



Engineering education in Africa

On 20 and 21 November, the annual Visiting Professors and Visiting Teaching Fellows' conference took place in Birmingham. The conference was attended by more than 40 engineering academics and industry leaders. In recent years, more than 200 Academy Visiting Professors and Visiting Teaching Fellows with significant industrial experience have used their expertise to enhance teaching and learning at more than 50 universities across the UK. In 2013, this model of secondment inspired an international adaptation of this programme by the Academy, focused on enriching engineering education in sub-Saharan Africa.

The aim of this year's Visiting Professors and Visiting Teaching Fellows conference was to look back over the life of the programme and ask: 'how do we know we have made a difference?', informed by the evaluation of the programme recently completed by the consultants Technopolis.

Among the speakers were Professor Wilson Nyemba, Dean of Engineering, University of Zimbabwe, and Professor Bavo Nyichomba, Associate Professor, University of Dar es Salaam, Tanzania, who lead the African adaptation of the programme.

Supported by Anglo American Group Foundation, this programme facilitates two-way, high level exchanges between higher education institutions and locally based industry. The programme aims to enhance the employability of graduates of engineering institutions by bringing engineering curricula in universities in line with current industrial practice, and improving teaching practices in engineering, through structured and strong partnerships between academia and industry.

The programme is based on a 'hub and spoke' model. The University of Zimbabwe and the College of Engineering and Technology at the University of Dar es Salaam are 'hub' institutions which began the two-year programme in the summer of 2013. Following academic and industry exchange

placements, workshops are held to ensure the learning is spread throughout 'spoke' universities in Uganda, Kenya, Botswana, Mozambique, Namibia and elsewhere in Zimbabwe.

Africa faces a range of major challenges which practical, innovative engineering solutions can help to address. Sub-Saharan Africa suffers from a serious and persistent lack of engineering capacity, as evidenced by this Academy's 2012 report *Engineers for Africa: Identifying capacity needs in sub-Saharan Africa*. The report found that 'low engineering capacity' was more accurately described as an inadequate number of engineers with sufficient skills and experience than as an insufficient number of engineers. The predominant reason identified in the report was that engineers were graduating without the necessary skills and expertise to be employable. Among the factors cited were courses and curricula that were seen to be too theoretical, outdated, and not relevant to local needs, and a lack of work placement opportunities for students. The Enriching Education in sub-Saharan Africa programme was created to help solve these problems, building on the legacy of the Academy's Visiting Professors and Industrial Secondment programmes in the UK.

The African adaptation of the Visiting Professor scheme was just one of many positive impacts cited by participants at the Visiting Professors and Visiting Teaching Fellows conference in Birmingham. Overall, it was felt the scheme has been a great success with significant input into teaching across those universities that have had the support of Royal Academy of Engineering Visiting Professors and Visiting Teaching Fellows.

▲ Professor Wilson Nyemba, Dean of Engineering, University of Zimbabwe speaking at the Visiting Professors' conference in Birmingham

President's column



Professor Dame Ann Dowling DBE FREng FRS

Following on from the recent adoption of our new Charter and Statutes, the Academy's new Trustee Board met for the first time on 20 October. One of the first major pieces of work that will be overseen by the Trustee Board is the development of a new strategic plan for the Academy. Gathering views and much valuable input from both external and internal stakeholders is a critical part of the development of the plan and I would like to thank Fellows who sent in comments to inform this process.

I am delighted that Professor Richard Williams OBE FREng and Allan Cook CBE FREng have both been elected by the Trustee Board as Vice Presidents, with responsibility for Fellowship engagement and coordination of the standing committees respectively. They join Professor Sir William Wakeham FREng who continues as Vice President with the remit of overseeing the implementation of the governance changes. In the new year, Richard Williams will be asking all Fellows to participate in an online survey with the aim of developing a better understanding of how Fellows would like to engage with the Academy. The survey will encompass working with the Academy, communications to and from the Academy and Fellows' interest in events both in London and regionally. I am keen to continue Sir John Parker's regional visits and want to make sure that we do that in a way that most suits our Fellows, companies and universities.

Recently I had the pleasure of being the host for an Academy event in which we debated whether we should take the 'E' out of 'STEM'. The evening was a lot of fun but asked a serious question - should we rebrand engineering, promoting its creativity and humanitarian aspects, rather than marketing it as a scientifically and mathematically-driven endeavour?

The need to ask the question arises from the fact that, while there are many excellent activities and programmes encouraging young people to take an interest in engineering, we still need a dramatic increase in the numbers of students who are inspired and go on to pursue a career in engineering. Positive change is happening; we know that from robust data showing that perceptions towards engineering and engineering careers are improving across all age groups. But it is not yet happening at the pace and scale we need in order to

prevent the UK from giving away real economic value in the future because of a shortage of engineers.

