



## Hat-trick of engineering celebrations as Prince Philip House reopens

The reopening of the full facilities of Prince Philip House and the Enterprise Hub's new Taylor Centre has seen the Academy's home on Carlton House Terrace play host to a series of celebratory events in the first few months of 2017. The official opening of the Taylor Centre, the announcement of the winners of the Queen Elizabeth Prize for Engineering (QEPrize) and Fellows' Day saw the building filled with Fellows, entrepreneurs, guests and media as the new year got off to a flying start.

The Taylor Centre is the new physical home of the Enterprise Hub, and was officially opened by Professor Dame Ann Dowling OM DBE FREng FRS on 9 February. The centre will help transform the UK's best and brightest engineering and technology entrepreneurs into the business leaders of tomorrow by providing a new, inspiring set of spaces for networking, generating ideas and developing skills.

At the launch event, over 200 guests heard Shirin Dehghan, founder of telecoms company Arieso, give a keynote speech on the importance of building the capabilities of the next generation of technology entrepreneurs. Guests also had the opportunity to meet some of the Hub entrepreneurs and take a closer look at the groundbreaking technologies they are developing.

On Fellows' Day, some 160 Fellows and their partners visited the Academy to view the new Taylor Centre, learn about recent Academy activities, and meet Trustees and Academy staff.

The event was also an opportunity for Fellows to talk to staff and other Fellows about how to get involved in leading and shaping Academy work, including policy, international activities and research. The ground floor of Prince Philip House and the Taylor Centre were filled with displays, with Academy departments showcasing their latest activities. Hub members also exhibited their innovations: Comp-A-Tent showcased a compostable tent, and Mo-Sys Engineering allowed guests to enjoy a virtual-reality experience.

On 1 February, the Academy hosted the announcement of the 2017 QEPrize winners. The four engineers who were responsible

for the creation of digital imaging sensors were awarded the £1 million prize, which celebrates global engineering innovations. The announcement was made by Lord Browne of Madingley FREng FRS, in the presence of HRH The Princess Royal.

The winners, Professor Eric Fossum and Dr George Smith from the USA, Professor Nobukazu Teranishi from Japan, and Dr Michael Tompsett from the UK, were awarded the prize for their contribution to revolutionising the way that visual information is captured and analysed. Together, their innovations have made an astounding social impact on the world: digital imaging sensors have enabled high-speed, low-cost colour imaging at a resolution and sensitivity that can exceed that of the human eye. (Find out more about the winners on page 3).

Reflecting on the winning technologies, Professor Sir Christopher Snowden FREng FRS, Chair of Judges for the QEPrize, said: "A picture is a universal form of communication. It can be shared instantly with anyone around the world, no matter what language they speak."

All of the events that have taken place in the newly reopened Prince Philip House have been supported by the Academy's catering partner, Harbour & Jones. The redevelopment work has also included complete refurbishment of the Academy's catering facilities, as well as an additional lift and a new corridor at mezzanine level. The Taylor Centre was made possible by a generous donation from distinguished inventor and entrepreneur Dr John C Taylor OBE FREng, as well as the support of the late Geoffrey Argent FREng and the Wolfson Foundation, and the kind donation of equipment for the new space from Toshiba UK. The Royal Academy of Engineering is grateful to them all for their contribution and support.

▲ The Enterprise Hub's new physical home, the Taylor Centre, was officially opened on 9 February. The Taylor Centre offers Hub members a state-of-the-art space to work and network

# President's column



## Meetings and visitors

### In her capacity as President, Dame Ann has met with:

Sinead Lynch, Chair of Shell UK

Professor Tim Broyd FREng, President of the Institution of Civil Engineers

Professor Jeremy Watson CBE FREng, President of the Institution of Engineering and Technology

Vincent de Rivaz CBE FREng, CEO of EDF Energy

Lord Prior of Brampton, Parliamentary Under Secretary of State for Business, Energy and Industrial Strategy (BEIS)

The Rt Hon Greg Clark MP, Secretary of State for BEIS

Alex Chisholm, Permanent Secretary for BEIS

### She attended the following events and meetings:

High-level stakeholder working group meetings on EU Exit: Universities, Research and Innovation chaired by Jo Johnson MP, Minister of State for Universities, Science, Research and Innovation

Science, Innovation and the UK Industrial Strategy POST panel discussion

Fellows' Day

Professional engineering institutions' reception

QEPrize winners announcement

QEPrize judges' dinner

New Fellows' lunch

Taylor Centre launch

Trustee Board strategy awayday

Excellence Fund for Frontier Research panel

Delivered the Sir Bernard Crossland Annual Lecture at Queen's University Belfast

QEPrize Trustee Board meeting

Lord Mayor's Trade and Industry Dinner

### She was interviewed by:

Good Housekeeping magazine

We have had a busy start to 2017 at the Academy, with the full facilities of Prince Philip House reopening following the development of our terrific new Taylor Centre.

These state-of-the-art facilities have been created to provide a new physical home for the Enterprise Hub, its members and mentors. It recognises how important it is for entrepreneurs to get together to collaborate, share ideas and advice, and meet Academy Fellows and is designed to help facilitate this. I was honoured to cut the ribbon at the official launch event on 9 February and to welcome the many Fellows, entrepreneurs, investors and supporters who attended it.

