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EU-US Frontiers of Engineering Symposium

Sixty of the most promising engineers under the age of 40 from the EU and the US met at Jesus College, Cambridge, last week for an intensive three-day symposium on developments at the cutting edge of engineering technology. The inaugural EU-US Frontiers of Engineering Symposium was organised by the US National Academy of Engineering (NAE) and The Royal Academy of Engineering, on behalf of the umbrella organisation of European Engineering Academies, Euro-CASE.

Following a template designed by the NAE, the event brought together intensive formal sessions with opportunities for informal networking. The aim was to facilitate international and cross-disciplinary research collaboration, promote the transfer of new techniques and approaches across disparate engineering fields, and encourage the creation of a transatlantic network of world-class engineers. Four key engineering areas were selected for discussion: bio-inspired engineering, materials ecology, augmented reality and signal processing.

Under the guidance of co-chairs Professor Richard Williams OBE FREng of the University of Leeds and Professor Sergio Verdu of Princeton University, an organising committee of younger engineers selected the speakers and attendees and structured formal and informal discussions. All attendees were challenged to think about developments and problems in areas different from their own, and to consider the implications for their own research.

Speakers and chairs included Professor David Woods, Director of La Laboratoire in Paris, a research laboratory and exhibition space where artists and scientists can work together, Dr Ramesh Raskar of MIT Global Labs, who presented research aimed at creating cameras that could see around corners and Dr Henk Jonkers of the University of Delft, who has invented a biological self-healing concrete which uses bacteria to seal its cracks. Dr Jonkers' innovation attracted substantial press coverage for the event, including articles in the *New Scientist* and an interview on Radio 4's *Material World* series.

Other speakers in the bio-inspired engineering session examined the biomechanics of insect flight, the lessons robotics researchers were learning from dragonfly flight and the use of self-assembling nano-medicines in treating cancer patients. Signal processing presentations included an examination of the use of networks as a way of visualising data, and an overview of the development of compressive sensing by Professor Emmanuel Candes, whose 2006 paper was one of the key steps forward in the field.

Guests at the event and the opening reception included Dr Julian Huppert, MP for Cambridge, Dr Sean Blanchflower, Director of R&D at Autonomy, and Professor Iain White FREng, who welcomed delegates to Jesus College. Professor Sir William Wakeham FREng, International Secretary of the Academy and Professor Charles M Vest FREng, President of the US National Academy of Engineering delivered the opening speeches at the event.

Among the event sponsors were several successful UK engineering companies, including Autonomy, ARM and Yorkshire Nanofactory. The Academy is also grateful to Professor Robert Mair CBE FREng FRS and to Professor Roberto Cipolla FREng for their personal support of the event.

Below: Delegates from the first EU-US Frontiers of Engineering Symposium gather at Jesus College.



PRESIDENT'S COLUMN



Lord Browne presents Alan Powderham FREng with the Sustained Achievement Award at the Academy's AGM (see page 8 for the full story).

The art of the possible

The UK faces many policy challenges – the need to rebalance the economy, the drive towards clean, affordable energy, the need for an educated and trained workforce for the future, to name but three. All of these challenges and much other national policy have an engineering dimension to delivery and a key role for a national academy of engineering is to support national policy by means of impartial, expert policy advice. We recently hosted a meeting of foreign associates of the US National Academy of Engineering and discussed our respective roles in pivotal areas of policy. I was reminded of how, not so long ago, it became evident that, in some key areas of policy, UK government was simply not availing itself of the best strategic engineering advice and of what steps we have since taken to help address that.

As the profession itself acknowledged, part of the problem was the organisation of the professional engineering community which, with its many institutions and associated bodies, is not ideally configured to be visible or accessible to policy makers. The 2009 select committee report *Engineering: turning ideas into reality* saw an urgent need to resolve this and called on the Academy to take a lead. The profession took up that challenge and, by working together, we have created a much more open point of access into engineering expertise of which policy makers across

government departments are making increasing use.

We are making great progress in achieving this goal by means of two new initiatives, led by the Academy, that bring the profession together to provide advice and, crucially, support for policy delivery. Education for Engineering (E4E) is working to make sure that the whole engineering workforce has the right skills to equip UK industry for economic growth and global competition. E4E is active in advising on and supporting policy across the full spectrum of engineering education and training as well as the teaching of STEM subjects and improving careers advice. It has worked on a project, commissioned by BIS, on STEM data in the further education sector; works closely with the Technician Council to raise the status of technicians and promote professional registration; and responds to consultations from government and the devolved assemblies.

Engineering the future is concerned with providing engineering policy support and project capacity to government departments and with raising awareness of the role of engineering. It is working with the Government Chief Scientific Adviser (GCSA) to engage the community of civil servants with a science and engineering background with engineering and produces joint responses to government consultations. It is working with the Department for Environment, Food and Rural Affairs on a project to explore the resilience of national infrastructure and has run meetings and exhibitions in Parliament and at the political party conferences.

The role of the GCSA, Professor Sir John Beddington, and his network of Government Chief Scientific Advisers has been central to improving government engagement with engineering. The Academy recently hosted a meeting for this group, a number of whom are Fellows, where options for further future collaboration were explored. The Academy is now regularly called on to host roundtable meetings where government officials can draw on the expertise of Fellows to explore an issue in depth or tackle a problem from a particular perspective. Our unique access to and relationship with business and industry is an enormous asset for policy makers seeking insight and understanding of what business needs in order to invest and succeed. We are

looking to broaden and deepen these links further to provide a better bridge between business and the policy making process.

