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Engineering the future – a vision for UK engineering

Over recent months, the Academy has been working closely with its partners in the *Engineering the future* alliance to produce a shared vision for engineering. This has been circulated to the major political parties' election manifesto writing teams. The vision document identifies the following five key priorities for a thriving UK economy, based on engineering innovation that builds on our national strengths and addresses the grand challenges of the 21st century.

- 1. Sustaining and encouraging investment in the skills for the future.** World-class engineering and technology skills are critically important if the UK is to compete internationally and create the high-value, technology-based industries of the future. Engineering at all levels is underpinned by the science, technology, engineering and maths (STEM) taught at school. We call for a greater focus on STEM subjects with young people taught by STEM specialists and given access to focused careers advice. The wide range of pathways into the engineering profession, from 14-19 Diplomas to degree courses, must be supported and industry needs encouragement to provide apprenticeships and graduate training. The right level of investment in university engineering departments must be ensured to maintain the UK's status as a world leader in engineering and science higher education.
- 2. Making the UK a leader in low carbon technology.** In this section, we make the case for harnessing the UK's capacity in engineering and scientific innovation to meet the challenges of climate change. We must seize the opportunities offered by low-carbon energy technologies and green innovation to become a world leader in these new industries. To incentivise investment, a stable, unambiguous and well-communicated policy and regulatory framework is needed, together with prioritisation of research funding for low-carbon energy technologies. There is also an urgent need to further reduce barriers to market entry and the costs of doing business.
- 3. Capitalising on the value of the UK science and engineering research base.** The UK has a vibrant world-class engineering and science research base, with a wealth of new ideas and technologies. Greater interaction between business and universities is needed to realise the full potential of this research base and unlock innovation for the benefit of society. Government should encourage more collaboration and people exchange between businesses and universities to increase knowledge transfer into commercial applications. It is also vital that the government investment fund for innovative new companies is maintained and the current R&D tax credit scheme expanded to position the UK ahead of our European competitors.
- 4. Harnessing the power of public spending to encourage innovation.** UK government public procurement is currently worth around £220 billion a year. With the right processes in place, public procurement could be used more effectively to foster innovation, improve public services and provide better value for money, taking advantage of emerging technologies to reduce costs. There must be a better balance struck between the short term drive for low cost and risk and the long term national benefits of seeking novel solutions.
- 5. Making greater use of engineering advice in government policy making.** In the final section of the document, we highlight how the delivery of most areas of public policy has an engineering dimension that needs to be considered at the start of – not the end of – the policy making process. We call on government to develop the policy making contribution of engineers within the civil service and also systematically draw upon the expertise of the professional engineering community. We argue strongly that where appropriate, Chief Engineering Advisers must be recruited to government departments in addition to, or instead of, Chief Scientific Advisers.

The Academy will continue to actively engage with the major political parties in the lead up to the 2010 election to ensure that the engineering message is clear. In the autumn, the Academy and its partners will also be attending the main party conferences, building on a series of successful fringe meetings in 2009.

Fellows can download the full vision document at www.raeng.org.uk/societygov/public_affairs/thefuture.htm

We are also working on a flyer that summarises the vision's key points, which will soon be available via the above webpage. Lastly, we are pleased to offer a service whereby Fellows can obtain details of their constituency prospective parliamentary candidates should they wish to contact them and take the discussion forward. To utilise this service or for more information on the vision for engineering and the *Engineering the future* alliance, please contact:

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PRESIDENT'S COLUMN



From left to right: Sir John Parker FREng, Alan Curtis, Dr Eleanor Stride, Brian Wood, Paul Cooper, Dr Patrick Naylor, Lord Browne of Madingley

The following is based on a speech given by the President to Fellows attending the launch of the Academy's making things better campaign on 4 March 2010 at 3 Carlton House Terrace.

The event included presentations from five of the Academy's current beneficiaries on how the Academy has 'made things better' for them and for society. The President also took the opportunity to thank the campaign's chairman, Sir John Parker FREng, and the campaign board for their excellent work.

Firstly I would like to take the opportunity to thank most warmly all those who have given their generous support to help us acquire this building [3 Carlton House Terrace] and for all donations to the *making things better* campaign, which we are officially launching today.

The Academy is founded on its Fellowship. You are all people of great distinction, at the top of your profession and who cover the entire spectrum of engineering. I believe that, with the current wealth of expertise among its Fellows, the Academy is stronger than ever.

Our position as a leader of the engineering profession has been reinforced by important statements from Government and Parliament. I am pleased to say that the Academy is now working together with the engineering institutions and leading organisations in the profession in ways that are breaking new ground.

It's worth repeating that our achievements depend entirely on the active participation of the Fellows – both in terms of thought leadership and practical assistance.

The title of our campaign – *making things better* – is something of which every engineer can take ownership.

As engineers, we sit at the interface between science and society. Whether it's low-carbon energy sources, robotic tools to aid medical surgery or faster and more sophisticated communications technology, the products and services developed by engineers are designed with specific, real-world problems in mind.

With the right policies, the right attitudes and, importantly, the right partnerships and commitment to action, Britain can become a beacon of high-end industry and manufacturing, contributing its engineering expertise to the global community.

Yet engineers often appear bashful about publicising their achievements. Humility is a virtue but there is still a lack of understanding among the general public about what it is that engineers actually do. There is also a general lack of enthusiasm about engineering among young people who may view engineering roles as dull and uninspiring rather than creative and rewarding. As a leadership institution it is our job to reverse these trends.

