



Her Majesty presents the QEPrize

On 26 October a range of events took place to mark the presentation of the Queen Elizabeth Prize for Engineering to Dr Robert Langer FEng. The day began with a welcome reception for the QEPrize Engineering Ambassadors at the Royal Academy of Engineering. One of the key missions of the QEPrize is to inspire the next generation of engineers and there were representatives from all of the QEPrize donor companies and from the wider QEPrize Engineering Ambassador network.

The day also marked the release of the first QEPrize *Create the Future* Report. The report revealed the changing perceptions of engineering across 10 key markets and provided a fascinating insight into the differences in perception between countries, as well as expert commentary from the fields of commerce, science, academia and the full breadth of engineering disciplines.

One of the highlights of the day was Dr Langer's address *The struggles and dreams of a young engineer*. He spoke of the challenges he faced in his early career, including how he was refused research funding and continuously discouraged from developing his groundbreaking drug delivery system, before rising above all expectations to develop a treatment that would have an impact on billions of lives worldwide.

Following his inspiring address, Dr Langer and guests travelled to Mansion House for a lunch hosted by the Lord Mayor and the City of London Corporation. The Lord Mayor paid tribute to Dr Langer's remarkable achievements and highlighted the importance of engineering in the UK, saying, "creativity, innovation and skills allow our country to be where it is today."

In the evening, guests travelled to Buckingham Palace to see Robert Langer being presented with his trophy by Her Majesty the Queen. Several influential international engineering economies were represented at the presentation ceremony, with Ambassadors and High Commissioners from countries including the US, China, Japan, Germany, South Korea, South Africa, Singapore and India in attendance. They were joined by senior business leaders from the QEPrize donor companies and QEPrize Engineering Ambassadors.

After the presentation, The Queen, accompanied by the Duke of Edinburgh, the Duke of York, Princess Eugenie and the Princess Royal joined the guests to celebrate the occasion.

QEPrize donor companies played a vital role, showing their support in person as well as featuring the report findings on their websites and social media channels, in order to reach key international audiences and business leaders.

Ground-breaking media interest was generated in the QEPrize. The report launch and presentation ceremony were covered across the globe and have already reached a worldwide audience of more than 500 million people. This, combined with the more than 600 million people who were reached by coverage of the announcement of Dr Langer's success, takes the number of people around the world reached by our media coverage of the QEPrize this year alone to over a billion.

The events of the day illustrated the international reach and importance of the QEPrize, and how the Prize continues to deliver on its key objectives to attract the next generation of young people and celebrate the achievements of engineering.

▲ The Queen presents Dr Robert Langer with the QEPrize trophy

President's column



Meetings and visitors

In her capacity as President, Dame Ann has met:

Paul Kahn, President, Airbus Group UK, and Jeremy Greaves, Vice President Communications and PR, Airbus
 Dr Mo Ibrahim HonFREng, Founder and Chair of the Mo Ibrahim Foundation
 Ed Vaizey MP, Minister of State for Culture and the Digital Economy
 Jo Johnson MP, Minister for Universities and Science
 Susan Acland-Hood, Director of the Enterprise and Growth Unit, HM Treasury

She attended the following events and meetings:

North East Regional Visit and Dinner: including visits to Teesside University, Cummins Engines UK, Gestamp Tallent Ltd, Centre for Process Innovation, Durham University and a dinner with Fellows at University College hosted by Professor Tony Unsworth FREng and Nigel Perry FREng
 The State banquet in honour of the President of China
 London South Bank University, to receive an Honorary Doctorate
 Leverhulme Trust Lecture *Faith in the Museum*, and Chairman's Dinner-Discussion
 The Science Media Centre
 Newton Fund Ministerial Advisory Group
 The National Physical Laboratory, hosted by Peter Thompson, CEO, Martyn Sené, Deputy Director and Director of Operations, and Robin Hart, Director of Programmes
 The opening of Kimbolton School, Queen Katherine extension, Huntingdon, Cambs.
 Foundation of Science and Technology, Debate on the Dowling Review
 Pi Capital Dinner
 University Alliance Annual Dinner
 Building better research collaborations between business and university researchers, Westminster Higher Education Forum Keynote Seminar
 University of Nottingham, Research Leadership and Management event
 University of Strathclyde, 20th Anniversary of the Institute of Photonics

She was interviewed by:

Lindsay McKenzie, reporter, *Research Fortnight*
 Kiki Loizou, Small Business Editor, *The Sunday Times*

The last few months have been significant in putting engineering, and its impact, on the world stage.

The audience was truly global for the presentation by Her Majesty The Queen of the Queen Elizabeth Prize for Engineering to Dr Robert Langer of MIT. We were joined at this celebration at Buckingham Palace by diplomatic ambassadors representing many countries, and the media coverage of the day's events reached a worldwide audience of more than 500 million people. The Queen Elizabeth Prize is an international £1million prize that celebrates engineers who are responsible for an innovation that has been of global benefit to humanity. Robert Langer was recognised for his ground-breaking achievements in engineering polymers to control the delivery of large molecular weight drugs for the treatment of diseases such as cancer and mental illness. It is estimated that over 2 billion lives have been improved worldwide by the technologies that Dr Langer's lab has created.

