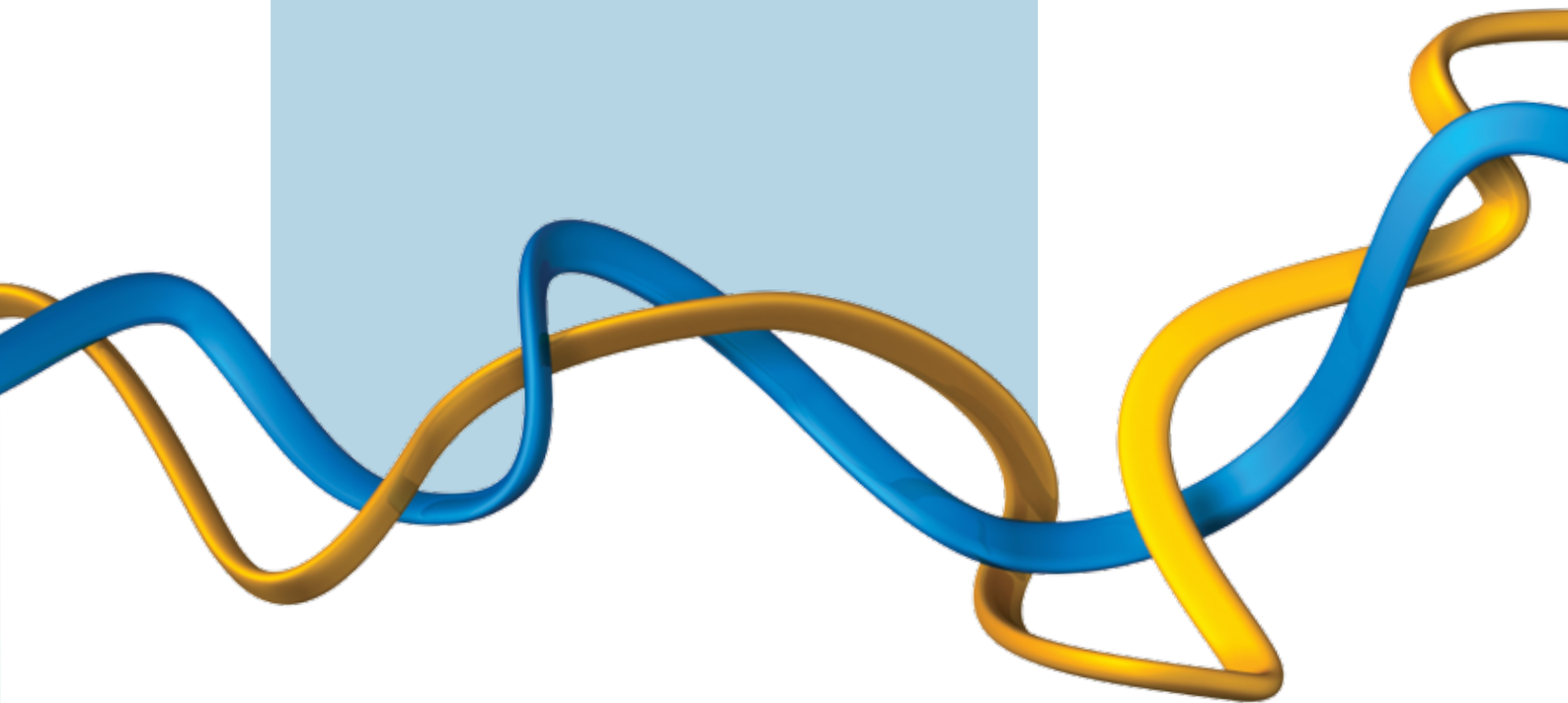




ROYAL
ACADEMY OF
ENGINEERING

ANNUAL REVIEW

2013/2014





Strategic priorities

As the UK’s national academy for engineering, we bring together the most successful and talented engineers from across the engineering sectors for a shared purpose: to advance and promote excellence in engineering. We provide analysis and policy support to promote the UK’s role as a great place from which to do business. We take a lead on engineering education and we invest in the UK’s world class research base to underpin innovation. We work to improve public awareness and understanding of engineering. We are a national academy with a global outlook and use our international partnerships to ensure that the UK benefits from international networks, expertise and investment.

The Academy’s programmes are driven by four strategic challenges, each of which provides a key contribution to a strong and vibrant engineering sector and to the health and wealth of society.

Drive faster and more balanced economic growth

The strategic challenge is to improve the capacity of UK entrepreneurs and enterprises to create innovative products and services, increase wealth and employment and rebalance the economy in favour of productive industry.

Lead the profession

The strategic challenge is to harness the collective expertise, energy and capacity of the engineering profession to enhance the UK’s economic and social development.

Foster better education and skills

The strategic challenge is to create a system of engineering education and training that satisfies the aspirations of young people while delivering the high-calibre engineers and technicians that businesses need.

Promote engineering at the heart of society

The strategic challenge is to improve public understanding of engineering, increase awareness of how engineering impacts on lives and increase public recognition for our most talented engineers.



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Forewords

President



In September 2014, I shall step down as President after just over three years in office. It has been a great honour. In this role, I have had the privilege of working with some remarkable and highly distinguished engineers to develop the Academy's strengths and pursue our mission.

We have seen considerable progress across all our strategic objectives, with the Academy having direct impacts on government policy in education and skills where we have made a significant contribution. The Academy's work has influenced policy and promoted debate on issues including the energy system, wind energy and the impacts of space weather events.

We have built on last year's increase in positive media coverage on engineering matters. Some 100 million people worldwide were reached by news of the award of the first Queen Elizabeth Prize for Engineering to the great engineers behind the World Wide Web.

There has been a significant change of attitude within government in recognising the value of engineering in furthering wealth creation and jobs. The work of our Fellowship has made a significant contribution to this and to the wider recognition of the role of professional engineering in UK society; we must now ensure that this opportunity translates into a significant rise in the number of young people choosing engineering as a career. A more united front with EngineeringUK, supported by the professional institutions, is a must for the future.

I have also been supported by the services of a very capable and dedicated staff team, led by our Chief Executive, Philip Greenish CBE. I am grateful to them and have truly valued their support.

Our natural alignment with business and industry creates valuable partnerships that drive a programme of world-class engineering research. This in turn brings the promise of creative new technology-driven businesses. Our new Enterprise Hub provides a growing spectrum of support to entrepreneurial researchers who want to develop and commercialise their brilliant innovations. The most valuable element is access to the expertise and mentorship provided by Fellows who have deep experience of successful start-ups. More than 100 of our Fellows have offered their very valuable expertise to assist in creating tomorrow's companies.

We have continued to work with government to support the further development of a modern industrial strategy for the UK. In the aerospace sector, the need to increase the supply of highly skilled engineers has led to industry and government funding a programme of 500 MSc bursaries, which the Academy and the Royal Aeronautical Society are delivering.

Our international relations have seen significant development with active collaboration with The Chinese Academy of Engineering and a renewed focus on working with our European and US counterparts. Our work to support engineering capacity and innovation in sub-Saharan Africa has been strengthened by the creation of partnerships between universities and local industry in Zimbabwe and Dar es Salaam and the launch of our Africa Prize for Engineering Innovation.

This year, we have made great strides in developing a national forum for engineering in our refurbished headquarters building. Our programme of events and meetings has brought in a wide range of audiences, opinion leaders and policymakers as well as representatives from academia and industry.

Following a review of governance, the Council agreed recommendations to bring the Academy's structure and ways of working into line with best practice. The Fellowship voted to amend the Academy's Charter, Statutes and Regulations accordingly, firstly at an Extraordinary General Meeting in April 2014 and subsequently by postal ballot. The outcome of that vote means that the Academy will now move to a structure that will be in line with modern governance and support our ambitions for the future.

The implementation of a review of membership will greatly enhance our process for electing new Fellows, the lifeblood of our organisation who give the Academy some 12,000 hours of their time to provide leadership, expertise and delivery. I am deeply grateful to them all, including the Senior Vice President, Professor Sir William Wakeham FREng, the Council and standing committees.

Fellows can be justifiably proud of our role and achievements but we cannot slacken our pace. We have much more to do to ensure that engineering is recognised at the heart of society and that engineering becomes the aspirational career of choice for our young people.

In nominating Professor Dame Ann Dowling FREng to succeed me as President from September 2014, the Council has chosen an outstanding engineer to take our Academy forward into this ever-changing but fascinating world of global engineering challenges. I wish all possible success and good wishes for Dame Ann and each of our Fellows for the years ahead.

Finally, I wish to place on record my thanks to the Academy's Senior Fellow, HRH The Prince Philip, Duke of Edinburgh. It was his deep interest in engineering that helped establish the Fellowship of Engineering in 1976; since then, his enthusiastic, unflagging support has helped transform the organisation into the fully fledged national academy it is today. It is with a great sense of pride that we named our building Prince Philip House in honour of his role as Senior Fellow.

Sir John Parker GBE FREng
President

Chief Executive



The Academy's strengths lie in its Fellowship and the partnerships forged across the engineering profession, business and industry and the wider engineering community.

During the year, we led joint work across the profession to influence education policy in areas most relevant to the formation of engineers. We reviewed and then led the design of schools curricula in both computing and design and technology. This has had a direct and lasting impact on young people's connection with engineering concepts at school.

Working with some 25 partners and supporters, the *Engineering for Growth* campaign highlighted how engineering supports society and the economy through a series of events which received excellent media coverage.

Engineering for Growth was also the theme of the 2013 annual awards dinner, which, as always, provided an excellent opportunity to celebrate

excellence in UK engineering. This year, we enjoyed the breathtaking setting of London's Battersea Power Station, thanks to support from Atkins, BAE Systems, Bosch, BP, JLR and Petrofac. The event took place in the presence of Royal Fellow HRH The Princess Royal and, in keeping with the theme, was addressed by the Chancellor of the Exchequer.

The generosity of our Fellows, donors and sponsors resulted in over £3.7 million in new commitments for education, engagement and capital projects. The Academy is enormously grateful for the support we receive, which is crucial to the development of the organisation and the growth in our impact and influence.

The Academy constantly strives to improve the processes and systems that underpin all our work and is essential to improve performance and efficiency. I am deeply grateful to those Fellows who have provided their time and expertise in key areas of management. Their leadership and support for such projects is invaluable.