We have a great story to tell and I know many of you are engaged in telling it. But we must now do more to make ourselves heard in society. I want the *making things better* campaign to be part of writing a new narrative for engineering – a narrative which looks forward to growth and success, not backwards to doom and decline.

The funds being raised by the making things better campaign will help to address these issues. I think the launch of this campaign could not be more timely.

Our aim is to raise £16.5 million; and I'm very pleased that we already have firm pledges for more than £5.5 million as well

as a most encouraging pipeline. Recent donations include a £1 million gift from the Ruler of Sharjah, for which we are most grateful to Lord Broers FREng, who has brought this about.

The funds will transform the Academy's building into a national Forum for Engineering and help put engineering at the heart of Britain's future. The funds will also work to attract more young people into all levels of the engineering profession through targeted expansion of our education and engagement activities. By working closely with partners, we are making our funds and our know-how go further and we are *making things better* for our society and for many young people directly.

The quest for new funds continues apace, with the goal of initiating work on the Forum in 2011. Major gift commitments have often been achieved through connections made by the Fellowship and your help in this regard is much appreciated. During the year, we plan to hold a series of regional meetings to keep you informed of our progress; we will also be writing to the Fellowship to invite your support in completing our campaign.

Meetings and visitors

The President has recently met:

**HRH Prince Philip,
The Duke of Edinburgh KG KT**
Senior Fellow

Helen Alexander CBE
President, Confederation of British Industry

Lord Rees of Ludlow OM KT PRS
President, the Royal Society

Andrew Mitchell MP

Professor Sir Adam Roberts KCMG FBA
President, the British Academy



making things better: the launch

The Academy's *making things better* development campaign was launched on 4 March 2010, with three celebration events.

The campaign aims to raise £16.5 million for the Academy's education and engagement work and to create a national Forum for Engineering at 3 Carlton House Terrace.

The campaign has made a flying start with gifts of £5.5 million already announced in its first few days from donors including Sultan Bin Mohammed Al Qasimi, Ruler of Sharjah,



Stephen Whittaker, Schlumberger; Hayaatun Sillem, RAEng; Angela Seay, David & Elaine Potter Foundation; Charlotte Edgeworth, Anglo American Foundation

major trusts and foundations such as the Wolfson Foundation and the Anglo American Foundation and global engineering companies including BAE Systems plc, BP plc, National Grid plc, Petrofac Services Ltd and Shell International Ltd.

If you would like to find out more about the campaign, you can visit

www.raeng.org.uk/development

Breakfast launch



Dick Olver FEng, campaign board member

The initial launch event provided an opportunity to thank supporters, reveal to a new audience the work of the Academy and show plans for the forum for Engineering at 3 Carlton House Terrace.

Speeches by Academy President Lord Browne, Sir John Parker, chair of the campaign board, and Dick Olver, a member of the campaign board, highlighted the importance of the Academy's work and in particular the aims of the *making things better* campaign.

Fellows' lunch

The Academy held a special event for Fellows to celebrate the launch of the campaign. In addition to speeches from Lord Browne and Sir John Parker, Fellows were given inspiring presentations from a range of Academy beneficiaries.

The Academy would like to thank all the Fellows who have supported the acquisition of the Academy's headquarters and the *making things better* campaign. A donor board is now on display in the reception area of 3 Carlton House Terrace.



Fellows Sir Peter Gershon and Sir John Parker

Evening reception at St James's Palace



Prince Philip with Past President Lord Broers (left) and a founder Fellow, Sir Hugh Ford

HRH The Duke of Edinburgh, founder and Senior Fellow of the Academy, hosted a special reception at St James's Palace to mark the launch of the *making things better* campaign.

Fittingly, the reception was held in the Queen Anne Room, where the inaugural meeting of the Fellowship of Engineering took place in 1976.

The evening got off to a successful start

with the handing over of £1 million towards the development of the Forum for Engineering by Sultan Bin Mohammed Al Qasimi, Ruler of Sharjah.

The event was attended by many eminent engineers, some of whom are new to the Academy's work. Other attendees came from a range of partners, including global companies and charitable institutions.

RESEARCH

Showcasing Britain's engineers

The Academy has continued to play a leading role in the SET for Britain poster competition, organised by the Parliamentary and Scientific Committee and held at the House of Commons. The event highlights the excellent research being undertaken by Britain's early-career engineers, scientists and technologists.

The one-day event was held on 8 March 2010, when 180 research projects were presented to MPs and peers. The 60 engineering posters were presented by researchers at varying career levels, including masters students and lecturers, and represented research being conducted at 29 UK institutions.

The Engineering Medal was awarded to Julian Rose from the University of Bath for his research on ionospheric tomography, a new technique that can prevent delays in GPS signalling caused by global ionospheric storms. The runner-up prize went to Dr Kosmas Tsakmakidis from the University of Surrey for his research into stopping light using meta-materials, which will lead the way for the development of new hybrid optoelectronic devices for information processing and telecommunication networks. Dr Tsakmakidis' research was also recently published in *Nature*.

The research topics ranged from the development of commercial materials for tougher biodegradable bottles, detection of blockages in natural gas pipelines, autonomous science for planetary exploration, the safe design of nuclear reactors and organic memory devices. In addition to winning the Engineering prize, Julian was also awarded The Westminster Medal which is presented to the best poster presentation of the day.



