

**New Fellows' Dinner 3 News of Fellows 3 Robert Langer lecture 4 Engineering Research Forum 6 2010 Events 7
Awards nominations 2010 7 Extreme flooding seminar 8 Solar energy briefing 9 Education for Engineering 10
Vicari reception 11 Obituaries 12 Call for assessors 12**

Government will support 'real' engineering

Lord Mandelson, the Business, Innovation and Skills Secretary, addressed an audience of eminent engineers at the Academy's annual Hinton Lecture in October 2009, to outline the Government's role in promoting the UK's economic recovery by fostering engineering skills.

He told an audience of over 300 people – including Academy past President Lord Broers, UK Atomic Energy Authority chairman Lady Judge, and Olympic Delivery Authority chairman John Armit – that the UK possesses world-leading engineering knowledge and skills that present huge potential to the future global economy. He said the country must invest in these skills to help them grow.

Although it is impossible to ignore the influence of the financial markets in the national economy, the UK requires, according to Lord Mandelson: "less financial engineering and more real engineering" if it is to overcome the economic downturn and prosper in the coming decades.

In his view, low-carbon technology is one area where the UK already has a lead but exploiting such opportunities is a challenge that must be faced by the next generation of engineers.

"The low-carbon transition alone makes the next generation of British engineers and scientists potentially among the most important in its history," he said. "We face the unique challenge of engineering at scale – we need to produce not some low-carbon vehicles and homes, but millions of low-carbon vehicles and homes and a new low-carbon infrastructure. Thousands of engineers will be required to make them a reality. It is our capacity to engineer and build on this massive scale that defines the modern challenge."

Lord Mandelson said that the Government is preparing for the challenge by putting "unprecedented" levels of investment into the UK's science base, which is expected to exceed £6 billion in 2010.

He revealed a raft of new Government initiatives to support innovation and skills, including the new Research Excellence Framework to recognise the economic and social impact of research.

The audience was also told to expect new national frameworks for adult skills and higher education. "They will include new tools for tracking advanced skills needs and demand in the economy and new measures for incentivising universities and colleges to work with business and industry in filling these skills gaps," Lord Mandelson said. "That will mean clear incentives to increase and improve the provision of science, technology, engineering and mathematics courses."

Academy President Lord Browne then chaired a question and answer session in which Lord Mandelson was asked about subjects including the future of the engineering profession, planning large infrastructure projects and the importance of design in engineering.

Introducing Lord Mandelson, the Academy President said: "The engineering profession has recently combined its efforts in a new way, giving support to a joint initiative called *Engineering the future*. Together we are stronger than when we act apart. One of our goals is to register a strong shared engineering vision with policy makers and politicians.

"The global slowdown has focused attention on the need to rebalance and diversify our economy. We need to refocus on our comparative advantages including creating world-leading, technology based products and services. It is engineers – as innovators, problem-solvers and entrepreneurs – who will help deliver this future," Lord Browne said.

(Right) Lord Mandelson delivers his speech, Future Foundations: Building Britain's economic strengths, at the 2009 Hinton Lecture



PRESIDENT'S COLUMN



Lord Browne and HRH The Duke of Edinburgh welcome Robert Harris, director of Arup Acoustics, to the Academy at the New Fellows' Dinner held at Drapers' Hall in November 2009

The United Nations Climate Change Conference will have taken place by the time you read this and its outcomes will have been made clear by the vast media presence.

What is undeniable both before and after the conference is the need for the nations of the world to prioritise and maintain momentum in confronting the challenge of climate change.

To meet the challenge requires plans, actions and consequences on a national scale. Any global agreement will only succeed if the Big Five (the European Union, United States, Japan, China, and India) can independently agree national plans to cut emissions. Without these in place, any global deal would be difficult to reach and liable to fail.

Even if agreement was reached among the world's developed nations, particularly on carbon trading, the way ahead will still be tough.

Interrelationships between nations must devote more time to medium and long-term research and development, including the infrastructure and capacity to deal with carbon emissions and national programmes to ensure these are carried out efficiently.

The way forward will also require good business sense. Until now, industry has been implicitly encouraged to produce carbon dioxide; the message has been 'Producing energy with carbon is cheap. If you produce energy with no carbon, it's more expensive.' It understandably makes economic sense to do the former.

An attractive structure of incentives must be put in place on a national scale to entice companies away from producing carbon. The most direct method would be to put a price on carbon but a mixture of different approaches could be applied to greater effect, such as taxes, regulations, and financial incentives.

Investors in such schemes will need confidence and assurance. At the very least, the world needs the 'architecture' of agreement on climate change to provide certainty and stability. Although it will be tough to even get this far in terms of global agreement, the money markets need to be reassured that investing in climate change is not only safe but an attractive financial proposition.

This isn't to say that significant steps are not already being made. Carbon reduction targets have been announced by the US and China; the EU has its 20-20-20 targets (a 20% cut in carbon emissions and an increase in proportion of renewable energy sources by 20% by 2020); Japan is expanding its nuclear energy capability; and Brazil has pledged to dramatically reduce deforestation.

But there is still more that can be done. Carbon trading has the potential to be incredibly important in reducing the world's climate emissions.

In Europe, over 12,000 industrial sites are covered by the EU's emissions trading scheme, which has been in place since 2005. Developed nations that have signed up to the Kyoto Protocol can offset their carbon emissions by funding the development of emissions-cutting projects

in poorer countries. These projects are awarded carbon credits for each tonne of carbon dioxide that is not released into the atmosphere, which can then be sold to companies covered by the EU scheme.

Other countries, such as Australia and Canada, are looking at adopting the idea but the real prize would be the US. Next year, the US Government will engage in the final debates on whether to formally adopt a federal cap-and-trade bill that would limit emissions from energy producers.