The Academy's own policy work, whether in its education, engineering or international dimensions, is very much focused on influencing and supporting the national agenda. Some recent examples include our proposals for *Engineering graduates for industry*, which seek to create motivated graduate engineers with the skills that industry needs; our widely reported study on electric vehicles, which has brought the Academy into the policy process on addressing the challenges of national rollout and our meeting on 'Engaging Business with FP8', which helped inform the government's negotiating position on the 8th European Framework Programme for Research and Technological Development.

The autumn Budget will no doubt bring many new challenges as the government seeks to balance the books and rebalance the economy. Engineering, with its focus on solving problems, driving innovation and creating wealth needs to be right at the heart of the policy process, shaping, influencing and helping make policies that are fit for purpose. The Academy will continue to play its part to ensure that national policy is informed by the best strategic and creative engineering input. After all, engineering, like politics, is the art of the possible.

Meetings and visitors

The President recently met:

Dr George Bugliarello
Foreign Secretary, US National Academy of Engineering

Dr Lance Davis
Executive Officer, US National Academy of Engineering

Keith H Millard
Immediate Past President, IMechE

COUNCIL NEWS

Academy AGM 2010

The 34th Annual General Meeting (AGM) of the Academy was held on 5 July at Carlton House Terrace. The meeting was chaired by the President, Lord Browne, with 67 Fellows attending.

The President delivered his review of a year during which the Academy had been working to support a strengthened and rebalanced economy and had called for a national industrial strategy focused on building capacity to support growth. He emphasised the Academy's roles in engineering formation, timely and authoritative policy work, research, the development of international relationships and raising the profile of engineering.

Six International Fellows, 53 Fellows and one Honorary Fellow were elected and the Annual Review and the Financial Report and Accounts for the year ended 31 March 2010 were adopted.

The AGM elected the following new Officers to the Council: Professor Brian Cantor (Vice President and Chair, Research and Secondments Schemes Committee) and Rear Admiral Nigel Guild (Chair, Proactive Membership Committee).

The AGM noted that the following six Fellows had been elected to the Council by ballot: Faith Wainwright, Dr Paul Golby, Dr Ian Nussey, Dr Michael Lynch, Professor David Payne and Professor Peter Goodhew. The AGM also approved changes to the Fellows' subscription rates.

Following the formal business of the AGM, the meeting was interested to hear technical presentations from three participants in Academy schemes: Helene Wehrmann (Engineering Leadership Award holder) Dr Graham Schleyer of the University of Liverpool seconded to Shell Global Solutions UK (a participant in the Industrial Secondment Scheme) and Dr Francesco Simonetti of Imperial College London (RAEng/EPSRC Research Fellow).

The President presented two awards: the Sustained Achievement Award 2010 to Academy Fellow Alan Powderham and the Sir George Macfarlane Award to William Machin.

Princess Anne becomes a Royal Fellow

The Academy is delighted to announce that HRH The Princess Royal has agreed to become a Royal Fellow. Her Royal Highness joins the Academy's Senior Fellow, HRH The Duke of Edinburgh and Royal Fellow, HRH The Duke of Kent.

The Princess Royal is President or Patron of some 320 organisations, including several in the engineering sphere. She is Royal Patron of Women into Science and Engineering (WISE), Patron of RedR (Engineers for Disaster Relief), Patron of the 7th World Congress of Chemical Engineering and a Fellow of the Royal Society.



HRH The Princess Royal

New Fellows for 2010

Sir Peter Gershon's Academy membership report of 2007 made recommendations to the Academy's Council regarding the intake of new Fellows into the Academy and the profile of nominations going forward for Fellowship.

While there are no targets as such for the intake of new Fellows - the sole criterion that the Membership Committee considers being engineering excellence, the Council has determined a policy on how it desires to see the profile of Fellows elected develop over time. This includes determinations that 10-20% of newly elected Fellows are women, 50-60% come from industry, 20-30% from SMEs and 20-30% are aged under 50.

The Membership Committee, working in close cooperation with the Proactive Membership Committee (PMC), has initiated a variety of changes to the process of nomination, assessment and final recommendation for election of candidates to the Council. Augmented by the work of the PMC, which identifies and supports the nomination of engineers from a wide variety of underrepresented groups and sectors, these changes are now beginning to bear fruit, which can be seen in the results of this year's elections for the Fellowship.

For the first time in 22 years, a full complement of 60 candidates was recommended for Fellowship: 53 Fellows, six International Fellows and one Honorary Fellow. Within the group of 53 UK-based Fellows, six (11%) were women, the highest number of new woman Fellows ever elected. Given the consistent high quality of new female nominees, there is every reason to expect this number to increase over coming years. Of the 53 Fellows, 29 (55%) have had careers primarily in industry. This is the highest number of industry-based new Fellows since 1998, arresting a decline over recent years. Fellows working in academia make up 34% of the newly elected Fellows and engineers in the government/Not-for-profit sector 11%.

With respect to other aspirations for composition of Fellowship, there were 11 (21%) newly elected Fellows with good credentials in small companies and university spin-outs and a total of 18 (34%) of the newly elected were aged under 50 years at the time of the AGM. Both these latter figures depended greatly on proactively nominated candidates.