A major programme to modernise the Academy's processes for managing grants and awards has established much-improved practice through a new IT-based system and clearer lines of accountability across all the schemes that involve the distribution of funds.

A root and branch review of the Academy's main website will, later in the year, provide us with a modern platform for electronic communications and services, such as the online booking of Academy events. A new set of functions in the Fellows' area will create new ways for Fellows to engage with the work of their Academy.

Philip Greenish CBE
Chief Executive

Drive faster and more balanced economic growth

The Academy is committed to supporting sustainable and balanced economic growth. It provides support to excellent researchers tackling problems of importance to society and industry, celebrates and invests in outstanding entrepreneurs and innovators, and brings together academia and business to create the conditions in which innovation can flourish

Many of the Academy's activities are focused on fostering a climate in which engineering can excel by transforming innovative ideas and materials into high-value products, services and infrastructure. These in turn cultivate growth not only in the economy but also in terms of the wellbeing of the nation by means of improvements in healthcare, more sustainable standards of living and the provision of fulfilling careers.

The Academy has continued to support a research portfolio of the very highest quality. The Enterprise Hub has significantly increased its efforts to promote the growth of high-potential small and medium engineering businesses, and the Academy has made key contributions to improving engineering education and increasing the quality and quantity of the skills base.

The Academy has worked with its partners to promote engineering and innovation as key drivers of wealth

creation and raised awareness of the issues that are barriers to engineering making an even bigger contribution, so that these are recognised, and, more importantly, acted upon.

Over 30 partners and supporters have worked with the Academy on the *Engineering for Growth* campaign, which has gained considerable media coverage for its exploration of key issues and its showcase of great UK engineering. The Academy also joined with other national academies to raise political awareness of the need to maintain the UK's status as a world leader in research through long-term planning and support. Joint activities included production of a statement, *Fuelling prosperity: research and innovation as drivers of UK growth and competitiveness*; a political contact programme including a meeting with the Chancellor of the Exchequer, the Rt Hon George Osborne MP; and events at the party political conferences.

Awards

The MacRobert Award is presented annually to a team of engineers for an exceptional UK engineering innovation that has been both commercially successful and delivered societal benefits. In 2013, the winner was a team from RealVNC, a Cambridge software SME, established by some of the inventors of remote computer access software.

RealVNC's technology gives computer, smartphone, and other device users the power to 'take over' another device remotely from anywhere in the world. This enables IT workers to solve problems on people's computers or smartphones without having to leave their own desks.

MacRobert winner, VNC software provides remote access between computers, tablets and smartphones



Silver Medals

The Academy's Silver Medals are awarded to outstanding individuals in recognition of their personal contributions to UK engineering. The awards celebrate individuals' success in creating and bringing a particular innovation to market. In 2013, the Silver Medallists were:

Elspeth Finch

Elspeth Finch co-founded the Intelligent Space Partnership, a transport consultancy focused on incorporating the needs of cyclists and pedestrians into city design and planning. She worked on successful projects including the Boston Downtown Crossing and Regent Street Strategy in London. Atkins acquired the practice in 2007, and Elspeth led its integration into its transport planning business. She is now the Futures Director in Atkins' Water and Environment business.

Dr Andrew Fitzgibbon

Andrew Fitzgibbon was the primary engineering influence in converting academic research at Oxford to a commercial product that became the Boujou system, released in 2000. Boujou automatically computes 3D camera motion from image sequences without the need for external references such as GPS or pre-positioned markers. Andrew contributed his expertise to the



development of machine learning for human motion capture, a core technology driving Kinect for Xbox.

Tim Morgan

Tim Morgan led the design, engineering and product development, manufacturing and commercialisation of the Mountain Trike All-Terrain Manual Wheelchair. He had identified the need for an all-terrain wheelchair that would allow users to reach places previously inaccessible to wheelchairs, such as sandy beaches, muddy festivals and even cobbled streets. It has a patented innovative drive as well as inventive steering, braking and chassis systems, and has won several accolades.

Dr Eben Upton

Eben Upton co-founded the Raspberry Pi Foundation to stimulate the teaching of basic computer science in schools and engage more children. He co-designed and developed the open architecture, low-cost single board computer, which runs the Linux operating system. He currently works as a system-on-chip architect at Broadcom, a large semiconductor company where he has led the development of next-generation high-end chips.

Tim Morgan worked as a design engineer at Bentley Motor Cars before he secured enough financial backing to develop his wheelchair design

Its technical engineering is so advanced that it is suitable for any imaginable device with a screen - even those that have not yet been invented. It is now used on over a billion devices worldwide, and VNC protocols have even become an official part of the internet. The MacRobert Award Committee Chair, John Robinson FREng, said: "For a relatively small UK company with no external investors to have grown to work with the world's biggest technology companies is truly inspiring."

Research

The Academy's Research Chairs and Senior Research Fellowships are jointly funded with industry partners to enable world-leading collaborative research. Over 40 research collaborations are currently supported, including ten new appointments made this year ranging from biomedical devices to cryogenic energy storage and satellite technology.



From left to right: Academy Research Fellows Dr Amanda Wright, Dr Grigorios Loukides and Dr Gavin Campbell, Bombardier's Director of Design Engineering and Technology Development

The Research Fellowship scheme provides high-calibre early-career researchers with five years' funding and mentorship to enable them to establish themselves as future research leaders. The scheme is highly competitive and, during the year, seven new appointments were made, maintaining the total number in post at 56.

Another flagship programme, the Leverhulme Senior Research Fellowships scheme, enables academics with a proven track record in research to be relieved of their teaching and administrative duties so that they can focus full time on research for up to 12 months. This year, seven new awards were made.

The Academy's annual Research Forum brings together Academy Fellows and beneficiaries, engineering researchers, industry partners, research funders and government representatives. The event was hosted this year by Academy Vice-President for Research, Professor Ric Parker CBE FREng, with guest speaker, Professor John Perkins CBE FREng, Chief Scientific Adviser, Department for Business, Innovation and Skills, who gave a presentation on engineering skills, research and growth. The annual forum provides an excellent opportunity for those engaged in engineering research within academia, industry and other interested parties to network and learn about leading-edge research sponsored by the Academy.

The SET for Britain event is a nationwide poster competition open to all early-career researchers in engineering, science and technology, celebrating innovative ideas in UK research. Run by the Parliamentary and Scientific Committee in partnership with the Academy and others, it provides an opportunity for researchers to exhibit their work to MPs and peers. For the 2014 event, 60 participants presented their research in the engineering category. Dr Stephen Hicks, Research Fellow at the University of Oxford, won the engineering gold medal and £3,000 prize for his research in developing smart glasses for partially sighted people.

International activities

The Research Exchanges with China and India scheme promotes academic collaboration between engineering researchers in the UK and China, or the UK and India, with the aim of strengthening bilateral relations and supporting the expansion of international networks of excellence.

The Distinguished Visiting Fellowship scheme provides funding to enable a UK university to host a senior academic from an overseas centre of excellence for up to a month, in order to engage in mutually beneficial activities.

This year, 24 new Research Exchanges were funded and 26 new Distinguished Visiting Fellowships were awarded.

The Academy also continues to act as a Designated Competent Body for the Tier 1 (Exceptional Talent) visa route, providing advice to the Home Office on the suitability and quality of applicants. It helped introduce changes to the routes to facilitate entry to the UK for researchers awarded prestigious fellowships from the Research Councils, the Wellcome Trust and other bodies.

Enterprise Hub

The Academy's Enterprise Hub was launched in April 2013 by Universities and Science Minister, the Rt Hon David Willetts MP, in front of a capacity audience of entrepreneurs, investors, businesspeople and policymakers. To date, 22 Hub members with 16 companies have raised almost £3.5million of external investment, supporting projects that involve over 50 people.

The Enterprise Hub was developed as a national resource taking the 'best of the best' UK-based entrepreneurial engineering companies and providing them with pre-seed funding and a long-term package of mentoring, training and bespoke support. It is working to bring about a step change in the success of these businesses and the contribution that they make to UK economic growth.

Ian Shott CBE FREng was instrumental in the setup of the Hub, and over 100 Academy Fellows, who include some of the UK's most successful entrepreneurs and business leaders, have volunteered to mentor entrepreneurs and growing SMEs through it. This unique access to expertise and networks is crucial for helping Hub Members to shape and then realise the visions they have for their innovative technology and engineering projects.

The first cohort of Hub Members has been drawn from the Academy's Enterprise Fellows and RAEng ERA Foundation Entrepreneurs Award winners. Enterprise Fellows are business-minded engineering academics who can be awarded up to £85,000 plus training and support to enable them to spend a year focusing on commercialising their innovation; RAEng ERA Foundation Award winners are early career researchers with strong entrepreneurial promise who are awarded a cash prize of £40,000. Over the coming year, the range of Hub programmes offered will be expanded



to include the *Launchpad Competition*, aimed at helping engineers between the ages of 16 and 25 to start a company, and the *Pathways to Growth* scheme, which will provide engineering SMEs with tailored training and capacity building to enhance their potential for growth.

The Hub also runs an events programme aimed at developing the skills of entrepreneurs, bringing the technology and finance communities together and raising awareness of policy issues that impact on entrepreneurship and growth. Events in 2013 included a briefing on crowdfunding and a workshop for Hub members on funding and finance.

Highlights of recent progress by Hub members include a £1.14 million investment in Dr Josh Reiss' MixGenius business, a spinout of Queen Mary, University of London. MixGenius is developing groundbreaking automatic mixing tools for audio production to enable amateur musicians to produce professional quality recordings without the need for an expensive sound engineer.

Dr Daniel Elford's novel noise barrier technology company Sonobex, a spin-out of Loughborough University,



has been awarded a TSB Smart Award Development of Prototype grant and secured private investment to further the development of the company. Sonobex has also completed its first commercial sale to Alstom.

Professor Janice Kiely's company, MIAtech, a spin-out of the University of the West of England, develops testing of food for bacteria such as salmonella and listeria and has seen total investment reach over £300,000, with seven people now involved in the company.