Academy CEO Philip Greenish, winner Julian Rose, runner-up Dr Kosmas Tsakmakidis and chair of the judge panel, Professor Liz Tanner FREng

Research Fellow prepares for bad weather

Academy and EPSRC-sponsored Research Fellow Dr Patrick McSharry has been in the media spotlight recently as his research could help the UK be better prepared for extreme weather conditions.

In an interview with the BBC's *Newsnight*, Dr McSharry argued that people could be better prepared for variations in the weather if forecasters provided greater detail, such as the chance of snow or heavy rain.

During his Fellowship Dr McSharry developed techniques that could provide this information by accounting for uncertainty in modelling processes

through evaluation of probabilistic forecasts. Weather prediction is perhaps the most pertinent application of this research but others include biomedical time series, speech modelling and risk management in healthcare and energy sectors.

Dr McSharry's first appointment since completing the Fellowship is to lead the Smith School's Centre for Catastrophe Risk Financing at Oxford, the first of its kind in the world. The centre has been established to study the risks associated with natural disasters and to develop effective and sustainable methods to manage those risks.

Sir Ned Warner celebrates century

Sir Frederick 'Ned' Warner FREng has become an Academy centenarian.

A founding Fellow, he will have reached the landmark birthday on 31 March 2010. It marks a further milestone in a life that has seen Sir Ned Warner build a chemical plant for manufacturing explosives in the Second World War, become President of the Institution of Chemical Engineers, and lead the first international team to examine the after-effects of the Chernobyl meltdown.

Sir Ned Warner formed a team of experts, each of whom were aged over 65, to visit the site of the nuclear disaster. This led to the formation of Volunteers for Ionising Radiation, a 100-strong team of engineers who would visit areas affected by nuclear incidents to make initial damage estimates.

He began his career in the 1930s, working shifts in a chemical plant. After his retirement from full-time work in 1980 he has continued to act as a consultant.



100 years old: Sir Frederick 'Ned' Warner FREng

President's book

Academy President Lord Browne published his autobiography in February 2010. The book, *Beyond Business*, covers his business life as chief executive of BP for 12 years – including the engineering feats and high-level meetings with the world's elected leaders.

AWARDS AND EVENTS

Award for satellite specialist

Dr Alexandre Pechev, Lecturer in Control Engineering from Surrey Space Centre at the University of Surrey, has won the Academy's ERA Foundation Entrepreneurs Award 2010.

Dr Pechev's research into the control of satellites in space, using complex software algorithms, opens the possibility, for the first time, of truly interactive, real-time, full-body animation of characters in video games and other computer-generated environments.

Games currently use motion capture and animation libraries to animate characters because of a lack of adequate processing power. This leads to unrealistic characters with limited interaction. Dr Pechev developed an algorithm that allows animation to take place in real time, and placed it in IKinema software due to come to market in 2010.



ERA Foundation award winner Dr Pechev

In-game characters will be able to truly interact with each other and scenery in real time. The algorithm can be applied to any platform from mobile phones to high-end games consoles.

Dr Pechev says: "IKinema is yet another example of research carried out in our universities which will have worldwide impact far beyond its original concept and I hope this award will inspire others to undertake similar commercialisation steps."

Sustained Achievement Award

Sir Bernard Crossland CBE FREng FRS was awarded the Academy's Sustained Achievement Medal for his contribution to engineering education and research.

During his professional career and following his retirement, Sir Bernard forged links with industry and academia and played a leading role in investigations including the Kings Cross Underground fire and Ladbroke Grove rail disaster.

In 1959 he became Professor of Engineering at Queen's University Belfast, where he went on to serve as Head of Department, Head of Faculty, and Pro Vice-Chancellor.

His achievements in research include the development of explosive welding in prototype nuclear reactors, and high-pressure engineering for an ICI polyethylene plant.



Sir Bernard Crossland FREng (left) is presented his award by Professor Robert Mair FREng

'mHealth' technology

The NHS could save hundreds of millions of pounds if it used mobile technology to deliver aspects of healthcare, Professor Lionel Tarassenko FREng told an audience at the Academy's headquarters in February 2010.

Professor Tarassenko spoke on *mHealth: mobile technology for 21st century healthcare*, as part of the ninth lecture in the Vodafone series. He outlined his vision for delivering healthcare remotely, using mobile phone-based monitoring to reduce hospital admissions. This could potentially save the NHS £750 million a year, he said.

People with long-term conditions, such as diabetes and hypertension, could share health data with a 'remote nurse' through their mobile phones. This would, Professor Tarassenko said, lead to reduced admissions and also facilitate early discharge of patients from hospital supported by home-based monitoring programmes.

Read a transcript of the event at www.raeng.org.uk/events



Professor Lionel Tarassenko FREng

Rooke medal

The Academy's Public Promotion of Engineering Medal has been renamed in honour of former President, the late Sir Denis Rooke OM CBE FREng FRS.

The new Rooke Medal for the Public Promotion of Engineering is due to be presented for the first time at the Academy's Awards Dinner on 7 June.

Sir Denis devoted much of his career and private time in giving support to young people engaged in the public promotion of engineering.

POLICY AND PUBLIC AFFAIRS

Generating future energy

Energy has been the focus of two Academy reports over the last 18 months. The second, launched on 17 March 2010, *Generating the Future: UK energy systems fit for 2050*, considers possible energy scenarios that could meet the UK Government target of 80% reductions in greenhouse gas emissions by 2050.