The Academy has attracted an international audience for its work further afield as well. Our work with key international partners has helped to open up opportunities for collaboration for academia and industry, and to inform government policy. Recent Academy missions to China on the topic of air quality, for example, have already resulted in changes to the Chinese legislative framework in this area, as well as positioning the UK as China's international partner of choice on this issue.

We have also partnered with China, as well as the US, on a series of Global Grand Challenges Summits. The second of these was held in Beijing in September and delivered a strong message that we need to better equip the next generation of engineers to address the world's challenges by adopting a more interdisciplinary approach to engineering education and research. Last month when China's President Xi Jinping visited the UK, I was honoured to be seated at the 'top table' at the state banquet in his honour.

Meanwhile, in emerging economies and the developing world, the Academy is making a tangible contribution to social and economic growth through programmes that build engineering capacity, using our particular expertise in connecting academia and industry.

The Africa Prize for Engineering Innovation, which is now in its second year, was designed with this goal in mind. In early November, we announced 12 shortlisted innovators from across sub-Saharan Africa, who will each receive six months of training and mentorship before pitching to a judging

panel for the chance to win £25,000. I am delighted that so many Academy Fellows have been involved as reviewers or mentors.

As a national academy of engineering, we work with other national academies across the world at a strategic level to enhance recognition of UK engineering, and to develop our collective capacity and impact. One of the ways we do this is through CAETS, the global federation of national academies of engineering.

I recently attended the 2015 CAETS convocation in Delhi, which was particularly exciting as the Academy will be taking up Presidency of CAETS next year, and hosting the 2016 convocation here in London. With the theme of *Engineering for a better world*, the event will bring together the Presidents of 22 national engineering academies, other global engineering leaders, international development practitioners and policy makers to discuss the vital importance of engineering for international development. Happily, it will coincide with the Academy's 40th anniversary, and therefore provides an excellent opportunity to take stock of the Academy's role on the global stage and to look ahead to future priorities.

As well as our impact beyond the UK, it is important that the Academy's footprint in the UK extends beyond London. I recently enjoyed the East Midlands Lecture, hosted by Rolls-Royce in Derby, and have also given talks at the Universities of Nottingham and Strathclyde; and our Vice President for Fellowship Engagement, Professor Richard Williams FREng, addressed a dinner for Fellows in Glasgow in early December. The Academy's education team has recently launched a new regional engineering project in Lowestoft, Suffolk. Following in the footsteps of successful projects in Barrow-in-Furness, Cumbria and Stoke-on-Trent, Staffordshire, it aims to inspire the next generation of engineers in an area with rich engineering heritage through industry partnerships, internships and funding to enhance the STEM curricula.

From our headquarters in Prince Philip House in central London, the Academy's impact reaches far and wide. It is by expanding and engaging our base of Fellows, partners and supporters in all corners of the UK and the world that this impact will continue to grow, and, in this way, challenges that the Academy can uniquely address, both within the sector and through the impact of engineering on wider society, will be met.

Ann Dowling

Diversity toolkit launched



The Academy brought together over 100 diversity programme stakeholders on 17 November to launch a new suite of materials, developed with and for employers, to encourage greater diversity and inclusion in the profession.

At a lively event hosted by Siemens at The Crystal, Docklands, several published outputs from the programme were showcased and discussed:

- A case study toolkit featuring examples of good practice from 16 employers and organisations, together with tools for implementing an inclusive culture. These have been mapped against key inclusion themes and captured in comprehensive detail to assist adoption by other companies.
- A case study collection, also mapped against key inclusion themes, developed by the Chartered Institution of Highways and Transportation (CIHT) in conjunction with their corporate partner employers. This was part of an Academy-funded project by CIHT, a signatory to the Engineering Diversity Concordat.
- A publication of the first Diversity Leadership Group (DLG) benchmarking survey into the drivers and outputs

of diversity and inclusion work, documenting the survey approach, key conclusions and anonymised results.

The survey found that while many UK engineering companies are already well engaged in driving better gender balance in the engineering profession, more work is needed in promoting ethnicity/race, sexual orientation and disability diversity. Of the companies surveyed, 96% anticipate difficulty in recruiting in the future and would like to broaden their recruitment pool; 83% see diversity as critical to enhancing their capacity for innovation and creativity and 76% see it as crucial to tackling the skills shortage.

The toolkit launch follows a September gathering of signatories to the *Industry-led ten steps* that the DLG developed with Women into Science and Engineering (WISE) in 2014. The initial 20 signatories have now grown to 35 and WISE has developed a monitoring tool against which organisations can assess their progress. Attendees discussed positive outcomes to date as well as challenges faced in implementing the *Ten steps* and shared examples of particularly effective practice against key themes.

In line with the best practice outlined in the toolkit, diversity and inclusion



▲ Top: Delegates at the Diversity toolkit launch
 Above: Diversity Leadership Group Chair, Allan Cook CBE FREng, speaks at the launch event

training is now being delivered across the Academy to all Trustees, Fellows on committees, and staff. The training materials will place diversity and inclusion action planning in the context of the Academy's strategic aims. This is supplemented by e-learning material addressing unconscious bias that will be available to all Fellows and staff.