I was also delighted to welcome Fellows to the newly refurbished Academy on Fellows' day on 30 January. It was wonderful to see so many of you, hearing more about the latest work of the Academy, meeting some of the excellent people who we support, and celebrating your own contributions. I am always impressed and humbled by the amount of time and expertise that Fellows give to our Academy; the organisation's reputation is founded on this.

Partnership working with Fellows was also at the heart of a very productive day spent by the Academy's Trustees and senior leadership team on 16 February, discussing the Academy's strategy, priorities and future areas for development. Between us, we debated and deliberated what needs to be done to achieve the Academy's ambitious strategic goals – and we are now shaping those ideas that we hope to begin sharing soon.

We are collaborating again across the profession to respond to the government's Green Paper on industrial strategy. This follows the publication of our post-referendum report *Engineering a future outside the EU*, which was the product of unprecedented collaboration across the professional engineering institutions (PEIs). This continues to be very well received at all levels of government and our discussions with ministers and senior officials are ongoing to ensure that the engineering imperatives are understood by those developing our negotiating positions. In January, I hosted a reception for the Presidents and Chief Executives of the PEIs where there was a clear appetite for more joint working, particularly on areas of policy where our combined voices will have a greater impact than a single organisation's.

Industrial strategy is clearly one of those areas, and presents us with a huge opportunity to shape the future of our profession. What makes me particularly

optimistic about our contribution making a difference is the willingness of the Department for Business, Energy and Industrial Strategy (BEIS) to work with us. To that end, over the last couple of months I have met a number of government ministers and officials to communicate our eagerness to contribute, including Greg Clark MP, Secretary of State for Business, Energy and Industrial Strategy, Lord Prior, Parliamentary Under Secretary of State at BEIS, and Alex Chisholm, Permanent Secretary in the same department.

I also spoke on the topic of *Industrial strategy: the role for science and innovation* at the annual reception of the Parliamentary Office of Science and Technology (POST) on 26 January. The event, which attracted an audience of parliamentarians and leaders from research and industry, prompted plenty of discussion about the industrial strategy Green Paper published just three days beforehand. A wide variety of views was heard on topics including how best to commercialise ideas from research and how to get young people interested in STEM. Working with government to provide advice on issues that affect or should be informed by engineering is one of the ways in which the Academy can truly lead the profession, a critical partnership that we will continue to foster.

Arguably one of the greatest testaments to the power of combined effort and collaboration so far this year is the award of the QEPrize to four engineers who transformed digital imaging. Like the first winners of the prize, whose combined contributions built the architecture of the internet and the World Wide Web, the discoveries and innovations of this year's winners have, in combination, transformed the way we live in the 21st century. Their innovations: the charge-coupled device (CCD); the pinned photodiode (PPD) and the complementary metal oxide semiconductor (CMOS) image sensor, span three decades and three continents, with many and diverse applications, from Skyping and selfies, to frontline war reporting and medical diagnostics.

Engineering has teamwork at its heart and engineering innovations are rarely the product of a single individual or effort. The same is true of the work of the Academy; collaboration underpins everything we do. With 2017 off to a flying start, I look forward to the many partnerships and collaborations the rest of the year will bring.

Ann Dowling



### Meet the QEPrize winners

The 2017 QEPrize was awarded to the four creators of digital imaging sensors: Professor Eric Fossum, Dr George Smith, Professor Nobukazu Teranishi and Dr Michael Tompsett. Together, their image sensor technology has transformed medical treatments, science, personal communication and entertainment, and is used in everything from smartphone cameras to image sensors in cars.

Digital imaging sensors have enabled high-speed, low-cost colour imaging at a resolution and sensitivity that can exceed that of the human eye. They offer instant access to images ranging from minute cell structures to galaxies billions of light years away.

The revolution began in the 1970s with the development of the charge coupled device (CCD) by Dr Smith and its later application in imaging by Dr Tompsett. The CCD is the image sensor inside early digital cameras, converting light into electrical signals and enabling images to be stored as digital data. The following decade, Professor Teranishi invented the pinned photodiode, reducing the size of light-capturing 'pixels' and significantly improving image quality. The development of the complementary metal oxide semiconductor sensor by Professor Fossum in 1992 then allowed cameras to be made smaller, more cheaply and with a better battery life.

▲ (L) Dr Michael Tompsett, Professor Eric Fossum and Professor Nobukazu Teranishi at the announcement in London on 1 February; and fourth winner Dr George Smith (R)

### Fellows' Day



▲ (L) Guests at Fellows' Day on 30 January, where displays and demonstrations throughout the building gave Fellows an opportunity to learn about recent Academy activities; (R) Dr Andrew Charles FREng and Kathleen Charles try a virtual reality experience, created by Enterprise Hub member Mo-Sys Engineering.

### SME Leaders programme

On 18 January, the Enterprise Hub held a speed mentoring day for the awardees of a new programme to build leadership capacity in innovative engineering SMEs.

The SME Leaders programme provides each awardee with a grant of up to £15,000 towards education and leadership development, plus a six-month support package comprising practical monthly

workshops, mentoring from Academy Fellows and access to the Taylor Centre, home of the Enterprise Hub.

The event was led by Norman Apsley CBE FREng, Chair of the programme's steering group. Mentors on the day included Fellows who are senior business leaders, serial entrepreneurs and investors.