RESEARCH

Industrial Secondments update

Industrial Secondments facilitate knowledge transfer between engineering academia and UK industry by enabling engineering academics in UK universities to spend three to six months in industry. The secondments provide academics with a unique opportunity to apply their skills and expertise to real world industrial projects. This results not only in improved business competitiveness and productivity but also an industrially-relevant engineering curricula that help produce industry-aware graduates, well equipped to have the greatest beneficial impact on our economy.

David Thompson, Professor of Railway Noise and Vibration at The University of Southampton spent six months at Arup Acoustics, working on a wide range of



Professor David Thompson

projects including auditorium acoustics, the acoustic design of schools, and railway noise and vibration. His secondment also gave him the opportunity to give presentations to Arup staff and to work with his past students, now employed by Arup, enabling him to gain additional insight into ways to further improve the industrial relevance of the curriculum at Southampton. The secondment resulted in a new MSc module on Architectural and Building Acoustics, new student projects and a strengthened relationship with future plans for collaboration with Ove Arup & Partners Limited.

The deadline for the next round of applications is 30 September 2010. For further information and application forms visit www.raeng.org.uk/research/univ/secondment/

Showcase for Academy research

The Academy's annual Engineering Research Forum is a showcase event that brings together UK researchers being sponsored by the Academy as well as industry partners, Government and research council representatives. This year's Forum, held on 15 September at the Royal College of Physicians, highlighted some of the leading-edge engineering research being conducted in the UK and an opportunity for networking with similarly-engaged and interested parties.

The guest speaker this year was Professor Adrian Smith FRS, Director General of Science and Research at the Department of Business, Innovation and Skills. Professor Smith's presentation was given against the backdrop of the imminent Government Spending Review, and cited the "good news" regarding the UK's return on research investment.



The Academy provides numerous funding opportunities for researchers and over the day, seven Academy-funded researchers presented their work and demonstrated the significant impact they were making in the international engineering community. Professor Phil Webb who holds a Research Chair sponsored by Airbus, is currently leading the way in automating the construction of aircraft, which will deliver significant safety and reliability improvements to the UK aerospace industry.

The prestigious Research Fellowship scheme, promotes excellence in engineering by fostering the development of high-quality, independent post-doctoral researchers and was represented by engaging presentations from Dr Valeria Nicolosi (Oxford), Dr Kosmas Tsakmakidis (Surrey) and Dr Richard Sandberg (Southampton). Currently the Academy funds 58 Research Fellows jointly with EPSRC each at an average cost of £500,000 over five years.

Strong links with industry are established and maintained through the Research Chair and Senior Research Fellowship schemes. BAE Systems has jointly sponsored the Research Chair of Professor Duncan McFarlane who is analysing the role of engineering in the complex systems used by service industries.

The Leverhulme Trust and the Academy both recognise and support research excellence and the Forum provided a fitting opportunity to present the three 2010 Philip Leverhulme Prize Winners in Engineering; Professor Mercedes Maroto-Valer, Dr Claire Adjiman and Dr Eleanor Stride. Professor Sir Richard Brook OBE FREng, Director of the Leverhulme Trust, congratulated the Prize winners who received £70,000 each to fund future research activities.

There were 19 poster presentations which can be found on the Academy's website www.raeng.org.uk/research. The Research Programmes team, headed by Robert Barrett, would like to thank all those involved for making the 2010 Forum a great success.



Dr Davide Mattia (Bath), Dr Valeria Nicolosi (Oxford) and Dr Vlado Lazarov (York) are Research Fellowship holders who participated in the event.

INTERNATIONAL

Perceptions surveys

The Africa-UK Engineering for Development Partnership is undertaking a series of perceptions surveys as part of a capacity-building assessment for the engineering profession in Sub-Saharan Africa. The objectives are two-fold: to build an evidence base that can be used to identify priorities for the next phase of capacity building activities and to provide baseline data against which the partnership can measure its future success. Two versions of the survey have been developed. The first is for completion by professional engineers working in Sub-Saharan Africa, the other is aimed at decision makers who engage with them. Further information can be found at www.raeng.org.uk/international/activities/engdev

US Foreign Associates meeting

On 31 August, the Academy held a meeting for European-based Foreign Associates of the US National Academy of Engineering (NAE), to coincide with the visit to the UK of the President, Foreign Secretary and senior management team of the NAE for the EU-US Frontiers of Engineering meeting. The event provided an interesting opportunity to compare and contrast the approaches and activities of the two academies. It was notable there was significant overlap, not least in areas such as the need to increase diversity in the engineering profession, promote innovation and enhance its contribution to economic performance, and ensure that engineering education is fit for purpose.

CAETS meeting

The International Council of Academies of Engineering and Technological Sciences (CAETS) held its annual meeting at the end of June in Copenhagen. Professor Sir William Wakeham FREng, the Academy's Honorary International Secretary and a newly appointed Director of CAETS, led the Academy's representation at the Board and Council meetings and the associated Symposium on Food Security. The symposium statement can be found at: www.caets.org/cms/7122/9875.aspx

Ministry of Science and Technology reception

The Academy and the Department of Business, Innovation and Skills jointly hosted a reception on 14 June for a delegation of high level officials from the Chinese Ministry of Science and Technology in Beijing, led by Professor Xinnan Li, Deputy Director Advisor, Department of Policy and Regulation. The Chinese delegation were participating in an 'Innovation in Enterprise' mission to the UK, at the invitation of Philip Rycroft, Director General, Innovation and Enterprise at BIS, which also included meetings with the Technology Strategy Board and site visits to see innovation in action.