The four scenarios proposed describe the whole energy system in its widest sense and illustrate the enormous engineering challenge faced. Although each scenario is based on different assumptions of the level of energy demand and which technologies will be utilised, it is clear that the energy system of 2050 will be very different from the energy system of the past few decades. Restrictions on carbon emissions from the use of fossil fuels will require a degree of electrification for both transportation and low-grade heat and, even if the capacity of renewable power is increased to as high a level as is realistically possible. Nuclear power, along with carbon capture and storage, will also be needed.

There is no single 'silver bullet' solution that will achieve the required 80% cuts in greenhouse gas emissions. Fundamental restructuring of the whole of the UK's energy system will be unavoidable. Demand reductions across all sectors of the economy will be critical through a combination of increased efficiencies and behavioural change. The full suite of low-carbon energy supply technologies already available (or identified as credible) will be needed, including: nuclear, renewables and carbon capture and storage. The scale of these engineering challenges is vast.

The working group, chaired by Dr Dame Sue Ion FREng, highlighted the fact that implementing fundamental changes to a system as large and complex as the UK's energy system can only be achieved with the political will to drive the changes forward. The market can only be relied on to a limited extent and the combined challenges of climate change, security of supply and affordability require a more directed approach, which concentrates on facilitating and ensuring delivery of the necessary infrastructure. This means reorganising Government departments to coordinate action and provide the clear and stable long-term framework for business and the public. This coordination is not currently evident.

The report concluded that implementing such fundamental and widespread changes across the planning, industrial, technological, economic, business and customer dimensions of the UK's energy system will only be achievable in the context of a national strategy to coordinate and drive the process.

The full report can be found at www.raeng.org.uk/gtf

Planning energy infrastructure

In November 2009, the Government published the first of its draft National Policy Statements for Energy Infrastructure (NPS). These cover five separate sectors: fossil fuels, renewable energy, gas and oil networks, electricity networks and nuclear power, together with a general overarching NPS.

The Academy, along with the IET, ICE, IMechE and IChemE, submitted a joint response to the main consultation that was carried out by the Department of Energy and Climate Change as well as a simultaneous inquiry carried out by the corresponding House of Commons Select Committee.

The Academy's response recognised the urgent need to reform the planning system – the current system being prone to long delays – and the need for a strategic approach to energy policy. It also supported the basic premises of the Government's national energy policy, namely that the future energy system must increase efficiency and reduce demand wherever possible; be made up of as diverse a range of primary fuels as possible; and increase the proportion of low-carbon energy.

To see a full list of Academy responses, visit

www.raeng.org.uk/news/publications

Meetings round-up

In the run-up to the General Election, representatives from the three main political parties were invited to contribute a piece for *Ingenia* magazine, outlining their views on the importance of engineering to the nation's future (see *Ingenia* 42).

Over recent months, the Academy has been holding a number of meetings with frontbench spokespeople of all parties to discuss the role of engineering in areas of public policy.

PolicyNet, the Academy-hosted network of policy professionals, has invited the three main political parties to visit the Academy to outline their views on science and engineering policy. The first guest will be Adam Afriyie, Conservative MP and Shadow Minister for Science and Innovation, who will speak at the Academy on 12 April 2010.

Government report on *Science for All*



Science for All report

A new report, *Science for All*, was published on 9 February 2010 as part of the UK science and society strategy commissioned by the Department of Business Innovation and Skills (BIS).

The Academy formed part of the expert group, commissioned by BIS to focus on a public engagement strategy for all the science-based disciplines.

The report identifies an urgent need to build on approaches developed in

recent years for engaging the public with science and technology and lays out a roadmap for all science-related organisations, the Government and other interested groups, to commit to take action.

The report draws on the Government's previous consultation, and on seven pieces of wider research, out of which the Academy specifically led on the research to develop a competency framework for public engagement.

The report and supporting documents can be downloaded from:

www.bis.gov.uk/science-for-all-report-launched

Integrating health technology

On 19 January 2010, the UK Focus for Biomedical Engineering hosted a briefing seminar on the integration of new technologies into the clinical environment.

Globally, healthcare is becoming increasingly dependent on engineering technology. The UK has plenty of expertise in the research and development of such technology but, historically, we have been less adept at exploiting and integrating these developments into the clinical environment for the benefit of patients and the UK economy.

In recent years, it has become recognised that both benefits need to be realised and organisations now exist to encourage those processes. Healthcare technology is complex and expensive – it is important that correct decisions are made regarding its implementation.

This seminar discussed the development of such technologies and their integration into the healthcare system. Chaired by Professor Tony Unsworth FREng, Chair of the UK Focus for Biomedical Engineering, speakers at

the session were Professor David Delpy, FREng FMedSci FRS, Chief Executive EPSRC; Colin Callow, National Technology Adoption Centres; Professor Graham Spittle CBE, Chair of the Technology Strategy Board; Dr Leonard Fass, GE Healthcare; and Dr John O’Dea, Crospon.

The day brought together a range of delegates from across the biomedical and bioengineering fields who heard from experts on integrating health technology into the UK medical environment, the challenges of implementing new technologies into the NHS, assistance available from the Technology Strategy Board, enabling technologies around the patient, along with a case study on EndoFLIP, a new gastro-diagnostic tool.

