

This is Engineering campaign goes live

In January, the Academy launched *This is Engineering*, an unparalleled multi-year perception-change campaign that seeks to rebrand engineering for young people and their influencers to encourage them to take up careers in engineering.

The UK's impending departure from the European Union and the development of a new industrial strategy present both an imperative and a unique opportunity to refocus efforts on boosting the supply of UK homegrown talent. Existing STEM engagement initiatives over the past 10 years have not had the impact expected. The Academy has set out to lead the profession in taking a different approach, and will work with partners from across engineering to promote the profession as attractive and accessible to young people.

This is Engineering launched on 24 January, and targets 13 to 18 year olds. The digital campaign will challenge young people to consider what engineering means in the 21st century, presenting it as a dynamic, exciting and varied career with huge opportunities to make a difference to society and how we live. It highlights how engineering is behind the things that young people love and do every day to tackle current perceptions of

engineering, which are often that it is narrow, technical and traditional.

It centres on an online and social media advertising campaign, complemented by a programme of PR activity that highlights the critical role that engineering plays in shaping the future. The first five adverts focus on engineers working in sport, design, space, fashion and technology. They direct audiences to an online hub, where they can learn more about the engineers and access practical information about how to pursue a career in engineering.

In the first seven weeks following launch, the campaign reached a potential 31 million people, seven million of whom have watched the videos. It also gained coverage in *The Times*, on Sky News, BBC Radio 4 and Radio 5 Live, among other media titles.

The Academy is leading *This is Engineering* in collaboration with EngineeringUK and industry partners, but it has been developed for the whole profession. The launch came shortly after the government's Year of Engineering and the two are closely aligned. *This is Engineering* will provide a legacy for the Year, building on its success and delivering the sustained engagement needed.

You can see the films at www.ThisIsEngineering.org.uk and the Academy encourages you to share them widely across your social media networks. *This is Engineering* can be found on Twitter at [@ThisIsEng](https://twitter.com/ThisIsEng) and under [#ThisIsEngineering](https://twitter.com/ThisIsEngineering)

To find out more or for an offline copy of any of the films for use at events, please email contact@thisisengineering.org.uk

◀ The *This is Engineering* campaign features Vinita Marwaha Madill, a Space Operations Engineer at the European Space Agency. She is one of five young engineers to feature in the campaign



President's column



▲ Sir John Parker GBE FREng and the President discuss the industrial strategy with the Prime Minister

In January, I was delighted to welcome many Fellows and their guests to the Academy for Fellows' Day, which gave them the opportunity to learn more about the Academy's activities and meet up with other Fellows and staff. The exhibits did an excellent job of showcasing the Academy's work and it was wonderful to meet and hear from some of the talented people that we support. Of course, Fellows' contributions underpin this work, and I am always grateful for the amount of time and expertise that Fellows give to the Academy. The day coincided with a farewell celebration for former CEO Philip Greenish CBE who was touched, and almost made speechless, by the accolades he received. His successor in the role, Dr Hayaatun Sillem, had outlined her plans for the Academy in a speech earlier in the day; her vision was very well received and many Fellows told me how delighted they were with her appointment.

But of course, not all Fellows can travel to London and I was able to use a recent business trip to the US as an opportunity to meet up with some of our Fellows based on the West Coast of the US. A little closer to home, I was honoured to give the first Regius Engineering Lecture at the University of Edinburgh in January, to celebrate 150 years since the founding of the Regius Chair. My theme for the lecture was the power of education, research and innovation, and as I had the opportunity to visit the School of Engineering on my visit, I sought to highlight some of the engineering innovations that originated at the university.

Capturing value from the UK's research base, through innovation, translation and commercialisation, is of huge importance, especially to the government's industrial strategy. In January, Rt Hon Greg Clark MP,

Secretary of State for Business, Energy and Industrial Strategy, attended a roundtable at the Academy to discuss industrial strategy. The discussions with Fellows and representatives of the professional engineering institutions highlighted engineering's role in creating economic growth and well paid jobs, and what is needed to encourage more people to enter the profession. Later the same day, Sir John Parker GBE FREng and I met the Prime Minister at a reception at Number 10 and were able to reinforce those messages.

The Academy continues to increase its support for excellent research and innovation. In 2017's autumn newsletter, I mentioned that the Academy would be receiving additional funding from the National Productivity Investment Fund. I am now pleased to announce that, as part of the government's Investment in Research Talent, the Academy has appointed 10 new Chairs in Emerging Technologies, providing research visionaries with long-term support to carry out research in emerging technology areas with high potential to deliver economic and social benefit to the UK. We expect to be able to run further calls for these highly prestigious chairs, and are very optimistic about our growing role in the research funding system that will support the industrial strategy.

A key aspect of our plans for the Academy is creation of a new Engineering Policy Centre. This aims to increase the Academy's capacity to carry out policy work in collaboration with partners, including the professional engineering institutions. In January, Dr Nick Starkey joined us as Director of Policy and a working group chaired by Professor Jeremy Watson CBE FREng has been established to develop plans for the centre. The centre will aim to provide a coordinated voice on policy issues where, by coming together, the engineering profession can have greater impact.

As you will have read in this newsletter, we have launched *This is Engineering*, a digital communications campaign centred on a series of video clips that are being shared with teenagers on social media to highlight engineering careers in new and unexpected ways. The campaign has been very well received – as I was able to see for myself when I showed one of the videos during a schools talk. This talk, during the launch week for the Year of Engineering, was at Ken Stimpson Community School in Peterborough as part of the excellent Speakers for Schools, a programme that coordinates talks in state

schools to encourage and inspire students of all backgrounds. After talking and showing the students demonstrations about aircraft, flight and noise, the students asked me lots of great questions, so I hope that the talk – and video – stimulated their interest in a future in the profession. We hope that many engineers will make use of the *This is Engineering* videos* during their outreach activities to illustrate the breadth of modern engineering.