Philip Greenish, the Academy's Chief Executive, gave a welcome address in which he discussed the role that international partnerships can play in creating the right environment for innovation to flourish. The networking reception was attended by over 50 people including Academy Fellows, policy makers, researchers and entrepreneurs with an interest in China.



Philip Rycroft, Director General - Innovation and Enterprise at BIS (left) and Professor Xinnan Li, Deputy Director Advisor, Department of Policy and Regulation at the Chinese Ministry of Science and Technology (right).

Newton International Fellowships

The Newton International Fellowships are administered by The Royal Academy of Engineering, the Royal Society and the British Academy. They aim to bring the research stars of the future from around the world to work with leading UK groups to build new global research collaborations. Follow-on funding is available to enable the Fellows to maintain their links with the UK.

One of the third cohort of 13 engineers to be awarded a prestigious Newton International Fellowship is Julian Mauricio Londono Monsalve from Colombia, currently completing his PhD at the University of Naples. He will be hosted by Professor David Wragg at Bristol University.

The aim of his project is to develop new damper systems for the protection of buildings from earthquake damage, by radically improving the energy dissipation capacity and reliability of traditional dampers. The research will consist of mathematical analysis, numerical simulation and laboratory-based experimental work. The project will benefit from access to the university's Earthquake Engineering Research Centre laboratory facilities and their experienced team of technical support staff.

The research is expected to result in prototypes of more efficient structural control systems. These enhanced systems could be used to protect important buildings and key structures from earthquakes, resulting in safer buildings in seismically active regions. Ultimately this could help to reduce the human cost in terms of death and injury, and create a more sustainable infrastructure which can be repaired and re-commissioned with lower cost and increased confidence.

The full list of Fellowships awarded is available at www.raeng.org.uk/international. Details of the next round of the scheme will be announced in early 2011.

POLICY AND PUBLIC AFFAIRS

Engineering the future hosts new MPs' reception in Parliament

MPs and Peers met with leading engineers in Parliament on 30 June at a reception hosted by the *Engineering the future* alliance of engineering organisations. The meeting, attended by over 30 parliamentarians of all parties, provided an opportunity to learn about the key contribution that engineering can make in addressing the challenges currently facing the UK.

Issues discussed included the need to rebalance the economy, the role of manufacturing, the development of a sustainable infrastructure and the low carbon economy.

Professor Christopher Snowden FEng, President of the IET and Vice-President of the Academy, spoke on behalf of *Engineering the future*, telling the capacity audience that "The major challenges facing the

world today all depend critically on engineering solutions to bring about

large scale change. Key to ensuring the UK's economic success will be making tough decisions now, such as targeting investment in science and engineering to enable us to remain competitive in global markets."

Kate Bellingham, former *Tomorrow's World* presenter and National STEM Careers Coordinator for the Department for Education, spoke of her work with young people to raise the profile of engineering and of the need to support appropriate routes for education and training.

Andrew Miller MP, the new Chair of the Commons Science and Technology Select Committee, also addressed the meeting and underlined the importance of the engineering contribution to the UK. "Engineering improves human life and is vital to society; engineering advice to government is critical," he said.

For more information on *Engineering the future*, please contact Tim Julier: tim.julier@raeng.org.uk

Kate Bellingham (left). Alison Seabeck MP with Andrew Furlong, Director of Policy & Communication at the Institution of Chemical Engineers (above).



Meeting on autonomous systems

In the fields of military and medicine, and from the transport system to the home, autonomous systems are being embedded in the technological architecture. Control systems capable of learning and adaptation, not reliant on external agents for direction, are already emerging in areas such as robotic surgery, aerial surveillance and telemedicine. These systems raise challenges for engineers, industry, regulators and wider society alike. They offer significant benefits in terms of potentially increased safety and reliability of systems but they pose risks through potential failures that could lead to unforeseen consequences.

They do not sit neatly in current regulatory frameworks, nor in social and conventional frameworks, raising

questions of who would be accountable should those failures occur, and who is responsible for avoiding those failures in the first place.

At a meeting hosted by University College London's Centre for Ethics and Law on 9 September, speakers representing the interests and concerns of the engineering industry, regulators and the wider public discussed the challenges of governing the use of autonomous systems. Chaired by Professor Maria Lee of UCL, the meeting opened with a talk by Professor Noel Sharkey, Judge of *Robot Wars* and joint-recipient of the Academy's Rooke Medal for the Public Promotion of Engineering, who outlined the many applications of autonomous systems, from the everyday to the ethically challenging.

Academy Fellows Lambert Dopping-Hepenstal and Dr Chris Elliott, respectively gave talks exploring the

risks and opportunities of autonomous systems to industry, and the hazards and benefits of their deployment in the military.

The level of debate at the meeting demonstrated that this area raises many thorny issues. A detailed exploration of some of the dilemmas to be navigated will feature in the December issue of *Ingenia* magazine.



Unmanned air vehicles are an example of an autonomous system

Summer in the news

The excellent coverage achieved for the Academy's report on electric vehicles and the infrastructure required to support them continued to generate further media coverage all through the summer. An extensive feature in the *Mail on Sunday* magazine in August set out the Academy's conclusions and featured interviews with Fellows Professor Roger Kemp, Dame Sue Ion OBE and Richard Parry-Jones.

The Academy's advice to government on future priorities for research led to considerable debate in the media, including in the *Financial Times* and the *Independent*. Further debate was generated in various electronic and broadcast media, including on Radio 4's consumer programme *You and Yours*.