Feedback from the day was positive, with delegates particularly interested in how to make introducing their technology into the UK health environment easier.

The Academy would like to thank Dr Patrick Magee for organising the seminar as well as the speakers and delegates who made this event a success.

APEG

The Associate Parliamentary Engineering Group held a meeting in the House of Commons on 25 January 2010 on the topic of how to rebalance the UK’s economy. Chaired by Bill Olnier MP, the meeting was addressed by Helen Alexander, President of the CBI, and President Lord Browne.

The debate focused on how to create a more diverse economic base, in favour of hi-tech, high-value industries.

The President said, “Our focus should be on reinventing our success and learning from our failure. The impact of the low carbon economy will be enormous but society and business will benefit.”

Outlining the role of the CBI in promoting business and industry, Helen Alexander pointed out that engineering and manufacturing form 13% of UK’s GDP – more than the finance sectors.

Guidelines on scientific advice to government

In February 2010 the Academy responded to the Government consultation on *Guidelines on Scientific Analysis in Policy Making*. The guidelines provide a high-level framework for addressing the way in which Government departments obtain and use science and engineering advice.

The response highlighted several key issues, including that engineering input into policy formulation is vital and not just about the end-point implementation. Also, that engineering advice can contribute to the development of policy itself and it is therefore crucial that it is taken in the early stages of policy development.

Young people debate privacy

On 5 and 6 March 2010, the Academy held *Mind Your Own Business* (MYOB), a young people’s conference on privacy, technology and society, funded by the Wellcome Trust and the Research Councils.

As part of a wider *Theatre of Debate* programme to raise young people’s awareness on the use of personal information, led by Y Touring Theatre Company, the two-day conference explored concerns over the privacy and security of personal data and how that balances against potential benefits for society.

The conference placed science, technology and engineering within a social context, and gave attendees the chance to explore, debate and discuss related issues. Through a series of activities, young people were urged to explore the impact of engineering on society, question access to personal data, and examine the use of electronic data to benefit wider society.

As part of the conference, students were treated to a performance of Y Touring’s *Breathing Country*, a play that explores the central themes of MYOB, and is part-way through a national tour.



One of the sketches produced at the event by Luke Warm

Publications received

Beyond Business – An Inspirational Memoir from a Visionary Leader, by John Browne; donated by the author.

Bristol to Bradford-on-Avon – A lifetime in engineering, by Dr A Moulton; donated by the author.

Bridges: The science and art of the world’s most inspiring structures, by David Blockley; donated by the author.

Bad Ideas? An Arresting History of Our Inventions, by Robert Winston. Donated by the author.

INTERNATIONAL

Academy hears business views on EU research



John Hill, Colin Harper, Professor Ric Parker FREng, and Paul Jenkins

On 15 January 2010, the Academy hosted a workshop which brought together industry and government to help develop the UK position for the primary EU research funding programme.

The European Union's Eighth Framework Programme for Research and Technological Development (FP8) will not be launched until late 2013, but debate is already under way in Brussels and among EU member states on the shape it may take.

While the UK's universities continue to win substantial European Union R&D contracts, there are concerns that UK business performance at this level has tailed off in recent years. The Academy's workshop invited industry figures to discuss their experience of previous Framework Programmes and to provide suggestions on what changes could be made in future to maximise industry participation.

The workshop was chaired by Professor Sir William Wakeham FREng, the Academy's International Secretary, and attended by over 100 guests from a wide range of industry sectors. Speakers included Professor Ric Parker FREng, Director of Research and Technology at Rolls-Royce Group, as well as representatives of Pfizer, QinetiQ, BT, the Technology Strategy Board and PERA (a European innovation and business support consultancy). The event was sponsored by the Department for Business, Innovation and Skills.

There was strong agreement at the meeting that the EU application and auditing systems needed to be simplified if greater business participation was to be achieved. Funding mechanisms should be revised to give more weight to exploitation than novelty. In high-technology areas, the EU also needed to aggressively promote the results of its research among international standards bodies and key multinationals in order to achieve industry acceptance.



Sir William Wakeham FREng

The Academy was also instrumental in preparing a European engineering response to an EU consultation on its strategy to return to sustainable economic growth by 2020. The response, produced on behalf of Euro-CASE, the umbrella group of European engineering academies, drew attention to the need for increased investment in STEM education across the continent, called for the European Commission to solicit engineering policy advice at an earlier stage in the development of policy and recommended the appointment of a European Chief Engineer.

Newton International Fellowship event

The development of terahertz imaging used in body scanners at airports and extreme objects in the outer solar system were just two of the cutting-edge research projects discussed at a meeting of Newton International Fellows on 16 February 2010.

The Newton International Fellowship Scheme is a £13 million initiative to bring world-class international postdoctoral researchers to the UK. The scheme's first 100 fellows gathered for the first time to discuss the potential applications of their research projects, and network with other Newton fellows and their British sponsors. Also in attendance were representatives from leading UK universities, research councils, and foreign embassies.

The scheme was established in 2008 by the British Academy, the Royal Society and The Royal Academy of Engineering to build a network of postdoctoral research leaders with lifelong links to UK research and education institutions. It has so far awarded 100 fellowships worth up to £100,000 each to highly talented and promising young academics in natural sciences, social sciences, engineering and the humanities from countries such as Brazil, China and the US.