There were many strong views expressed in the debate on how we should address this issue, but one aspect that we all agreed on is that engineering requires a suite of skills, not just those related to the application of science and maths. So I am delighted that the exhibition *Engineer Your Future* is just about to open at the Science Museum for a period of three years. The Academy had a central role to play in this exhibition that brings together funding and creative input from a number of engineering companies and the Department for Business, Innovation and Skills. Visitors to the exhibition will be able to take part in a number of engaging activities that demonstrate the skills that engineers use every day, such as teamwork and problem solving. The exhibition will also enable visitors to 'travel' through a futuristic cityscape, meeting people working across many engineering sectors, from energy generation, transport and health to creating digital effects in filmmaking.

One of the challenges of branding engineering is that it is so diverse - its ubiquity and pervasiveness can, paradoxically, render it invisible. Indeed, a recent report - the *Universe of Engineering*, published by the Engineering the Future policy alliance led by the Academy, shows that the profession has undergone profound changes over the last 15 years. Engineering is now making an even greater contribution to society and the economy and engineers are now needed across an increasingly diverse range of fields, from the development of smart materials to drug delivery systems and brain imaging. The report makes it clear that we need to do better at representing the breadth of 21st century engineering in our communications and marketing if we are to inspire more young people into choosing engineering careers. The report is a call to action for all of us.

Meetings and visitors

In her capacity as President, Dame Ann Dowling has met:

Martin Donnelly, Permanent Secretary BIS

Mark Hunt, Chief Executive and President of IMechE

Paul Kahn, President, Airbus Group UK

Sir Paul Nurse HonFREng, President of the Royal Society

Lord Stern, President of the British Academy

Sir Mark Walport, Chief Scientific Adviser

New Fellows' briefing



On 17 November, the Academy welcomed new Fellows to the Academy. This year, 59 new Fellows were elected: 51 new Fellows, one new Honorary Fellow and seven new International Fellows.

During the afternoon, new Fellows were invited to Prince Philip House to be briefed on the work of the Academy and the ways in which Fellows can get involved. They were

then officially inducted in a short ceremony at the annual New Fellows' Dinner, held at London's Drapers' Hall.

On arrival at Drapers' Hall, new Fellows were asked to swear the oath and sign the Academy roll book before being presented with their Fellowship scrolls by the Senior Fellow, HRH The Duke of Edinburgh. Following the dinner, the new Fellows were addressed by the President and The Duke of Edinburgh, and the new Fellows' response was given by Steve Cowley FEng, Chief Executive Officer of the UK Atomic Energy Authority.

▲ The Senior Fellow, HRH The Duke of Edinburgh; Academy President, Professor Dame Ann Dowling DBE FEng FRS and Royal Fellow HRH The Princess Royal with the 2014 International Fellows

QEPrize Ambassadors



▲ Fashion show with wearable technology by CuteCircuit at the QEPrize Ambassador Network launch

The Queen Elizabeth Prize for Engineering (QEPrize) Ambassador Network is an international network of young engineers. It was launched on 6 November, with a themed party at Prince Philip House that celebrated modern engineering.

The guests, who included young professionals from all engineering disciplines, were greeted by RoboThespian, a humanoid life-size robot, before exploring several different engineering-themed installations. From virtual reality experiences to a Lego play area, 3D

printing pens and a fashion show, the party set the tone of collaboration and creativity that is a feature of the Ambassador Network.

QEPrize Chairman Lord Browne FEng FRS, with Create the Trophy competition judges Professor Mark Miodownik FEng and Roma Agrawal, met the competition finalists, whose 3D-printed trophies were on display. The winner was Euan Fairholme, a fourth-year mechanical engineering student from the University of Glasgow.

To learn more about the QEPrize Ambassador Network, go to: <http://createthefuture.qeprize.org/qeprize-ambassadors>

Trustee Board

The first meeting of the newly elected Trustee Board took place on 20 October at Prince Philip House. The meeting was chaired by Professor Dame Ann Dowling DBE FEng FRS, the Academy's President. The Board made a number of appointments. Professor Sir William Wakeham FEng was co-opted as a trustee for one year and appointed Vice President to oversee the implementation of the recommendations that emerged from the recent governance review. Dame Ann was appointed Chair of the Nominations Committee and Chair of the Remuneration Committee. Allan Cook CBE FEng was appointed Vice President to oversee the coordination of the Academy's operating committees. Professor Richard Williams OBE FEng was appointed Vice President to oversee Fellowship engagement with the Academy. Dr Mike Howse CBE FEng was appointed Chair of the Audit and Risk Committee.

The Board received reports from Professor Helen Atkinson CBE FEng, Chair of the Education and Training Committee; and Professor Martyn Thomas CBE FEng, Chair of the External Affairs Committee.