The Times carried a series of engineering articles in July that covered a variety of topics including the work being done to reverse the low take-up of science subjects by girls and of young women enrolling onto engineering apprenticeships. There was also an extensive interview with Philip Greenish CBE following the launch of a survey by BAE Systems which called for a high level debate around the engineering skills agenda.

Nuclear lessons learnt report

A report will be launched in November that investigates the lessons to be learnt from recent and current nuclear build projects relevant to the proposed new nuclear power plant programme in the UK. The report was commissioned by the Office for Nuclear Development and will be published under the *Engineering the future* banner.

The bulk of the work was carried out by a team from Lancaster University and includes analysis of a number of projects including Olkiluoto in Finland and Flamanville in France. The most significant lessons that will be reported include the need for high quality personnel from the lead engineers through to the sub-contractors; the design and licensing issues that need to be resolved before the start of construction; and the fact that first-of-a-kind plants are more expensive and take longer to build need to be considered.

Out in force at the Cheltenham Science Festival

The Academy has been working with the Cheltenham Science Festival for the last four years, helping to build its engineering profile. This year, the Academy was a major sponsor of the Festival, which took place from 9-13 June.



Professor Roger Kemp FREng and Robert Llewellyn discuss electric vehicles at the Cheltenham Science Festival.

Three of the Academy's Festival debates are now available to watch on video or listen on podcast at: www.raeng.tv

In his session *Electric dreams: the future of cars*, Professor Roger Kemp FREng discussed the findings from the Academy's latest policy report on electric cars and debates the pros and cons of running battery-powered vehicles.

Professor Roger Falconer FREng raised public awareness of the recent findings of the *Global Water Security* publication,

Research collaboration

The Academy responded to an inquiry from Research Councils UK on successful collaborations between research institutions and industry. Fellows were able to provide examples of a large number of such collaborations including the Academy's own Research Chairs and Senior Research Fellowships, as well as large university/industry initiatives such as Rolls-Royce University Technology Centres. Successful business spin-outs including ARM Holdings and Surrey Satellite Technology Ltd were also highlighted in the report *Research for our future* as were more diverse, multi-disciplinary approaches such as Mobile VCE which links leading IT companies with a number of UK universities.

The inquiry also asked for the key criterion required to nurture such collaborations. The main criteria identified was that the research must be world-class in standard, especially given increasing levels of global competition in academia and the multinational nature of business. To support and maintain such a standard a number of additional issues were highlighted such as sufficient funding, clarity of purpose, high quality personnel and intellectual property rights.

The Academy's response concluded that if these criteria are properly addressed there is no reason why the UK can't continue to benefit from successful and lasting research collaborations between industry and academia.

the first report produced by *Engineering the future*, a broad alliance of professional engineering bodies.

In *Engineering the Paralympics*, Dr David James, the first awardee of the Academy's Public Engagement with Engineering Fellowship, debated whether allowing disabled athletes to compete against non-disabled athletes would hinder the potential of engineered-enhanced Paralympians to excel.

Three further Academy Fellows took part in festival activities: John Armit CBE FREng, spoke in a debate about the sustainability of the London 2012 Games; Professor Chris Bishop FREng delivered a spectacular interactive presentation for family audiences on intelligent machines and Professor Brian Collins FREng discussed the challenges of developing an intelligent transport system.

The Academy also supported the festival through its *Ingenious* grants programme. An *Ingenious*-funded interactive exhibition focusing on wind and solar power took place in the festival's discovery zone. An *Ingenious*-funded five-day masterclass, delivered by the festival organisers, provided intensive public engagement training for 12 early-career engineers.

The Academy funds such activities to seed and foster the growing community of engineers with enhanced communication skills, who value public engagement and who are proactive in taking part in activities. The closing date for the next round of *Ingenious* is 29 October 2010. For more information, see www.raeng.org.uk/ingenious

Contact: lesley.paterson@raeng.org.uk

AWARDS

The Sustained Achievement Award

The Academy awarded the 2010 Sustained Achievement Award to Fellow Alan Powderham (see photo on page 2). In a career spanning over 40 years, he has brought engineering excellence to numerous projects setting new industry benchmarks in foundation engineering. His solutions have been described as dramatic and adventurous. Yet central to his approach is safety and value - he has a passion for relating theory to design and design to construction.

In his determination to promote engineering excellence, Alan Powderham has pioneered the combination of the observational method and value engineering, stimulating a renaissance in the former during the construction of the Channel Tunnel in the 1980s. This success was soon followed by the Mansion House and Limehouse Link, the latter being cited as the UK's prime example of value engineering in civil engineering in the early 1990s. He also superbly displayed UK engineering expertise in the US on the Boston Central Artery jacked tunnel project - the biggest of its kind in the world.

The Sir George Macfarlane Award

Will Machin, Team Manager, Plant & Process Engineering at the National Nuclear Laboratory (NNL) has been awarded the 2010 Sir George Macfarlane Award. The Award recognises the potential of younger UK engineers, who have demonstrated excellence in the early stage of their career.

Will Machin has scored several significant firsts; in 2006, he was the youngest ever delegate on the NNL's Management Development Programme, he became the lab's youngest chartered engineer in 2007 and in 2010 his outstanding qualities were rewarded by his appointment as the NNL's youngest Technical Manager, a role in which he leads the professional engineering staff at the NNL's offices in Warrington.