Supporting research and innovation, working with industry and government, and encouraging more young people into the profession all enhance engineering to the benefit of both business and society. I have no doubt that our profession will continue to be a strong driver of growth.

Meetings and visitors

In her capacity as President, Dame Ann has met:

Sinead Lynch, Chair, Shell UK
Sir Mark Walport FRS HonFRSE, CEO, UKRI
with Dr Hayaatun Sillem
Rt Hon Claire Perry MP with Dr Hayaatun Sillem
Patrick Vallance FRS, President, GSK with Dr Hayaatun Sillem

She attended the following events and meetings:

The Hinton Lecture
The inaugural Zienkiewicz Lecture at Swansea University, which she delivered
HM The Queen's Evening Reception at Buckingham Palace
QE Prize presentation and reception
Judging panel of the EPSRC 2017 photography competition
Engineering150 celebration
Regius Engineering Lecture, University of Edinburgh, which she delivered
Royal Society of Edinburgh Triennial Dinner attended by HRH The Princess Royal
Queen's Anniversary Prizes for Higher and Further Education
International Fellows' Dinner, San Francisco, California
Council for Science and Technology meeting
Sir Denis Rooke Memorial Lecture
Roundtable with Sir Mark Walport FRS HonFRSE

She was interviewed by:

School House magazine

*instructions to download the videos can be found on the front page

Enterprise Hub fifth anniversary celebrations

On 20 February, the Enterprise Hub held the first event in a series celebrating its fifth anniversary.

The event was an opportunity to reflect on what the Hub has achieved, and to set out its vision for the future. Twenty Hub members showcased their innovations to over 100 attendees. Exhibitors included CustoMem, winner of the 2017 BioStart award, which aims to commercialise bio-engineering; Vivacity Labs, which was awarded a £1.9 million grant to deploy smart traffic technology at a city-wide scale in Milton Keynes; and Recoil Kneepads, which has a distribution deal with Homebase.

In five years, Hub members have turned innovation into engineering impact on society through commercial exploitation. They have started 57 new businesses, created 270 new jobs and attracted over £62 million of additional funding. This progress has been supported by the collective experience of successful business leaders and entrepreneurs within the Academy's Fellowship, who have acted as mentors. The Hub has



▲ Michael Loweth, Business Development Manager at Oxford Space Systems, demonstrates the company's technology to a guest

grown from supporting just six Enterprise Fellows in its first year to recruiting over 40 engineering entrepreneurs across various programmes per year, with a network of more than 100 Hub members.

As the Hub grows, it has several focus areas. There are plans to enhance its work with engineering SMEs in the UK to help them transform their prospects through new perspectives and bigger ambitions. Stronger partnerships are another focus, with plans to work locally, regionally and internationally with others who support

innovation and entrepreneurship. All efforts aim to create and grow businesses and jobs in the UK.

To mark the anniversary year, the Hub will be hosting two more events to celebrate the success of the entrepreneurs it has supported. The annual Hub Showcase will be on the 31 May, and the Launchpad Competition final will be on 22 November. Details of the events can be found at www.enterprisehub.raeng.org.uk/latest/events

A message from the new CEO of the Academy, Dr Hayaatun Sillem



I was absolutely delighted to take up the post of Academy CEO at the start of this Year of Engineering. Engineering and technology are playing an ever more visible role in the world around us. From the impact of artificial intelligence (AI) and automation, air quality, the challenges faced in the NHS and in housing to the influence of social media and the need to improve economic opportunity in underserved regions of the UK: all are issues on which an engineering voice is important. They are issues that engineers, working with others, can help to address.

My guiding vision in taking on this exciting appointment is that the Academy will become an essential part of national life, trusted by all our key stakeholder groups, including policymakers, those who create wealth from engineering and technology, educators and academics, the professional engineering community, and engineers at all career stages.

Delivering this vision will require us to develop an even stronger partnership between the executive and the Fellowship than exists today, and to make sure that the activities we undertake generate outcomes that matter at a scale that is meaningful. Only by harnessing the expertise, credibility and commitment of our outstanding Fellowship will this be possible.

We will also need to strengthen our partnerships beyond the Fellowship if we are to be effective in fulfilling our leadership role. We are in the process of establishing a new Engineering Policy Centre, hosted by the Academy with participation from the 37

other organisations that represent professional engineering in the UK. Our objective is to drive a step-change in the visibility and influence of the profession at the highest levels of government – both regionally and nationally – and, ultimately, to contribute to material improvements in policy development and implementation.

Engineering is under the spotlight during 2018 and the government's Year of Engineering offers an unprecedented opportunity to kick-start efforts to attract a new generation into engineering, which better reflects the society we live in. A major part of our contribution to the Year is *This is Engineering* – our digital marketing campaign to reposition engineering in the minds of young people from all backgrounds and their influencers. I look forward to working with staff, Fellows and partners to ensure that we make the most of this Year of Engineering and accelerate progress towards our ambitious goals in the years ahead.

Thought leadership

Engineering Policy Centre

The Trustee Board has committed to establishing a new Engineering Policy Centre in collaboration with partners across the engineering profession.