The approved minutes of Trustee Board meetings will be made available on the Fellows' area of the Academy's website.

Energy and natural resources

Counting the cost

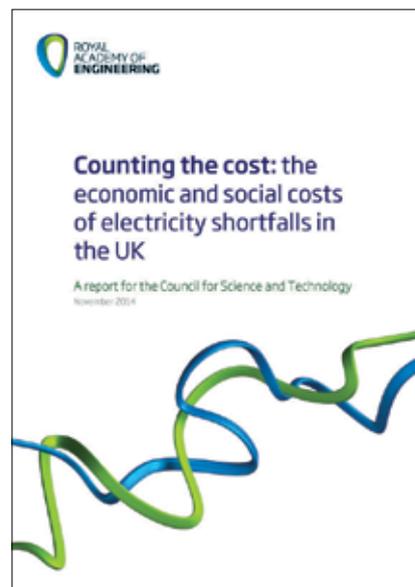
Last year, the Academy investigated the GB electricity capacity margin on behalf of the Prime Minister's Council for Science and Technology. A follow-up report, *Counting the cost: the economic and social costs of electricity shortfalls in the UK*, was published in November.

The objective of this report was to assess the available evidence on the potential costs of electricity shortfalls. This is useful because it helps policymakers to understand the cost/benefit trade-off between investing in greater levels of capacity and resilience to disruption. Several recent real

world case studies of blackouts were considered as part of the study.

The report found that any significant interruption to electricity supply in the UK would have severe economic consequences. This is especially true as the UK is becoming rapidly more dependent on electricity. Networks, processes and value chains are also becoming increasingly complex and interdependent. Measures used to evaluate the value of lost load were found to be highly uncertain, depending on the sector affected as well as the time, frequency and duration of the event. For this reason, the report concluded that a more robust assessment of the costs of electricity shortages should be developed.

The report is now available at: www.raeng.org.uk/countingthecost



Battle of Ideas

Once again, the Academy supported *Battle of Ideas*, the annual festival of public discussion and debate held at London's Barbican on 18 and 19 October.

The Academy sponsored the debate, *Energy futures: how can we keep the lights on?*, drawing on its recent report on the electricity capacity margin and previous work on the future of the UK's energy system.

Dr Alan Walker, Head of Policy, joined an expert panel that discussed how the UK could address the 'trilemma' of a low carbon, secure and affordable energy system.

Technology and society

Born to Engineer

The ERA Foundation's *Born to Engineer* campaign and website aim to encourage young people to pursue engineering careers. As part of the campaign, two Academy-supported researchers, Dr Andrew Robertson and Dr Eleanor Stride, have made videos about their work.

Dr Robertson is a computer software engineer who has designed a system to allow bands to drive the tempo of their live music performances, without depending on a click track.

Dr Stride works to create and control micro-bubbles that can be injected into the bloodstream of cancer patients, magnetically guided to the site of the cancer and then be burst using ultrasound, releasing chemotherapy



▲ Dr Eleanor Stride

drugs at the site of the cancer. Her approach could avoid the widespread destruction of healthy cells that is unavoidable with present treatments.

Their videos and others in the series can be viewed at:

<http://tinyurl.com/oh2eeuy>

For more information about the campaign, visit: www.borntoengineer.com

Health apps

On 19 November, the Academy held a joint meeting with the Academy of Medical Sciences on *Health apps: regulation and quality control*. The meeting was jointly chaired by Dr Martyn Thomas FREng and Professor Lionel Tarassenko FREng.

The recent and ongoing expansion of health apps constitutes an emerging grey area for regulation with unresolved issues for regulators, app developers and users. This meeting brought together software developers, distributors, accreditors, academics, clinicians and policy representatives with regulators to foster cross-disciplinary solutions. This included Apple and developers of the first two healthcare apps to be approved by the MHRA and FDA.

After identifying some of the key challenges emerging from the current UK regulatory system, the meeting proposed potential solutions to create a clearer and better connected process to regulate health apps.

Stoke Engineering Project

As part of the Stoke Engineering Project's expansion to work with feeder primary schools, the Academy has recently completed the delivery of 10 continuing professional development (CPD) days. The full-day sessions saw pupils from reception through to Year 6 participating in hands-on engineering-based activities that ranged from making their own periscopes to making models of the London Eye and Tower Bridge. The activities were designed to link engineering with literacy and numeracy.

The CPD days were designed to build the confidence of primary school teachers, to help them deliver a hands-on, practical and engaging STEM curriculum. After shadowing the sessions for students, teachers then received their own CPD session.