The diversity and inclusion toolkit and supporting online materials are available at www.raeng.org.uk/diversitytoolkit

Innovation and entrepreneurship

Africa Prize shortlist

The Africa Prize for Engineering Innovation brought together 12 innovators shortlisted for its 2016 prize for a week-long training session in Accra, Ghana, at the end of October. The Africa Prize offers six months of bespoke business training and mentoring to a dozen entrepreneurs from across sub-Saharan Africa. Now in its second year, the prize provides the winner with £25,000, with £10,000 awarded to two runners up.

This year's shortlisted innovators came from nine countries including, for the first time, francophone Africa. The contenders' innovations range from edible insects through to new technology and business models to deliver energy to rural regions, helping to transform the lives of the 620 million inhabitants of sub-Saharan Africa without access to electricity.

Among the shortlisted medical technology innovations is the Cardio-Pad. This innovation broadens access to the expertise of Cameroon's limited



number of cardiologists: there are just 50 cardiologists for a population of more than 22 million. The Cardio-Pad uses a modified tablet and monitoring equipment to allow doctors and nurses to collect data on a patient and send it to one of these cardiologists to provide expert advice.

The Africa Prize for Engineering Innovation was established to celebrate innovation in Africa and highlight the importance of engineering as an enabler of improved quality of life and economic development.

The event was chaired by Dr Dame Sue Ion DBE FREng, Chair of the MacRobert Award judging panel. Fellows and guests were given the opportunity to question the winners about the company's major achievements, how they overcame key challenges and their future plans and innovations.

The MacRobert Award identifies outstanding engineering innovation with proven commercial success and tangible social benefit. As well as gaining from

The Academy-sponsored debate tackled questions such as: will there be a new industrial revolution and what might this look like? How can we best support engineering and innovation? What impact will technologies such as virtual reality have on our society and the way we do business?

Dr Hayaatun Sillem, Director of Programmes and Fellowship at the Academy, spoke on the panel alongside

The Prize is generously supported by the Shell Centenary Scholarship Fund, Consolidated Contractors Company, the Foreign and Commonwealth Office's Africa Prosperity Fund, ConocoPhillips and the Mo Ibrahim Foundation.

Find out more at www.raeng.org.uk/africaprize or follow @RAEngGlobal on twitter.

▲ The innovators shortlisted for the Africa Prize for Engineering Innovation

the prestige of the award, the winners receive a gold medal and a £50,000 prize.

Applications for the 2016 MacRobert Award are now open at: www.raeng.org.uk/prizes/macrobot.

The closing date for entries is 31 January 2016.

The event is now available to view at www.raeng.tv

other experts from City AM, PwC, SolidWorks R&D, and University College London. The event was well-attended with the audience engaging in lively debate on the subject, and raising a number of interesting questions.

Over the course of the weekend, the Battle of Ideas was attended by over 3,000 people. Further information about the event is available at www.battleofideas.org.uk

New Higher Education Partnerships

The Academy has launched a new Higher Education Partnership programme with the Federation of Indian Chambers of Commerce and Industry (FICCI) as part of its Newton Fund activity. The programme aims to enhance teaching, research and innovation outcomes in Indian universities by supporting bilateral industry-academia links.

Following a workshop in Delhi in May, a call for expressions of interest was launched, garnering 49 applications from a range of Indian engineering universities proposing innovative partnerships with counterparts across both industry and academia in India and the UK. Ideas put forward by applicants included the

design of new graduate-level courses in emerging technology fields, building innovation and collaborative research capacity, and the development of learner-centric engineering teaching methodologies.

On 3 and 4 November the Academy attended FICCI's annual Higher Education Summit in Delhi where Tim Askew FREng announced a shortlist of 25 applicants who will be asked to submit full proposals. The Academy intends to fund up to 15 full projects.

Once operational, the selected institutions will work in conjunction with FICCI's National Knowledge Functional Hub to share lessons and build wider institutional capacity amongst universities within their region through a hub and spoke model.



▲ Tim Askew FREng at FICCI's Higher Education Summit

Innovation in agri-tech

Over 120 delegates visited Prince Philip House to attend the Academy's Innovation in agri-tech event on 12 October. Chaired by Professor Dick Godwin FREng, the event brought together innovators in the agricultural sector, including engineers, business chiefs and representatives of key industry bodies. The audience heard about innovations including robotic weeding, precision irrigation and remote animal monitoring technology.

Following the presentations, a panel discussion debated wider issues facing agricultural engineers and farmers

including how to exploit advances in other sectors, UK membership of the EU, and accessibility of broadband in rural areas. Speakers also highlighted the significance of the government's agri-tech strategy, with many on the panel and in the audience keen to engage and follow its progress.

The event was accompanied by displays from CNH Industrial, Senseye, Harper Adams University and the Institution for Agricultural Engineers.