Should this go through, the global carbon trading market could rapidly rise from around \$125 billion to several hundred billion dollars.

The best outcome for the world will be international agreement on extending the carbon trading system under the Kyoto Protocol, allowing it to be scaled up significantly. If there is no agreement, then some form of global carbon trading will survive but in a very limited and fragile form.

Meetings and visitors

The President recently met:

HRH The Duke of Edinburgh
Senior Fellow

The Rt Hon Lord Drayson
Minister for Science and Innovation

Lady Judge
Chairman, UK Atomic Energy Authority

The Rt Hon Lord Mandelson
Secretary of State for Business, Innovation and Skills

Professor John Pethica FRS
Vice President and Physical Secretary, Royal Society

The Rt Hon Claire Curtis Thomas MP

Dame Jean Thomas CBE FRS
Vice President and Biological Secretary, Royal Society

Dr Charles M. Vest
President, National Academy of Engineering, President Emeritus of the Massachusetts Institute of Technology

Academy welcomes new Fellows



Lord Browne and Prince Philip, flanked by Professors Sarah Springman and Sir Michael Pepper

The Academy welcomed a new group of eminent engineers into the Fellowship at the annual New Fellows' Dinner held at Draper's Hall, London, in November 2009.

In the presence of the Senior Fellow, HRH The Duke of Edinburgh, and President, Lord Browne, the Academy welcomed 38 new Fellows, four new Honorary Fellows, and three new International Fellows.

Prior to the presentation ceremony, all new Fellows were greeted by Lord Browne and invited to sign the Academy roll book. They were then presented with their scrolls of Fellowship by the Senior Fellow. Following dinner, the new Fellows were welcomed by the Academy President and The Duke of Edinburgh. Robert Harris FREng gave a speech in response on behalf of the new Fellows.

Engineering at the party conferences

Engineering had a high profile at each of the three main political party conferences over the autumn, with fringe events organised by the engineering profession with the theme: *Picking winners: can engineering succeed where finance failed?*

The meetings provided a platform for engineers and senior politicians to debate how to create a strong engineering base to support the UK's economic future.

Speaking at the Labour party conference, Lord Drayson, Minister for Science and Innovation, highlighted the need for more technological knowledge within Government to inform policy decisions. Jonathan Flint of Oxford Instruments called for engineers to acquire the skills to take more leadership roles within companies. Hanna Sykulska, an engineer who worked with NASA, spoke of the inspiration and excitement of an engineering career.

At the Conservative party conference, Kenneth Clarke QC MP, Shadow Secretary

of State for Business, Innovation and Skills, spoke about the need to enact the right conditions to allow engineering and hi-tech manufacturing to thrive in the UK. David Waboso FREng of London Underground described how an engineer tackles the challenges of managing major infrastructure projects.

At the Lib Dem conference, Vince Cable MP, Liberal Democrat shadow Chancellor of the Exchequer, emphasised the importance of developing engineering skills to meet the challenges of the future. Dame Wendy Hall CBE FREng spoke about new horizons in ICT and the need for a more diverse engineering profession.

Following the meetings, an 'engineering manifesto' is being developed which will be sent to the parties' General Election manifesto writing teams. This is also being turned into a toolkit to support engineers who wish to talk to their local parliamentary candidates in the run-up to the election in 2010.

News of Fellows

Archibald Bethel CBE FREng has received an honorary doctorate from Strathclyde University.

Professor Dame Ann Dowling CBE FREng FRS has been appointed Head of the Department of Engineering at Cambridge University.

Professor Ludwik Finkelstein OBE FREng has received the Tallantire Exceptional Achievement Award from the Institute of Measurement and Control.

Sir Peter Gershon CBE FREng became Chairman of Tate & Lyle in July 2009. He was previously Chairman-elect of the group.

Professor Dame Wendy Hall CBE FREng FRS has received the 19th Duncan Davies Medal from the Research and Development Society.

Professor Chris Hodge FREng has been named Chairman of the Board of Trustees of the Institute of Marine Engineering, Science and Technology.

Professor Charles Kuen Kao CBE FREng FRS was awarded the 2009 Nobel Prize in Physics.

Dr Mike Lynch OBE FREng has been appointed a trustee to the National Endowment for Science, Technology and the Arts.

Richard Parry-Jones CBE FREng has been named co-Chair for the UK Government's new Automotive Council.

Professor Stephen Richardson FREng has been appointed Deputy Rector at Imperial College London.

Professor Brian Spalding FREng FRS has been awarded the Benjamin Franklin Medal in Mechanical Engineering.

Professor Mike Walker FREng was awarded an OBE in the 2009 Queen's Birthday Honours and will be the next President of the Institute of Mathematics from January 2010.

Professor Chris Wise FREng received the Structural Awards' Supreme Award on behalf of his company, Expedition, for the Stockton-on-Tees Infinity Bridge.

INTERNATIONAL

Biomaterials pioneer Langer gives rare UK lecture

One of the world's foremost authorities on tissue engineering, Professor Robert Langer, paid a rare visit to London in October 2009 at the invitation of the Academy to speak about his achievements in drug delivery and biomaterials.

The Massachusetts Institute of Technology (MIT) professor gave his lecture to a packed house at the Wellcome Trust theatre. It covered the arc of his career, from his early breakthroughs in enclosing drug molecules in biodegradable polymers in the 1970s to his current research on drug delivery through remote-controlled microchips and the creation of new medical devices from shape-memory biomaterials.