Will Machin mentors NNL's younger engineers and he has also been appointed Visiting Senior Fellow at the University of Liverpool where he supervises design projects on the Masters Programme.



Will Machin receiving his award from Lord Browne of Madingley FEng FRS

EVENTS

Forthcoming Events

4 October 2010, 6.00pm
Lecture Series in Mobile Telecommunications & Networks
Title: The art and science of social computing
Speaker: Natasa Milic-Frayling
Venue: 3 Carlton House Terrace
Contact: helen.berrington@raeng.org.uk

12 October 2010, 6.00pm
The 2010 Hinton Lecture and Dinner
Title: Back to the Big Bang - the Large Hadron Collider
Speaker: Dr Lyn Evans CBE FRS, Project Leader, Large Hadron Collider
Venue: The Royal Institution, W1S 4BS
Contact: helen.berrington@raeng.org.uk

19 October 2010, 6.00pm
Prime Innovator Lecture II
Title: Commercialising meaning based computing
Speaker: Dr Michael Lynch OBE FEng
Venue: 3 Carlton House Terrace
Contact: helen.berrington@raeng.org.uk

8 November 2010, 11.00am
New Fellows' Briefing
Venue: 3 Carlton House Terrace
 Followed at 6:45pm by
New Fellows' Dinner
In the presence of the Senior Fellow
Dinner Venue: Drapers' Hall, EC2N 2DQ
Contact: amy.abbott@raeng.org.uk

Events and dates listed are accurate at the time of printing. Please see the Academy website for more events and up to date information.

Awards Nominations

Applications are now being received for the following 2011 prize:

The Royal Academy of Engineering ERA Foundation Entrepreneurs Award

This prize fund has been established to identify entrepreneurial researchers, working in UK universities in the field of electro-technology, who are at an early stage in their career. The award will be presented to an individual or team demonstrating considerable entrepreneurial promise and the potential to benefit the UK's future prosperity.

Closing date: 11 October 2010

The following 2011 Awards are now open for nominations:

The President's Medal

This medal is awarded, biennially, to an organisation or individual, that has contributed significantly to the Academy's aims and work through 'initiative in promoting excellence in engineering'.

The Sir Frank Whittle Medal

This medal is awarded to an engineer, normally resident in the UK, for outstanding and sustained achievement which has contributed to the well-being

of the nation.

The field of activity changes annually. In 2011 the medal will be awarded for 'Engineering Innovations in Transport'.

The Silver Medal

This medal recognises an outstanding and demonstrated personal contribution to British engineering, which is resulting in successful market exploitation, by an engineer working in the UK. Up to four medals may be awarded in any one year.

Closing date: 1 November 2010

For more information, including how to submit a nomination visit www.raeng.org.uk/prizes

DEVELOPMENT

Spreading the campaign message

Having successfully completed a series of six *making things better* campaign dinners each hosted by a member of the campaign board, the Academy has held its first dinner outside England. The dinner, held in Belfast in July, was hosted by Past President Lord Broers FREng FRS at the Northern Ireland Science Park on the theme *Catalysing and connecting for economic recovery: the role of socializing innovation*. Professor John McCanny FREng, at Queen's University Belfast Institute of Electronics Communications and Information Technology, hosted a reception and welcomed Professor Mary Walshok of the University of California San Diego, who made a presentation at the dinner.

The event brought together business leaders such as Lord Ballyedmond and Sir George Quigley, as well as local innovators such as Dr Peter Fitzgerald, former MacRobert Award winner, to exchange views and to learn about the role the Academy could play in rebalancing the local economy through engineering.

The next campaign dinner will be in Scotland on the theme *Engineering: Powering Scotland forward*; a dinner is also being planned in Wales.



Attendees at the Northern Ireland campaign dinner hosted by Lord Broers and held at the Titanic Quarter in Belfast.

Professional skill development supported by the Comino Foundation

The Academy has recently announced that David Lim, a researcher in the School of Construction Management and Engineering at the University of Reading is to be the recipient of the Comino Foundation Research Student Development Fellowship. With a financial value of £10,000, this award will enhance and complement his technical skill set through enabling additional opportunities and activities that will add value to his investigative ability and overall capability as a researcher.

The Academy is grateful to both the Comino Foundation for their generosity

and to Dr Eric Duckworth OBE FREng for his help in securing this support.

Energy efficiency at the Academy

The Academy has separately commissioned David Lim to gather data to inform a carbon reduction strategy in its offices at 3 Carlton House Terrace. This has involved an audit of energy usage of Academy staff. This study will investigate the technological, behavioural and economic feasibility of various interventions. It is hoped that the results will lead to further research in developing a proposal for a behavioural code of conduct for occupants of Grade 1-listed buildings.

David Lim will present his findings at a talk on 22 September, as part of the Academy's programme for the London Design Festival.

Upcoming Development campaign dinners

Date: 25 October

Title: *Engineering: Powering Scotland forward*

Host: Dr Gordon Masterton OBE FREng FRSE

Date: 1 November

Title: *Engineering quality solutions to 21st century biomedical challenges*

Host: Lord Darzi KBE HonFREng

Date: 25 November

Title: *Hidden Masters: Celebrating the role of engineers*

Host: Lord Browne of Madingley FREng FRS and Viscount Linley

To find out more about the Academy's *making things better* campaign go to:

www.raeng.org.uk/development/default.htm or contact the Development

Team on 020 7766 0657.