▲ Primary school teachers from the Star Academy (sponsored by the Academies Transformation Trust) taking part in a CPD event

Diversity Leadership Group

The Academy's Diversity Leadership Group (DLG), which brings together 40 engineering employers and employer-led organisations, is working on diversity benchmarking across participant companies. Another of its projects is a common evaluation of career perceptions following industry-school engagement. The DLG is also preparing work experience guidance to support and increase diverse participation. This will dovetail with output material being produced by the task and finish groups that the Academy convened to help implement the review of engineering skills by Professor John



Perkins FREng. In addition, the DLG is collecting case studies to spread good practice in diversity and inclusion.

The early career subgroup met at the Academy in early September and

presented their own plans to stimulate diversity in engineering to Allan Cook CBE FREng, DLG Chair. Their ideas will be integrated into the DLG action plan.

▲ Allan Cook CBE FREng with members of the DLG early career subgroup

Diversity Concordat



The Engineering Diversity Concordat is a voluntary agreement prepared by the Academy between professional engineering institutions (PEIs) to take action to increase diversity across the profession. The number of signatories to the Concordat continues to grow.

At a meeting in October, the British Institute of Non-Destructive Testing (BINDT) joined other PEIs, bringing the total number of signatories to 31. This means 99.3% of engineering registrants belong to institutions with a commitment to increase diversity and inclusion - up from 80.5% at the end of 2013.

The meeting covered aspects of diversity data monitoring, collection and reporting,

with inputs from the Institution of Engineering and Technology (IET), the Institution of Mechanical Engineers (IMechE), the Institute of Physics (IOP), the Engineering Council (MERCATOR project) and Polaris Associates presenting a modelling tool to predict the effect of action on diversity at different levels of membership and registration.

For more on the Concordat, signatories and Resource Guide visit: www.raeng.org.uk/diversityconcordat

◀ Caroline Bull, Vice President of the British Institute of Non-Destructive Testing, signs the Concordat

Skills for university



From 2 to 4 September, the Academy delivered its fourth developing skills residential course for 16 young women who are enrolling on engineering courses at university. The objective of the course

was to equip the students with some further relevant skills before they embark on engineering degree courses, and before beginning careers where women will be in the minority.

The course enhanced their ability to work in a team, and also built upon their capacity, confidence and capability to undertake work required to complete an engineering degree.

Training sessions covered personal development planning, negotiation skills and presentation skills. The women also heard from female role models from the engineering industry.

▲ Delegates learning about the art of negotiation from Linda Potgieter of Business Negotiation Solutions Ltd

Engineering Your Future

The Science Museum in London is hosting *Engineer Your Future*, a free exhibition that opens to the public from 17 December. The exhibition is designed to excite young people about engineering and challenge their perceptions about engineering careers.

It aims to appeal equally to girls and boys between the ages of 11 and 15, as well as their parents and teachers, and gives young people the chance to see and experience engineering skills for themselves. *Engineer Your Future* is supported by the Academy, ABB, BT, EDF Energy, IBM, Mott MacDonald, National Grid, Network Rail and the Department

for Business, Innovation and Skills. The exhibition complements the *Your Life* campaign, which aims to increase the number of young people studying maths and physics and considering STEM careers.



Deployable Structures box

The Academy's curriculum resources provide extended learning activities for use in a STEM club, for a STEM challenge day or to enhance and add context to the curriculum. A new set of resources, launched in June, enable maths learning within the engineering context of deployable structures. There are a range of Key Stage 3 maths topics covered, including density, nets, transformations, scale, conversions, circles, area, compound shapes and problem solving.

The resources consist of a teacher's guide to explain how the activities could be used, six activities and two case studies about engineers who work with deployable structures.

The resources can be downloaded at: www.raeng.org.uk/curriculum-resources

◀ The resources and kit within the Deployable Structures box

10 steps launch

On 29 September, the Academy's Diversity Leadership Group and WISE jointly launched a 10-step plan aimed at sustaining female talent in STEM. The initial 20 signatories represent a range of companies that are directly concerned with the STEM talent pool, and specifically with ensuring that women are supported to contribute fully, stay and progress within the sector.

The signatories committed to:

- understand the starting point so that progress can be monitored
- educate leaders and give them accountability for change
- change mindsets by challenging bias and sexism
- be creative in job design
- make flexible working a reality for all
- increase transparency of opportunities for progression

- sponsor talented women to the same extent as men
- demonstrate to women the commitment to retain and develop them
- treat the retention of women as if it was any other core business issue
- share learning and good practice.

For more information please contact: diversity@raeng.org.uk or see www.wisecampaign.org.uk/business/ten-steps

Innovation and entrepreneurship

Frontiers of Engineering

From 6-8 November, the Academy joined forces with the São Paulo Research Foundation to hold a cross-disciplinary symposium that brought together 60 of the brightest young engineering researchers from the UK and Brazil.