The SME leaders on the programme are from 10 companies: Bodle Technologies (Oxfordshire), BOXXARR (Berkshire),

CyberOwl (Warwickshire), Dulas (Wales), Lein Applied Diagnostics (Berkshire), Onlicar (London), Oxford Space Systems (Oxfordshire), Senergy Innovation (Northern Ireland), REACT Engineering (Cumbria), and Spiro Control Systems (Cheshire).

To find out more about the programme, please visit [www.raeng.org.uk/SME-Leaders](http://www.raeng.org.uk/SME-Leaders) or email [catherine.lawrence@raeng.org.uk](mailto:catherine.lawrence@raeng.org.uk)

## Hidden Figures STEM event



▲ (L-R) Elspeth Finch, Chair of the Enterprise Hub's Innovators' Network, Anita Bernie, Platform Launch Director at Surrey Satellite Technology Ltd, Hazel Macnamara, partner at PwC, Panel Chair Ginny Buckley, Professor Karen Holford FREng and TV presenter Rachel Riley were all Q&A panel members at the Manchester United Foundation's screening of *Hidden Figures* on 26 January, which aimed to inspire young women interested in STEM. The Oscar-nominated film tells the story of three African American women – two mathematicians and an engineer – who played instrumental roles at NASA during the space race of the 1960s.

## Video series launched to inspire LGBT engineers

On 2 February, the Academy joined forces with InterEngineering and Mott MacDonald to launch a new series of online videos profiling lesbian, gay, bisexual and transgender (LGBT) engineers as part of LGBT History Month.

The *What's it like?* video series tells real stories to inspire prospective engineers who are LGBT, as well as existing engineers who may wish to come out or transition at work. It features 20 successful LGBT role models working in a wide variety of engineering settings, from design studios to the British Army.

An audience of over 150 people, from a wide range of employers, institutions and other organisations, attended the launch event at Prince Philip House. They were able to watch the videos and listen to personal reflections from Dr Mark McBride-Wright, Chair and co-founder of InterEngineering; Lord Browne of Madingley FREng FRS; Mike Haigh, Managing Director of Mott MacDonald; and Dr Hayaatun Sillem, Deputy CEO and Director of Strategy at the Academy.



LGBT History Month is celebrated in February in the UK and aims to increase the visibility of LGBT people and their experiences, and to raise awareness of matters affecting the LGBT community.

The video profiles can be viewed at [www.interengineeringlgbt.com/lgbt-in-engineering-video-profiles](http://www.interengineeringlgbt.com/lgbt-in-engineering-video-profiles)

▲ **Top:** Attendees at the LGBT video launch event on 2 February. **Right:** Lord Browne of Madingley speaks at the event



## Enterprise Fellowships

The Academy has awarded the latest round of Enterprise Fellowships to 12 engineering entrepreneurs.

The new awardees will join the 61 existing Enterprise Hub members, who have between them so far raised a combined £30 million in additional funding for their start-ups.

The awardees cover a broad range of innovations: a hard-wearing antibacterial coating that can be applied to surfaces to reduce the spread of germs in public areas; a heart valve delivery system that reduces the need for open-heart surgery; window panes that turn opaque at the flick of a switch; and improved audio systems for sports stadiums to make audiences feel part of the action.

The award provides recipients with up to £60,000 funding, as well as business training, PR support, access to the home of the Hub, the Taylor Centre, and mentoring from a Fellow. The ultimate aim is to improve the skills of the recipients, so that they can repeat their success in new ventures, generate more



impact from university research, and act as role models for others, growing the entrepreneurial network in their universities.

With lifetime membership to the Enterprise Hub, the 2017 cohort will be among the first to make use of the new Taylor Centre (see page 1).

Details and case studies of Hub members

and mentors can be found on the Hub website. If any Fellow would like to support any of the awardees, please contact the Hub team at [enterprise@raeng.org.uk](mailto:enterprise@raeng.org.uk)

▲ Enterprise Hub member Dr Alexander Enoch of Robotical demonstrates Marty the robot at the launch of the Taylor Centre on 9 February. Awarded an Enterprise Fellowship in 2016, Robotical develops 3D-printable robots that are used to help children learn how to code

## Diversity and Inclusion Progression Framework launch

On 15 December, the *Diversity and Inclusion Progression Framework* was launched at a joint event held by the Academy and the Science Council at the Institution of Civil Engineers in London. The event brought together some 80 senior representatives from engineering bodies and institutions.

Belinda Phipps, Chief Executive of the Science Council and Philip Greenish CBE, Chief Executive of the Academy, spoke about their organisations' experience of leading diversity and inclusion in science and engineering. There were discussions about the development of the progression framework, feedback from the pilot of the framework, and the next steps for a collective benchmarking exercise, which is due to take place in 2017 and includes a self-assessment against the framework.

The session closed with a Q&A involving Philip Greenish, Belinda Phipps, Bola



Fatimilehin, the Academy's Head of Diversity, Hannah Kowsun, Director of Marketing and Communications at the Science Council, Scott Keir, Head of Education and Statistical Literacy at the Royal Statistical Society, and Sarah Bond, Director of for business sake, followed by a networking lunch.

The progression framework was developed through collaboration between the Academy and the Science Council in order to progress diversity and inclusion across engineering and science professional bodies.

It builds on the Academy's *Engineering Diversity Concordat* and the Science Council's *Declaration on Diversity, Equality and Inclusion*, and asks professional bodies about progress in eight key areas by setting out four levels of good practice.