Top: Dr Daniel Elford's Sonobex barriers use a structural arrangement that scatters incoming sound waves so that instead of being reflected, as in conventional systems, they are cancelled out
Above: Dr Susannah Clarke is a design engineer establishing an orthopaedic surgery spin out

Foster better education and skills

An engineering education continues to open doors to some of the most fulfilling and best-rewarded careers. The Academy plays an active role in delivering major programmes and formulating policy on the formation of engineers. It also champions the case for more diverse, better trained engineers and technicians to meet the needs of the UK economy and industry

The last year has seen significant input from the Academy into public policy in education. The education programmes for schools, colleges and universities, run by the Academy with many partners, continue to grow.

A key government publication in 2013 was the review *Engineering Skills* by Professor John Perkins CBE FREng, Chief Scientific Adviser to the Department for Business, Innovation and Skills. The Academy played a leading role in providing the report, working with Professor Perkins and his team to provide the relevant information and data to support the case for increasing the number and quality of engineers in the UK. The report considered all phases in the engineering talent pipeline and outlined short- and long-term actions to reverse a trend that threatens to leave the country without enough skilled engineers.

The review identified five key issues that need to be addressed to solve the skills crisis: inspiring the very young of all backgrounds and both genders; increasing teaching excellence in key subjects; widening vocational pathways to engineering careers; ensuring

sufficient resources in universities to teach engineers effectively; and increasing retention within the sector. The report made 22 recommendations to improve the situation, 15 of which required the full and active engagement of the engineering community, working alongside the education sector.

The Academy is now taking a lead role in implementing many of the recommendations. Through the *Education for Engineering* alliance (E4E) of 36 professional engineering institutions, four task groups have been established to look at increasing employer engagement to support teaching in schools, colleges and universities. These groups will report to Professor Perkins' team in November 2014.

The Academy has also been supporting the development of new qualifications. The National Committee for 14-19 education, hosted by the Academy, held a series of seminars to develop the content and structure of a new Engineering A Level. The proposals are currently being examined by an awarding body to see if they can be implemented as a future qualification.

In December 2013, the Level 2 Principal Learning in Engineering qualifications developed by the Academy from the Engineering Diploma were approved for inclusion in school performance measures by the Department for Education. This represented a successful end to a hard-fought campaign to ensure that school students would be able to study and gain qualifications in engineering at Key Stage 4.

The Academy has also been working on a series of publications on engineering higher education which are due to be published in the spring and summer of 2014.

Activities in schools

The Barrow Engineering Project (BEP) continues to be a major part of the Academy's effort to encourage more people, especially young women and people from a wider range of backgrounds, to become engineering technicians, graduate engineers and engineering researchers. Launched in April 2008, the BEP has provided over 25,000 STEM learning opportunities in local schools and colleges. In October, the Academy won a Cumbrian education 2013 'Golden Apple Award in Community Involvement' for this BEP initiative.

Following the success of BEP, the Academy has launched the Stoke Engineering Project in November 2013. The project provides funding to enhance and enrich the STEM curriculum of six secondary schools and two further education colleges in the area. This work aims to inspire the next generation of engineers and technicians in Stoke-on-Trent and Staffordshire. A partnership of educators and representatives from local engineering employers met in early 2014 to discuss how to work together to highlight the range of career opportunities available to students both locally and nationally.



Pupils at Fleming Fulton School, Belfast launching a model of a bob skeleton sled. The pupils made the sled as part of the Academy's STEM learning activity.

The Academy's remit to inspire and excite young people about careers in engineering is being taken forward through support for a project to build an engineering careers exhibition at the Science Museum in London, provisionally entitled 'That Could Be Me'. Funded by a consortium of companies, the exhibition will focus on 11-15 year olds and will challenge both their perceptions of engineering.

Computing in schools

The Academy launched a new voice for computing in 2013. The UK Forum for Computing Education (UKForCE) was established to provide an independent and unified voice to advise UK government and other agencies on key issues relating to computing education. The expert body was set up in response to recommendations of the joint Royal Society and Royal Academy of Engineering report *Shutdown or restart: the way forward for computing in UK schools*, published in 2012.

UKForCE, chaired by Chris Mairs CBE FREng, brings together representatives from across education, computer science, digital media, IT, engineering and telecommunications to advise on matters relating to the computing curriculum, qualifications and assessment and the supply and training of computing teachers. It covers the whole of the UK and will be working on computing education issues across all devolved jurisdictions.

A new computing curriculum for all schools in England, which the Academy

and BCS (the Chartered Institute for IT) advised on, represents a significant change, with much greater focus on computer science. The devolved nations are also reviewing and updating their computing curricula. The key priority for UKforCE in its first year is to ensure that teachers can access the necessary continual professional development they need. To this end, the Forum is currently researching how well-prepared schools in England are to deliver the content of the new computing curriculum.

Students from the Barrow Engineering Project taking part in a GSK activity in July 2013



The Academy has produced a suite of STEM teaching and learning resources for use in schools. This year, a new resource for teachers of 11-14 year olds was added with the development of *Disaster response: How do engineers save lives in the aftermath of a natural disaster?* A further range of maths resources has also been developed for secondary schools to use with primary school students during transition days.



Teacher coordinators who lead the Connecting Teachers project and help foster collaboration between STEM teachers gathered together at the Academy to discuss progress in July 2013

Through the Connecting STEM Teachers programme, the Academy continues to support its network of 24 STEM Teacher Coordinators with continuous professional development, teaching and learning resources and funding for collaborative projects with their regional network schools. Within the 385 secondary schools that are involved, there have been 37,098 STEM learning opportunities for students since the programme was launched in September 2011.

Further and higher education

The Academy published an important study on engineering higher education capacity in the UK. The report, *Skills for the Nation: Engineering undergraduates in the UK*, highlights the complex structure of the 182 institutions that offer a wide variety of engineering programmes.

It shows that the demand for engineers across all sectors of the UK economy exceeds supply and that engineering remains a highly attractive career option for young people. However,

where teaching programmes in 46 of the UK's most established universities are consistently being filled to capacity, many of the UK's new universities – which include a number of former polytechnics – have undersubscribed with suitably qualified applicants for engineering courses.

Professor Kel Fidler FREng, co-author of the report, said: “The Academy’s labour market studies show significant demand for graduate engineers, evidenced by employers’ readiness to pay salary premiums. This, coupled with the capacity available to engage more of our brightest youngsters in high-quality, well-resourced professional engineering institution accredited courses in many of our newer universities augurs well.”

The Academy continued to work with the Royal Aeronautical Society, government and a number of major aerospace engineering employers to deliver the Aerospace MSc bursary programme. The scheme’s main purpose is to attract new talent, knowledge and skill to develop the UK’s aerospace sector’s professional workforce as well as upskilling current aerospace employees. The bursaries are offered to people with general engineering, mathematics or physics backgrounds who wish to take a specialist MSc qualification to find employment in the aero sector. The take-up for bursaries has proved extremely popular and the programme is on track to fund 500 students over the course of the scheme.



Above: Aero MSc bursary awardee Emma Cooke

University/industry links

The Academy provides curriculum development and increased learning capacity through its Visiting Teaching Fellowship and Visiting Professorship programmes which bring practising engineers from business and industry into universities. These flagship schemes engage thousands of students and hundreds of academics across the UK each year, providing valuable opportunities to update curricula and improve the student experience. These programmes are complemented by the Academy’s Industrial Secondment Scheme, which enables teaching staff in higher education institutions to work on collaborative projects with industry in order to improve the quality and industrial relevance of their teaching.

Bursaries and professional development

The Academy’s long-established Engineering Leadership scheme identifies and supports talented engineering undergraduates with the potential to be future leaders in industry. Over the past year, 35 Advanced Award holders each received £5,000 funding to undertake a personalised programme of professional development, overseen by mentors. Engineering Leadership Standard Awards also enabled promising engineering undergraduates to take over 200 places on a range of bespoke personal and professional development courses.

The Panasonic Trust, Sir Robert Malpas, Petrofac and other Academy bursary schemes funded continued professional development in the form of MSc or equivalent degree studies, with 14 recipients in full-time study awarded between £5,000 and £9,000 each in 2013, and an additional 64 recipients studying for part time degrees awarded up to £1,000.

For students who wish to explore the possibilities of a research career, the Nuffield Foundation/Royal Academy of Engineering Undergraduate Research Bursaries provide support for

Diversity

Over the past 12 months, there has been significant progress across the Academy’s work on diversity, both internally and externally.

The external programme, funded by the Department for Business, Innovation and Skills, has seen a number of developments. The majority of professional engineering institutions (PEIs) have now become signatories to the Engineering Diversity Concordat. The Concordat commits PEIs to take action to improve diversity across the engineering profession. The Engineering Diversity Concordat Group, chaired by Professor Dame Wendy Hall FREng, provides a platform for the institutions to come together, share good practice and monitor progress towards achieving concordat objectives.

The Diversity Leadership Group, chaired by Allan Cook CBE FREng, brings together some 40 employers and coordinates action in stimulating demand for, and retention of, a diverse talent base. It aims to remove barriers to entry and increase the supply of women and other underrepresented groups into the profession. The group

is focused on engaging a diverse future generation, building inclusive cultures to encourage retention and broadening diversity through wider interaction in higher education.

In addition, the Academy’s diversity work has built alliances with a range of organisations, including Women in Science and Engineering, Women’s Engineering Society, Everywoman, the STEM Disability Committee, the Social Mobility Foundation and the National Mentoring Consortium.

Activities include disseminating findings from pilot projects; commissioning research; submitting written evidence to the Science and Technology Committee enquiry into Women in STEM careers. It also contributes to the government ‘Your Life’ campaign.

Internal work has focused on continuing to embed good diversity practice. Across the Academy, all activities are required to have diversity action plans in place; an online system to collect diversity data across all activity is under development; and an Academy Diversity Committee has been established.



Finally, the Academy has developed a showcase of role model materials and other resources to encourage more young people to consider careers in engineering. Developed with input from Tomorrow’s Engineers and others, materials have been distributed at a number of events including the campaign Designed to Inspire which encouraged more engineering students to make the transition from education into engineering employment.

Chi Onwurah MP, Shadow Minister, Cabinet Office, was one of the role model engineers who spoke at the Designed to Inspire events and on the video clips that accompanied them

undergraduate engineering students to undertake work placements in research, with 10 students receiving this bursary in 2013.