The Newton International Fellowship scheme has become a recognised brand across the world, helping UK universities and research institutions to develop their international connections and promote global partnerships. The scheme has been very successful in attracting some of the world's brightest early-career researchers and in establishing links that will benefit the UK research base for many years.

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International Fellows

The Proactive International Fellowship Group strives to ensure that the pool of candidates for International Fellowships better reflects both the Academy's international priorities and the wider international society within which the Academy exists.

We are currently looking to increase the number of nominations and welcome your suggestions. For further information regarding international nominations please contact Dr Shafiq Ahmed.

shafiq.ahmed@raeng.org.uk

Among the speakers at the event were Philip Greenish CBE, Chief Executive of The Royal Academy of Engineering, Lord Rees FRS, President of the Royal Society, Professor Duncan Gallie FBA, Foreign Secretary of the British Academy, and Professor David Clary FRS, Chief Scientific Adviser to the Foreign and Commonwealth Office.

The talks were followed by a poster session where over 40 Newton fellows presented their work. It is hoped that the event will be an annual occasion for Newton fellows both past and present to showcase their research and network with a range of stakeholders.

Fifty Newton Fellowships for 2011 will be announced later this year. For further information visit

www.newtonfellowships.org



Ukrainian Newton fellow Dr Oleksiy Sydoruk

New Year Honours

Several Academy Fellows received honours at the start of 2010.

Dame Commander of the Order of the British Empire

Dr Susan Elizabeth Ion OBE

Visiting Professor, Imperial College, London and Chair, UK Fusion Advisory Board. For services to Science and Engineering.

Commanders of the Order of the British Empire (CBE)

Professor Robert James Mair FRS

Master of Jesus College and Professor of Geotechnical Engineering, University of Cambridge. For services to Engineering.

David Malcolm Orr

Director of Corporate Services, Department of Finance and Personnel, Northern Ireland Executive.

Adrian Shooter

Chairman, Chiltern Railway Company Ltd. For services to the Rail Industry.

Officers of the Order of the British Empire (OBE)

Alexander Beveridge Anderson DL

Chairman of Governors, University of Teesside. For services to the Community in the North East.

Dr Andrew James Herbert

Managing Director, Microsoft Research, Cambridge. For services to Computer Science.

Professor John Alexander McDermid

For services to the Defence Industry.

News of Fellows

Professor Arthur Bergles was awarded an honorary doctorate from Sapienza University of Rome.

Professor Howard Chase was appointed Head of the School of Technology at Cambridge University's Department of Chemical Engineering and Biotechnology.

Dr Alfonso Farina was awarded the IEEE Dennis J Picard Medal for Radar Technologies and Applications.

Dame Julia Higgins and **Professor Helen Atkinson** were both named Women of Outstanding Achievement by the UK Resource Centre for Women in Science, Engineering and Technology.

Professor Tony Kinloch was awarded the Royal Society's Armourers and Brasiers' Company Prize.

Professor Trevor Kletz was awarded the Society of Chemical Industries' Mond Health and Safety Award.

Professor Adrian Long was awarded the James Alfred Ewing Medal 2009 by the Institution of Civil Engineers. Professor Long and his team were also awarded the Construct Award 2009 for Innovation and its adoption.

Dr Henry McDonald was awarded the Royal Aeronautical Society's Gold Medal 2009.

Professor Alvin Nienow was awarded the American Institute of Chemical Engineers' 2009 Plenary Lecture Award.

Barrie Scuffham was awarded an honorary Fellowship of Newcastle University.

Professor John Wood CBE was appointed Secretary General of the Association of Commonwealth Universities.

Professor Paul Younger DL was appointed Deputy Lieutenant for the County of Tyne and Wear. He was also awarded an honorary doctorate by the National University of St Augustin, Arequipa, Peru.

Academy supports disaster relief charity

The Academy has become a Patron of RedR, the leading training and recruitment charity for international disaster relief. The Academy's Senior Vice President, Professor Robert Mair, said: "The Academy is strongly committed to the application of engineering to poverty reduction and helping communities rebuild in key areas such as water and sanitation, shelter, and infrastructure, following natural disasters. Everything that RedR strives for is central to the Academy's key strategies."

RedR is appealing for emergency funding as it steps up its activity in Haiti in response to the devastating earthquake which killed an estimated 230,000 people in January. The sheer scale of the disaster has meant that there is a shortage of skilled staff. RedR is delivering urgently-needed training to develop skills in logistics, water, sanitation, hygiene and security, ensuring that the best possible aid is being delivered to the 3 million people affected.

Further funding will mean that RedR can expand its efforts to respond to the unprecedented need in Haiti. If you would like to donate please visit

www.redr.org.uk/donate

EDUCATION

14-19 Diploma in Engineering

The 14-19 Diploma in Engineering was officially launched in September 2008, with a pilot in the boroughs of Southwark and Lambeth in London. The qualification is designed to give students the opportunity to develop a good understanding of the engineering sector.

There are currently around 30 UK schools and colleges delivering the Level 3 (A Level) Diploma, although this figure looks set to rise in September 2010. The initial aims of the programme were to gain an understanding of the progress of the Diploma in schools and colleges, identify good practice and listen to the concerns of lecturers and teachers to build strong relationships between the Academy and post-16 engineering educators. Facilitating the sharing of resources as part of the initiative is particularly important for the lecturers who are delivering the Diploma.