To view the framework in full, please visit [www.raeng.org.uk/publications/other/diversity-progression-framework](http://www.raeng.org.uk/publications/other/diversity-progression-framework)

▲ (L-R) Sarah Bond, Philip Greenish, Scott Keir, Belinda Phipps, Bola Fatimilehin and Hannah Kowsun take part in the Q&A panel at the event

## Royal Academy of Engineering and Royal Society of Edinburgh joint lecture

This year's annual joint lecture, hosted by the Royal Society of Edinburgh on 6 March, was given by Archie Bethel CBE FREng FRSE, Chief Executive of Babcock International Group Plc.

Mr Bethel gave a talk entitled *Delivering the Nation's Flagships*, which offered his insight into the engineering and technological innovation involved in the development and building of two new



aircraft carriers, HMS Queen Elizabeth, the largest warship ever commissioned for the Royal Navy, and HMS Prince of Wales. Following the lecture, Mr Bethel answered questions from an audience of more than 130 guests, which included

Fellows, Scotland-based engineers and members of the public.

▲ The HMS Queen Elizabeth, the largest warship in the Royal Navy, and subject of the RAEng/RSE annual joint lecture

## Innovation and entrepreneurship

### Introducing the 2017 QEPrize trophy



▲ Samuel Bentley is presented with a certificate for his winning trophy design

Samuel Bentley, 15, from Wales was selected as the winner of this year's QEPrize *Create the Trophy* competition.

Samuel took his inspiration from the highest Welsh peak, Snowdon. He is currently studying for his GCSEs at Ysgol Glan Clwyd in St Asaph, including a GCSE in engineering. He has a keen eye for drawing and design, and has previously illustrated a games manual for the local playing fields association, as well as designing the logo for his band.

When asked about his design, Samuel said: "I enjoy the design aspect of engineering and seeing the finished product after all of the hard work has been put in. My trophy was inspired by the great Welsh mountain, Snowdon; it is an achievement to start at the bottom of Snowdon and climb to the top, just as it is an achievement to win the Queen Elizabeth Prize for Engineering."

This year, the competition was open to an international audience, and entries were received from 32 countries.



▲ Samuel Bentley's winning trophy design, inspired by Welsh mountain Snowdon

Samuel was announced as the winner at an event held at the Royal Academy of Engineering on 1 February, in the presence of HRH The Princess Royal. His design will be 3D printed into the final trophy by BAE Systems, and will be awarded to the winners of the QEPrize at a reception at Buckingham Palace later in the year.

View the gallery at [qeprize.org/trophy-2017](http://qeprize.org/trophy-2017)

## Frontiers of Engineering for Development

In February, the second Global Challenges Research Fund (GCRF) Frontiers of Engineering for Development symposium took place at the Royal Society of Surgeons of Edinburgh. The event brought together an international group of 60 future leaders in engineering and international development to network and discuss how cutting-edge research can help to address global challenges on the themes of economic sustainability, clean water and clean energy.



▲ Participants at the symposium in Edinburgh share ideas

The two-and-a-half-day symposium offered participants the opportunity to think about these challenges in a collaborative and cross-disciplinary way, sharing techniques and approaches

across different academic disciplines. At the end of the event, groups of two or more participants were invited to apply for one of nine seed funding awards of £20,000 each in order to kick-start a new collaborative project.

Having received excellent feedback so far, the symposia continue to be a highlight in the Academy's portfolio of activities under the GCRF.

To find out more about future events, please visit [www.raeng.org.uk/frontiers-of-engineering-for-development](http://www.raeng.org.uk/frontiers-of-engineering-for-development)

## Africa Prize training

A shortlist of 16 entrepreneurs from Cameroon, Ghana, Kenya, Mozambique, Nigeria, South Africa, Tanzania and Uganda have been selected for the next stage of the Africa Prize for Engineering Innovation. In February 2017, representatives from all 16 teams went to Kigali, Rwanda, for a week of entrepreneurial training, where they practised their pitches and met inspiring local Rwandan innovators.

Their innovations include renewable energy solutions, technology that helps disabled people access employment, and medical equipment to help diagnose pneumonia in children.

The Africa Prize for Engineering Innovation is in its third year. It provides mentoring and training for sub-Saharan African entrepreneurs, and supports them to develop scalable solutions to local challenges.

Following a pitch competition in Nairobi on 23 May, the next winner will be chosen, following in the footsteps of Arthur



Zang, who won the award last year with his invention of the Cardio-Pad.

To find out more, please visit [www.raeng.org.uk/africaprize](http://www.raeng.org.uk/africaprize)

▲ Brian Turyabagye with his innovation, Mama-Ope, a jacket that diagnoses pneumonia

## New Research Chairs and Senior Research Fellowships

The Academy has announced the award of four new Research Chairs and Senior Research Fellowships.

The four awardees cover a broad spectrum of engineering research and will hold these positions for five years from March 2017. Each awardee will be mentored by an Academy Fellow during this time.

The programme aims to strengthen the links between industry and academia by

supporting exceptional academics in UK universities to undertake use-inspired research that meets the needs of the industrial partners.

### Full list of awardees:

Dr Xibo Yuan, Safran Electrical & Power UK / Royal Academy of Engineering Senior Research Fellowship in Advanced Aircraft Power Generation Systems at the University of Bristol.