Work has now begun in earnest to develop the centre to increase the impact of engineering on society by informing policy and building the capacity and

ability of engineers and policymakers to work productively with each other. The Academy is leading the venture, working in partnership with the other professional engineering organisations. A working group has been set up, chaired by Professor Jeremy Watson CBE FREng, which includes both Academy Fellows and colleagues from engineering institutions. Dr Nick Starkey joined the Academy as Director of Policy in January, and will oversee the development of the centre.

In order to maintain momentum, it was also decided that collaborative work would continue on industrial strategy while the centre was being developed.

A roundtable with Greg Clark MP was held earlier in the year and a programme of work is being developed to build on the profession's response to the industrial strategy Green Paper. This will focus on three main themes: achieving the target of spending 2.4% of GDP on research and development funding; the engineering skills shortage; and grand challenges such as clean growth, AI and the data economy, and mobility.

This is a challenging but exciting opportunity for the Academy. For more information or to contribute in any way please contact Dr Alan Walker, Head of Policy at alan.walker@raeng.org.uk

10th Young Arab Women Leaders conference

In December, the Academy hosted the 10th Young Arab Women Leaders conference, focusing on the development of leadership skills in the next generation of young women in STEM.

The event, which was organised by the Arab International Women's Forum (AIWF) in collaboration with the Academy, PwC and the World Bank, brought together guests and delegates from 40 different countries, including the UK, US and the Arab States.

Session topics covered: women-led innovation and new solutions to the global energy, food, water, and climate



▲ A panel discuss educating and empowering the next generation of STEM women leaders

change crises; women-led innovation in medical technologies and healthcare AI; supporting diversity, inclusion and innovation in energy, engineering, and infrastructure; and strategies to advance gender diversity in tech entrepreneurship and the digital economy.

Speakers included Haifa Fahoum Al Kaylani,

Founder Chair, AIWF; Florence Gschwend, Co-founder, Chrysalix Technologies; Dr Naila Arebi, Chair of Medicine, St Mark's Hospital; and Dr Enass Abo Hamed, CEO and Co-Founder, H2GO Power.

The panel sessions were interactive and discussion based, with speakers and delegates sharing strategies for success.

Diversity and Inclusion programme workplan 2018-19

In the last year, the Academy's Diversity and Inclusion (D&I) Programme successfully delivered several activities to embed D&I within the profession. These included research on culture and inclusion in engineering and delivery of the first ever D&I benchmarking exercise for professional engineering institutions (PEIs) delivered in partnership with the Science Council.

The Academy delivers the programme in collaboration with engineering employers and employer-led organisations, PEIs, third-sector organisations, its employees and Fellows. Over the next two years, the programme will work with:

- employers to develop more inclusive

cultures across engineering, support increased measurement of D&I, and create a framework that SMEs can use to plan and assess D&I progress

- PEIs to implement recommendations from the D&I benchmarking report
- Fellows and employees across the Academy to implement action plans, and monitor, measure and report on D&I progress.

Dervilla Mitchell CBE FREng, Chair of the D&I Committee, said: "The business case for diversity has been made time and again: we know that diverse teams come up with better, more innovative solutions. Our profession has more to do to support this agenda and we are committed to broadening our engagement so that engineering careers across every sector become widely recognised as inclusive and deeply rewarding. I urge all organisations to get in touch with the



▲ Dervilla Mitchell CBE FREng, Director at Arup and Chair of the Academy's D&I Committee

Academy's diversity team to find out how to get involved so that we can make collective progress and continue to be tremendously proud of the achievements of our industry."

For more information, please email diversityteam@raeng.org.uk or visit www.raeng.org.uk/engdiversity

Fellows' day and EGM

On 8 February, over 200 Fellows, their partners and guests attended the annual Fellows' day at Prince Philip House, London.

Following an Extraordinary General Meeting in which some governance changes were approved (see Richard Williams' update, page 11), Fellows' day was an informal and social occasion. It provided an opportunity for Fellows to hear the latest updates on the Academy's work and to find out how they can get involved. They had the opportunity to explore an exhibition showcasing the work of the Academy, and heard from the newly appointed Chief Executive, Dr Hayaatun Sillem, who shared her vision for the Academy.

Academy President Professor Dame Ann Dowling OM DBE FREng FRS spoke, highlighting some of the Academy's achievements and successes in the last year. She discussed the recently launched digital campaign, *This is Engineering*

(see page 1), which seeks to change perceptions and attitudes towards engineering and to encourage more young people from all backgrounds to take up careers in the industry. She went on to illustrate how the campaign will work with the Year of Engineering and highlighted the Academy's "work with the government - and our partners across the profession to build greater public awareness of engineering, and to ensure that the impacts last well into the future".

The other speakers were Professor John Loughhead OBE FREng, Chief Scientific Advisor for the Department for Business, Energy and Industrial Strategy, who spoke about the government's clean growth strategy, and Dr Ruth Misener, Senior Lecturer at Imperial College London, winner of the Academy's 2017 Sir George Macfarlane Medal.

Following the talks, guests joined a farewell reception for Philip Greenish CBE to celebrate his exceptional contribution to the Academy during his 14 years as Chief Executive.



▲ (left) Teams from across the Academy had stands to demonstrate their work, and (right) Academy CEO Dr Hayaatun Sillem with former CEO Philip Greenish CBE, and President Dame Ann Dowling

Digital policy reports

On 14 March, the Academy launched two digital policy reports on cyber safety and the Internet of Things (IoT).

The first is an Academy report on the cyber safety and resilience of the complex, interconnected systems that support the modern economy. It explores the vulnerabilities associated with these systems, while identifying opportunities for the UK to exploit existing world-class expertise and to lead internationally on developing regulatory and non-regulatory measures to improve practice.