The Academy has long championed the importance of developing industrial leaders who will drive UK growth in the future. With a grant from the Gatsby Charitable Foundation, and the personal support of Lord Sainsbury, the Academy has enabled more than 300 exceptional engineering graduates to attend the world’s most prestigious business schools. A substantial portion of their fees are covered by the Sainsbury’s Management Fellowship (SMF) award, and following the completion of their MBA, they are supported by an extensive network of SMF alumni, the Sainsbury Management



Fellowship Society, which has ambitious plans in supporting future industry leaders. The SMF alumni also form an important backbone to the Engineering Leadership Advanced Awards, providing mentoring and participating in selection activities.

Petrofac Royal Academy of Engineering Fellows at a Poster Day event with Martin Barnes (centre), General Manager, Petrofac Engineering Services

Lead the profession

The Academy's Fellows are leaders across the engineering profession. This creates a natural role for the organisation to harness the collective strengths of engineering in order to influence and inform policy, lead the debate and contribute to the development of engineering across all sectors

Providing policy advice to government is a key role of the Academy, so it is important that the Academy has a close understanding of the complex factors that shape the context of national policy. The Academy's unique capacity is that it can draw on the expertise of its Fellows to address policy challenges, both short- and long-term. This capability is in increasing demand by government and others to support national policy and capacity in a range of areas with an engineering dimension to delivery.

To increase engagement of expert Fellows in policy work, the Academy has begun to establish Communities of Practice. The aim is to create an environment where Fellows can engage more closely with Academy policy work and help respond to requests from government and the media. Communities of Practice have so far been established on energy and environment, medical technologies, transport, and computer systems engineering, with one planned for manufacturing.

As well as increasing impact and influence on policy, the Academy has also dramatically increased its media profile. It is vital that that every piece of work maximises its impact and reaches its targeted key audiences. In addition, getting engineers and engineering into the media is important because it allows

the Academy to engage the public with the implications of engineering in society.

Impact and influence

The Academy responded to a wide variety of consultations to government, parliament and other bodies over the past year. Particular highlights include Sir John Armitt FREng's independent review of infrastructure, a joint national academies submission to the Department of Business, Innovation and Skills (BIS) consultation on the impact of EU membership on research and innovation and a House of Lords inquiry into the impact of current changes to the immigration bill on international students in science and engineering subjects. Professor Helen Atkinson CBE FREng, Chair of the Academy's Standing Committee for Education and Training, also acted as a witness to the House of Lords committee inquiry into international students.

The Academy's report on the potential impact of extreme solar storms on the UK's electricity grid, satellites, GPS systems, aviation and mobile communications received widespread media attention and led to discussion at senior levels of government on implementation of the recommendations it set out.

Where a joint approach is more appropriate, the Academy utilises its alliances with the engineering profession, Engineering the Future and Education for Engineering, to provide the responses. The Academy provides an open front door into engineering expertise for government and other policymakers.

Engineering the Future responses submitted in the last year include cybersecurity, carbon capture and storage, low carbon innovation and a House of Commons Business, Innovation and Skills Committee call for written evidence on the extractive industries sector.

Energy and environment

Energy has once again been a central theme of the Academy's policy work. Following the 2012 joint report with the Royal Society on the extraction of shale gas in the UK, there has been continued engagement with government, regulators, the media and the public on issues relating to the recommendations of the report.

Meetings have been held on the UK's role in the next generation of nuclear energy and measurements relating to smart grids. The progress of the Energy Bill through parliament was closely followed, with input from the Academy's energy Community of Practice and a briefing for Fellows to discuss the impacts of the legislation on wider UK energy policy. A report on *GB electricity capacity margin* was produced for the Council for Science and Technology – see *Keeping the lights on*.

A detailed study was undertaken on *Future ship powering options*. The report provided an assessment of alternative methods of ship propulsion such as liquified natural gas, fuel cells and nuclear power. As one of the first reports of its kind, it has already been the subject of considerable discussion within the maritime sector internationally.

Fellows were proactive in engaging with the media during the spring in response to the floods, highlighting the roles of engineering and engineers in flood relief and prevention. The Academy held a public meeting and a media briefing with the David Rooke FREng and other Fellows expert in flooding resulted in national print and TV coverage.

Manufacturing and industry

The Academy published two reports on forthcoming ways of manipulating materials, from high-tech

Keeping the lights on

The Academy was invited by the Prime Minister's Council for Science and Technology to undertake an investigation into the capacity margin of the GB electricity system. The study was led by Dr John Roberts CBE FREng. In conducting the work, a number of participants in the GB electricity system were consulted, including the major energy utilities, independent generators and other relevant stakeholders.

The report concluded that there are a number of market-based and political factors that were currently combining to bring about a reduction in the electricity capacity margin within the next five years. These factors, in the absence of intervention, would reduce the capacity margin in the short term, in a manner that would present an increasing risk to security of supply.

The report recommended that interim measures should be introduced to maintain capacity while the reform of the electricity market, including the carbon floor price, was resolved. More generally, it recommended that government needed to work together with industry to foster a constructive dialogue with the public on energy policy. It concluded that there was an urgent need to develop a holistic energy system strategy.

The report had a direct impact on government policy, helping to reinforce the seriousness of the issue, effect action and position the Academy as a source of constructive, expert advice on a matter of national importance. A significant amount of media coverage also resulted from the report.

manufacturing to low-energy recycling methods. *Additive manufacturing: opportunities and constraints* reported on a roundtable held by the Academy on the future of additive manufacturing and 3D printing in the UK, and their potential impacts on UK industries. From the materials fed into additive manufacturing equipment to the potentially bespoke items that emerge, this report considered the reality of the technologies and their potential to open up new areas of manufacturing.

The Academy considered the sustainability of the domestic supply chain in a report entitled *Made for the future*. The report looked at how domestic goods are made, used and recycled. It explored the challenges of reducing both the material resources and energy used in the manufacture and use of everyday items from mobile phones to boilers. It also highlighted the

The MF Fanafford, a ferry fuelled by liquefied natural gas, featured in the report *Future ship powering options*
© A Greig



The Made for the Future report published in November 2013 explored future ways of making, using and recycling consumer goods



Richard Bradbury and the Elan microprocessor ankle and KX06 hydraulic knee were featured in the report *Innovation in medical technologies*

'Innovation in...'

Innovation in... is an Academy series of events, chaired by the President, Sir John Parker GBE FREng, which focus on the latest developments in sectors that will affect society in the coming decade. The focus of previous events in the series have included construction; technology-based companies and automotive.

The Academy held three further events in the series during the year. Innovation in medical technologies featured discussions on areas as diverse as biological scaffolds, medical robotics and modern prosthetics. The talks included discussions about securing investment for innovative medical technologies, clinical and NHS and patient viewpoints, and examples of upcoming medical technologies.

Innovation in materials, co-sponsored by the Institute of Materials, Minerals

and Mining and the Materials Knowledge Transfer Network, highlighted innovative technologies and processes. The event featured a keynote address by Professor Mark Miodownik, winner of the Academy's 2013 Rooke Award for public engagement with engineering. Case studies illustrated advances in the fields of synthetic biology, nanotechnology and photovoltaics as well as new emerging applications for 3D printing, graphene and biomaterials.

The third and final event of the year, entitled Innovation in energy, focused on the technological innovations being made in electricity generation as well as exploring innovations in system management. Topics highlighted included small modular reactors, tidal arrays, storing renewable energy on the gas grid and high voltage direct current. The events attracted a large and varied audience with further outreach opportunities created by online films of the events and summary reports.

questions that demand the attention of designers, manufacturers, retailers and consumers to help reduce the demands on resources created by our everyday behaviour.



Dental frameworks being made by the additive manufacturing process of laser melting © Renishaw

Infrastructure and support

A report on *Public Projects and Procurement in the UK* provided advice

on how taking a more systems-level approach to procurement practice would help drive efficiency in the commissioning of major government projects. The report focused on procurement practice in the construction and ICT sectors. It highlighted the need for civil servants to become intelligent clients as well as the importance of vision, leadership and incentivising the right behaviour.

Smart buildings: people and performance reported on a roundtable that considered potential applications for smart building technologies and set out to identify possible challenges. The event encouraged holistic, systems thinking for building design that included the wellbeing, maintenance and productivity of buildings across their full lifecycle.

Biomedical engineering

The Academy's Panel for Biomedical Engineering conducted a joint project with the Academy of Medical Sciences

on how best to gather evidence for the regulation of medical devices and engineered systems and concluded there is a need for improved methods of demonstrating medical device safety, performance and efficacy.

There is potential to adopt methods from the engineering sector for assessing medical devices. Dialogue between clinicians, device manufacturers and the 'end user' is important to ensure that devices are designed to meet real clinical need. Given its strong research base and with the NHS at the core of its healthcare system, the UK is well placed to generate the necessary high-quality evidence for such devices.

The report was discussed at meetings with the Medical Healthcare products Regulatory Agency and Parliamentary Under Secretary of State for Quality, Earl Howe.

The Panel also supported the Royal Society of Medicine's event *Recent developments in digital health*, which

shared best practice and latest developments in the field of digital health. Speakers considered how engineering could help people maintain their independence, living at home and staying out of hospital through applications such as mobile health, telecare and point-of-care testing.

International activities

This year, the Academy established two far-reaching programmes aimed at building teaching, research and innovation capacity across sub-Saharan Africa.

The Enhancing Engineering Education Programme in sub-Saharan Africa is designed to build the connections between African universities and local industry, drawing on the Academy's highly successful UK-based Industrial Secondment and Visiting Professor schemes. This pilot is based around two 'hub' universities, the University of Zimbabwe and the College of Engineering and Technology, University of Dar es Salaam, and nine 'spoke' universities in the region. The programme involves a series of professional development workshops and two-way secondments between the engineering faculty and local industry partners.

In March 2014, the Academy launched the £25,000 Africa Prize for Engineering Innovation, a major new award aimed at stimulating, celebrating and rewarding technology-based innovation and entrepreneurship in sub-Saharan Africa. A shortlist of the most promising applicants will receive six months of mentoring and training, before an overall winner is chosen in spring 2015.