Professor Christoph Bruecker, BAE Systems / Sir Richard Olver and Royal Academy of Engineering Chair in Aeronautical Engineering at City University London.

Professor Robert Bowman, Seagate Technology / Royal Academy of Engineering Research Chair in Advanced Materials for Data Storage at Queen's University Belfast.

Professor Serafim Bakalis, Procter & Gamble / Royal Academy of Engineering Research Chair in Engineering Consumer Products for a Sustainable Future at the University of Birmingham.

The next round of applications is due to close in September 2017. For more information, please visit [www.raeng.org.uk/researchchairs](http://www.raeng.org.uk/researchchairs)

## Industrial Fellowships Annual Forum

On 2 February, the Industrial Fellowships Annual Forum took place at Prince Philip House. It was attended by delegates from industry and academia, as well as Academy Fellows.

The event brought together past and current awardees and their industrial partners to showcase the impact that this programme, previously known as the Industrial Secondments Scheme, has had over its 15 years of facilitating collaborative research.

Professor Elaine Martin OBE FEng, the scheme's Chair, shared her vision for the future after attendees were welcomed by Dr Andrew Clark, Director of Programmes at the Academy. The event concluded with drinks and networking.

The Industrial Fellowships scheme enables mid-career academics to undertake a collaborative research project in an industrial environment. It aims to strengthen the relationship between universities and industry, and improve the quality



and industrial relevance of teaching. The next round of applications is due to open later this year.

For further information, please contact the research team at [research@raeng.org.uk](mailto:research@raeng.org.uk)

▲ Professor Elaine Martin OBE FEng, Chair of the Industrial Fellowships scheme, talks to attendees at the forum

## Research Fellows' induction day

On 2 February, the Academy held an induction day for its new Research Fellows to give them the opportunity to learn more about the Academy's work and network with other attendees.

The Research Fellows were welcomed by Professor Neil Alford MBE FREng, who chairs the steering group for this scheme. Attendees included both current and past Research Fellows, as well as Academy Fellows. The annual event is part of the Academy's wider engagement with its awardees, both during and after their Research Fellowship.

Research Fellowships provide funding for five years and are designed to promote excellence in engineering. They provide support for early-career researchers and encourage them to develop successful academic research careers.



▲ Research Fellows learn about the Academy at their induction

## Global Grand Challenges summit

The third Global Grand Challenges Summit will be held on 19 and 20 July 2017 in Washington DC, organised by the UK, US and Chinese academies of engineering. Engineering researchers, educators, policymakers and students are invited to meet and seek solutions to humanity's great challenges, inspiring the next generation to forge a better future for the world through engineering and interdisciplinary collaboration.

Confirmed speakers for the summit include: Michael Abrash, Chief Scientist,

Oculus VR; Professor Dame Sally Davies, Chief Medical Officer to the UK; Jeffrey Dean, Google Senior Fellow, Google; Christof Koch, President and Chief Scientific Officer, Allen Institute for Brain Science; Professor Molly Stevens FREng, Professor of Biomedical Materials and Regenerative Medicine and Head of The Stevens Group, Imperial College London; and musician and technology enthusiast will.i.am. More speakers are to be announced shortly.

Before the summit on 18 July, the Global Grand Challenge Student Innovation Competition will be held. This will give

teams of undergraduate students from across the UK, China and the USA the opportunity to pitch their engineering innovations to solve a global challenge to a panel of experts.

The UK's five teams will be chosen via the *Engineering a Better World* student competition, which is a seven-month programme of innovation, design and business development. The successful teams will be picked to go to Washington DC at a competition showcase hosted by the Academy in April 2017.

Registration for the summit is now open at [www.ggcs2017.org](http://www.ggcs2017.org)

## Technology and society

### Zones of engineering discovery at *New Scientist Live 2017*

In September 2017, the Academy will partner with the second *New Scientist Live* event at Excel London. A veritable extravaganza of science, technology, engineering and maths, the four-day show will run from 28 September to 1 October.

This year's festival of ideas and discovery will feature immersive exhibition zones covering humans, technology, Earth and the cosmos, plus a new engineering zone in which the Academy is a key partner. Each zone also has a stage hosting its own programme of talks by innovators and thought-leaders.

The inaugural 2016 show attracted over 20,000 visitors. The Academy's Superheroes vs Superhumans stand



showcased some of the latest engineering techniques for human enhancement.

▲ Visitors to the Academy's stand at the 2016 *New Scientist Live* event learn about the engineering behind Marvel's *Iron Man*

## Creating value from data

On 5 December 2016, the Academy hosted a joint event with the Royal Statistical Society to explore how engineers and statisticians, along with representatives of a number of other disciplines, can work together to address the future challenges around big data and exploit the opportunities that may arise.

The event was chaired by Professor Jim Norton FREng, Chair of the Academy's Digital Systems Community of Practice, and panellists included: Professor Mandy Chessell CBE FREng from IBM; Dr Mike Short CBE FREng from Telefonica; Professor David Hand OBE from Imperial College London, the UK Statistics Authority and Winton Capital; and Professor Adele Marshall from Queen's University Belfast.

The discussion covered a number of topics, ranging from the importance of metadata standards and robust data governance to valuation of data and the challenges for companies in unlocking its value. A conclusion was the need for more education at all levels and better multidisciplinary working if the UK is to move towards a data-enabled economy.