A video of the event can be viewed at www.raeng.tv



▲ Robotic weeding: an agri-tech innovation

Innovators' Network

On 29 October the Enterprise Hub hosted its third Innovators' Network event at the Academy. These events aim to stimulate excellence and encourage creativity and innovation in engineering by providing a forum for shared learning and support. Invitees hold senior positions at engineering and technology companies of various sizes - from pre-revenue start-ups to multi-million pound corporates - and across various industries.

The event began with a brief reflection on the inextricable link between innovation and productivity, in the shape of the recent Engineering the Future (EtF) response to the BIS Select Committee on the government's productivity plan, and the Academy's report *Investing in Innovation*.

It has been estimated that 51% of productivity growth between 2000 and 2008 could be attributed to innovation.

John Pelton MBE, Strategic Projects Director of Crossrail, was then invited to speak informally, along with four members of his cross-disciplinary team. Crossrail has become known for breaking the mould in UK construction in its development of a strategy and process for managing innovation in mega projects, and as the first project of its kind to host a dedicated innovation team.

John introduced Crossrail's innovation programme, Innovate18, which is open to all Crossrail employees and colleagues from participating contractors, or nominated supply chain and stakeholder organisations.

Following the talk, attendees had the opportunity to speak to John and his team in small groups. Discussions ranged from recording the lessons learned from Innovate18 and ensuring that other projects could benefit from the developments made during Crossrail's operation, through to how the value of engineering and engineering innovation can be promoted to help inspire the next generation of engineers and ensure government are fully aware of the benefits of investing in innovation.

To see the EtF response or the *Investing in Innovation* report, visit www.raeng.org.uk/publications

To find out more about the Enterprise Hub's Innovators' Network, email catherine.lawrence@raeng.org.uk

Africa Prize winner triumphs in Pitch@Palace



▲ Dr Askwar Hilonga at St James's Palace for Pitch@Palace

Dr Askwar Hilonga, winner of the Academy's inaugural Africa Prize for Engineering Innovation, has won the Duke of York's Pitch@Palace Africa competition.

Dr Askwar Hilonga is a chemical engineer from Tanzania who invented Nanofilters, bespoke water filters that use nanotechnology to filter out particular contaminants. After winning the Africa Prize in June for his innovation, Dr Hilonga was one of ten entrepreneurs from across the African continent invited to participate in Pitch@Palace Africa at St James's Palace, London.

Pitch@Palace was founded by the Duke of York in 2013 to help entrepreneurs amplify and accelerate their business ideas by connecting them with potential supporters. The inaugural Pitch@Palace

Africa event was hosted in partnership with Nigerian billionaire Alico Dangote and former President of Nigeria Olusegun Obsanjó.

Dr Hilonga delivered a passionate and articulate pitch to an audience including heads of state from seven countries across the region, Cherie Blair, senior business representatives and venture capitalists, many of whom offered immediate assistance to support the dissemination of Nanofilters across the continent.

The Academy will continue to support Dr Hilonga in identifying opportunities to accelerate his business.

Find out more at www.raeng.org.uk/africaprize and www.pitchafrica.com

Newton Research Collaboration Programme

The Academy has announced 26 awards made under the Newton Research Collaboration Programme. The programme offers UK researchers the opportunity to undertake a collaborative project with researchers from Newton

Fund partner countries by providing funding to support their travel and subsistence. The recent awards will see research carried out in Brazil, Mexico, South Africa, Turkey and Vietnam.

As part of the Newton Fund, the exchanges must focus on engineering challenges that will enhance social

welfare and economic development in the partner country, and increase its capacity to carry out excellent research in engineering.

Find out more about the Academy's Newton Fund programmes at www.raeng.org.uk/newtonfund

Distinguished Visiting Fellowships

The Academy has awarded 11 Distinguished Visiting Fellowships at universities across the UK. These awards enable engineering departments in UK universities to host a Distinguished

Visiting Fellow from an overseas academic centre of excellence, for a period up to a month.

The current round of the scheme has brought world-leading academics to the UK from the US, China, Israel, South Korea, India and Canada.

The scheme enables UK universities to access global centres of excellence in engineering research and teaching, with a view to strengthening UK capacity and international standing and promoting new international collaborations.

Infrastructure and transport

Encouraging debate on transport congestion

Transport congestion is the subject of the Academy's first 'challenge paper', launched at a breakfast debate in early December. The new 'challenge paper' format allows Academy Fellows with particular expertise to explore challenging issues of interest and produce an evidence-based expert view where a firm consensus policy position might prove difficult.

The transport challenge paper addresses the growing problem of congestion on the UK's road and rail networks and assesses the technical practicality of a variety of measures to address the challenges, either to buy time before new infrastructure can be delivered or as the most effective means of optimising existing capacity. Led by a number of Fellows who are experienced transport practitioners, it focuses on the costs and congestion reduction potential of the different measures and identifies 18 'frontrunners' that offer the best potential value for money.

The paper recommends that government should develop an integrated strategy

for tackling road and rail congestion and that such a strategy must maximise the impact of any measure by carefully packaging different technologies and policy measures together.

It also finds that, of all the available interventions considered, efficient pricing on the road network offers the single best way of tackling congestion. The paper recognises that this is not currently popular with either politicians or the public, but that a well-designed system could be publicly acceptable and achieve a substantial impact.