It is already clear that the practitioners delivering the Diploma are experienced and committed to making the qualification a success for their students. Engineering businesses are proving very supportive and providing students with fantastic opportunities to learn in commercial and industrial contexts. Lecturers and teachers have commented on how the Diploma appears to be better at preparing their students for university and employment than traditional A Levels. Most importantly, students are expressing how much they enjoy the variety of topics they get to study and, not surprisingly, how they are inspired by visits to engineering companies.

Developed in consultation with industry, the Diploma covers topics such as *mathematics for engineers*, *scientific principles* and *engineering enterprise*. It places a strong emphasis on the need for students to learn through practical activities and industrial settings and is suitable for students who wish to progress to university or join the workforce.

The Academy was actively involved in the development of the Diploma and was instrumental in helping Southwark and Lambeth to become a pilot consortium for the new qualification in 2008. It produced the Mathematics for Engineering resources available to Diploma students and has recently commissioned specialists to produce teaching and learning resources for the plant maintenance unit.

Stylli Charalampous and Dominic Nolan have joined the Academy to support the colleges and schools that are delivering the Post-16 (Level 3) Diploma in Engineering.

Sports venue design

The Academy is supporting a sports venue design competition led by design and construction group Arup and jointly supported by SportsAid and the Construction Youth Trust.

The brief is to design a sports venue for any sport, new or old, existing or future. The aim is to raise interest, engagement and excitement in engineering, design and construction.

It is open to 12-14 year old students from schools within London, particularly the five 2012 Olympic boroughs: Waltham Forest, Hackney, Tower Hamlets, Greenwich, and Newham. Judging is over two rounds and the final will take place on 29 April 2010 at Arup's London offices in Fitzroy Street. For more information, visit www.maddesign.ning.com

Summer Soirée

The Academy is always pleased to receive suggestions from Fellows for events and activities. In particular, imaginative offers to host the Academy's Summer Soirée or visits by Fellows are always welcome and are now being considered for the coming three years.

As many readers will know from experience, a Soirée allows VIPs, Fellows of the Academy, their partners, and other guests to enjoy entertaining displays of engineering expertise associated with the host – typically, a company, university or research organisation. This is followed by a dinner for 200 to 300 guests. A successful Soirée marries engineering fascination with an enjoyable social

Tomorrow's Engineers



EngineeringUK and the Academy have announced the launch of *Tomorrow's Engineers*, a determined effort to reach out to the next generation of engineers and technicians at a time when society and the economy needs them most.

Tomorrow's Engineers brings together a number of well-established organisations that promote engineering to young people: Primary Engineer, Stem Cymru (incorporating Engineering Education Scheme Wales), Sentinus (Northern Ireland), The Engineering Development Trust, The Industrial Trust, The Smallpeice Trust, Young Engineers and Young Engineers and Science Clubs Scotland (SCDI).

It aims to extend the reach of these organisations by providing funding for work with young people and support with identifying schools and evaluating impact. It builds on the work of the Academy's Best Programme, which will continue to support post-19 engineering students, with *Tomorrow's Engineers* reaching out to younger students.

The founding partners for *Tomorrow's Engineers* are EngineeringUK, The Royal Academy of Engineering and Lloyd's Register Educational Trust. These are being joined by further supporters from industry and the professional engineering institutions.

For more information, please visit www.tomorrowsengineers.org.uk

occasion. A typical Fellows' visit attracts up to 30 Fellows, and includes technical tours and presentations by key staff.

For further information please contact Amy Abbott on **020 7766 0641** or amy.abbott@raeng.org.uk

Support for teaching design programme

The Academy has announced an exciting new programme to support Visiting Teaching Fellowships in Engineering Design, with a particular emphasis on the built environment.

Supported by The Ove Arup Foundation, the programme will see 10 young industrial engineers appointed to leading universities from October 2010. The aim is to enrich the undergraduate engineering curriculum and learning experience by relating and applying teaching material to the operational issues and real-life problems that graduate engineers often face when enter industry.

The Foundation's support of engineering design in the built environment is timely given the publication of the Academy's recent report, *Engineering a low carbon built environment* (see *In Brief, Ingenia 42*) which followed on from Arup's support of a Visiting Professorship initiative in Building Engineering Physics. It is hoped that some of the new posts will support Visiting Professors in this technical area.

In addition to the technical aspects of their involvement, Visiting Teaching Fellows have proven to be inspiring role models for undergraduate engineers and valuable in giving career advice. They have also been instrumental in establishing and building sustainable links between industry and academia.

Academy at the 2010 Design Festival

The Academy will be organising a programme of events and activities to coincide with the London Design Festival 2010. At the invitation of the festival's founder, Sir John Sorrell, the Academy will introduce an engineering design flavour to the week-long festival in September.

The Academy has chosen *Designing a low carbon infrastructure for London* as the title for its four-day programme, which will be divided into daily themes dealing with transport, innovation, buildings, and a London schools day dedicated to low-impact living and the London of 2050. For more details visit www.londondesignfestival.com

Update: National HE STEM Programme

The London Engineering Project and the Welsh Engineering Project are jointly preparing to roll out the effective practice lessons learned over their lifetimes. This is in response to a call by the National HE STEM Programme for collaborative proposals to transfer and embed good practice within higher education institutions.

The National HE STEM Programme is a £21 million, three-year initiative funded by the Higher Education Funding Councils for England and Wales (HEFCE and HEFCW) that commenced on 1 August 2009 and is taking forward activities in three related strands.