The lecture was chaired by Professor Robert Mair FREng FRS, Senior Vice President of the Academy, and Sir Mark Walport, Director of the Wellcome

Trust. Prior to the lecture, Professor Langer attended a roundtable lunch for Wellcome Trust and Academy Fellows and officials to discuss research cooperation at the interface between engineering and biomedicine.

Professor Langer is one of the most cited engineers in history. He was the youngest person to be elected to all three US national academies at the age of 46 and his laboratory at MIT is the largest bioengineering facility in the world. In 2008, Professor Langer was awarded the Finnish Technology Academy Foundation's Millennium Technology Prize – regarded by some as the engineering equivalent of the Nobel Prize – for his innovations in drug delivery.

A transcript of Professor Langer's lecture is available on the Academy's website www.raeng.org.uk/international/activities/past_events.htm



Robert Langer, Institute Professor at MIT

UK-India solar energy workshop

The Academy hosted an intensive workshop for a select group of key UK and Indian stakeholders to help them identify and overcome the practical challenges to deploying new solar energy capacity in India.

The workshop in September 2009 was chaired by Professor Nigel Brandon FREng and Dr S P Gon Chaudhuri, of the NB Institute for Rural Technology, with assistance from Professor Gehan Amaratunga FREng and Professor Ravi Silva FREng. Attendees included representatives from industry, academia, government and the world of venture capital from both India and the UK.

The outcomes of the conference will be used to produce a roadmap for the deployment of new solar energy capacity in India in the short to medium term. The Academy hopes to hold a further meeting in India in the first half of 2010 to develop a work programme for engineering cooperation on solar energy deployment, with the support of UK and Indian governments and industry.



Delegates gather together for the UK-India workshop

The workshop was organised with the support of the UK Department of Business, Innovation and Skills' Global Partnership Fund.

Copies of all presentations delivered at the workshop are available on the Academy's website www.raeng.org.uk/international/activities/past_events.htm

Newton Fellowships

The next round of submissions for the Newton International Fellowships has begun and will close on 8 February 2010.

The Newton International Fellowships bring researchers from around the world to work with top groups in the UK. Further information is available at

www.newtonfellowships.org

Tribute to Jon Burch



Rear Admiral Jonathan Burch CBE, former Chief Executive of the Royal Academy of Engineering, died on 4 November 2009.

His funeral was attended by Philip Greenish and Keith Davis, representing the Academy. Jon was CEO from 2000 to 2003, following a lengthy engineering career in the Royal Navy starting in 1966. He helped to organise the privatisation of the Royal Dockyards in 1985 and spent two years commanding Devonport, the largest naval base in Western Europe.

Jon Burch retired to the West Country with his wife, Ursula.

Academy and the Middle East

The Middle East could be a future point of focus for the Academy's activities following a scoping meeting held in October 2009.

The meeting was chaired by Professor Sir William Wakeham FEng, the Academy's Honorary International Secretary. A number of Fellows, including Professor Neil Alford FEng, Sir Patrick Haren FEng and Norman Haste OBE FEng, gave presentations on their respective experiences of the region, covering themes such as education, energy, security, infrastructure and water.

Stuart Laing, Master of Corpus Christi College, Cambridge, and former Ambassador to Kuwait, provided an excellent overview of the region, drawing on his vast diplomatic experience.

The meeting concluded with a discussion period where attendees had the opportunity to contribute views and suggestions. A number of valuable points were raised during the meeting, which will help the Academy to progress its plans for Middle East activity. The Academy extended its thanks to everyone who attended, as well as those who contributed but were unable to attend.

The general summary of the meeting and the presentations are available from the Academy website www.raeng.org.uk/international/activities/past_events.htm



Stuart Laing (left) and Professor Sir William Wakeham at the Academy's Middle East meeting

Second annual Euro-CASE conference

The Academy offered valuable insights into the promotion of engineering at the second annual conference of Euro-CASE, the umbrella group for European engineering academies, which was hosted by the Royal Swedish Academy of Engineering Sciences in Stockholm in November 2009.

The conference examined the challenges of attracting young people across Europe to careers in science, technology engineering and maths. It attracted an audience of senior European education, policy and business figures, including representatives from the EU Commission, the OECD, and the European Roundtable of Industrialists.

Professor Matthew Harrison, Director of Education Programmes at the Academy, delivered a well-received presentation

on engineering education in the UK and the Academy's successes in promoting engineering as a career to female students and underrepresented groups. Professor Sir William Wakeham FEng, the Academy's Honorary International Secretary, also participated in the meeting and in the Euro-CASE board meeting which followed.

This conference follows the Academy's successful event in November 2008 on Europe's 2020 energy targets, which saw the first visit by a European Commissioner to the Academy's London offices. The 2010 conference will be held in Germany on the theme of delivering economic growth through innovation.

Video footage of the conference and copies of all the presentations delivered are available on the Euro-CASE website www.euro-case.org

PUBLIC ENGAGEMENT

Privacy drama



Breathing Country to tour in January 2010

A new UK tour of a public engagement play will help inform the Government on public reaction to the new NHS electronic patient record.

Breathing Country is produced by the Y Touring theatre company, in partnership with the Academy, to raise awareness of the importance of IT and engineering for health. Each performance is followed by a debate to give young people the opportunity to voice their thoughts and concerns on privacy issues.

The play has recently completed a five-week tour of London schools and science centres, which finished with a special performance in October 2009 at the Wellcome Trust. The Trust provided £250,000 funding for the project, with added support from the Research Councils.

Written by award-winning playwright Ben Musgrave, the play is set in the near future and tells the story of two teenagers, Simon and Lizzie, who are growing up in a world where technology makes privacy impossible. Meanwhile, Lizzie's father Richard, Head of Communications at the Department of Health, aggressively promotes the new NHS electronic patient records which will revolutionise healthcare. Simultaneously, Janet, a doctor and researcher, is eagerly looking forward to the day when patients' records are easily accessible and research is made easier and faster by access to a huge range of records.