Senior Research Fellowship award

Dr Andrew Tyas has been awarded a Defence Science and Technology Laboratory (DSTL) / Royal Academy of Engineering Senior Research Fellowship for his work in protection engineering against high explosive blast at the University of Sheffield.

The aim of the research is to predict the response of materials and structures to an explosive detonation, for use in a wide range of applications including defence and infrastructure protection. The project will combine experimental blast test work with computational analysis to help fully understand the key underlying processes, which will be used to improve protection against blast events.

As part of the project, a world-leading Centre for Blast Research will be established at the University of Sheffield to tackle national and international research challenges in this field, and to give expert guidance to practitioners and policy makers.



The research will lead to major improvements in the ability to design protective systems for personnel, vehicles, structures and infrastructure, saving lives and making systems more resilient to attack. In addition, it is hoped that this will help improve risk assessment tools for blast planning and design scenarios, aiding planners

and policymakers with the assessment of and possible mitigation against explosive attacks.

Applications are now open. For further information see www.raeng.org.uk/researchchairs

▲ Dr Andrew Tyas Senior Research Fellow

Hinton Lecture 2015



▲ Professor Lord Mair addresses the audience at the annual Hinton Lecture

On 24 November Professor Lord Mair CBE FEng FRS, Sir Kirby Laing Professor of Civil Engineering and Head of Civil and Environmental Engineering at the University of Cambridge, addressed an audience of over 150 people at the Academy's annual Hinton Lecture. For the first time, the audience for the lecture was extended across the UK via a live stream on www.raeng.tv

The subject of the lecture was the role of geotechnical engineering in creating underground infrastructure, with a particular focus on challenges and technological solutions.

The audience heard how Lord Mair and his colleagues were involved in identifying an innovative solution to the challenging geology of Crossrail's Stepney Green crossover, where new methods were used to relieve water pressure in layers of sand in the Lambeth Group and therefore stabilise the ground for tunnelling.

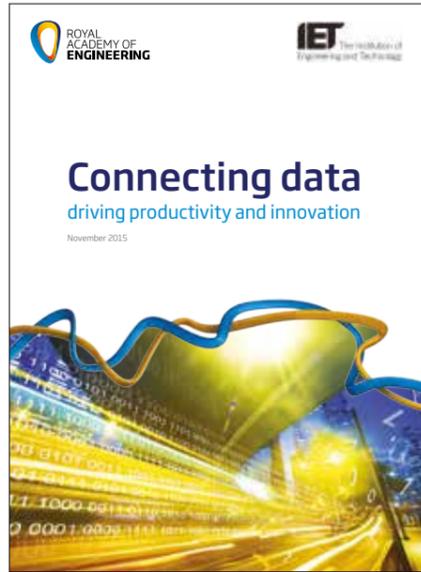
Innovative solutions further west on the Crossrail route were also highlighted. Lord Mair talked through how his team were involved in the installation of optical fibres and sensors to monitor and analyse the impact on the main tunnel of creating openings for cross tunnels. The findings of the analysis will allow subsequent projects to save time and materials on cross tunnel construction.

When asked about the future of tunnelling technology, Lord Mair predicted that sensors will become increasingly important, particularly in the achieving the 'holy grail' of tunnelling without volume loss. The Northern Line extension will present one particular challenge where sophisticated monitoring will be critical, as it will involve tunnelling directly through the piles of Battersea Cats and Dogs Home without disturbing its residents, who must remain in situ during construction.

The lecture was followed by a Q and A session and drinks reception, when the Fellows, students and industry representatives attending had the opportunity to network and discuss the evening's insights.

A video of the event is now available to watch at www.raeng.tv

Technology and society



▲ The Connecting data report

Connecting data report

The UK is strongly placed to develop a leading data-enabled economy, according to a new report by the Academy and the IET, although we will need to address barriers to remain competitive internationally. While data analytics in the UK is still immature, there are pockets of excellent practice to grow and develop further.

The report, *Connecting data: driving productivity and innovation*, was published on 16 November and explores how the UK can create a 'data-enabled' economy through the use of data analytics, supported by data science and advanced data connectivity. It was compiled using evidence from a series of sector-specific stakeholder workshops run between November 2014 and June 2015. These covered a range of sectors: advanced manufacturing, built environment, energy, transport, health, aerospace and defence, and insurance.

Recommendations made by the report include:

- Develop a suite of technology-independent resilience frameworks for both new and old infrastructure in order to overcome the fragility of increasingly interdependent systems and the risks this creates to critical infrastructure and the Internet of Things.
- Extend the Universal Service Obligation (USO) to broadband access and aim for the EU target of 30 Mbits/sec download speeds rather than the 5 Mbits/sec initially suggested by government and the welcome 10 Mbits/sec now being mooted by the Prime Minister.
- Develop data trading platforms governed by mutually agreed standards

that create trust in data capture, trading and re-use, particularly up and down supply chains.

- Adapt undergraduate and postgraduate courses to reflect new and unmet demands for a multi-skilled workforce with data science skills.
- Encourage regulators, professional institutions and standards bodies to work together to make performance and resilience a shared priority.