The programme features activities to widen participation within the STEM disciplines at university level by working with those currently within the school and further education sectors. Activities include higher education curriculum developments, focusing on course delivery and design, student support, and knowledge and skills. There are also activities to encourage those currently within the workforce, and generally, without a prior university-level qualification to engage with further study to develop enhanced knowledge and skills.

Michael Grove of the National HE STEM Programme, said: "The nature of the call is to support the transfer and wider adoption of proven good practice within the higher education STEM sector. The National HE STEM Programme is making funding available to those among HEFCE and HEFCW-funded higher education institutions to share proven, evidence-based interventions directly related to its three strands of activity."

The Royal Academy of Engineering's National HE STEM Programme team will also be calling for other engineering-related proposals in the next few months as well as holding a series of effective practice seminars in partnership with the Higher Education Authority Engineering Subject Centre.

For further details, visit www.thelep.org.uk/national

For further details of the collaborative fund, visit www.stemprogramme.com

Engineering graduates for industry

The Academy has published a report identifying how to increase the number of employable engineering graduates in the UK.

Commissioned by the Department for Business, Innovation and Skills, *Engineering graduates for industry* provides details on how the teaching of engineering degrees can be improved to meet the skills required by industry.

A previous Academy report, *Educating Engineers for the 21st Century*, demonstrated that businesses are looking for engineers who have "practical experience of real industrial environments". With this in mind, *Engineering graduates for industry* focuses on the options available for enabling universities to develop experience-led teaching for engineering courses.

The report is based on a wide-ranging study of engineering higher education, which found that experience-led teaching develops a range of skills that industry requires but also necessitates

innovative and sustained partnerships between universities, business and industry.

The report can be downloaded at: www.raeng.org.uk/egi



The front cover of the Academy's report

Obituaries

Mr Frank Mackley FEng died aged 86 on 11 January 2010. Prior to his retirement he was Chairman, JT Mackley and Co Ltd.

Sir Norman Payne CBE FEng died aged 88 on 7 February 2010. Before his retirement he was Chairman, BAA Plc.

Professor Cedric Turner CBE FEng died aged 83 on 13 February 2010. At the time of his death he was Emeritus Professor of Materials in Mechanical Engineering, Imperial College London.

Proactive Membership Committee

Last year saw a healthy number of candidates nominated for Fellowship. This year has already seen significant improvements in the nomination process and the Proactive Membership Committee (PMC) has taken full account of advice passed to it regarding the range of individuals nominated for election. There is, however, an urgent need for more Fellows to identify, nominate and assess candidates, especially those who by nature of their work are relatively unknown to the Fellowship.

The Proactive Membership Committee runs masterclasses for Fellows interested in learning about nomination best practice and how to assess candidates. The next one will take place in early June.

If you would like to attend this masterclass or simply talk through someone you have in mind as a possible candidate, please contact the PMC Chair, Ian Nussey (ian_nussey@uk.ibm.com or **01789 773356**), or Fellowship Manager, Chris Coulter (chris.coulter@raeng.org.uk or **020 7766 0687**).

Engineers Against Poverty cycle challenge

Three Academy staff members have completed a long-distance bicycle ride through south-east Asia to raise money for charity.

Cuong Dang, Helen Berrington, and Éva Culleton-Oltay took part in the 512 km cycle ride from Ho Chi Minh City in Vietnam to the temples of Angkor Wat in Cambodia, in aid of charity Engineers Against Poverty.



So far they have raised around £8,000 for charity. If you would like to make a donation or find out more about the challenge itself, visit www.raeng.org.uk/international/cyclechallenge/cyclechallenge

Staff news

Dominic Nolan has joined the Academy as Joint Manager, 16+ Teaching Programme. Previously he was Head of Faculty, Design and Technology, at Coopers Technical College in Bromley.

Tim Julier has joined the Academy as Programme Manager, Policy and Public Affairs. Previously he was a senior executive at the University of Surrey.

Sapna Somani has returned to the Academy as Project Officer, HE STEM Programme – Engineering, following maternity leave.

Events Spring 2010

12 April 2010

PolicyNet General Election Session

Speaker: Adam Afriyie MP, Shadow Minister for Science and Innovation

Location: 3 Carlton House Terrace, London SW1Y 5DG

Contact: policynet@raeng.org.uk

13 April 2010

2010 Lloyd's Register Educational Trust Lecture and Dinner: A low carbon world – is it realistic?

Speaker: Dr Anne-Marie Warris,

Environmental Adviser, Lloyd's Register

Chair: Lord Browne of Madingley

Location: Royal Society of Medicine, 1 Wimpole Street, London W1G 0AE

Contact: faye.whitnall@raeng.org.uk

7 June 2010

2010 Academy Awards Dinner (in association with BAE Systems)

Location: The Guildhall, Gresham Street London EC2V

Contact: amy.abbott@raeng.org.uk

22 June 2010

2012 Olympic and Paralympic Games: Engineering from Beijing to London

– Briefing seminar and reception

Chair: John Armitt FEng, Chair, Olympic Delivery Authority

Location: 3 Carlton House Terrace, London SW1Y 5DG

Contact: katherine.macgregor@raeng.org.uk

5 July 2010

AGM and Awards Ceremony

Location: 3 Carlton House Terrace, London SW1Y 5DG

Contact: faye.whitnall@raeng.org.uk

For more information visit www.raeng.org.uk/events

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