The play begins its eight-week UK tour in January 2010 and will include a special performance at the Academy as part of a two-day conference on privacy, security and technology specifically for young people.

For more information
www.ytouring.org.uk

RESEARCH

Improving aerospace systems

Professor Philip Webb is the new Research Chair in Aerostructures Design for Assembly and Systems Installation at Cranfield University.

The manufacture, installation and testing of aircraft systems is a complex and largely manual task requiring a considerable, dedicated and skilled resource. The Research Chair, sponsored by both Airbus and the Academy, will take a leading role in the development of innovative systems installation practices, with an aim to eliminate limitations on capability.

Professor Webb will leave his Associate Professorship at Nottingham University to join the Department of Systems Engineering and Human Factors and will contribute to the world class reputation of Cranfield Aerospace research by developing a new centre of excellence, tackling key systems challenges that are currently facing European and UK industry.

New research chair

The Academy and the European Construction Institute (ECI) have announced the appointment of Professor Naomi Brookes to a new Research Chair in the Management of Complex Projects at Loughborough University.

There is a growing number of major and iconic engineering construction projects in the UK, particularly in the run up to the London 2012 Olympics, that involve intricate networks of partners that can often be geographically distant from each other.

In her new post, Professor Brookes will address the specific management issues that impact on the delivery of large construction projects.

The research programme will focus on improving sustainability and delivery by examining supply chain management, resources, environmental risk and future regulation and the impact of skills shortages.

Promoting engineering excellence



Academy-sponsored research projects were showcased at the Engineering Research Forum

The Academy's annual Engineering Research Forum was held in September to showcase leading edge research being conducted in UK centres of excellence. The Forum also provides an opportunity for researchers, industry sponsors and other funding bodies to meet and discuss the wide range of engineering research being carried out and helps to strengthen links between academia and industry.

The Academy sponsors research engineers from all over the UK, working in both academia and industry, in areas as diverse as new low-carbon technologies, biosensors, quantum theory for information retrieval, surgical simulators and aircraft design.

The presentations represented the diversity of both the sponsored research and schemes. A presentation from Professor Anne Neville, the Academy's first 10-year Research Chair at the University of Leeds, was about exploiting nature to solve industrial problems. Professor Dennis Loveday, E.On/RAEng Research Chair, from Loughborough University spoke on his research into retrofitting Britain's buildings for a low carbon future.

The Academy's prestigious RAEng/EPSRC Research Fellowship scheme was represented by three speakers. Dr Matthew Eaton from Imperial College London spoke on nuclear systems, Dr Amanda Clare from Aberystwyth University presented her research on the automation of science laboratories and Dr Patrick McSharry from University of Oxford on modelling complex dynamical systems.

The Global Research Award scheme aides the development of international research networks by sponsoring engineers to conduct research in centres of excellence overseas. Professor Mark Price from Queen's University Belfast spoke of his experience at Georgia Tech in the US, where he conducted further research on aircraft design, and Mr Howell Istance from De Montfort University presented his research on gaze-controlled gaming for people with motor disabilities conducted at the University of Tampere, Finland.

Professor Ric Parker FREng, Director of Research and Technology at Rolls-Royce, gave an engaging presentation on the importance of managing collaborative research and the efforts being made by Rolls-Royce to maximise their opportunities.

The Research Programmes team, Robert Barrett, Misty Palmer and Angus Baker, would like to thank all those involved for making this year's event a great success.

The evening's 15 presentations are available to view on the Academy's website www.raeng.org.uk/research/researcher/research_forum/posters_2009.htm

AWARDS/EVENTS

Fellows' visit: Warton Aerodrome

Fellows were invited to visit BAE Systems' Warton Aerodrome complex near Preston in September 2009, to see work on the new Typhoon combat aircraft and unmanned air vehicles.

Warton Aerodrome is one of BAE Systems' main assembly and testing facilities. Its runways have been used to build and test several notable military aircraft, including the RAF's Tornado and the latest Typhoon.

Currently, Warton is the final assembly site for the Eurofighter Typhoon and is also home to the first two Royal Air Force Typhoon squadrons. It was also the designated testing site for all development models of the RAF's newest aircraft.

Fellows were given an overview of BAE Systems Military Air Solutions, including a briefing on the engineering lifecycle for developing combat aircraft. They were then given a guided tour of the Warton site, taking in BAE's development of unmanned air vehicles and finally a close look at the Eurofighter Typhoon itself.

Winter 2009/2010

11 January 2010

New Year Reception

Speaker: Professor Sir Michael Brady
FREng FRS

Venue: 3 Carlton House Terrace, London
SW1Y 5DG

Contact: helen.berrington@raeng.org.uk

21 January 2010

Fellows' Visit: BRE

Venue: BRE, Bucknalls Lane, Watford,
Hertfordshire, WD25 9XX

Contact: faye.whitnall@raeng.org.uk

22 February 2010

Lecture Series in Mobile Telecommunications and Networks

Speaker: Professor Lionel Tarassenko
FREng

Chair: Professor Mike Walker FREng,
Vodafone Group R & D

Contact: helen.berrington@raeng.org.uk

10 March 2010

Academy Regional Lecture and Fellows' Spring Dinner

Speaker: Professor Keith Ridgway OBE
FREng

Venue: Manchester University

Contact: jvbsshelf@googlemail.com

16 March 2010

Joint RAE/RSE Lecture and Dinner

*The simplicity and complexity of wind: an
engineer's take*

Speaker: Ian Irvine, Technical Director,
Sgurr Energy

Venue: Royal Society of Edinburgh

Contact: events@royalsoced.org.uk

Events and dates listed are accurate at the time of printing. Other events may be announced at short notice. Please see the Academy website for the recent information: www.raeng.org.uk/events