Connecting data: driving productivity and innovation, concludes that harnessing the power of data analytics and linking key datasets reliably in real time has immense potential to drive innovation and enhance UK productivity, which is currently lagging 17% behind the average across the G7 economies. However, good practice is currently not widespread or consistent enough across and between each sector of the economy, and faster progress needs to be made to ensure rigorous performance and resilience.

To read the report visit www.raeng.org.uk/connectingdata

Ingenia live!

The second event within the *Ingenia live!* series took place on 12 November at Prince Philip House. The main theme - engineering for sports - was explored by two industry representatives who gave their expert insights into the advanced engineering and novel materials being used to make sports equipment faster, lighter and stronger.

Dan Chambers, Co-founder and Director of Draft Wheelchairs Ltd., spoke about the engineering challenges he had to overcome in designing and building bespoke sports equipment for elite athletes in disability sport.

The second speaker of the evening, Dr Caroline Hargrove, Technical Director of McLaren Applied Technologies, focused on the key principles of the McLaren F1 simulator and shared some interesting



insights into McLaren's approach to bicycle design.

The evening was hosted by Dr Scott Steedman CBE FREng, Editor-in-Chief of

Ingenia magazine. A film of the event is available to view at www.raeng.tv

▲ A McLaren designed bicycle

Dr Hugh Hunt gives Autumn Lecture



On 3 November, Dr Hugh Hunt, Reader in the Department of Engineering, University of Cambridge and winner of the Academy's 2015 Rooke Award for promotion of engineering to the public, gave a lecture about two of the most iconic events of the dark days at the end of World War II: the escape from Colditz Castle and the Dambusters raid.

Dr Hunt demonstrated how he and his engineering team recreated the two-man glider built to escape from Colditz Castle, and the Dambusters raid

People and talent

bouncing bomb for an award-winning television documentary. He explained how live reconstruction can tell much more than a reading of eye-witness accounts. The lecture was attended by over 80 delegates including budding young engineers who joined in the Q and A session.

◀ Dr Hugh Hunt, the Academy's 2015 Rooke Award winner, on his television documentary

New school posters

To celebrate Tomorrow's Engineers Week (2-6 November), the Academy's education team created a set of *Engineering is...* posters for schools to challenge narrow misconceptions of engineering by illustrating the amazing breadth of engineering and its impacts.

Through a series of striking images, the posters illustrate engineering's role in surgery, sports performance, robotic pollination, irrigation, creating beautiful architecture and easing traffic congestion.

As well as creating these resources for schools, the Academy has built on the successes of the Barrow and Stoke Engineering Projects in encouraging greater interest in STEM subjects, by funding 28 different engineering activities for primary, secondary and sixth form colleges in these areas. The activities include using books like *Iggy Peck, Architect* and *Rosie Revere, Engineer* to link literacy lessons



with engineering, setting up a Year 7 engineering club and supporting an opportunity for students to make their own film about space travel.

The posters and the stories behind the images can be seen at www.raeng.org.uk/engineeringis

Exploration Challenge

The third round of the BG Group Exploration Challenge was launched in October at a successful event for students and their teachers at the Academy.

Since its launch in June 2014, the BG Group Exploration Challenge has given 150 sixth form students from across the UK a unique opportunity to work alongside engineers and gain a valuable insight into engineering careers. The Challenge requires students to carry out practical experiments to gather data about the porosity and permeability of rock samples. This data is then used to advise BG Group managers about the development of hydrocarbon reservoirs.



▲ BG Group petrophysicists demonstrating the Exploration Challenge experiment

Engineering Leadership Advanced Awards event

Over the weekend of 10 and 11 October, almost 100 of the top engineering undergraduates in the UK attended the Engineering Leadership Advanced Awards annual event at Conference Aston in Birmingham. Engineering Leadership Advanced Awardees

(ELAA) are chosen for their ability to demonstrate their leadership skills and act as role models for future generations of engineers.

Each year, current awardees come together for a weekend of training and networking with each other, Academy Fellows, Sainsbury Management Fellows and ELAA alumni.

This year, Janice Crawford FREng gave an inspirational pre-dinner speech outlining her career progression.

Applications for next year's ELAA awards are now open.

For further information contact jacqueline.clay@raeng.org.uk

Engineering Fast Track

The Academy welcomed 89 students onto its *Engineering Fast Track* programme between October and November 2015 as part of an effort to encourage undergraduates from diverse and underrepresented backgrounds into the profession.

The students came from a wide range of universities, where they are currently pursuing a degree in science, technology, engineering, mathematics or physics.

The programme consists of a series of workshops that give students the opportunity to learn more about different engineering career paths and to receive training on recruitment and selection processes. Each workshop concluded with a speed-networking session where students had the chance to engage directly with engineering employers.

The *Engineering Fast Track* workshops will run until February 2016 and form the second phase of the Engineering Engagement Programme (EEP), which



▲ Students at the EFT speed networking event

the Academy has created with a group of 13 engineering employers. The EEP is delivered in partnership with Sponsors for Educational Opportunity London.