The UK-Brazil Frontiers of Engineering symposium took place in São Paulo, and aimed to break down geographical and professional barriers. It encouraged researchers to think about developments and problems at the frontiers of other disciplines.

The event was co-chaired by Academy Fellow Professor Alison Noble OBE FEng, Director of the Institute of Biomedical Engineering, The University of Oxford,



and attendees included Royal Academy of Engineering Research Fellows Dr Tamara Holmgren, Dr Antoniu Pop, Dr Mathieu Lucquiaud and Dr Helen Bridle. Themes for the meeting included smart grids, big data, bioremediation and oil and gas research.

Following the event, Professor Noble said: "To address the complex global challenges that face us we need a new generation

of engineers who are comfortable working outside disciplinary silos and in collaboration with their peers across the globe. The Frontiers of Engineering symposia are a great way to build international links and cross-disciplinary awareness of the engineering leaders of tomorrow."

▲ Lynne McDonald from UK Power Networks delivers her presentation in the smart grids session

New MacRobert Chair



▲ Dr Dame Sue Ion DBE FEng

The UK's longest running national prize for engineering innovation, the Royal Academy of Engineering MacRobert Award, has appointed the first female chair of its judging panel, Dr Dame Sue Ion DBE FEng. As one of the UK's foremost nuclear engineers, Dame Sue was appointed Chair of the Nuclear Innovation Research Advisory Board by the government in January 2014. She has served two terms between 2004 and 2011 on the Prime Minister's Council for Science and Technology, and earlier this year was awarded one of the Academy's most prestigious accolades - the President's Medal.

The MacRobert Award has become synonymous with spotting the 'next big thing' in technology, and was established 45 years ago to identify outstanding innovations with proven commercial promise and tangible societal benefit.

Applications for the 2015 Award are now open. The award, which is linked with the Royal Academy of Engineering's Enterprise Hub and supported by the Worshipful Company of Engineers, is open to individuals and teams from organisations of all sizes in the private, public and charitable sectors.

Fellows are encouraged to spread the word throughout their networks. As well as benefiting from the prestige of the award and national recognition, MacRobert Award winners receive a £50,000 prize and a gold medal.

Pitch@Palace

HRH The Duke of York welcomed 41 start-ups to St James's Palace on 5 November for the second Pitch@Palace event. As an official partner of the event, the Academy's Enterprise Hub was able to nominate three Hub members to take part and exhibit. One start-up from each partner organisation was chosen to pitch



▲ Dr Daniel Plant pitches Armourgel at Pitch@Palace

at the final event, which took science and technology as its theme.

The Hub members who took part in the exhibition were Enterprise Fellow Dr Dan Plant (Armourgel), ERA Foundation awardee Dr Oliver Payton (Nanodynamics) and Launchpad finalist James Popper (SinclairFire).

Dr Plant also delivered a pitch using Armourgel, an energy absorbing 'smart' material that stiffens on impact. He demonstrated that it is thin and flexible enough to be integrated into everyday garments. Along with the other participating entrepreneurs, he had the opportunity to network with an audience of CEOs, mentors, investors and other influential members of the UK business community.

Business and manufacturing



Robotics and autonomous systems

On 6 November, Secretary of State for Business Innovation and Skills, the Rt Hon Dr Vince Cable MP, came to the Academy to meet representatives from

leading UK businesses, robotics and autonomous systems (RAS) experts and investors.

The roundtable event, organised by the Academy's Enterprise Hub, followed the publication earlier this year of the

UK RAS Strategy by the Robotics and Autonomous Systems Special Interest Group, chaired by Professor David Lane FREng FRSE.

A discussion point at the meeting was that existing research and industrial networks with RAS interests should be connected more effectively at a national level.

The Academy's Enterprise Hub was highlighted as an example of a support mechanism that successfully connects academia and industry to accelerate promising UK start-ups.

▲ The semiautonomous drone known as the ARM system, unveiled at the University of Bristol and built by a team including Enterprise Hub member Dr James MacFarlane

Leaders in Innovation Fellowships

From January to March 2015, the Academy will play host to over 200 international budding entrepreneurial researchers under its Newton Fund Leaders in Innovation scheme. The programme, which aims to build entrepreneurial and commercialisation capacity in Newton partner countries, will bring cohorts of 10-15 researchers from selected partner countries to the UK for an intensive residential course of training and mentoring in entrepreneurship. When they return home, researchers will be supported in their own countries to commercialise their innovations, while benefiting from ongoing mentorship from senior experts at home and in the UK.

Fellows supported through this programme will benefit from connections to the Academy's Enterprise Hub. A wider benefit of the programme will be the creation of international networks of innovators and technology entrepreneurs.