## Procurement guidelines for diversity and inclusion

A small action group has been established to lead activity on procurement guidelines for diversity and inclusion.

Over the past year, the Academy's diversity programme has debated whether procurement contracts could or should be used to encourage and support greater

diversity and inclusion throughout the supply chain. The action group will now lead on the production of guidance on common clauses and policy statements that can be used in procurement, initially focusing on the highways and transportation sectors.

As part of the work carried out by the Diversity and Inclusion Leadership Group, the action group is being led by Dr Nelson Ogunshakin OBE, who is Chief Executive

of the Association for Consultancy and Engineering and a member of the Transport for London Board. The action group brings together representatives from many of the key client organisations in highways and transportation, such as High Speed 2, Highways England, Network Rail and the Department for Transport. It is drawing on examples from previous work carried out by organisations such as the London 2012 Olympic Delivery Authority and Crossrail. Initial output is expected in the summer.

## Responding to the industrial strategy Green Paper

On behalf of 38 professional engineering institutions, the Academy is leading a response to the government's Green Paper on industrial strategy – *Building our Industrial Strategy*.

The profession's 2016 report on the impacts of Brexit, *Engineering a future outside the EU*, highlighted the crucial role of an industrial strategy in ensuring that the UK can thrive in a changing and highly competitive global landscape. In view

of this, and the very positive response to the report from across government, media and the engineering community, the profession has agreed to adopt a similar model to shape a collective response to the Green Paper.

This is an important opportunity for the engineering profession to ensure that the voice of the sectors and disciplines it represents is heard.

## New digital policy studies

The Academy is starting two new policy studies under its 'digital systems' theme.

The first, led by Professor Jim Norton FREng, aims to better understand how to co-create value by sharing or trading data. Case studies will build on the growing body of work on data sharing and trading by the Academy and others,

identifying best practice examples and highlighting opportunities and barriers. The case studies will include engineering examples, especially those that have involved the supply chain, and examples from other sectors. It will focus on the engineering solutions used for the platform, data management or analytics as well as the business outcomes. The Academy aims to publish the study in early 2018.

The second will take the form of a challenge paper or discussion paper, on the regulation of autonomous systems, led by Professor Tony Gillespie FREng.

The study aims to explore the engineering sectors that will be most affected by regulatory changes, and to better understand the key concerns for engineers and regulators in order to support UK innovation in this field.

## The Higher Education Focus website

The Academy has developed a new interactive website for engineering higher education. The site collates information and provides a hub for those teaching, studying, working, or interested in the subject.

The website includes links to relevant books, journals, online resources and

reports; information about schemes for industry, undergraduates, postgraduates and academic staff; information about the Engineering Education Research Network; details of upcoming events; and weekly news updates. There is also an interactive forum for the engineering community to discuss relevant teaching practices and share useful links and information.

The Academy is currently working to increase the website's content and

reach by collaborating with other organisations, including the Engineering Professors' Council and the Engineering Education Research Network.

The Higher Education Focus website and details about signing up can be found at [hefocus.raeng.org.uk](http://hefocus.raeng.org.uk)

For further information or to add content to the website, please contact [highereducation@raeng.org.uk](mailto:highereducation@raeng.org.uk)

## Robots at the Science Museum

The Academy is supporting the Science Museum's latest exhibition *Robots* with a series of live events.

The pop-up workspaces and live dialogue events are funded by the Academy's public engagement scheme *Ingenious* and will coincide with the new exhibition. The events, taking place between March and June, will be developed by engineers in partnership

with the Science Museum, and will explore the cutting-edge engineering behind contemporary robotics.

The exhibition features more than 100 robots, and explores humanity's 500-year quest to recreate ourselves in mechanised form. From a 16th-century mechanical monk to robots from science fiction and modern-day research labs, the exhibition enables visitors to discover the cultural, historical and technological context of humanoid robots.

Visitors can interact with some of the 12 working robots on display and glimpse recent developments from robotics research, exploring how roboticists are building robots that resemble us and interact in human-like ways. The exhibition ends by asking visitors to imagine what a shared future with robots might be like.

The *Robots* exhibition is open until 3 September 2017. For more information, please visit [beta.sciencemuseum.org.uk/robots/](http://beta.sciencemuseum.org.uk/robots/)

## Academy roundup

### Sharing expertise

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

On 30 January 2017, Prince Philip House was filled to capacity for what has become our annual Fellows' Day. The occasion celebrated the work that Fellows are leading through the Academy to advance engineering policy and drive change through innovation and research. Fellows were able to see the state-of-the-art new facilities in the Taylor Centre and its new drop-in 'Hub Central' zone. It was an opportunity to hear about how the Academy's Enterprise Hub is enabling young entrepreneurial engineers to develop their ideas, and we heard from a number of them during the evening. I was pleased to receive



▲ Ian Ritchie CBE FREng FRSE, Professor Richard Williams OBE FREng FRSE and Enterprise Hub member Dr Sam Chapman of KENOTEQ

very positive comments and emails from attendees about the event. A few days later, I also attended the formal opening of the Taylor Centre, which provides a physical home for the Enterprise Hub, as it continues to engage a good number of Fellows in mentoring and support through our contact networks. It was interesting to talk to a number of Hub members about their experiences of this mentoring, and to also have the opportunity to see and interact with many of their innovations.

Looking ahead, the new interactive e-forum for Fellows is due to be launched

in the near future. A trial version is now being tested and further information will be available in coming weeks.