New UKForCE Chair

The UK Forum for Computing Education (UKForCE), which is hosted by the Academy, has welcomed its new Chair, Professor Jeff Magee FEng,

Principal of the Faculty of Engineering at Imperial College. He takes over from Chris Mairs FEng, Chief Scientist at Metaswitch Networks and Chair of Code Club, who drove the creation of UKForCE from its genesis in the Royal

Society's *Shut Down or Restart* report. Professor Magee joins as Chair at a time when the new computing curriculum is starting its second year of teaching in English schools.

WISE Awards 2015

On 12 November, WISE celebrated its annual awards at the Grange Hotel, St Paul's, in the presence of HRH The Princess Royal. The Academy is working closely with WISE through its diversity programme and sponsored the Influencer Award category this year.

The winner, Dr Marily Nika, is a Programme Manager at Google and Director of London Geekettes, part of a global community dedicated to inspiring and supporting women in the technology industry.

The awards were preceded by a daytime conference in which delegates had the opportunity to follow a programme of presentations, panel discussions and engaging workshops. Allan Cook CBE FEng, Chair of the Academy's Diversity Leadership Group, joined the event as one of the main panellists.



▲ The Princess Royal with WISE award winner Dr Marily Nika

Executive Engineers Programme

The Executive Engineers Programme was held at Conference Aston on the weekend of 3 and 4 October. It was attended by 30 young engineers from

a range of organisations including large multi-nationals, SMEs and universities. The programme provides an enhanced career 'boot camp' for graduate engineers of high potential looking to accelerate their careers, and involves a weekend course each year over three years.

This year's event included a combination of lectures, case studies and group exercises. Participants pay to attend, however most receive financial support from their organisations.

Perkins Review - two years on

It has been two years since Professor John Perkins FEng, then Chief Scientific Adviser at the Department for Business, Innovation and Skills, published his groundbreaking report on engineering skills. Since then, a variety of groups and organisations have been working to implement the report's 22 recommendations. Their progress has

been followed and supported through the professional alliance Education for Engineering, which is hosted by the Academy.

Significant headway has already been made in helping to secure the pipeline of engineering skills for the future by increasing understanding amongst teachers and pupils of the opportunities that engineering offers. The Teaching Industrial Partnerships Scheme has

been expanded to provide placements for teachers, and new work experience projects are available through the Tomorrow's Engineers website. Joint business case information for further education and employers is now provided on the National Forum for Engineering Centres website, and a new post-graduate matching portal has been launched by UCAS. More initiatives and materials continue to be developed to implement Professor Perkins's recommendations.

Academy roundup

New Fellows and guests were joined by Senior Fellow, HRH The Duke of Edinburgh and HRH The Princess Royal. Following the dinner, the new Fellows were addressed by The Duke of Edinburgh and the President. Richard Sadler FEng, formerly Chief Executive Officer, Lloyd's Register Group, responded on behalf of the new Fellows.

The 2016 new Fellows dinner will be held on Wednesday 19 October 2016 at Drapers' Hall, London.

◀ The President in conversation with new Fellows at Drapers' Hall



New Fellows' briefing and dinner

On 21 October, 50 new Fellows were formally welcomed into the Academy. The new Fellows spent the afternoon at Prince Philip House hearing from

Fellows who help shape and lead the Academy's work, along with senior staff members.

They were then officially inducted into the Academy before enjoying a gala dinner at Drapers' Hall, London.

Party conferences

This year, the Academy took part in a successful set of events at the conferences of the three largest parties in Parliament. Hosted alongside the other national academies, these breakfast roundtable meetings in Brighton, Manchester, and Aberdeen saw a selection of senior parliamentarians discuss the role that research and innovation play in solving the challenges of the productivity puzzle.

As this was the first conference season after the May General Election, it was a significant opportunity to talk about the status of funding and what more can be done to support UK excellence in research and innovation, and so bolster economic growth.

The Academy welcomed Universities and Science Minister, Jo Johnson MP and Chair of the House of Commons Science and Technology Committee, Nicola Blackwood MP to the Conservative event.

This followed a lively discussion at the Labour party conference in Brighton, an event which heard from Professor Jeremy Watson CBE FEng.

In a first for the Academy, an event was also held at the Scottish National Party conference in Aberdeen. The 2015 MacRobert Award winners Artemis Intelligent Power provided a well-received case study at the event, outlining their path to developing both their innovation and their successful company.

East Midlands Regional Lecture

Rolls-Royce hosted the second East Midlands Lecture and Dinner on 25 November at Derby Conference Centre. The lecture, entitled *Early development of the Rolls-Royce RB211 Turbofan engine* was given by Academy Fellow and former technical advisor to Rolls-Royce, Philip Ruffles CBE FEng FRS. His presentation covered the early development of the RB211 Turbofan engine from 1960 to 1980 and revealed, for the first time, the full technical story behind the company going into receivership and subsequently recovering.

The audience were also given the opportunity to view the Rolls-Royce Heritage Exhibition at its education and development centre in Derby.

In her address to the dinner that followed, the President thanked Phil Bennett FEng and Professor Ric Parker CBE FEng for organising this event.