Awards Nominations

The following awards are now open for nominations for 2010. General information on all the Academy's prizes and awards can be found at

www.raeng.org.uk/prizes

Special Achievement Award

Deadline: 26 February 2010

This Award recognises the contribution of an individual working as part of a team involved in a major engineering project that has substantial impact on society.

www.raeng.org.uk/prizes/special

Sustained Achievement Award

Deadline: 26 February 2010

This is awarded to an engineer normally resident in the UK whose achievements have had a profound impact upon their engineering discipline. This award applies particularly to those engineers who have not been recognized earlier in their careers for reasons such as latency in the impact of their work or late disclosure owing to national or commercial secrecy.

www.raeng.org.uk/prizes/sustained

The Sir George Macfarlane Award

Deadline: 26 February 2010

The Award is in memory of Sir George Macfarlane (1916 - 2007), one of the founding Fellows of the Academy, and recognises the potential of younger UK engineers who have demonstrated excellence in the early stage of their career (fewer than eight years since graduation from a first degree in engineering). This excellence is marked by a quality of leadership and/or technical and scientific attainment that is clearly seen to be outstanding by their employers and organisation.

www.raeng.org.uk/prizes/macfarlane

Public Promotion of Engineering Medal

Deadline: 26 February 2010

The Public Promotion of Engineering Medal is awarded to an individual, small team or organisation who have contributed to the Academy's aims and work through their initiative in promoting engineering to the public.

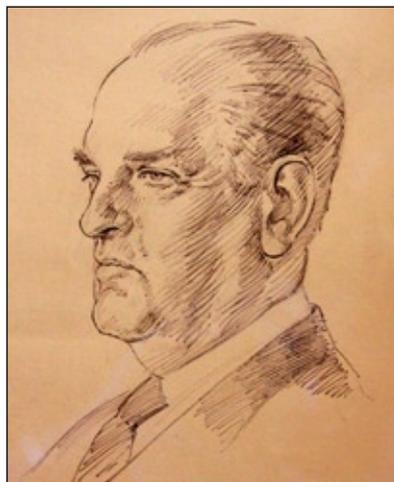
www.raeng.org.uk/prizes/public

For more information, including how to submit a nomination, please email awards@raeng.org.uk

Hungarian Academy welcomes visiting Fellows

A group of senior engineers, including 16 Fellows of the Academy, visited the Hungarian Academy of Engineering (HAE) in September 2009, as part of the Worshipful Company of Engineers' annual overseas meeting.

Members of the livery company were welcomed by Dr Janos Ginsztler, president of the HAE. In his welcome address, Dr Ginsztler spoke on the role of the Academy and its then President, the late Sir Denis Rooke, in encouraging the formation of the HAE. The daughter of Sir Denis, Diana Blair-Fish, presented the HAE with a sketch of her father (right).



POLICY AND PUBLIC AFFAIRS

Extreme flooding: Malaysian insights

The nature of flood risk in the UK is rapidly changing. Catastrophic flooding events are now often characterised by flash floods caused by summer storms than by relentlessly rising rivers during wet winters.

Extreme downpours, such as those recently in Cumbria, are likely to become more common as predictions of more extreme weather events accompany prediction of climate change.

In light of this, the Academy, in conjunction with ICE and CIWEM, organised a briefing in October 2009 to explore how the UK can best engineer towns and their associated drainage systems to be more robust in the face of severe rain events. Coping with the rapid fall and dispersal of a summer downpour is more complicated than making sure the current drainage system is working properly or upgrading it.

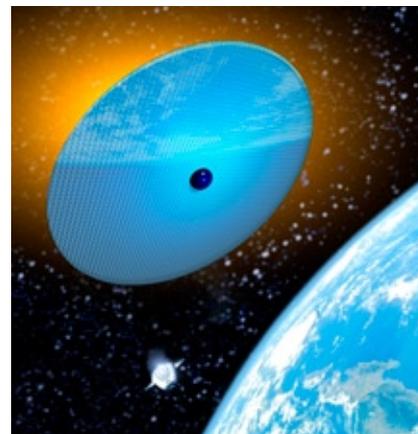
New thinking in terms of design and short-term storage of run-off is required along with specific measures that can be used as the normal drainage system becomes overwhelmed. This is because

relying on foulwater drains (which handle the run-off from households) can result in foulwater overwhelming the system, as has been seen in London on a number of occasions, resulting in severe pollution of the River Thames.

To offer an international insight into the issue, the Academy welcomed Dato' Ir Hj Husaini Sulaiman, Director General for the Department of Irrigation and Drainage in Malaysia. Dealing with tropical downpours has been a routine matter for generations of Malaysians. The drainage systems of Kuala Lumpur, originally been designed during British rule, has been drastically expanded and improved since then. Could the UK now usefully learn from Malaysia how best to deal with sudden downpours? A number of presentations examined a range of engineering solutions as well as new approaches to designing infrastructure.

The briefing received significant press interest and Academy experts were in great demand to comment on the Cumbria floods.

Geoengineering



A space mirror could block the sun's rays

In July 2009, the Academy co-hosted a seminar on geoengineering along with the Institute of Physics and the Royal Society of Chemistry. A report summarising the proceedings was published in October.

The seminar, *Geoengineering: Challenges and global impacts*, was chaired by Dr Brian Iddon MP. Dr Iddon is a member of the Commons Committee that included geoengineering as a case study in its inquiry into engineering.