Fellows can find details of upcoming regional events at [www.raeng.org.uk/events](http://www.raeng.org.uk/events) and I look forward to the opportunity to meet you at some of these.

I continue to welcome your ideas, observations and advice, and can be contacted at [vicepresident@raeng.org.uk](mailto:vicepresident@raeng.org.uk)

### Publications received

*Higher - 100 years of Boeing* by Russ Banham has been donated to the Academy by Sir Michael Arthur and added to the library in the Fellows' room.

*The 5G Myth and why consistent connectivity is a better future* by Professor William Webb FREng has been donated to the Academy by the author and is also in the library in the Fellows' room.

*Total Design over time* by Arup has been donated to the Academy by Dervilla Mitchell CBE FREng and can be found in the Fellows' room.

### Media roundup

The Academy's past President, Sir John Parker GBE FREng, featured in several national newspapers, including the *Daily Telegraph* in November and the *Financial Times* in February, emphasising the work that large companies need to do to increase boardroom diversity. His comments complement the Academy's wider work on diversity and inclusion, which included an appearance by Head of Diversity Bola Fatimilehin on BBC Radio 4's *Today* programme in January, discussing the film *Hidden Figures*.

Following the Chancellor's Autumn Statement in November, the Academy's comments on industrial strategy were widely featured in trade press and received coverage in *The Times*. The Academy's response was further shared in January when the government published its industrial strategy Green Paper.

The engineers on the Africa Prize for Engineering Innovation shortlist continue to receive attention, with a number of profile pieces appearing on the *Guardian* website during December. Past winners of the MacRobert Award have also received coverage ahead of the announcement of

the 2017 finalists. An interview with 2006 winner Douglas Anderson OBE FREng FRSE appeared in the *Daily Express* in February, about his invention of Optos, a non-intrusive whole-retina scanner that uses laser technology to monitor any changes to the eye.

The announcement of the 2017 winners of the Queen Elizabeth Prize for Engineering received global coverage across countries including the USA, Japan and the UK, where it featured on BBC One's *News at Six* and in segments on Sky News, BBC World News and BBC radio. News of the QEPrize announcement reached a potential global audience of 1.3 billion people.

## New Year's Honours

Congratulations to the 13 Academy Fellows who were recognised by HM The Queen in this year's New Year Honours list.

### Knighthoods

**Professor John Vincent McCanny CBE FREng FRS**, Professor of Microelectronics Engineering and Director, Institute of Electronics, Communications and Information Technology, Queen's University Belfast, for services to higher education and economic development

### Order of the British Empire Commanders of the Order of the British Empire

**Professor Polina Bayvel FREng FRS**, Professor of Optical Communications and Networks, University College London, for services to engineering

**Dr Andrew Douglas Garrad FREng**, Member of Supervisory Board, DNV

GL, and President, European Wind Energy Association, for services to renewable energy

**Professor Peter John Goodhew FREng**, Emeritus Professor of Engineering, University of Liverpool, for services to engineering and education

**Professor Hywel Rhys Thomas FREng FRS**, Pro Vice-Chancellor (International and Engagement), and Director, Geoenvironmental Research Centre, Cardiff University, for services to academic research and higher education

**Dr David Watson FREng**, Director, IBM Research UK, for services to science and engineering research

**Professor Guang-Zhong Yang FREng**, Director, Hamlyn Centre for Robotic Surgery, for services to biomedical engineering

### Officers of the Order of the British Empire

**Professor Vidal Ashkenazi FREng**, Founding Director and Chief Executive

Officer, Nottingham Scientific Ltd, for services to science

**Michael Douglas Carr FREng**, Board member, Innovate UK, and Non-Executive Director, Ordnance Survey, for services to innovation

**Professor Anne Neville FREng FRSE**, Royal Academy of Engineering Chair in Emerging Technologies, University of Leeds, for services to engineering

**Dr Christoph Stefan Wiesner FREng**, Chief Executive, The Welding Institute, for services to engineering and innovation

### Members of the Order of the British Empire

**Dr Antony David Trapp DL FREng**, Executive Chairman, Osbit Ltd, for services to the engineering and energy industries

**Anthony Peter Wilson FREng**, Director, AECOM, for services to building and engineering

## Legacy support

Copies of *Build a better world*, the Academy's legacy information brochure, are available from the Development department or can be downloaded from the Academy's website at [www.raeng.org.uk/ways-to-give](http://www.raeng.org.uk/ways-to-give)

Fellows who would like to have a confidential, informal discussion about legacy giving are invited to contact Clare Flynn Scarcelli, Head of Major Giving, on 0207 766 0652 or [clare.flynn@raeng.org.uk](mailto:clare.flynn@raeng.org.uk)

## News of Fellows

**Professor John Bell GBE** has been appointed industrial strategy champion for life sciences

**Baroness Brown DBE**, has been appointed as the next Chair of the Committee on Climate Change's Adaptation Sub-Committee

**William Tudor Brown MBE** has been appointed to the board of Marvell Technology Group

**Professor David Butler** has been appointed Chair of South Devon UTC

**Professor Dame Ann Dowling OM DBE** has been awarded an honorary doctorate of science from Northumbria University

**Professor Amr S Elnashai** has been appointed Vice-Chancellor and Vice-President of Research and Technology Transfer at the University of Houston