The second is a joint report between the Academy and the PETRAS IoT research hub, a consortium of nine UK universities. It discusses how the opportunities of the IoT can be realised across consumer, public space and industrial applications with recommendations for governance, policy, security, digital skills and ethics.

Professor Jeremy Watson CBE FREng chaired the launch. Attendees included stakeholders from government, industry and academia. A lively panel discussion followed presentations by the reports' working group chairs, Professor Nick Jennings CB FREng and Paul Taylor FREng.

The reports are available on the Academy website at www.raeng.org.uk/policy

Autonomous systems

Over the last year, Fellows with expertise in autonomous systems have been exploring the barriers to autonomous systems' contribution to UK economic growth.

Autonomous systems are made up of complex technologies that can harness the potential of sensors, robotics and AI to understand their environment and make decisions without human intervention.

The group has found that better alignment

is required to promote widespread, safe adoption. This applies to regulators working collaboratively across sectors, inclusion of the wider public in technology advancement, development of skills linked to the needs of the industry, and unified standards across digital and physical infrastructure. It concludes that the government should support these initiatives to ensure that UK productivity benefits from autonomous systems.

Recent announcements relating to AI within the industrial strategy White Paper could signal significant opportunities to help autonomous systems overcome these existing barriers, providing that the government's definition of AI is inclusive.

The Academy has sent letters to government officials to highlight these issues and outline the potential benefits of autonomous systems in terms of economic growth.

Fresh case for investment

The Academy is undertaking a policy project, *Fresh case for investment in research and innovation*, in partnership with the other national academies.

The Academies aim to generate evidence to ensure that the best available analysis informs future

decisions to invest in research and innovation. An expert steering group, chaired by Lord David Willetts, will oversee two research commissions that aim to complete by summer 2018.

The first commission will gather evidence on how to measure the benefits of research and innovation, and the second commission will focus

on the conditions needed to translate research and drive innovation.

Rather than simply refining the case for more investment, the project will develop an evidence base to better describe the conditions needed to ensure the continued excellence of the UK's outstanding research and innovation base.

Engineering and science D&I benchmarking

On 7 February 2018, representatives across engineering and science professional bodies attended an event to learn about the results of the D&I benchmarking exercise that the Academy and Science Council carried out in 2017.

The key findings from the benchmarking exercise show that across engineering and science:

- there is a lot of similarity in patterns of self-assessment
- governance and leadership is highlighted as an area of strength
- D&I performance is weakest in education and training, accreditation and examinations, and in prizes, awards and grants
- women are represented better on boards, as chairs of board committees, and in the membership of scientific bodies than in PEIs
- black, Asian and minority ethnic (BAME) people are represented



▲ Attendees heard from a number of speakers at the event at Prince Philip House

better on the boards of PEIs than science bodies, although overall most participating professional bodies across engineering and science have no BAME people in senior leadership

- barriers to progress include lack of data, lack of resources and the challenge of the demographic starting point, in terms of gender and ethnicity.

A steering group of professional engineering institutions and Science

Council members, chaired by Rosemary Cook CBE, Chief Executive of the Institution of Physics and Engineering in Medicine, will take forward the implementation of recommendations.

For more information, please email diversityteam@raeng.org.uk

Full reports on the performance of engineering and science separately and together are available at www.raeng.org.uk/peis

Future infrastructure

In January, the Academy responded to the National Infrastructure Commission's (NIC) interim National Infrastructure Assessment.

It was a wide-ranging submission covering all sectors of infrastructure, as well as some important cross-cutting issues. Thank you to those Fellows who contributed to this effort.

The Academy recognises the importance of infrastructure and the need for it to take early account of key trends in demographics, technology and the environment, as well as the need to contribute to economic productivity and growth. As such, it is initiating a policy study that examines the above trends and the strategies for design,

financing and delivery that can realise the best economic, environmental and social outcomes over the lifetime of infrastructure assets.

The Academy hopes to work closely with the NIC and other PEIs. Any Fellows who would like to know more or are interested in contributing to this study should contact Dr Andrew Chilvers at andrew.chilvers@raeng.org.uk

President shortlisted as one of the most influential women of the last century

Dame Ann Dowling was included on a shortlist of the most influential British women of the century, as part of a special series by BBC Radio Four's *Today* programme.

In the 100th year since some women were given the vote, the *Today* programme celebrated by interviewing women and asking them to nominate an influential figure. Roma Agrawal, structural engineer, winner of the 2017 Rooke Award and author of *Built*, nominated the President. She was chosen for being the first female president of the Academy, and for epitomising what engineering is about: improving society.

The shortlist of 12 women was selected from 20 nominees, and Dame Millicent Fawcett, leading suffragist and campaigner for equal rights for women, was announced as the eventual winner. Other nominees included chemist Professor Dorothy Hodgkin, scientist Rosalind Franklin and architect Dame Zaha Hadid.

Nominations for the 2019 Queen Elizabeth Prize for Engineering

On 26 March 2018, nominations for the 2019 Queen Elizabeth Prize for Engineering (QEPrize) officially opened.

The QEPrize is a global £1 million prize that celebrates a groundbreaking innovation in engineering. It rewards an individual or team of engineers whose work has had a major impact on humanity. It celebrates stories of these engineering successes, raising the international public profile of engineering, and inspiring new generations of engineers to take up the challenges of the future. The start of the fourth prize cycle sees the QEPrize firmly established as the world's leading award for engineers and engineering as media coverage of the 2017 QEPrize activities reached over two billion people across the globe.

Professor Sir Christopher Snowden FREng FRS continues in his role as Chair of the international judging panel and the nominations advisory group will again be led by Professor Stephen Williamson FREng.