Intrapreneurs Network

As part of its efforts to build the next generation of engineering leaders and UK high-tech enterprises, the

Academy's Enterprise Hub seeks to bring the very best 'intrapreneurs' together in an Intrapreneurs Network through which they can share best practice and knowledge.

An intrapreneur is a person within a large corporation who acts as an innovation champion or takes responsibility for turning an idea into a profitable finished product through risk-taking and innovation. The first meeting was held on 18 November and was chaired by Elspeth Finch, Director of Innovation Europe, Atkins Global. To thrive in demanding corporate environments, intrapreneurs must develop a range of skills, attributes and relationships. The Intrapreneurs Network is in the early stages of development but should make a valuable contribution to promoting innovation in companies.

Research Chair

Professor Eileen Harkin-Jones FREng has been appointed the Bombardier/Royal Academy of Engineering Research Chair in Structural Materials at the University of Ulster. One of the UK's most influential and respected engineers in her field, her work will further enhance the institution's global research capability in the highly

competitive area of composites and aerospace materials.

Focusing primarily on aerospace composites, Professor Harkin-Jones will also foster collaborations and partnerships across other key



▲ Professor Eileen Harkin-Jones FREng

engineering research areas including computing, metal forming and nanotechnology. The aim of the research project is to improve the current industrial manufacturing processes while developing new, high value added manufacturing processes that are essential for the growth of the UK manufacturing base.

Infrastructure and transport

Hinton Lecture

The Academy's flagship Hinton Lecture was delivered by the First Sea Lord and Chief of Naval staff, Admiral Sir George Zambellas at Prince Philip House on 29 October.

The theme of the lecture was *Engineering a 21st century Navy for a 21st century nation*. Sir George described the diversity of engineering and technical innovation within the emerging 21st century Royal Navy. He explained how its future needs will demand even more radical innovation in technology and leadership. Admiral Zambellas addressed important questions such as whether new technology can deliver the same effects without the need for as many human elements in the process. He spoke of opportunities in, "how we encourage, embrace and expand the role of technology. To optimise the efficiency, credibility and battle-winning edge of your Navy."



This year, for the first time, the lecture was screened live via a video conference link to an audience in Glasgow. The 220 guests who attended the lecture in London and Glasgow included Fellows, representatives from academia and industry and members of the public.

The lecture in London was chaired by Sir John Parker GBE FREng, Immediate Past President of the Royal Academy of

Engineering. Professor Liz Tanner FREng, Professor of Biomedical Materials at the University of Glasgow, chaired the proceedings in Glasgow.

View the Hinton Lecture at: www.raeng.tv

▲ Sir John Parker GBE FREng with Admiral Sir George Zambellas

2015 Colin Campbell Mitchell Award

The UK team behind the development of Ford's internationally commended, low fuel consumption 1.0 litre EcoBoost engine has been awarded the Royal Academy of Engineering's newly established Colin Campbell Mitchell Award, named after one of Scotland's most accomplished marine engineers.

The research and development team, based at Ford's Dunton Technical Centre in Basildon, Essex, have developed the three-cylinder engine, which is able to deliver superior performances to traditional 1.6 litre engines with better fuel economy and CO₂ emissions 20% lower than conventional engines.

The members of the Ford team receiving the award, including a £6,000 prize, for their great contribution to the advancement of mechanical engineering are Dr Roland Ernst (team leader), Dominic Evans, Steve Johnson, James Saward, Dr Mark Cary and Mike Rowland.

The inaugural Colin Campbell Mitchell Award was presented to the Ford EcoBoost

team by Academy President Professor Dame Ann Dowling DBE FREng at the Institution of Mechanical Engineers' Thomas Hawksley Prestige Lecture on 10 December 2014.

Future cities

On 10 November, the Academy held a workshop as part of a scoping exercise for a study on future cities. Chaired by Dr Peter Bonfield OBE FREng, Chief Executive of the BRE Group, the meeting was attended by key stakeholders across industry, academia, government and local government.

The attendees reflected on the UK's position in terms of future cities initiatives. The group identified several elements that make up the future cities system and highlighted those on which the UK is leading.

Key points from the workshop are being taken forward to identify the Academy's role in supporting and improving UK capabilities in future cities.

For more information, contact philippa.shelton@raeng.org.uk

Connecting data

The Academy is partnering with the IET on a study reviewing the increasing importance of data analytics to engineering businesses and the role that better connectivity will play in the use of data to improve products and performance. Data analytics will develop and grow with more connected machines, higher speeds, greater bandwidth and Internet reliability. The study aims to show how engineering companies across sectors can benefit.

The study will begin with sector-specific workshops, taking place over six months. Sectors covered include transport, health, built environment, energy, manufacturing, defence and aerospace. These will be supplemented by interviews with companies that have used these technologies to improve their products and services. The study will focus on engineered systems that stand to be enhanced by the use of data, rather than those that are already using it effectively. The project will look at developments over the next five years and a report will be published in summer 2015.