EDUCATION

TEP training

In July, the Academy and the Technology Enhancement Programme (TEP) built on earlier collaborations to develop and deliver three regional training events for practitioners of the Advanced Diploma in Engineering. The three events took place in London, Nottingham and Manchester and focused on the Level 3 topics of Instrumentation and Control (Principal Learning Unit 4) and Maintenance (PLU 5). The Technology Enhancement Programme is an established and prestigious programme aimed at supporting and improving the teaching and learning of technology in schools and colleges and currently based within Middlesex University.

Ideas for practical learning activities feature highly on the wishlists of Engineering Diploma practitioners. The training delivered by the Academy focused on using resources, kits and components from TEP and Middlesex University to create practical activities for teachers and lecturers to use with their learners.

The training was generously aided by supporters from industry who provided the venues for the events. The London event took place at the London Transport Museum's Depot at Acton and included a tour of their collection of artefacts, control systems and vehicles. The Nottingham event took place at E.ON Energy's coal-fired power station at Ratcliffe-on-Soar and included a tour of the power station's control room and turbine hall. Siemens were the hosts in Manchester, where delegates were given a detailed tour of Siemens' cutting edge programmable logic controller products and systems, followed by a tour of their train care centre.

Some forty teachers and lecturers attended the CPD events. Many delegates commented on the effectiveness of the resources now available as a result of the collaboration between from the Academy, TEP and Middlesex University and how they could use them with their own Engineering Diploma learners.

The plan now is to build on this success to develop more CPD that responds to the needs of Engineering Diploma practitioners.

National Higher Education STEM Programme update

During the first call for engineering activities under the National Higher Education STEM Programme, the Academy funded eight HE innovation projects. Three of these involve employer engagement. There are also three education research projects one of which involves employer engagement. A summary of all the funded projects and application procedure are available at www.thelep.org.uk/national/calls The Academy has also funded six engineering outreach projects, one in each of the programme's regions.

The second call for engineering activities is now open and will close on 29 October. Under this call, the Academy invites proposals from any English and Welsh institution for curriculum innovation (including employer engagement), education research and engineering for society projects.

In collaboration with the Higher Education Academy Engineering Subject

Centre, the Academy also ran an event called *Engineering graduates for industry: enhancing effective practice in employer engagement* earlier in September. The recent Academy report, *Engineering graduates for industry* stated that: "Sustainable, world-class, experience-led HE engineering degree programmes which attract the best students are an essential element to meet the graduate recruitment needs of industry".

This seminar provided an opportunity for employers and engineering academics to develop ideas on how to build effective collaborations in engineering degree programmes.

The team is working to organise one workshop in each of the six programme regions during September and October. A definitive programme about these workshops will be available soon at www.thelep.org.uk/national/engactivityseminars/upcomingevents

For more information, visit: www.thelep.org.uk/national or contact HE STEM team at: HESTEM@raeng.org.uk

E4E update

In the wake of the closure of the Qualifications and Curriculum Development Agency, there is concern over maintaining standards and regulation of curricula, qualifications and assessment.

Education for Engineering (E4E), the Academy hosted body that offers engineering education advice to government and the devolved National Assemblies, therefore jointly convened a meeting of STEM organisations to discuss the formation of subject standing committees for STEM curricula. Along with ACME (Advisory Committee on Mathematics Education) and SCORE (Science Community Representing Education), E4E is now arranging meetings with officials from the Department for Education to learn more about the new structure they are proposing. E4E will present the case for the science, mathematics and engineering communities to be engaged in the review of the national curriculum and support the development of the curriculum.

New Academy lapel badges

Two Academy Fellows have generously funded the design and production of lapel badges. The badges feature the old style Academy monogram logo with a single script cypher RAEng within an oval in gold on a plain background. They are available in two colours, maroon or navy blue. The lapel badges measure 16 mm by 11 mm, are priced at £10 each and are uniquely for Fellows.

To order a lapel badge contact janet.weekes@raeng.org.uk
The full range of Academy ties and brooches are displayed on the Fellow's area of the Academy's website.



An initiative to link Science, Engineering, ICT and Health

The Academy is now hosting the new Technician Council, a joint initiative intended to raise the profile of Technicians in the UK. It includes members of the engineering, science, ICT and health communities and is funded by the Department for Business, Innovation and Skills (BIS).

The Technician Council is chaired by National Grid Chief Executive Steve Holliday FREng and had its first meeting in July. The Council was formed in response to the findings of a group, led by Lord Sainsbury, that included The Gatsby Charitable Foundation, The Engineering Council, The Science Council, EngineeringUK, the Department of Health, the National Apprenticeship Service, the UK Commission for Employment and Skills and the Academy. The aim is to develop and secure the UK's STEM based sectors by encouraging the training, support, development and recognition of technicians.

In many areas, such as the transportation and petrochemical industries, technicians account for well over half the workforce. Without them, many industries which drive the UK economy would cease to function.

The Further Education team at BIS is encouraging the Technician Council to provide a catalyst for the engineering science, ICT and health communities in their work to provide opportunities for progression for people in vocational occupations, and upskilling the workforce.

All have a keen interest in the career development of hundreds of thousands of skilled and semi-skilled employees and by working together will ensure that technicians know which qualifications are in demand, and where to find employers that require them.