**Jim Fairbairn OBE**, **Professor Win Rampen** and **Professor Richard**

**Williams OBE** have all been elected Fellows of the Royal Society of Edinburgh

**Dame Judith Hackitt DBE** has been appointed Chair of the Semta Group

**Professor Christopher Hall FRSE** has been elected Curator of the Royal Society of Edinburgh

**Professor Dame Wendy Hall DBE FRS** has been appointed Regius Professor in Computer Science at the University of Southampton and has been chosen to lead the government's review into the development of artificial intelligence

**Professor Peter Hansford** has been named Chair of Network Rail's competition and contestability review

**Sir David Higgins** has been appointed Chair of Gatwick Airport

**Graeme Hobbs** has been appointed Chair of Bristol Is Open

**Dr Raghunath Anant Mashelkar FRS** has been appointed a director of ACCESS Health International

**Professor Sir John McCanny CBE FRS** has been appointed Regius Professor of Electronics and Computer Engineering at Queen's University Belfast

**Colin Smith CBE FRS** has been elected to the US National Academy of Engineering

**Professor Stephen Myers OBE** has been appointed a non-executive director of Advanced Oncotherapy PLC

**Professor Richard Parry-Jones CBE** has been appointed industrial strategy champion for ultra-low emission vehicles

**Dr John C Taylor OBE** has been awarded an honorary doctorate from the University of Durham

**Sir Colin Terry KBE CB DL** has been appointed Chair of BOXARR

**Peter Warry** has been appointed Acting Chair of River & Mercantile Group

## Call for nominations

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

The deadline for making nominations this year is 1 May 2017. This can be done 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](http://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](mailto:webmaster@raeng.org.uk)

All other queries regarding nominations should be directed to [membership@raeng.org.uk](mailto:membership@raeng.org.uk)

## 2016 Annual Fund update

Launched in September 2016, the Academy's 2016 Annual Fund appeal has raised £21,500 as of 1 February 2017.

Since it was first launched in 2012, the Annual Fund has helped the Academy launch new initiatives in enterprise, education and other areas of work. It has also brought much-needed additional capacity to established work programmes. An update on how funds have been used will appear in a future newsletter.

The Academy would like to extend its thanks to all those who have contributed so far.

Copies of the Annual Fund brochure can be viewed and/or downloaded from [www.raeng.org.uk/get-involved](http://www.raeng.org.uk/get-involved)

## New funding

The Academy's *Connecting STEM Teachers* programme has received a further year of support from Royal Dutch Shell. A grant of £300,000 will help the programme continue to work with teachers to improve the STEM learning experience, and improve uptake of and attainment in STEM subjects. Last year, the programme reached 570 schools, 740 teachers and over 66,000 students across the UK.

BP has been confirmed as Headline Sponsor of the Academy's 2017 Awards Dinner, which will be held on 29 June at the Landmark Hotel, London. The Silver Sponsors of this year's event are BAE Systems, GKN, Jaguar Land Rover, Lockheed Martin, Rolls-Royce, and Electrical Power Research Institute (EPRI).

## Forthcoming events

This is a selection of Academy events. For a complete list, visit [www.raeng.org.uk/events](http://www.raeng.org.uk/events)

23 May 2017

**Enterprise Hub Showcase**  
Venue: Prince Phillip House  
Time: 4.00pm to 7.30pm

22 May to 23 May 2017

**Africa Innovates 2017**  
Location: Nairobi, Kenya

29 June 2017

**Awards Dinner 2017**  
Venue: The Landmark London  
Time: 6.30 to 10.30pm

4 September 2017

**Research Forum**  
Venue: Prince Philip House  
Time: 10.00am to 4.30pm

5 September 2017

**AGM**  
Venue: Prince Philip House

6 September 2017

**Diversity and Inclusion Programme plenary event**  
Venue: Prince Philip House

26 September 2017

**Ingenia live!**  
Venue: Prince Philip House  
Time: 6.30pm to 9.00pm

18 October 2017

**New Fellows' briefing**  
Venue: Prince Philip House  
Time: 12.30pm to 5.00pm

18 October 2017

**New Fellows' dinner**  
Venue: Drapers' Hall  
Time: 6.30pm to 10.45pm



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## Obituaries

**Professor Paul Adrian Auchmuty Back CBE FREng** died aged 86. He was formerly Director of Sir Alexander Gibb and Partners Ltd.

**Dr David Andrew Clarke FREng** died on 4 February 2017, aged 55. He was Chief Executive Officer of the Energy Technologies Institute, a member of the UK Energy Research

Partnership and UK Low Carbon Innovation Group Executive.

**Mr Ernest Martin Eltis FREng** died on 3 January 2017, aged 95. He formerly worked for Rolls-Royce Plc.

**Dr William Henry Penley FREng** died on 27 January 2017, aged 99. He was formerly Engineering Director of Marconi Underwater Systems, and Controller of R&D Establishments and Research at the Ministry of Defence.

**Professor Roger Lacroix FREng** died aged 88. He was formerly Honorary Professor at ENPC Paris.

**Mr Frank Alexander Sims OBE FREng** died on 22 December 2016, aged 84. He was formerly Chief Executive of Pell Frischmann Consultants Ltd.

**Professor Graham Charles Wood FREng** FRS died on 4 November 2016, aged 82. He was formerly Emeritus Professor of Corrosion Science and Engineering at the University of Manchester.