Engineering memories

Gifts in wills have made a real difference to the Academy's work and will become even more important. Many legacies are from people who recall the excitement of becoming an engineer, in the hope they can encourage others to join the profession. The Development team is keen to hear Fellows' earliest memories and stories about their first moments. If you would like to share your story so we can encourage others to reflect how engineering has been good to them, then please email

sarah.philbrick@raeng.org.uk

Development Advisory Board

Ian Barlow has taken over from Sir Richard Olver FEng as Chair of the Academy's Development Advisory Board. Members of

the Board help the Academy to broaden its range of supporters, and strengthen its relationships with business and industry. Son of Sir William Barlow FEng, Academy President from 1991-96, Ian Barlow undertakes a number of senior business roles and previously supported the Academy's fundraising campaign to create the Forum for engineering. Two new members have joined the board – Ayman Asfari FEng, Group Chief Executive, Petrofac plc and Dr Tony Hayward FRSE, Chairman, Glencore plc.

Awards nominations

The following 2015 Royal Academy of Engineering Awards are now open for nominations:

Colin Campbell Mitchell Award

The award is made to an individual or team of up to six engineers either

working or studying in the UK. It will be awarded for having made the greatest contribution to the advancement of any field of engineering within the period of the four years prior to making the award.

Sir Frank Whittle Medal

The medal is awarded to an engineer resident in the UK whose sustained achievements have had a profound impact upon their engineering discipline.

Sir George Macfarlane Medal

The award recognises the potential of engineers working in the UK who have demonstrated excellence in the early stage of their career (less than eight years since graduation from a first degree in engineering).

*Closing date for all the above:
Monday 15 January 2015*

To make a nomination, visit:
www.raeng.org.uk/grants-and-prizes/prizes-and-medals

For more information please call Sylvia Hampartumian on 020 7766 0648 or email awards@raeng.org.uk

2015 Royal Academy of Engineering MacRobert Award

Supported by the Worshipful Company of Engineers

Applications for the MacRobert Award 2014 are now open:

The MacRobert Award is the premier prize for UK engineering innovation. It is given annually for an outstanding innovation, commercial success and benefit to the community.

The award honours the winning organisation with a gold medal and the team members with a prize of £50,000. It seeks to demonstrate the importance of engineering and the role of engineers and scientists in contributing to national prosperity and international prestige.

For further information please visit www.raeng.org.uk/prizes/macrobot or email macrobert@raeng.org.uk

Closing date: 31 January 2015

Publication received

So you want to be an engineer has been donated by Professor Gareth Padfield FEng.

News of Fellows

Sandy Anderson OBE DL has been awarded an honorary degree from Teesside University.

Professor David Cardwell is the new Head of the Engineering Department at the University of Cambridge.

Tristram Carfrae RDI has been awarded the 2014 Gold Medal by The Institution of Structural Engineers.

Allan Cook CBE has been appointed to chair the UKTI Defence and Security Organisation Industry Liaison Board.

Dr Paul Golby CBE has been appointed Chairman of NATS Board.

Professor Eileen Harkin-Jones has joined Ulster University as its Bombardier-Royal Academy of Engineering Research Chair.

Dr Andy Harter has been appointed Chair of the Cambridge Network.

Professor Calestous Juma FRS has been awarded the Lifetime Africa Achievement Prize by the Millennium Excellence Foundation.

Dr Joanna Kennedy OBE has been appointed to the board of the ERA Foundation.

Professor Dame Julia King DBE has been awarded an honorary degree by the University of Manchester.

Professor Mark Miodownik has won the Royal Society Winton Prize.

Professor John Loughhead OBE has been appointed DECC's Chief Scientific Advisor.

Professor Torgeir Moan has been awarded an honorary doctoral degree by the Aalto University, Helsinki, Finland.

Professor Sir Jim McDonald FRSE has been appointed Non-Executive Director of Weir Group.

Professor Richard Parker CBE has been named CTO of the Year Europe 2014.

Professor Richard Parry-Jones CBE has been appointed Non-Executive Director on the board of Kelda Holdings Ltd, Kelda Eurobond Co Ltd and Yorkshire Water Services Ltd. He has also been awarded the IMechE 2014 James Watt International Gold Medal.

Professor Ian Poll OBE has been appointed to the Council of the Natural Environment Research Council (NERC).

Professor Albert Rodger has been awarded an honorary degree by Aberdeen University.

Professor John Wood CBE has received an honorary doctorate from B.S.Abdur Rahman University.