News of Fellows

Sir John Armit CBE has been appointed to the National Infrastructure Commission and made President of the Institution of Civil Engineers.

Warren East CBE has been awarded a lifetime achievement award by the National Microelectronics Institute.

Dr Andy Harter has been awarded an honorary doctorate of science from Anglia Ruskin University.

Professor Antony Jameson FRS has been awarded the Daniel Guggenheim Medal.

Professor Dame Julia King and **Professor Robert Mair FRS** have been elevated to the House of Lords as crossbench peers.

Professor Gordon Masterton OBE FRSE has been appointed Chair of Future Infrastructure at The University of Edinburgh.

Professor Sir Jim McDonald FRSE has been appointed to head Weir Group's Technology Advisory Board.

Professor Mark Miodownik has been awarded the 2015 NAKFI Communication Award for his book, *Stuff Matters: Exploring the Marvelous Materials That Shape Our Man-Made World*.

Dervilla Mitchell CBE has been appointed to the board of the British Aviation Group.

Alan Mulally has been elected to the International Air and Space Hall of Fame.

Stephen Payne OBE has been awarded an Honorary Doctorate from the University of Winchester.

Dr John C Taylor OBE has been awarded the Harrison Medal by the Worshipful Company of Clockmakers.

David Waboso CBE has been appointed President of the Association for Project Management.

Sir Peter Williams CBE FRS has been appointed Chairman of Kromek Group plc.

Autumn media round-up

This autumn has seen new Fellows attract a range of press coverage including profiles in local and trade press. News that Professor Dame Julia King DBE FREng and Professor Robert Mair CBE FREng FRS were to be appointed to the House of Lords was also reported in the national media.

The launch on 23 October of the Academy's report *A critical time for UK energy policy* was widely covered. In addition to articles in *The Guardian* and *The Independent*, Dr David Clarke FREng discussed the report on BBC Radio 4's *Today* programme.

The Sunday Times reported on the Academy's *Investing in innovation* report in September, and in November, *The Sunday Telegraph* carried a letter signed by Fellows calling for increased innovation spending. Academy Chief Executive Philip Greenish CBE was quoted in *The Independent* following the House of Commons Science and Technology Committee's warning that the UK could lose its status as a world leader in research if science and innovation spending is not increased.

The Launchpad competition finalists were well covered in September and October, including reports in *The Sunday Times*, the *Financial Times* and at *Wired.co.uk*. On 26 October, the presentation of the Queen Elizabeth Prize for Engineering received widespread international attention, through coverage ranging from the BBC World Service to *Hello!* magazine, reaching 500 million people.

Call for awards

The following 2016 Royal Academy of Engineering awards are now open for nominations:

Sir Frank Whittle Medal - For outstanding and sustained achievement in any engineering discipline.

Sir George Macfarlane Medal - For a UK engineer who has demonstrated excellence in the early stage of their career.

Colin Campbell Mitchell Award - For an engineer or small team of engineers who have made an outstanding contribution to the advancement of any field of UK engineering.

Rooke Award - For the public promotion of engineering by an individual, small team or project.

Closing date: 15 February 2016

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

For more information please email awards@raeng.org.uk

MacRobert Award

Supported by the Worshipful Company of Engineers

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

Closing date: 31 January 2016

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

Forthcoming events

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

18 January 2016

New Year Reception

Speaker: Philippe Mellier, CEO

De Beers Group

Venue: Prince Philip House

1 March 2016

RAEng/RSE Annual Joint Lecture

Speaker: Mrs Anne Richards CVO CBE, Chief Investment Officer, Aberdeen Asset Management

Venue: Royal Society of Edinburgh

23 June 2016

Awards Dinner 2016

Venue: The Pavilion at the Tower of London

Fellows' lunches

The Trustee Board is hosting a series of lunches for Fellows at the Academy to provide an opportunity for informal networking and conversation with colleagues. Please note that there will be a limited number of spaces available and advance registration is essential. Dates for future lunches are now confirmed:

17 December 2016

12.30pm - 2.30pm

Venue: Prince Philip House

Hosts: Allan Cook CBE FREng, Academy Vice President and Professor Helen Atkinson CBE FREng, Trustee and Chair of the Education Committee

4 February 2016

12.30pm - 2.30pm

Venue: Prince Philip House

Host: Professor Richard Williams OBE FREng, Academy Vice President

Tickets for the lunch cost £25 (including VAT).

You can register for a ticket via the Academy's website at: www.raeng.org.uk/events/list-of-events



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Obituaries

Professor William John Thomas FREng died on 27 October 2015, aged 86. He was formerly Emeritus Professor of Chemical Engineering at the University of Bath.

Professor Brian Wilshire OBE FREng died on 5 November 2015, aged 78. He was formerly Professor and Director, EPSRC Engineering Doctorate Centre/ EPSRC Integrated Graduate Development Scheme, University of Wales.

Mr Gordon Lionel Wright FREng died on 6 October 2015, aged 88. He was formerly Technical and Engineering Director, Agricultural and Petrochemicals Divisions, ICI plc.