The Academy continues to work closely with Euro-CASE, the European umbrella group for national engineering academies, and has helped build strong links between Euro-CASE and the European Commission, particularly in the areas of innovation and energy. In February 2014, the Academy hosted a lecture by Dr Henning Kagermann, President of acatech, the German



Staff from universities in Zimbabwe met with Academy representatives as part of the Enhancing Engineering Education in sub-Saharan Africa programme in March 2014

national academy of engineering, to inform UK manufacturing policy stakeholders about the German industrial strategy, *Industrie 4.0*.

The Academy increased its engagement with China on energy and environmental issues, through a mission to Beijing on air quality and a joint seminar on innovation in low carbon energy with the Chinese Academy of Engineering in London. The mission resulted in the creation of a UK China Expert Group on air quality, co-chaired by Professor John Loughhead OBE FREng, with the aim of feeding the views of UK experts into China's draft legislative air quality programme.

Engineering alliances

The Academy convenes the Education for Engineering (E4E) and Engineering the Future alliances with the organisations representing the profession.

The government's educational reforms continue apace and E4E responded to 14 consultations over the last year. These ranged from changes to GCSE and A levels to new plans for apprenticeships and new accountability measures for schools and colleges – all of which will have significant impact on the future engineering skills pipeline. E4E also responded to the review of adult vocational education by Nigel Whitehead FREng in his capacity as commissioner for the UK Commission on Employment and Skills.

Engineering the Future worked together on five responses and consultations on aspects of engineering policy as well as a series of reports and events. These included a report providing insight into manufacturing and a study on the role of engineering in the healthcare sectors. Dame Sue Ion FREng chaired a project to update a study undertaken by Sir Robert Malpas FREng in 2000 on *The Universe of Engineering*. These reports will be published in the spring and summer of 2014. A public meeting was held with representatives of the Intergovernmental Panel on Climate Change (IPCC) and the Department of Energy and Climate Change at which engineers discussed the implications of the IPCC's Working Group 3 on climate change mitigation.



Professor Henning Kagermann, President of acatech, Germany's national academy of science and engineering, speaking at the Academy's Prince Philip House



Promote engineering at the heart of society

The Academy aims to increase debate on engineering and its impact on society and build public recognition for our most talented engineers. It is ideally placed to raise awareness of engineering across all disciplines and to bring it to where it truly belongs –at the heart of society

Dr Joanna Heaton-Marriott and Matt Dickinson beside the comic book characters Dr Darkness and Mecha-Man



Engineering for Growth

Engineering for Growth is an Academy-led partner campaign to raise awareness of the contribution of engineering to UK economic growth and quality of life and explore how engineering can make an even bigger contribution.

The campaign is delivered in partnership with a number of prominent organisations, including government and engineering industry. Since its inception in 2013, it has reached millions of people through traditional and social media, events, and ministerial engagement.

A series of topical events raised debate and discussion on key *Engineering for Growth* issues organised by the Academy and the campaign partners. These events have addressed key issues including entrepreneurship, apprenticeships, skills, immigration, diversity, innovation and education. For example, a breakfast panel debate: *The Brain Gain – should we be importing top quality STEM skills from abroad?* brought together representatives from UK engineering companies, the Trade Unions Congress, the Confederation of

British Industry (CBI), the Social Market Foundation, and government to discuss immigration and the UK versus the international engineering skills base.

Engineering for Growth co-branding has also been used extensively across the Academy's activities, helping to reinforcing a single and coherent key message to all of our key target audiences of the importance and value of engineering.



Engaging activities

The public engagement grants scheme, Ingenious, funded by the Department of Business, Innovation and Skills (BIS), supported 24 new projects during the year, giving engineers the opportunity to engage with the public in innovative ways. Fun Kids Radio gave young engineers a chance to become children's radio broadcasters while, in the Solent region, the University of Southampton trained engineers to become buskers on ferries, presenting marine engineering demonstrations to the travellers on board. A third opportunity turned engineers into tour guides on a travelling Routemaster bus filled with outstanding UK engineering innovations.

Another funded project was *HeroLab*, a collaboration between the University of Central Lancashire and Marvel comic artists. They worked together to develop a new graphic novel for children featuring superheroes and villains with powers based on real-life engineering innovations. *Herolab* was

featured in a full page article in the *Metro* newspaper, in October 2013, significantly increasing the reach of the project.

In November, the Academy was one of the core partners of Tomorrow's Engineers week, a new initiative led by (BIS). The week brought together a number of partners to deliver a week-long series of events and activities to encourage more young people, in particular girls, to embark on a career in engineering. Evaluation of the week's activities showed that there was a 6% rise in the number of 11- to 14-year-old girls who said they would consider a career in engineering.



Students at the Big Bang Fair learn about 'mechanical advantage' through a simulation of lifting rubble after an earthquake

Reaching out through the media

The Academy has increased its presence in the media, with 50% more coverage than the previous year, generating over 2,200 pieces of print and online coverage in 2013-14: a promising sign that its efforts to promote engineering and its importance to society are making progress. The Academy also provided expertise and comment for over 80 television and radio programmes.

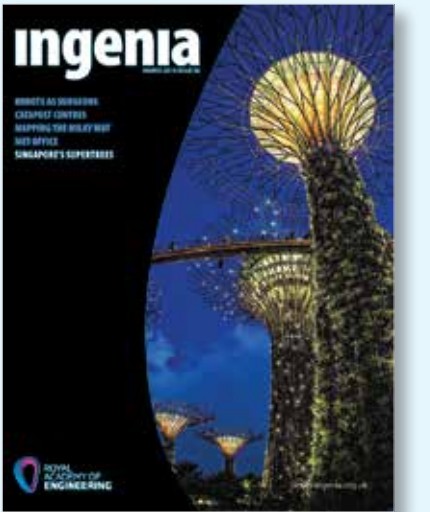
Examples included the *GB Electricity Capacity Margin* report covered in nine TV interviews with Dr John Roberts FREng and Dame Sue Ion FREng, including *Sky News*, *BBC Newsnight*, *Channel 4 News* and *BBC News at Ten*. The report also received wide radio and press coverage, from outlets including *The Guardian*, BBC Radio 5 Live and Radio 4.

At the start of 2014, the announcement of the new Presidential nominee Professor Dame Ann Dowling was

covered extensively in national and trade media. Dame Ann's announcement featured in *The Times*, *The Independent*, *The Engineer* and *The Guardian* and as a result, she was interviewed on ITV's *Daybreak*, *BBC Newsnight* and *BBC Look East*, commenting on the diversity in the engineering profession.

The Academy was also successful in raising the profile of female engineers to new audiences, with a major feature on Arup's Director of International Development Jo da Silva OBE FREng in *Vogue* and smaller features in *Marie Claire* and *Cosmopolitan*.

The Academy also reaches out to a broad audience through its quarterly magazine *Ingenia*, which carries articles that cover the spectrum of engineering and profiles of engineers across all disciplines. This year, it published articles on how the Met Office models weather, the use of robots as surgeons, the



decommissioning of North Sea oil rigs and some of the many applications of 3D printing. The printed version of the magazine has a readership of 33,000, with another 114,000 people accessing the online version each quarter.

The Academy continued to be a lead partner at the Big Bang Fair. This year, more than 70,000 visitors attended the event which took place at the Birmingham NEC in March 2014. The Academy presented a new stand at the event which hosted a range of activities on the theme *Engineers save lives*. Demonstrations and resources on the stand explored the different ways engineering can help after natural disasters, from pumping clean water to those in need to using heat-sensitive cameras to hunt for survivors.

An eventful year

Following successful events in preceding years, the Academy staged three events at the Cheltenham Science Festival exploring: society's relationship with the web with Dame Professor Wendy Hall FREng; space weather with Professor Paul Cannon FREng; and a light-hearted event, *Engineering: Call my genetically engineered bluff*, based on the format of the popular television show. Dame Wendy was also a guest director for the Cheltenham Festival 2013, along with Universities and Science Minister, the Rt Hon David Willets MP and comedian Dara O'Briain.



Top: Royal Fellow HRH The Princess Royal, Academy President Sir John Parker GBE FREng, Professor Brian Cantor CBE FREng, Vice Chancellor of the University of York, with Dr Helena Daffern, Department of Electronics, University of York at the Academy soirée
Above: Professor Dr Uwe Krueger giving the 2013 Hinton Lecture



Later in the year, the Academy took part in the *Battle of Ideas* festival, held at the Barbican Centre in London. As well as supporting a panel debate on big data with Dr Martyn Thomas FREng, the Academy took part in a second event to debate whether advances in technology are always good for society.

The Academy held joint fringe events, in partnership with its sister national academies, at all three main party conferences in 2013 to raise debate on *Can research and innovation fuel the UK economy?* Fellows Ian Shott CBE, Professor Lionel Tarassenko CBE and Dr Martyn Thomas CBE were part of the panels alongside political party representatives, Fellows from the Royal Society, British Academy and Academy of Medical Sciences, and other commentators.

During the past year, the Academy hosted three PolicyNet events to provide a platform for STEM policy staff to exchange ideas. The events covered the topics of the role of the Parliamentary Office of Science and Technology; the impact of the Technology Strategy Board's network of Catapult centres and the challenges of creating infrastructure for big cities.

Infrastructure was also the theme for the Academy's two flagship lectures. Professor Dr Uwe Krueger, Chief Executive Officer, Atkins, delivered the annual Hinton Lecture on the

engineering challenges and innovative infrastructure solutions to dealing with population growth and climate change. The Lloyd's Register Foundation Lecture was given by Andrew Wolstenholme OBE FREng, Chief Executive Officer, Crossrail, about Europe's largest infrastructure project and offered unique insight into how this colossal feat of engineering was being brought to reality.

The University of York hosted this year's Soirée and exhibition at The Ron Cooke Hub in June 2013. Royal Fellow HRH The Princess Royal attended the event, alongside over 200 Fellows and guests. Speeches from Sir John Parker GBE FREng and the university's Vice-Chancellor Professor Brian Cantor CBE FREng highlighted the importance of engineering in society and the crucial role that skilled engineers play.

An exhibition at the Soirée, entitled *Design for Living* showcased not only engineering research but also the way in which engineering has influenced work in other academic disciplines.

Academy awards

In July 2013, over 450 Fellows, engineering business leaders, innovators, opinion formers and journalists assembled inside London's iconic Battersea Power Station for the annual Academy Awards evening, which was themed *Engineering*

Queen Elizabeth Prize for Engineering

On 25 June 2013, the winners of the Queen Elizabeth Prize for Engineering (QEPrize) attended a reception at Buckingham Palace to receive their award from Her Majesty The Queen in front of an audience that included the three leaders of the UK's main political parties.