Forthcoming events

This is a selection of Academy events. For a complete list, visit www.raeng.org.uk/events

14 January 2015

New Year Reception

Speaker: Richard Deakin, CEO, NATS

Topic: Flights of the Future

Venue: Prince Philip House

21 January 2015

View from the top

Speaker: Helmut Engelbrecht, CEO of URENCO Ltd

Topic: A new generation of nuclear power for a growing population

Venue: Prince Philip House

27 January 2015

Harnessing the energy of entrepreneurship: engineering future leaders

Venue: Prince Philip House

10 March 2015

Ingenia Live!

Steering into the unknown: The new age of driverless cars

Speakers: Professor Paul Newman FREng, Oxford Mobile Robotics Group and Neil Fulton, the Transport System Catapult

Venue: Prince Philip House

11 March 2015

Northwest Regional Lecture

Speakers: Paul Howarth FREng and Richard Taylor FREng

Topic: the future of civil nuclear research in the UK

Venue: School of Engineering, University of Liverpool

Academy in the news

The Academy has maintained an almost constant presence in the media with the

new President and expert Fellows much in demand as commentators.

Interviews with Professor Dame Ann Dowling DBE FREng FRS on her vision for the Academy have appeared in the *Financial Times*, *The Independent* and *Times Higher Education*. Her election was covered in a large number of publications, including *The Engineer*, *Engineering & Technology*, *Construction* and *New Civil Engineer*.

Dr Dame Sue Ion DBE FREng spoke about how she became a top engineer and the need for more diversity in the profession to *The Huffington Post* and *The Independent*. Her career was also highlighted in an article in the *Sunday Telegraph*.

The Universe of Engineering, challenging the profession to act together to modernise the profession, received national coverage in *The Daily Telegraph*, *Professional Engineering* and *Works Management*.

Last year's *GB electricity capacity margin report* was mentioned in connection with National Grid's latest winter outlook. This resulted in interviews by the report's chair and panel members in the *Sunday Times*, *BBC Radio 4*, *Utility Week* and *Channel 4 News*.

The shortlist for the inaugural Africa Prize for Engineering Innovation was reported widely in the UK and Africa, including interviews with all shortlisted engineers on the BBC World Service, and features on *SABC Breakfast News* in South Africa and in the *Daily Nation* in Kenya.

The first edition of the Launchpad Competition, recognising bright UK entrepreneurs between the ages of 16-25 for their ideas, was mentioned in *The Manufacturer* and *The Engineer*.

The Academy's Hinton Lecture 2014, given by the First Sea Lord Sir George

Zambellas was mentioned in *The Times* and in the *Sunday Times*.

The Queen Elizabeth Prize for Engineering's *Create the Trophy competition* and its winner were widely covered in trade titles such as *Engineering & Technology*, *Process & Control Today*, *Machinery Market*, *Develop3D* and *The Engineer*.

Articles on the newly elected Fellows of the Academy have generated over 50 mentions in trade and regional press.

The Academy's Research Forum was featured in *Research Fortnight* and *Engineering & Technology*. Articles about Academy researchers have appeared in *Materials World*, *Network Communications*, *Safety and Health Practitioner*, while academic Fellows and researchers have provided expert comments for articles appearing on *BBC News online*. The Frank Whittle Medal, awarded to Professor Peter Wells CBE FREng FRS FMedSci FLSW, was featured on both radio and TV on *BBC Wales* and in *Electronics Weekly*.



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Obituaries

Mr Robert Beresford CBE FREng died on 7 March 2014 aged 75. He was formerly Chairman, Mott MacDonald Group Ltd.

Dr Stephen Lawrence Bragg FREng died on 15 November 2014 aged 90. He was formerly Director, Wolfson Cambridge Industrial Unit.

Professor Brian Leonard Eyre CBE FREng FRS died on 28 July 2014 aged 80. He was formerly Senior Visiting Fellow, Department of Materials, University

of Oxford and Deputy Chairman, AEA Technology plc.

Mr Richard Gilbert Dodds FREng died on 17 October 2014, aged 67. He was formerly Manufacturing and Supply Chain Specialist, Unilever.

Sir Maurice Hodgson FREng died on 1 October 2014 aged 94. He was formerly Chairman, Imperial Chemical Industries plc.

Dr Stanley Baldwin Kendrick OBE FREng died on 2 November 2014, aged 88. He was formerly Deputy Chief Scientific Officer, Admiralty Research Establishment.

Mr John Martin FREng died on 26 November 2014, aged 87. He was formerly Director, System X Development BT.

Mr Kenneth Charles Quinton MBE FREng died on 4 July 2014, aged 90. He was formerly Director of Research, British Cable Services Ltd.

Professor John Hugh Westcott FREng FRS died on 10 October 2014, aged 93. He was formerly Emeritus Professor of Control Systems, Electrical Engineering Department, and Senior Research Fellow, Imperial College London.