The current laureates and winners of the 2017 QEPrize are Dr George Smith, Dr Michael Tompsett, Professor Nobukazu Teranishi and Professor Eric Fossum, the four engineers whose combined efforts developed the modern digital image sensor. The inaugural prize in 2013 was awarded to the five pioneers of

Public engagement



▲ The winners of the 2017 Queen Elizabeth Prize for Engineering with their trophies, presented by HRH The Prince of Wales

the internet and World Wide Web, and Dr Robert Langer FREng of MIT won the 2015 prize for his work in controlled-release large molecule drug delivery.

All nominations are to be managed through an online process. To make a nomination, or for more information on the prize, criteria and past winners, please go to www.qeprize.org/nominate

Tell your friends about *Ingenia*

The Academy's quarterly magazine, *Ingenia*, publishes stimulating and informative articles about all aspects of engineering and technology.

It is aimed at engineering enthusiasts from 10 to 110, including students, engineering undergraduates, engineers at all levels, academics, opinion formers and policymakers. It has a large

readership among young people, with almost 4,000 copies going out to schools, colleges and sixth forms.

Fellows are invited to request copies of the magazine to give out at events and public engagement activities to help raise awareness of engineering.

To add someone or an institution to the mailing list free of charge, or request copies for an event, please contact the *Ingenia* team at ingenia@raeng.org.uk



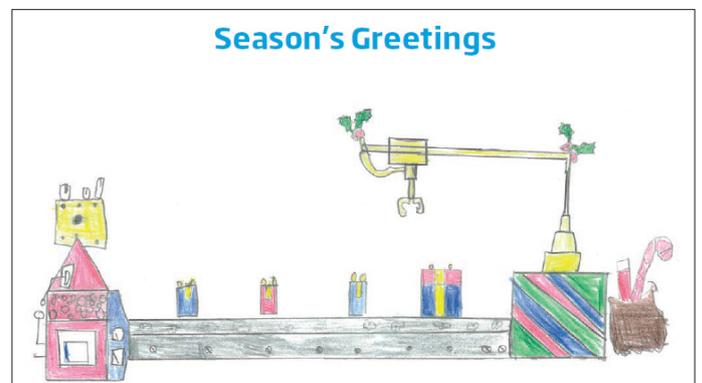
2017 Christmas card competition

A Year 5 pupil from a school participating in the Barrow Engineering Project created the winning design for the Academy's 2017 Christmas card.

The Academy challenged primary school children from the project to design a present wrapping machine to help the tired elves or an alternative sleigh to deliver presents faster, to help Santa and his elves cope with the growing world population.

The pupil from Newbarns Primary School, Barrow-in-Furness, created a design that was sent to all Academy Fellows, industry contacts, ministers and others government officials. The competition showcased the work of the Academy's education programme while engaging young children.

The Barrow Engineering Project was launched in April 2008 as part of the Academy's ongoing work to address the engineering



▲ The winning card design by a Year 5 pupil from Newbarns Primary School

skills crisis, embed STEM deeper in the curriculum and encourage more young and diverse people to become engineers and technicians. It was identified as an area of economic deprivation and high unemployment. Over the last eight years, the percentage of students taking triple science in Barrow has increased by 370.7%.

Ingenious grants awarded

In February, the Academy awarded 20 grants under its public engagement programme *Ingenious*. The projects will provide engineers with the opportunity to engage public audiences with creative engineering content, and build their engagement skills in the process.

This year, the panel focused on projects that would have an impact on underrepresented communities and groups in engineering. The selected projects include a public art competition based in Leeds focused on underserved working class communities, which challenges participants to reimagine a world that only uses low carbon technologies. Another project is a workshop that targets women and girls in the West Country to consider alternative water supplies and the innovative engineering solutions used to solve real-world water issues.

The projects will provide opportunities for members of the



▲ A 2017 *Ingenious* project centred on the large windfarm off the Thanet coast. Participants had the opportunity to make their own wind turbine

public to meet professional engineers and learn about the exciting, creative work that they undertake. This year, all *Ingenious* funded projects running will be delivered as part of the Year of Engineering, and will feature on the calendar of events for the Year.

Education and skills

Welsh Valleys Engineering Project

On 9 March, the Academy launched its latest engineering education programme in the Welsh Valleys.

The regional project will build on the Welsh Valleys' engineering heritage, enabling students in the area to build skills that will support many of the new engineering companies that are investing

in South Wales. The project provides funding for STEM enhancement and enrichment opportunities for students, and continued professional development for teachers. It will create an engineering ethos across schools and the community, and aims to increase local employer engagement by developing partnerships between schools and employers.

The project is a fully funded, five-year programme reaching eight secondary schools and five primary schools across the Welsh Valleys. It is funded by the Panasonic Trust.

A recently awarded Waterloo Foundation

grant will also support primary schools in the area for two years. It will help to deliver an inspiring and engaging STEM curriculum, enable schools to buy equipment for after-school STEM clubs, and encourage them to take part in national STEM activity programmes, such as the Big Bang Fair and British Science Week. Teachers will also receive extra training and support through local networks developed by the project.

The Academy's engineering education projects in Barrow-in-Furness, Stoke-on-Trent and Lowestoft have provided over 100,000 STEM learning opportunities to young people since their launch.

Celebrating enterprise and entrepreneurship in higher education

On 18 January, the Academy hosted a joint event with the Quality Assurance Agency for Higher Education (QAA) to celebrate enterprise and entrepreneurship in UK higher education.