The QEPrize celebrations had started earlier in the day with a lunch at the Guildhall, hosted by the Lord Mayor of London, with guest VIP speaker, HRH Princess Eugenie of York. Later in the evening, the celebrations culminated in an engineering party with a difference at Tate Modern that showcased the wonders of modern engineering through curated installations and interactive demonstrations. Coverage of the celebrations reached an audience of 53 million in the UK with international coverage of the prize - including a feature on *Voice of America* - reaching 100 million people.

Following the announcement, the winners continued to be proactive



throughout the year in promoting the prize through a number of events. This included an event with QEPrize winner Vinton Cerf that took place at the Royal Institution, with an audience of senior educators and young people from schools across the UK.

The opening of nominations for the second QEPrize was marked by judges Paul Westbury CBE FREng and Professor Brian Cox OBE appearing in the UK

media, including BBC Radio One and BBC Radio 5 Live, and reaching over 31 million people. The nominations day itself was also successful in reaching out through YouTube and Twitter. The next prize winner/s will be announced in early 2015.

Her Majesty The Queen with prize winners (l to r) Dr Vinton Cerf, Dr Robert Kahn and Sir Tim Berners-Lee FREng

for Growth. The highlight was the announcement of the MacRobert Award, which was presented by Royal Fellow HRH The Princess Royal. This year's guest speaker was the Chancellor of the Exchequer, the Rt Hon George Osborne MP, who addressed the audience on the theme of engineering and its role in promoting economic growth. The evening was supported by Atkins, Petrofac, BAE Systems, Bosch, BP and Jaguar Land Rover.

Terry Hill CBE FREng was awarded the President's Medal in recognition of his achievements in civil engineering and infrastructure. He has worked on a number of high-profile infrastructure projects including the Channel Tunnel Rail Link and led Arup during the construction of the Aquatics Centre at the Beijing Olympics and the building of Heathrow Terminal 5.

The winner of the Sir Frank Whittle Medal was Professor Lin Li FREng, University of Manchester, in recognition of his outstanding contribution in developing laser and materials processing technologies.

The Sustained Achievement Award was given to Dr H Peter Jost CBE, founding father of the field of tribology, the science and engineering of interacting moving surfaces.

Dr Michael Porton, Culham Centre for Fusion Energy, won the Sir George Macfarlane Medal for his development of safety and materials technology.

Dr Julien Reboud of the University of Glasgow and Dr Reuben Wilcock and Robert Rudolf from the University of Southampton were the winners of the RAEng ERA Foundation Entrepreneurs Award.



Dr Michael Porton, winner of the Sir George Macfarlane Medal



Building organisational capacity

The Academy endeavours to find the best engineers from a wide range of backgrounds for nomination to the Fellowship. To provide a quality venue for its events and resources for its wide-ranging education and engagement work, the Academy also seeks funding and in-kind support from a wide range of partners

Battersea Power Station provides a dramatic backdrop for the Academy Awards Dinner 2013



Membership review

Following a root-and-branch review of the Academy's election and membership processes led by Dame Sue Ion FREng, the Academy Council accepted all the recommendations of the review group which are now in the process of being implemented.

The principal changes are: a reformed and expanded membership panel structure for considering Fellowship proposals with 11 panels replacing the existing five; a more robust Fellow-managed assessment process; and nominations under consideration for two years instead of four years. There will also be a new timeline for the nomination and election cycle.

It is anticipated that the 11 new panels, combined with the greater number of Fellows brought onto them, will provide a better and more thorough system for the evaluation of nominations. All the changes introduced this year will be subject to an annual review by the Membership Committee.

Grants management

In the course of the past year, the Academy has undertaken a programme to modernise and strengthen its approach to grants management and administration. This has included the procurement of a new IT-based grants management system launched in summer 2014 and an extensive programme of restructuring, training and development for all staff involved in grants management.

Governance review

A comprehensive review of the Academy's governance chaired by Professor Sir William Wakeham FREng, has been undertaken over the last two years. This had not been reviewed in depth since the Academy's formation nearly 40 years ago. Over the intervening period, there has been a substantial amount of new legislation and the Academy's corporate structure is now more complex following the incorporation of two subsidiaries, the Queen Elizabeth Prize for Engineering Foundation and RAE Trading Limited.

The principal aims of the review were to examine the governance mechanisms of the Academy, to research alternative models of governance and to report to Council recommendations for improvement on the current structure. The objective was to ensure a governance structure that operates effectively, now and in the future, in the pursuit of the Academy's charitable object.

Following approval by the Council of the recommendations of the review, the Academy held an Extraordinary General Meeting on 7 April 2014 at which Fellows voted by special resolution to adopt amended Charter, Statutes and Regulations which embody the proposed changes in governance. The same resolution was put to Fellows in a postal ballot and the result was again overwhelmingly in favour of the proposed changes.

Development

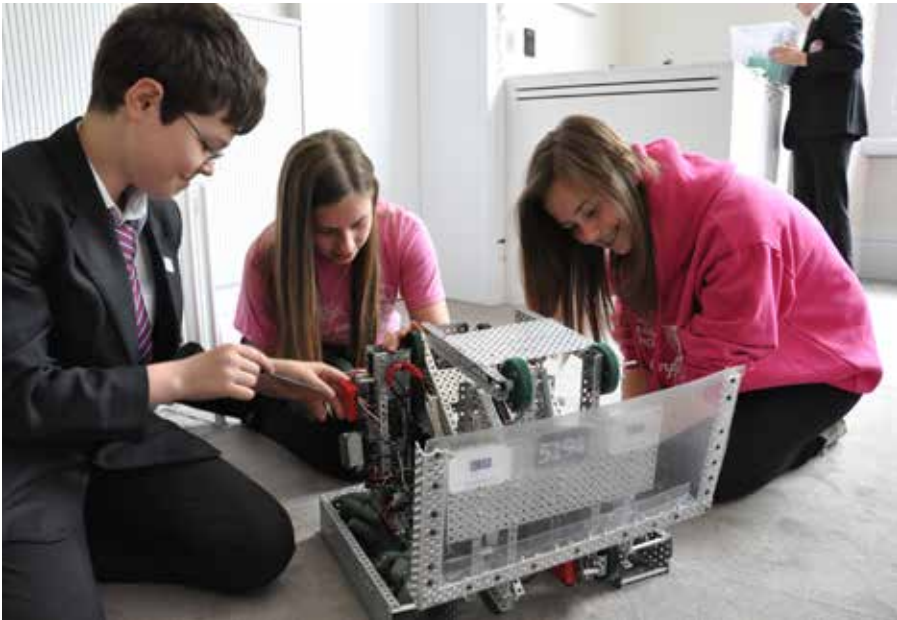
The Academy's fundraising efforts enjoyed an exceptional year, with over £3.7 million in new commitments made for education, engagement and capital projects. The continuing generosity of all donors and sponsors is greatly valued.

Fellows, as ever, led by example. Dr John C Taylor OBE FREng pledged a substantial sum towards the creation of a centre for entrepreneurship at Prince Philip House, which will provide a base for the Enterprise Hub and related activities. Fulfilment of multi-year support from Sir Robin Saxby FREng and a grant from the ERA Foundation provided the Hub with start-up funding of its own, enabling this important initiative to hit the ground running.

Fellows contributed to the 2012 and 2013 annual funds, giving extra capacity to several programmes. They also assisted by generating introductions to potential funders.

During the year, discussion dinners hosted by Fellows attracted senior figures from the transport and cybersecurity sectors, raising the Academy's profile and helping establish new relationships. The annual Academy Awards evening provides another major opportunity for engagement, to showcase UK engineering and celebrate excellence. The Academy thanks Atkins, BAE Systems, Bosch, BP, JLR and Petrofac for making the 2013 event possible.

Multi-year commitments were received from BAE Systems and Petrofac. The Worshipful Company of Engineers has also committed significant long-term support for the MacRobert Award. The Shell Centenary Scholarship Fund and Consolidated Contractors Company provided additional support for the new Africa Prize for Engineering Innovation. Six engineering companies also provided substantial backing to a major careers



Students from East Barnet School presenting their VEX Robot at the Academy's 2013 Teacher Coordinator celebration event

exhibition being planned with, and at, the Science Museum in London, provisionally entitled *That Could Be Me*; the Academy is project-managing this group.

The Academy welcomed Weir Group, Bosch, GKN and URS Corporation to the Forum Partnership programme, which supports public engagement and thought-leadership events at Prince Philip House.

Throughout the year, the Development Advisory Board, chaired by Sir Richard Olver FREng, provided expert advice and guidance in pursuit of the Academy's continuing efforts to broaden and diversify its funding sources.

Trading company

The Academy's trading subsidiary, RAE Trading Limited, provides catering for the Academy's events and meetings in Prince Philip House. It has a service agreement with Harbour & Jones, who provide an onsite catering team. The trading company also markets Prince Philip House as an events venue primarily to the corporate sector. The

location in St James and excellent catering have ensured the success of the venue over the past year. It has obtained repeat business from corporate clients such as Waitrose, John Lewis Partnership, McKinsey & Company and PrudentialRide London. In its first full financial year, the trading company generated revenues of £1.2 million and will gift aid nearly £400,000 to the Academy.