Geoengineering is an emerging field of research that aims to manipulate the earth's climate at a sufficient scale to counteract the effects of climate change. One of two general principles is employed: either reducing the amount of solar energy absorbed by the earth or sequestering atmospheric carbon.

Three particular geoengineering schemes were addressed during the seminar: Dr Alan Gadian from the School of Earth and Earth Environment at the University of Leeds proposed a cloud whitening strategy to reflect more solar radiation back into space and thus cool the planet. Dr Dan Lunt of the University of Bristol's School of Geographical Sciences described a space-based scheme using mirrors to reflect sunlight away from the earth. Professor Andrew Watson of the University of East Anglia's Environmental Sciences summarised methods of fixing atmospheric carbon by stimulating the growth of marine algae. Finally, Professor Steve Rayner from the University of Oxford discussed public acceptability and policy issues relating to geoengineering schemes.

The report can be downloaded from www.raeng.org.uk/events/pastevents

Hazards Forum examines risk aversion

The Academy co-hosted two recent seminars for the Hazards Forum, each looking into risk and natural hazards to the benefit of public safety. The first event, held in September 2009, was on the risks associated with alternative fuels – part of a series of seminars focusing on energy. Chaired by Professor Haroun Mahgerefteh, Professor of Chemical Engineering, University College London, the speakers addressed issues connected with hydrogen, biodiesel and offshore wind farms.

The second event, held in November 2009, was on *The Limits to Risk Aversion: new results from safety analysis*. Chaired by Professor Bill Bardo FREng, President of the Institute of Measurement and Control, this seminar focused on particular assessments and how they relate to human and environmental decisions.

The Hazards Forum is a community of interested organisations that aims to identify key lessons from catastrophes and towards risk reduction and control strategies. For further details visit www.hazardsforum.org.uk/content

An inconvenient truth ...or a load of hot air?

The Academy arranged a public meeting in November 2009 to discuss engineering solutions to climate change. The event was held at the Science Museum's Dana Centre and chaired by *The Guardian's* clean technology correspondent, Alok Jha.

Based on the assertion that scientists are broadly in agreement that global

warming is directly linked to human activities, the event introduced several expert figures to speak on engineering solutions to climate change. Dr Sue Ion OBE FREng, former Group Director of Technology at BNFL, spoke on energy generation; and Professor Roger Kemp FREng, from the Engineering Department at Lancaster University, presented his views on low-carbon transport.

Tap the sun's rays, says solar expert



Professor Hans Müller-Steinhagen FREng

In September 2009, the Academy hosted a briefing by Professor Hans Müller-Steinhagen FREng on using solar thermal power plants to exploit this kind of energy.

In terms of renewable energy, solar energy offers the greatest potential. The sun radiates many times more energy onto the earth's surface than mankind uses to power its economies.

The problem with successfully harnessing solar energy lies in converting it into usable forms of heat or electricity. Up to now, the most common approach has been relatively small photovoltaic or passive thermal units.

An alternative approach is now being pursued using much larger solar thermal power plants. These use concentrated solar radiation to produce superheated steam or hot air which is then fed into conventional steam and/or gas turbine cycles to generate electricity. In this briefing, Professor Müller-Steinhagen, Director of the Institute of Technical Thermodynamics at the German Aerospace Centre, described current activities in developing this technology, as well as the DESERTEC initiative to establish a European supergrid that would allow such solar plants in North Africa and the Middle East to supply electricity to Europe.

Professor Müller-Steinhagen's address was followed by a panel discussion, chaired by Professor Roland Clift CBE FREng, that covered the commercial, political and economic issues raised by this technology. Panel members were Professor Nick Jenkins of Cardiff University and Director of the Centre for Integrated Renewable Energy Generation and Supply (CIREGS) along with Professor Walt Patterson, a fellow of the Energy, Environment and Development Programme at Chatham House and a visiting fellow of the Science Policy Research Unit, University of Sussex.

Details of the event, including a video of the presentation, can be found at www.raeng.org.uk/societygov/policy/current_issues/energy

Research Excellence Framework

The Higher Education Funding Council for England (HEFCE) has entered the final consultation phase in the development of the new Research Excellence Framework (REF).

REF will replace the Research Assessment Exercise, which supports research through an assessment system to allocate block grants to universities in the UK. The system also covers Wales and Scotland, although national bodies have responsibility for funding there.

The Academy has responded to both of the previous REF consultations and held meetings of the engineering community with HEFCE in support of these. The final meeting in November 2009 examined

questions on the ways that the impact of research can be reliably assessed and the implications of treating engineering as a single unit of assessment.

The value of these consultative meetings at the Academy is they allow academic Fellows to discuss implications and make constructive suggestions for the good of engineering research in the UK.

The Academy has a long history of giving support to past iterations of the REF. During this time much attention was given to efforts to ensure that excellence in engineering research, as compared with research in basic science and other fields, was properly reflected. This interest continues with the new framework.

ICT for the UK's Future

In October 2009, the Academy launched a report exploring the importance of a national IT base for the UK economy, particularly in the wake of the global recession. The report, *ICT for the UK's Future*, examined the present and future state of UK information and communications technology (ICT) in a global context and identified potential opportunities for improvement.

The report made a number of recommendations relating to various aspects of ICT. Broadband coverage was seen as essential to the development of a modern knowledge-based economy and it was recommended that the UK must have full coverage by 2012. Education, skills and qualifications were also highlighted as crucial both in terms of schools and the expertise available to policy makers. ICT competence was found to be lacking in senior positions within UK society and that this created a major barrier to developments such as cloud computing.