The event launched the QAA's revised guidance, *Enterprise and entrepreneurship education: Guidance for UK higher education providers*. Participants heard about the policy drivers for embedding enterprise and entrepreneurship in higher education, and the key revisions to the QAA's guidance document and its international impact so far.

The second part of the event highlighted the work of the Academy and showcased best-practice case studies in the practical

delivery of entrepreneurial education. Attendees heard from several speakers, including Fiona Mugione, Chief of the Entrepreneurship Section at the United Nations Conference on Trade and Development, and Margherita Bacigalupo, Research Fellow, European Commission Joint Research Centre.

First evaluation of UTCs report published

In December, the first evaluation of University Technical Colleges (UTCs) was published, finding that project-based learning and employer involvement has helped to create more well-rounded, work-ready students.

The study team visited 10 UTCs, and the report found that students at UTCs develop transferable skills such as project management and good communication

alongside their technical skills. Employers involved in their education described them as "young professionals ready for work". Students said that they felt more confident about their next steps.

The report was undertaken by the National Foundation for Educational Research on behalf of the Academy and the Edge Foundation to evaluate the UTC model in order to inform sector-wide practice.

The next stage of the evaluation will focus on UTCs with high levels of employer and university engagement. It will include a best practice guide for UTCs on working with education and industry stakeholders.

The full report can be read on the Academy website www.raeng.org.uk/publications/reports/evaluation-of-university-technical-colleges

Aiming for Awesome

The Academy has collaborated with the Royal Air Force (RAF) to create *Aiming for Awesome*, a teaching resource that brings 100 years of RAF engineering to life.

The resource will help celebrate the RAF centenary in classrooms across the UK. Teams from both organisations combined their expertise to create 10 different STEM challenges for teachers to set for pupils. The challenges reflect some of the key engineering innovations that have enabled the RAF to shape the modern world and protect UK skies for 100 years.

The series of resources is aimed at primary school children and the challenges have been designed to open up the world of engineering experimentation to more students. Schools receive the resource boxes free of charge and teachers can take part in a short training session to learn how to make the most of its contents.

In early January, the Academy launched the *Aiming for Awesome* resource at the Association of Science Education's annual conference at the University of Liverpool. Academy staff demonstrated the challenges, and provided resources and posters for teachers to take home and start using in clubs



▲ The box includes challenges such as measuring the impact of ejector seats

and lessons. Many visitors attended the Academy's stand and teachers were enthusiastic.

The Academy has also developed a set of six posters for distribution to schools around the country. The posters provide an insight into technology used within the RAF, key functions carried out by the RAF in terms of disaster relief, and include stories about RAF personnel.

Research and innovation

Pitch@Palace

On 28 February, 15 African engineering entrepreneurs pitched their innovations to an influential audience of entrepreneurs, investors and media at Pitch@Palace Africa at St James's Palace. The event was hosted by HRH The Duke of York.

The engineering entrepreneurs have all been shortlisted for the 2018 Africa Prize for Engineering Innovation, and are undergoing an intensive programme of training and mentorship delivered by the Academy.

Following an audience vote, Shafik Sekitto and the team behind the Uganda-based startup Matibabu were announced as the winners of Pitch@Palace Africa 2.0. They have been invited to take part in Pitch@Palace Global in December 2018.

Matibabu's device can test for malaria without drawing blood. It is a low-cost, reusable device that clips onto a patient's finger and uses red light to detect changes in the shape, colour and concentration of red blood cells, which are all affected by malaria. Within one minute the test results are sent to a mobile phone linked to the device.



▲ The 15 entrepreneurs, from Uganda, Kenya, South Africa, Ghana, Nigeria, Cameroon and Rwanda, with HRH The Duke of York

Charles Ofori from Ghana came second with Science Set, a mini science lab that contains all the materials needed to carry out experiments in the school syllabus. In joint third place were Nnaemeka Chidiebere Ikegwuono from Nigeria with ColdHubs, a solar-powered walk-in cold room that extends the shelf life of perishable food tenfold, and Arthur Woniala from Uganda with Khainza Energy Gas, a cheap biogas made from manure and safe for household use.

Pitch@Palace Africa is a collaboration between the Academy's Africa Prize for Engineering Innovation and HRH The

Duke of York's Pitch@Palace initiative. It supports entrepreneurs by giving them the opportunity to access mentors and advisers, distribution systems and supply chains, and connections and investment.

In June 2018, the finalists will present their pitches at an event held in Africa, and the winner of the Africa Prize 2018 will receive £25,000. Runners-up are each awarded £10,000.

More information about the shortlisted entrepreneurs can be found at www.raeng.org.uk/grants-and-prizes/international-research-and-collaborations/africa-prize

New Research Chairs and Senior Research Fellowships

The Academy has announced the award of six new Research Chairs and Senior Research Fellowships, two of which receive funding through the government's Investment in Research Talent initiative.

The six awardees work in varied areas of engineering research and will hold the positions for five years from March 2018, with mentoring from a Fellow provided during the period. The programme strengthens the links between industry and academia by supporting exceptional academics in UK universities to undertake use-inspired research that meets the needs of industrial partners.