Academy event highlights

April 2013

Designed to inspire – *Role models event for students considering careers in engineering*

Enterprise Hub launch

May 2013

Measurement to enable smart and intelligent grids

A one-day conference co-hosted by the Academy, National Physical Laboratory and Energy Networks Association

Liquid air energy – *a new industry for UK Plc*

June 2013

Next generation nuclear energy – *the UK's role*

Cheltenham Science Festival 2013 – featuring three Academy-sponsored events

Engineering Nature – Academy's Midlands regional lecture

Innovation in medical technologies – A conference highlighting the latest innovations in the medical technologies sector

Queen Elizabeth Prize for Engineering – award presented by HM The Queen at Buckingham Palace

Annual Soirée and Exhibition – hosted by the University of York, in the presence of HRH The Princess Royal

July 2013

Academy Awards Dinner at Battersea Power Station

The MacRobert Award winner and finalists 2013 Exhibition

Academy's Annual General Meeting – chaired by Sir John Parker GBE FREng

September 2013

Engineering Research Forum – the annual showcase of engineering research sponsored by the Academy

Innovation Hothouse – the final

Crossrail: delivering Europe's largest infrastructure project – Lloyd's Register Foundation Lecture 2013

October 2013

Battle of Ideas 2013 – featuring two Academy-sponsored events: *Technology and sustainability: kill or cure?* and *Number crunching and ethics in the era of Big Data*

Imagination: the key to engineering the future – Hinton Lecture 2013

The future of manufacturing – *A new era of opportunity and challenge for the UK*

November 2013

Apprenticeship recruitment – *accessing untapped talent*

Innovation in materials – a conference highlighting the latest innovations in advanced materials

Apprenticeships for all – *challenging longstanding perceptions*

The brain gain – *should we be importing top quality STEM skills from abroad?*

January 2014

The used car test – Fellows' New Year reception lecture

February 2014

Industrie 4.0 – *what can the UK learn from Germany's manufacturing strategy?*

Engineering and Big Science – *opportunities for the UK*

Lessons learned in managing the winter floods – the engineering response

Recent developments in digital health

March 2014

Carbon dioxide emissions – Are we wasting a valuable resource? Academy's Sheffield regional lecture

Bridging the gap between vision and experience – Joint annual lecture with the Royal Society of Edinburgh

Innovation in energy

Videos available to view at www.RAEng.tv

Academy publications

These reports were published during the last financial year and are available to download at: www.raeng.org.uk

April 2013

Fuelling prosperity: research and innovation as drivers of UK growth and competitiveness

May 2013

Innovation in automotive – summary of a conference featuring automotive original equipment manufacturers, technology advisers and motorsports groups ►

June 2013

Smart buildings: people and performance

Establishing high-level evidence for the safety and efficacy of medical devices and systems

Skills for the nation: engineering undergraduates in the UK



July 2013

Future ship powering options – exploring alternative methods of ship propulsion ►

October 2013

GB electricity capacity margin – a study undertaken at the request of the Prime Minister's Council for Science and Technology

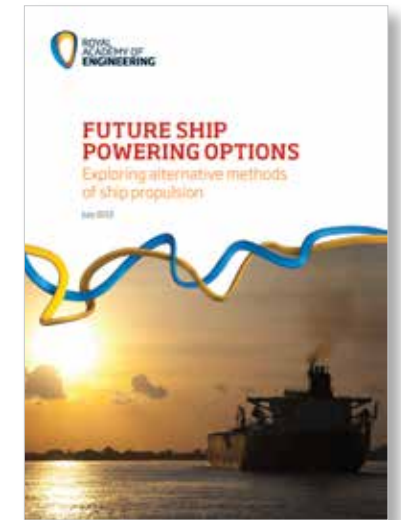


November 2013

◀ **Innovation in medical technologies** – technology development and research in areas from nanotechnology to telecommunications

Additive manufacturing: opportunities and constraints – 3D technology and its potential to open up new areas of manufacturing

Made for the future – a report exploring future ways of making, using and recycling consumer goods



February 2014

Public projects and procurement in the UK: sharing experience and changing practice

March 2014

Engineering in Society – an e-book providing students with a wider perspective on the profession of engineering

University Technical Colleges - opening up new opportunities for girls – an ebooklet co-published with WISE

How many engineers does it take ... ? – an ebooklet highlighting the range of engineering disciplines involved in making commodities

Highlights of the year by theme

Enterprise Hub

Over **£700,000** committed by Fellows and supporters towards Hub activities

Over **100** Fellows volunteered to mentor the Hub's technology entrepreneurs

To date, Enterprise Fellows have founded **16** companies and attracted **£3.5 million** additional investment

Africa Prize for Engineering Innovation

The Africa Prize has attracted **£400,000** in external funding

Engineers from **14** countries in sub-Saharan Africa entered the first Africa Prize

Developed industrialised countries have **20-50** scientists and engineers per 10,000 population, compared with **1** in the poorest African countries

Aerospace industrial strategy

Aerospace MSc Bursary Scheme developed by government, the Academy and the Royal Aeronautical Society to boost the supply of aeronautical engineering skills

Developed in partnership with **10** leading employers, there are bursaries of **£9,500** available for three-year courses

189 students have benefited to date

Engineering for Growth

34 campaign partners and supporters including government, major industry professional engineering institutions and SMEs

5 debates, **3** references in ministerial speeches and **4,000** unique *Engineering for Growth* website visitors

Over **100** press articles generated by the campaign during the year

Engineering for Growth Academy Awards Dinner with **450** attendees including the Chancellor of the Exchequer

Skills for the Nation report

Explored the capacity to increase the number of graduate engineers being produced in the UK

UK engineering higher education is a complex structure with **182** independent institutions

46 established universities that offer engineering are consistently filled to capacity

63 new universities offer engineering but recruit only half the number of potential students

Queen Elizabeth Prize for Engineering

Media coverage of the first QE Prize winners reached **52 million** people in the UK and **100 million** internationally

Prize winners met **400** young people and **300** leaders in education

Keynote engineering lecture - Crossrail

Given by Andrew Wolstenholme CBE FREng, CEO, Crossrail

10,000 people working across 40 construction sites involving **270** apprentices

4.5 million tonnes of excavated material will create a new **1,500** acre RSPB nature reserve

GB electricity capacity margin report

Commissioned by the PM's Council for Science and Technology

Electricity supply likely to stretch system close to limits during winter **2014-15**

5 immediate recommendations to avoid blackout by **2020**

Prince Philip Medal

Winner, Dr Terry Hill CBE FREng delivered some of the UK's most significant civil engineering initiatives

Projects include the Channel Tunnel Rail Link (HS1); Heathrow Terminal 5; The Beijing Olympics National Stadium and Aquatics Centre

Led an infrastructure review which could save the UK **£38 billion** a year

Flooding response

The wettest two months in **250** years saw coastal and Thames Barrier defences tested and mainly successful in resisting catastrophic flooding

David Rooke MBE FREng, Executive Director at the Environment Agency gave a lecture on the engineering aspects of the UK's flood response

Media briefing held with **3** Academy Fellows to discuss engineering solutions to flooding

Diversity programme

40 employers and Sector Skills Councils engaged through the Diversity Leadership Group

30 signatories to the Engineering Diversity Concordat for Professional Engineering Institutions covering **95%** of total registrant population

175 students attended Designed to Inspire showcase supported by **10** BME role models

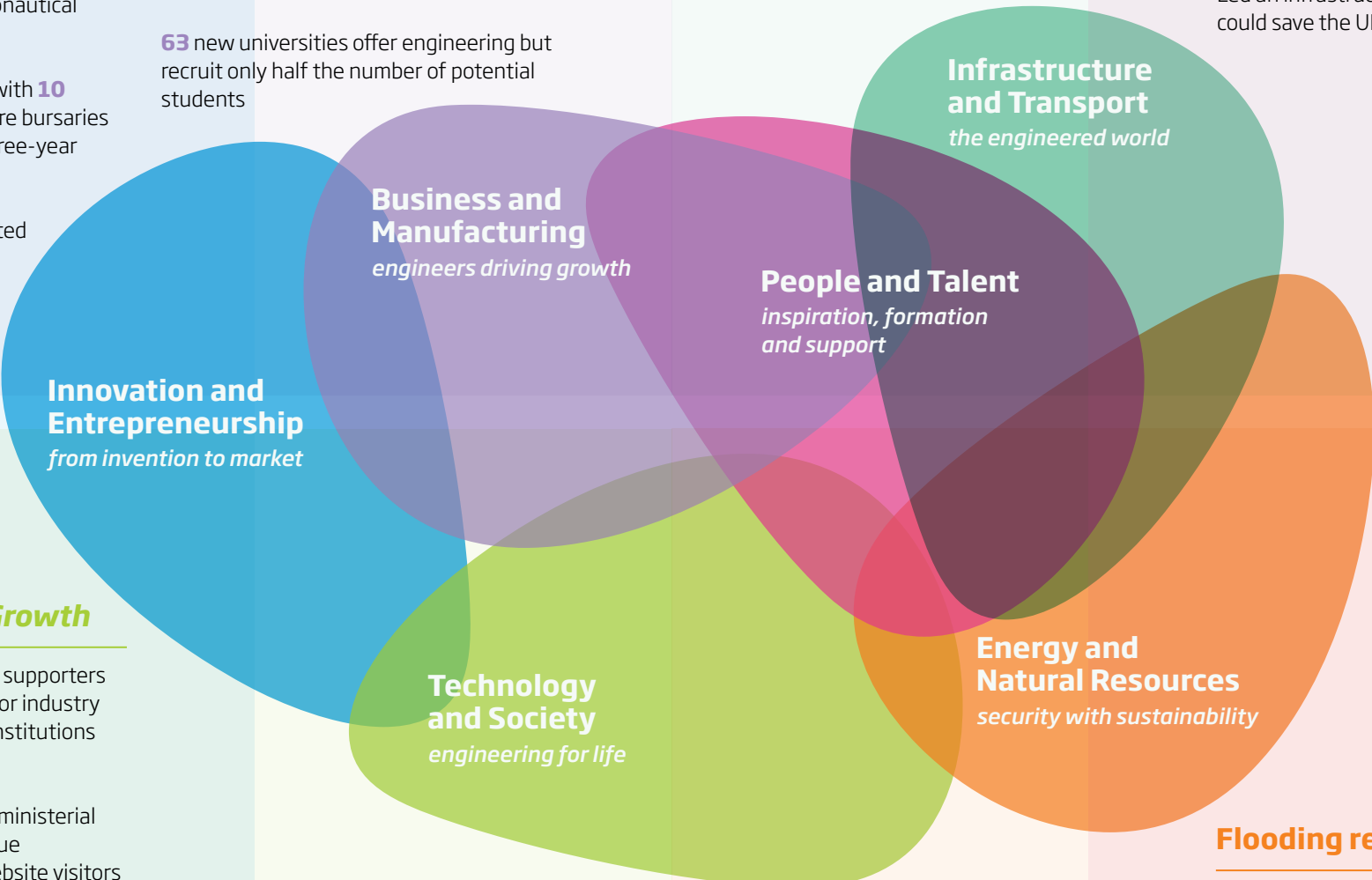
Research

Supported **183** researchers including 58 Research Fellows and 42 Research Chairs

£27.1 million in third-party funding attracted for research posts

Researchers involved with **190** different companies

19% of Academy Chairs and Fellowships are women (vs **5.5%** of engineering professionals)



Annex to the Annual Review

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Fellows

Fellows of the Academy are leading engineers in the UK drawn from academia, industry, and the not-for-profit sectors. Fellowship is a national honour, awarded for outstanding personal engineering achievements. Election to the Fellowship is managed by current Fellows of the Academy.