The report concluded that the UK's ability to exploit the potential of ICT would be key to successful recovery from the recession. There are signs that the UK has the potential to be a world leader in certain areas but that this will only be realised through coherent and competent leadership. The full report can be read at www.raeng.org.uk/news/publications/list/reports

Women at work

As part of efforts to improve the role of women at work in the Arab world, British Council Lebanon held a two-day networking event in Beirut, *Preparing Women for the Digital Future: Crossing Cultural Barriers*.

The event, attended by Dr Imren Markes in September 2009, is part of the British Council's Women at Work programme and featured discussions and debates with professional women from the UK, Lebanon and elsewhere.



EDUCATION

Young women engineers given Headstart

Young women starting university in October 2009 were given skills training to help them through their degrees in a new course devised by the Academy and education programme Headstart.

Aimed at young women who have been through previous Headstart courses, the new course was led by experienced women mentors who covered such topics as developing effective negotiating skills, devising personal development plans and learning presentation skills.

Participants were also joined by Headstart alumni, currently working with Procter & Gamble Baby Care Engineering, the UK Atomic Energy Authority and the Science and Technology Facilities Council, when they visited Wembley Stadium, the London Eye, and the O₂ Arena in London.

On the last day of the course, participants were addressed by Professor Dame Wendy Hall CBE FEng FRS.

Headstart is a well-established education programme run by the Engineering Development Trust whose aim is to encourage students interested in mathematics or science to consider technology-based careers. It provides opportunities for school pupils in Year 12/55 to spend up to a week at university prior to making their UCAS applications.



Women students take part in a skills top-up course coordinated by the Academy and Headstart

London Engineering Project

From September 2009, London South Bank University (LSBU) became the lead organisation delivering outreach activities for the London Engineering Project (LEP), with continued support from the Academy and increased involvement from LSBU's resident engineers and Widening Participation Unit.

Schools already involved in the project are continuing to work with the LEP and LSBU is continuing to recruit student and professional engineering ambassadors to work with LEP schools. LSBU will play a key role in showcasing the work of the LEP over the next few years. Lessons

learned will be widely disseminated among other higher education establishments through printed publications and seminars, while Cascades, a programme set up to support primary schools in adopting a new curriculum in September 2011, is embracing the best-practice lessons of the LEP's work in primary schools.

BAE Systems supports the Engineering Engagement Project, an Academy-run programme to provide teachers with continued professional development. It also offers resources and role models to secondary schools. It is currently working with its first tranche of selected schools.

Education for Engineering

Education for Engineering (E4E), the Academy hosted body that offers engineering education advice to Government and the devolved National Assemblies, is continuing to push for greater transparency within the further education sector in order to create a clearer overall picture of post-16 engineering education. An additional current focus is to impress upon the shadow cabinet the potential value of the new 14-19 Diploma in Engineering.

A total of 2,500 students took the Diploma in its first year with a further 4,000 choosing to take it in the current academic year. Of these 6,500 students, most are taking the Level 2 Diploma, which is equivalent to 7 GCSEs at grades A*-C. With most UK universities now accepting the Level 3 Diploma (with Additional Specialist Learning in maths and physics) as an entry qualification for a degree in engineering, it is already a popular choice for students opting to continue studying after GCSEs and is proving to be a worthwhile addition to the previously available pool of education options.



16+ teaching scheme

The Academy is working with the Technology Enhancement Programme and the National STEM Centre in York to develop high quality continuing professional development for teachers delivering the Level 3 Diploma in Engineering. The Level 3 Diploma is currently being taught in at least 15 schools and colleges in England. The two-year programme, which is known as the 16+ Teaching and Learning Programme and funded by the Gatsby Charitable Foundation, will forge strong relationships between the Academy and the schools and colleges involved. The development of new teachers' courses and resources will enhance the teaching and learning of the first cohort of Level 3 students and provide an environment for continued recruitment.

DEVELOPMENT

London engineer wins Ayrton Fellowship



Colleen Scales (left), a graduate civil engineer from Stratford in East London, has become the first recipient of the Panasonic Trust's new award, the Hertha Marks Ayrton Fellowship. WS Atkins engineer

Colleen, who until recently has been working on secondment at London Underground, was awarded the fellowship to study a full-time Masters course in Engineering Geology with Ground Models at Imperial College London from 2009.

The Hertha Marks Ayrton Fellowship has been established by the Panasonic Trust to promote and support under-represented groups in engineering and is awarded as part of its highly successful Fellowship scheme.

Robotics director wins £10,000 prize

Professor George Carter, an industrial tutor at Durham University's School of Engineering for the last 30 years, has won recognition for his work in inspiring students with the £10,000 Visiting Professor Education Innovation Prize from The Royal Academy of Engineering, which is supported by the National Nuclear Laboratory (NNL).

The prize was presented in September 2009 at the Academy's annual conference for Visiting Professors at Aston University in Birmingham.

Since 1979, Professor Carter has devoted one day a week to teaching at the University, supervising students at various levels, including advising MEng students on their final year projects. He offers the students inspiration and expertise from his full-time role as Technical Director of Labman, a North Yorkshire based company designing bespoke robots and automation systems.

Professor Carter makes available student placements at Labman and arranged a £2,000 entrepreneurial prize for final year students. He also supports Durham University's solar car project, in which students design and build a solar car and compete internationally.

Reception raises funds for Academy forum

Academy President Lord Browne, National Grid Chairman, Sir John Parker FEng, and Chairman of the UK Atomic Energy Authority, Lady Judge, co-hosted a private reception in honour of the Academy in November 2009.

At the reception, artist Andrew Vicari presented three portraits of Leonardo Da Vinci, Isambard Kingdom Brunel and Sir Frank Whittle, a founder Fellow of the Academy. These portraits have been specially commissioned as a generous donation to the Academy.