The full list of awardees is:

- Professor Byron Byrne, Ørsted/Royal Academy of Engineering Research Chair in Advanced Geotechnical Design, University of Oxford
- Professor Claire Davis, Tata Steel/Royal Academy of Engineering Research Chair in Low Energy Steel Processing, University of Warwick
- Dr Corin Gawith, Covesion/Royal Academy of Engineering Senior Research Fellowship in Nonlinear Optical Materials by Ultra-Precision Machining, University of Southampton
- Professor Mark Girolami, Lloyds Register Foundation/Alan Turing Institute/Royal Academy of Engineering Research Chair in Data Centric Engineering, Imperial College London
- Dr Radan Slavik, Lumenicity/Royal Academy of Engineering Senior Research Fellowship in Thermally-insensitive Hollow Core Optical Fibres, University of Southampton
- Dr Cindy Smith, Scottish Water/Royal Academy of Engineering Senior Research Fellowship in Biofiltration by Biological Design, University of Glasgow

The next round of applications is due to close in September 2018. For more information, please visit www.raeng.org.uk/researchchairs

Leverhulme Trust Senior Research Fellowships

In November 2017, the Academy awarded seven researchers from around the UK with a Leverhulme Trust Senior Research Fellowship.

The researchers will focus on topics including next-generation advanced gasification technology, novel strategies for designing alloyed metals, and machine-to-machine communications. The fellowships will begin in September and October 2018.

Leverhulme Trust Senior Research Fellowships aim to support academics to concentrate on full-time research by funding a replacement academic to take over their teaching and administration duties for up to a year. These Fellowships

help academics to reinvigorate their research careers, enhance their current research interests or start new lines of research without constraints. They also provide an opportunity for a more junior academic to gain valuable teaching and administrative experience by covering the duties of the awardee.

The next call for proposals to the scheme will open later in 2018, for Fellowships starting in 2019.

For further information, visit www.raeng.org.uk/leverhulme-research-fellowship

Chair in Emerging Technologies

The Academy has announced support for 10 new Chairs in Emerging

Technologies in universities across the UK.

The scheme aims to identify global research and innovation visionaries and provide them with long-term support to lead on developing emerging technology areas that have high potential to deliver economic and social benefit to the UK.

The awardees will play a leadership role in their technology area, including supporting policy work concerning it.

The awards have been made possible after the Academy received extra government funding in 2017 as part of Investment in Research Talent, from the National Productivity Investment Fund. This funding will support the 10 new chairs over a 10-year period.

Academy roundup

Media roundup

In November, to coincide with the launch of Tomorrow's Engineers week, the President appeared on BBC Radio 4, BBC Radio 5 Live and BBC Radio Wales. She spoke about the need to improve D&I in engineering and to change outdated public perceptions of the sector.

Head of D&I Bola Fatimilehin also

appeared on BBC Look East to discuss the Academy's Engineering Engagement Programme and its aims to broaden graduate recruitment.

The finalists for the Africa Prize for Engineering Innovation continue to receive media attention, with several profiles appearing on *Guardian* online during December. The Queen Elizabeth Prize for Engineering's *Create the Future 2017* report received extensive international coverage, including a BBC Radio 4 *Today* interview with Lord Browne of Madingley FEng FRS,

Chair of the Queen Elizabeth Prize for Engineering Foundation.

In January, the launch of the Academy's digital campaign, *This is Engineering*, generated news stories in *The Times* and *The Engineer*, alongside numerous local press and specialist publications.

The Academy's CEO Dr Hayaatun Sillem has discussed the launch in interviews with BBC Radio 4, BBC Radio 5 Live and *Ian King Live* on Sky News. The campaign is being heavily promoted on social media.

Fellows' day and the EGM



Professor Richard Williams OBE FREng FRSE, Vice President of Fellowship Engagement, provides an update on the Academy's Fellowship activities.

On 8 February, Fellows' day was another enjoyable and successful occasion, now established as a popular event in the Academy calendar. I was delighted to hear Fellows' comments on how much they valued an event that encompassed both an afternoon and early evening, thus facilitating easier travel to and from London. Some praised the greater ease and welcome for Fellows at Prince Philip House and their use of the drop-in facilities in the Taylor Centre. At the open day itself, it was pleasing to hear the loud buzz of conversation as Fellows talked with staff at the display stands, each demonstrating achievements and future projects. I think that we all discovered something new about our Academy and its growing influence.

I was pleased to see the 'gear change' in planning, and now implementation, of the new Engineering Policy Centre. Policy is an area that Fellows have long wished to see scaled up. The impact of

the Academy's international activities was also notable. Our Fellows have established a reputation among other international engineering academies for being the world-leading academy in driving forward the sustainable development goals and fostering engineering innovation and leadership in developing economies.

This year Fellows' day included an EGM, at which some final changes in governance were unanimously approved. This is the last formal step in refreshing some governance operations to enhance the transparency of some Committee and Board processes. I have been pleased to see the recommendations being implemented. The intention is that Fellows should benefit from greater clarity of role descriptions, clearer timelines for becoming engaged in formal Academy Committees and enhanced information regarding pathways to appointments to the Trustee Board and the remit of the Nominations Committee.

There are a number of local lunches and lecture events scheduled in the coming months and I warmly invite your participation. If there is not one in your area and you might wish to host one, we would be pleased to assist in developing an event with you. As ever, I am pleased to receive your suggestions and ideas to vicepresident@raeng.org.uk

Fellows' lunches

Since the start of the year, several members of the Trustee Board have hosted lunches for Fellows across the UK.

On 1 February, Professor Steve Young FREng hosted a lunch at the University

of Cambridge, while Professor Geoffrey Maitland FREng hosted one at Prince Philip House on 28 February and Professor Elaine Martin OBE FREng hosted at the University of Leeds on 9 March.

Details of a Fellows' lunch in Scotland will be available soon. Naomi Climer FREng plans to host a lunch on 23 October at Prince Philip House, London - details can be found on the website.