For more information please contact David Ozholl at the Academy:
david.ozholl@raeng.org.uk

Ove Arup Foundation Visiting Teaching Fellowships

The first tranche of Ove Arup foundation funded Visiting Teaching Fellows will take up their appointments this autumn. Funded by the Ove Arup Foundation, the appointees will focus on enriching the undergraduate engineering teaching curriculum in all aspects of engineering design with particular emphasis on sustainable development, systems, innovation, building engineering physics and the built environment.

Interest in this programme was considerable and the subsequent standard of applications extremely high. Not only does the programme

underline the Academy's commitment to experience-led teaching but also strengthens its efforts to forge industry-academia links.

Those appointed as Visiting Teaching Fellows include senior engineers from Doosan Babcock, Arup, Buro Happold, Ramboll UK, Halcrow, Edenvale Young, Environmental Perspectives and RPS. They will be hosted at Bath, Bristol, Cambridge, Edinburgh, Heriot-Watt, Manchester, Nottingham, UCL, Queen's Belfast and Sheffield universities.

The initiative has been made possible by the Academy's *making things better* campaign. The Academy is extremely grateful to the Ove Arup Foundation and to Dr Michael Shears CBE FREng for facilitating this opportunity.

Young women engineers visit the Academy

After the success of last year's Headstart course held at the Academy, 16 more young women benefited from two days of pre-university skills training.

The course is run exclusively for female students who are about to embark on an engineering degree and who have previously taken part in a Headstart residential course. Led by experienced female mentors, it covers such topics as learning presentation skills, developing effective negotiating skills and devising personal development plans.

The participants also visited the Centre for Efficient and Renewable Energy in Buildings at London South Bank University to learn about new, innovative solutions being developed to reduce CO₂ emissions and were addressed by past Engineering Leadership Advanced awardee, Suria Ismail of Arup.

Headstart is a well-established education programme run by the EDT (Engineering Development Trust), the aim of which 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.



Headstart students preparing for their group presentations on renewable energy

News of Fellows

Professor Dinos Arcoumanis FEng was awarded an honorary Professorship by Tianjin University, China.

Professor John Davidson FEng FRS was presented with the Prince Philip Medal.

Professor Dame Ann Dowling FEng FRS has been appointed Panel Chair for the Research Excellence Framework.

Professor Dame Wendy Hall CBE FEng FRS has been appointed Dean of the new Physical and Applied Sciences Faculty at the University of Southampton.

Professor Andy Hopper CBE FEng FRS has received an honorary degree at Queen's University, Belfast.

Dame Sue Ion OBE FEng gave the 2010 Duncan Davies lecture.

Sir David McMurtry CBE FEng received an honorary fellowship from Cardiff University.

Norbert R. Morgenstern FEng FRSC has been awarded the 2010 Schuster Medal.

Dr John Roberts CBE FEng has been appointed Chairman of Halite Energy.

Professor Brian Spalding FRS FEng has received the 2010 Benjamin Franklin Medal in Mechanical Engineering.

Sir William Wakeham FEng has spent August touring universities in India on behalf of the Academy.

Professor Philip Withers FEng has been awarded the Armourers and Brasiers Award.

Professor John Wood CBE FEng was made an Officer of the Order of Merit of the Federal Republic of Germany.

Obituaries

Dr John Collingwood FEng died on 24 July at the age of 93. Before his retirement he was Director in Charge of Research at Unilever plc.

Professor James Dooge FEng died on 20 August at the age of 88. At the time of his death he was a Research Consultant, Centre for Water Resources Research at University College Dublin.

Mr James Gray FEng died on 3 August at the age of 84. Before his retirement he was Chief Engineer, Generation Design and Construction, South of Scotland Electricity Board.

Professor William Johnson FEng FRS died on 13 June at the age of 88. Prior to his retirement he was Emeritus Professor of Mechanics at the University's of Manchester and Cambridge.

Mr Charles Spencer King CBE FEng died on 26 June at the age of 85. At the time of his death he was a consultant for Spen King and Associates.

Dr Adrian Robin John Mills Lloyd FEng died on the 9 September at the age of 69. He was formerly Senior Principal Scientific Officer for the Defence Research Agency, Maritime Division, Haslar.

Professor Sir Frederick Warner FEng FRS died on 3 July at the age of 100. He was formerly a Visiting Professor, Department of Biological and Chemical Sciences, University of Essex and a Founder Fellow of the Fellowship of Engineering.

To read personal tributes to former Fellows or contribute an expression of your appreciation of another Fellow's life, you can visit www.raeng.org.uk/appreciation

Staff News

Margaret Stewart is retiring from the Academy after 16 years' service. She joined as Finance Assistant and was promoted to Finance Manager two years later.

Wendy Lewis has joined the Academy as Chef / Manager. Previously she worked for high-profile firms in the City.

Karen Russell, Finance Assistant, left the Academy in August after 10 years' service.

Melanie Washington has rejoined the education team after a year on maternity leave. Melanie will resume her role of Project Manager for the BAE Systems funded Engineering Engagement Project.

Heather Williams, Project Director HE STEM Programme, gave birth to Isla Scarlet McKay Williams on 15 July.

Jenny Young has joined the FE and HE Team within the Education Department as maternity cover for Heather Williams. Previously she worked at BAE Systems as Systems Engineering Manager.

Sonia Teague has joined the Academy as Head of Finance. Previously she worked at the Horse Race Betting Levy Board as Head of Finance.

Contact

If you would like to find out more about this newsletter or make a contribution, contact: Juliet Benning (Editorial Assistant) at juliet.benning@raeng.org.uk or **020 7766 0645**

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