Limited edition lithographs of the portraits, signed by the artist, are currently available for sale. The proceeds will help raise funds for transforming 3 Carlton House Terrace into a forum for engineering as part of the *making things better* campaign.

If you are interested in purchasing one of the prints, please contact nadia.azzouzi@raeng.org.uk



From left to right: Andrew Vicari, Lady Judge, Lord Browne, and Sir John Parker

making
things
better

The campaign
Public launch 4 March 2010

Funding in place for Africa project

The Africa-UK Engineering for Development Partnership now has significant funding in place thanks to the generous support of institutions including the Anglo American Group Foundation, the David and Elaine Potter Foundation, and Schlumberger.

The partnership, which the Academy has developed in association with the Institution of Civil Engineers and the Africa Engineers Forum, aims to build the capacity and influence of African engineering institutions. In particular, the partnership seeks to create stronger links between African engineers and the international engineering community.

A series of workshops will allow African engineers to share experiences and

information and develop skills – in particular how to best communicate with policymakers and the business community. The workshops will be themed around issues the engineers prioritise and could include healthcare, renewable energy, communications and engineering for economic development.

Other organisations involved in the Africa-UK Engineering for Development Partnership include: the World Federation of Engineering Organisations, Engineers Against Poverty and the Association for Black Engineers.

The Academy is very grateful to Lord Browne FEng FRS and David Potter CBE FEng for their help in securing the funding.

Obituaries

Mr Keith Beattie OBE FREng died aged 63 on 27 October 2009. At the time of his death he was Director for Crossrail, London Underground.

Mr Peter Cameron MBE FREng died aged 83 on 10 October 2009. Prior to his retirement he was Project General Manager and Chief Engineer, Heysham 2 and Torness, NNC Ltd.

Mr David Stewart Currie FREng died aged 83 on 9 November 2009. Prior to his retirement he was Director of Civil Engineering, British Rail.

Professor Anthony Evans FREng FRS died aged 66 on 9 September 2009. At the time of his death he was a professor at the University of California.

Mr Peter Fraenkel FREng died aged 94 on 18 November 2009. Prior to his retirement he was Senior Partner, Peter Fraenkel & Partners and Chairman, Peter Fraenkel Maritime Ltd.

Mr Selchouk Ghalib CBE FREng died aged 95 on 15 October 2009. Prior to his retirement he was Managing Director, The Nuclear Power Group Ltd and Director, Rolls-Royce Ltd.

Professor Kenneth Ives CBE FREng died aged 82 on 8 September 2009. At the time of his death he was Emeritus Professor of Civil Engineering, University College London.

Mr Paul Marsden FREng died aged 75 on 10 October 2009. Prior to his retirement he was Managing Director, ICI Fertilizers.

Contact

If you would like to find out more about any of the articles in this newsletter, please contact:

Newsletter Editor (Chris Atkinson)

Telephone: +44 (0) 20 7766 0645

Email: chris.atkinson@raeng.org.uk

Staff News

Katherine MacGregor has joined the Academy as Policy Advisor. Previously she was at the New Zealand Trade and Enterprise.

Alice Curnow has left the Academy as Team Administrator to return to Australia.

Melanie Washington, Project Manager, Education, gave birth to a baby girl, Eva Rose Kleanthous, on 1 November 2009.

Natasha McCarthy, Policy Advisor, gave birth to a baby boy, Ivo Felix McCarthy, on 17 September 2009.

Dave Rowley has left the Academy as Head of Campaigns to join the Bloodhound SSC project as Education Programme Director.

Carolyn Lawler has joined the Academy on a nine-month secondment from BT Openreach.

Hal Igarashi has joined the Academy as the employer-coordinator on the HEFCE/HEFCEW-funded National STEM Programme. He was previously SQR Policy Manager at the Energy & Utility Sector Skills Council.

Stylli Charalampous has joined the Academy as a manager of the Gatsby funded 16+ Teaching and Learning Programme. He was previously Head of the School for Engineering at Waltham Forest College.

Fellows' area on Academy website

An information library is being added to the Fellows' private area on the Academy website. The Council Minutes and the Council Officers' Minutes will be placed in the private area from 2010 onwards. It also holds Academy documents such as the *Charter and Statutes*, Annual Reviews and Financial Accounts. Responses and reports, newsletters and lists of upcoming events will also be added to the area.

Call for assessors

The Proactive Membership Committee (PMC) is seeking Fellows' assistance. One of the issues of concern in the current membership process is the reluctance of many Fellows to provide an assessment of candidates who they do not know personally or with whose work they are not immediately familiar. The PMC is gathering a group of Fellows to provide evidence for such candidates.

During 2009, the PMC ran two masterclass sessions. These showed, through *in vivo* case study, how to prepare cases, particularly but not exclusively for candidates who are relatively unknown to many Fellows. In 2010, the PMC is holding another Nominators and Assessors Masterclass. It will suit Fellows who are interested in joining the independent assessor pool.

The session will be held at 4pm on Monday 25 January 2010. It will last 90 minutes and be followed by a drinks reception. Those interested may notify Fellowship Manager, Dr Chris Coulter (chris.coulter@raeng.org.uk), or PMC Chairman, Dr Ian Nussey (ian_nussey@uk.ibm.com)

Publications received

Marconi My Beloved, by Maria Christina Marconi; donated by Elettra Marconi.

A password reminder has been sent so Fellows can retrieve their login details quickly in order to access the private area. In a first for the Academy, Fellows will be given the opportunity to contribute to a consultation on the National Policy Statements for Energy Infrastructure. This consultation is open until 22 February 2010 and represents an important development in the UK's planning regime.

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