Forthcoming events

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

17 April 2018

East Midlands Regional lecture

Venue: University of Lincoln

Time: 5.15pm to 9.00pm

23 April 2018

Ingenia live! presents space

Venue: Prince Philip House

Time: 6.30pm to 8.30pm

1 May 2018

Royal Society of Edinburgh and Academy annual joint lecture - 25th Anniversary

Venue: Royal Society of Edinburgh

Time: 6.00pm to 7.30pm

31 May 2018

Enterprise Hub Showcase

Venue: Prince Philip House

Time: 5.00pm to 8.30pm

27 June 2018

Awards Dinner

Venue: The Pavilion at the Tower of London

Time: 6.30pm to 10.30pm

News of Fellows

Professor Philip David Coates won the 2017 International Science and Technology Cooperation Award at the National Science and Technology Awards in China

Lord Paul Drayson was appointed a director of Airbus

Professor Tariq Durrani OBE FRSE has been elected as a foreign member of the US National Academy of Engineering

Dr Shaun Fitzgerald has been appointed Director of the Royal Institution

Professor Antonio Gens received the Kevin Nash Gold Medal from the International Society for Soil Mechanics and Geotechnical Engineering

Tony Harper has been appointed Director of Faraday Battery Challenge

Professor Joseph Hun-wei Lee has been appointed Chairman of the Assessment Panel of the Hong Kong Public Policy Research Scheme

Professor Timothy Leighton FRS has been awarded the Royal Society's Clifford Paterson Medal

Professor Jinghai Li has been appointed as New Party Group Secretary of the National Natural Science Foundation of China

Sir Terry Matthews OBE has been appointed to the Order of Canada

Andrew Wolstenholme OBE has been appointed Group Managing Director, Maritime & Land UK at BAE Systems

Andrew Wyllie CBE has been appointed President of the Institution of Civil Engineers

New Year's Honours

Congratulations to the six Academy Fellows who were recognised by HM The Queen in this year's New Year's Honours list.

Dame Commander of the Order of the British Empire (DBE)

Professor Pratibha Gai FREng FRS, Professor and Chair of Electron Microscopy, University of York, for services to chemical sciences and technology.

Commanders of the Order of the British Empire (CBE)

Dr Demis Hassabis FREng, Co-founder and Chief Executive Officer, DeepMind, for services to science and technology.

Professor Karen Holford FREng, Deputy Vice Chancellor, Cardiff University, for services to engineering and the advancement of women in science and engineering.

Professor Philip A Nelson FREng, Chief Executive Officer, Engineering and Physical Sciences Research Council and Chair, Research Councils UK, for services to UK engineering and science.

Officer of the Order of the British Empire (OBE)

Suranga Chandratillake FREng, General Partner, Balderton Capital, for services to engineering and technology.

Member of the Order of the British Empire (MBE)

Professor Mark Miodownik FREng, Professor of Materials Science, University College London, for services for science, engineering and broadcasting.

Nominations of prospective new Fellows

The Academy's effectiveness depends critically on the talent, energy and commitment of its Fellows and the role of the Fellowship is central to the whole membership process.

To reduce the time taken from nomination to election, the closing date for Fellowship nominations will be 1 September 2018. Consequently, the new calendar for 2019 candidates will be:

Closing date for nominations:

1 September 2018

Reviewing of candidates by membership selection panels:

October 2018 to March 2019

Inform proposers of results:

May 2019

Online election:

July 2019

AGM - when the new Fellows are formally ratified:

September 2019

New Fellows' briefing and dinner:

October 2019

Fellows can nominate via the Academy's online system for nominations, which is found in the Fellows' secure area of the Academy's website:

www.raeng.org.uk/fellows-area

Fellows will require a username and password to access it. To retrieve a forgotten password, email webmaster@raeng.org.uk

All other queries regarding nominations should be directed to membership@raeng.org.uk

Leave a lasting legacy

Thank you to all Fellows who have generously pledged a bequest to the Academy.

Legacy gifts are essential in bringing together the most successful and

talented engineers from across the profession with a shared purpose: to put engineering at the heart of a sustainable and prosperous society, improving lives and opportunities.

For a confidential discussion about legacy giving, please contact Fiona Stewart, Head of Philanthropy on 020 766 0852 or

fiona.stewart@raeng.org.uk



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Obituaries

Professor John Frederick Knott OBE

FREng FRS died on 5 October 2017, aged 78. He was formerly a Professor of Materials and Metallurgy at the University of Birmingham.

Mr Stanley Clarke Agnew FREng

died on 23 December 2017, aged 91. He was formerly Chief Engineer at the Scottish Development Department.

Dr Ian William Dand FREng died on 12 December 2017, aged 77. He was formerly Director of British Maritime Technology.

Sir John Cullen FREng died on 14 January 2018, aged 91. He was formerly Chairman of the Health and Safety Commission.

Dr Thomas Alan Wyatt FREng died on 5 January 2017, aged 84. He was formerly Reader Emeritus in Structural Design and Visiting Professor, Imperial College London.

Dr Ronald Leslie Bell CB FREng died on 25 December 2017, aged 88. He was formerly Director General, Agricultural Development and Advisory Service, and Chief Scientific Advisor, Ministry of Agriculture, Fisheries and Food.

Dr David Hywel Davies FREng died on 16 October 2017, aged 88. He was formerly Deputy Director-General DGXII, European Commission.

Professor Calestous Juma HonFREng FRS died on 15 December 2017, aged 64. He was formerly Professor of the Practice of International Development and Director of the Science, Technology and Globalization Project, Harvard University.

Professor Rudolf Prince FREng died on 3 July 2017. He was formerly Professor Emeritus in the Chemical Engineering Department, University of Sydney.