HONORARY FELLOW

Elected in 2013 was:

General Sir Peter Wall
Chief of the General Staff, British Army

INTERNATIONAL FELLOWS

Elected in 2013 were:

Khalid Al-Falih
President and Chief Executive Officer, Saudi Aramco

Professor Hans-Jörg Bullinger
Senator, Fraunhofer Society of Applied Research

Ursula Burns
Chairman and CEO, Xerox Corporation

Carlos Ghosn
Chairman and CEO, Renault-Nissan Alliance

Professor Patrick Prendergast
Provost, Trinity College, University of Dublin

FELLOWS

Elected in 2013 were:

Professor Bashir Al-Hashimi
ARM Professor of Computer Engineering and Associate Dean (Research), University of Southampton

Dr Steve Allpress
Vice President and Chief Technology Officer of Modem Software, Nvidia Corporation

Dr Douglas Anderson
Founder and Vice President of Global Advocacy, Optos plc; Founder and Chairman of Crombie Anderson Associates Ltd and Non-Executive Director, Michelson Diagnostics Ltd

Professor Adisa Azapagic
Professor of Sustainable Chemical Engineering, School of Chemical Engineering and Analytical Science, The University of Manchester

Air Marshal Simon Bollom
Chief Engineer, Royal Air Force, Chief of Materiel (Air), Defence Equipment and Support

Eur Ing Samir Brikho
Chief Executive, AMEC plc

Professor Muffy Calder
Chief Scientific Adviser for Scotland and Professor of Computer Science, University of Glasgow

Naomi Climer
President of Sony Media Cloud Services and Deputy President, IET

Garrett Copeland
Managing Director, Operations, British Airways

Janice Crawford
Formerly Director, Engineering, Procurement, Construction and ICT (EPCI), Foster Wheeler Energy Ltd

Professor Zhanfeng Cui
Donald Pollock Professor of Chemical Engineering, University of Oxford, and Professorial Fellow, Hertford College, Oxford

Professor Paul Curtis
Senior Fellow, Dstl

David Eyton
Group Head of Technology, BP plc

James Fairbairn
Executive Director, Compressors, Howden Group Ltd

Dr Richard Greaves
Group Chief Technology Officer, Meggitt plc and Member of the Board of Directors, SAE International

Carolyn Griffiths
Chief Inspector and Head of the UK Rail Accident Investigation Branch

Professor Robin Grimes
Chief Scientific Adviser to the Foreign and Commonwealth Office

Professor Christopher Hall
Professor Emeritus and Senior Professorial Fellow, School of Engineering, University of Edinburgh

Peter Hansford
Government Chief Construction Adviser,
HM Government; Visiting Professor,
University College London

Christopher Hendy
Technical Director and Head of Bridge
Design and Technology, Atkins plc

Professor Ian Hunter
Radio Design/Royal Academy of
Engineering Professor of Microwave
Signal Processing, School of Electronic
and Electrical Engineering, University
of Leeds

Professor Tim Ibell
Associate Dean, University of Bath

Dr Cliff Jones
EPSRC Fellow of Manufacturing;
formerly, Chief Scientific Advisor, ZBD
Displays Ltd

Robert (Bob) Joyce
Executive Director, Product Creation and
Delivery, Jaguar Land Rover

Martin Knights
Global Head of Tunnelling and Earth
Engineering and Sciences, Halcrow
Group Ltd

Professor Lin Li
Head of the Manufacturing Research
Group and Director of the Laser
Processing Research Centre, The
University of Manchester

Professor Jianguo Lin
Professor in the Mechanics of Materials,
Head of Mechanics of Materials Division,
Department of Mechanical Engineering,
Imperial College London

Professor Jeffrey Magee
Dean of the Faculty of Engineering
and Professor of Computing, Imperial
College London

Howard Mathers
Technical Director (Submarines),
Babcock International Group

Andrew McNaughton
Chief Executive, Balfour Beatty plc

Professor Marcus Newborough
Development Director, ITM Power plc

Dr Patrick O’Brien
Chief Executive, ITF (Industry
Technology Facilitator)

Professor Washington Yotto Ochieng
Head of Transport Section and Chair in
Positioning and Navigation Systems,
Department of Civil and Environmental
Engineering, Imperial College London

Professor Raffaella Ocone
Professor of Chemical Engineering,
School of Engineering and Physical
Sciences, Heriot-Watt University

Professor Gareth Pender
Professor of Environmental Engineering
and Head of School of the Built
Environment, Heriot-Watt University

Professor John Pethica
Chief Scientific Adviser, National
Physical Laboratory, and Physical
Sciences Secretary, Royal Society

Professor Stratos Pistikopoulos
Professor of Chemical Engineering,
Imperial College London

Sir Vivian Ramsey
High Court Judge Queen’s Bench
Division, Technology and Construction
Court

Dr Andrew Rickman
Founder and Chairman, Rockley Group

Dr Toby Roberts
Managing Director, WJ Groundwater Ltd

David Rooke
Director of Flood and Coastal Risk
Management, Environment Agency

Professor Dragan Savić
Professor of Hydroinformatics and Head
of Engineering, University of Exeter

Dr Andrew Shields
Assistant Managing Director, Toshiba
Research Europe

Andrew Sinclair
Managing Director, Biopharm Services

Professor Raymond Snidle
Professor of Mechanical Engineering,
School of Engineering, Cardiff University

Professor Kenichi Soga
Professor of Civil Engineering, University
of Cambridge

Professor Molly Stevens
Professor of Biomedical Materials and
Regenerative Medicine and Research
Director for Biomedical Material
Sciences, Department of Materials and
Institute for Biomedical Engineering,
Imperial College London

Paul Taylor
Director of Programme Assurance,
AWE plc

Dr Antony Trapp
Managing Director, OSBIT Power Ltd

Marcus Vilaça
Executive Director, Engineering and
Technology Strategy,Yahsat, UAE

Dr Nicholas Waltham
Head of Imaging Systems Division, RAL
Space, Rutherford Appleton Laboratory

Dr David Watson
Director, Emerging Technology, IBM
Software Group

Andrew Wolstenholme
Chief Executive Officer, Crossrail

Dr Richard Wylde
Managing Director, Thomas Keating Ltd;
QMC Instruments Ltd; Visiting Reader,
University of St Andrews

Council

The Council – which held four ordinary meetings during the year – directs and manages the Academy and governs and controls its affairs, delegating as appropriate some of its functions to standing committees, each of which reports regularly to Council. As the Academy is a registered charity, the Officers and Members of Council fulfil the role of Trustees. As at 31 March 2014, the Council consisted of those listed below.

OFFICERS AND MEMBERS OF COUNCIL

President
Sir John Parker GBE FREng

Immediate Past President (ex officio)
Lord Browne of Madingley FREng FRS

Senior Vice President
Professor Sir William Wakeham FREng

Vice Presidents
Professor H Atkinson CBE FREng
Mrs D Mitchell FREng
Professor R Parker CBE FREng
Professor R Parry-Jones CBE FREng
Dr M Thomas CBE FREng

Honorary Treasurer
Mr I Ritchie CBE FREng FRSE

Hon Sec for International Activities
Professor Sir William Wakeham FREng

Hon Sec for Education and Training
Professor H Atkinson CBE FREng

Ordinary Members
Professor G Amaratunga FREng
Mr J Baxter FREng FRSE
Dr S Bold FREng
Professor N Brandon OBE FREng
Mrs C Burke FREng
Ms S Clarke CBE FREng
Professor B Collins CB FREng
Mr A Cook CBE FREng
Professor Sir Michael Gregory CBE FREng
Dr A Harter FREng
Mr S Howison FREng
Professor J Loughhead OBE FREng
Professor H Thomas FREng FRS FLSW
Dr J Venables CBE FREng
Mr N Whitehead FREng

Chair, Membership Committee
(ex officio)
Dr J E Roberts CBE FREng

Chair, Proactive Membership Committee
(ex officio)
Mr N Cooper FREng

IN ATTENDANCE

Chief Executive
Mr P Greenish CBE

Director, Finance and Corporate Services
(Council Secretary)
Mr H Beeston ACIS

Academy Standing Committees

AWARDS COMMITTEE

The role of the Awards Committee is to identify and to recommend to the President and Council appropriate candidates for all of the Academy’s relevant prizes and awards, with the exception of National Honours, the International Medal, the Queen Elizabeth Prize and the MacRobert Award.

Chair:
Mrs D Mitchell FREng

Members:
Dr R Buckingham FREng
Professor C Christopoulos FREng
Professor J Cilliers FREng
Dr D A Clarke FREng
Professor T Ibell FREng
Mr A M Kinghorn FREng
Professor R Ocone FREng
Mr N J Perry FREng
Professor J M Reese FREng FRSE
Professor J C P Woodcock FREng

Secretariat:
Mr Philip Greenish CBE

Committee Secretariat:
Miss S Hampartumian

EDUCATION AND TRAINING COMMITTEE

The Education and Training Committee’s role is to oversee and be responsible for the Academy’s activities in engineering education and training and to maintain links with other bodies working in these fields.

Chair:
Professor H V Atkinson CBE FREng

Members:
Mrs J Bryant FREng
Dr M J Cook FREng
Professor J K Fidler FREng
Mr J W Lazar FREng
Professor J P K Seville FREng
Professor H R Thomas FREng FRS
FLSW
Ms F Wainwright MBE FREng

Ex Officio:
Professor N M Alford MBE FREng
Professor A Finkelstein FREng
Professor P J Goodhew FREng
Dr S W Huntington FREng
Professor Dame J E King DBE FREng

Committee Secretariat:
Dr R Morgan

ENGINEERING POLICY COMMITTEE

The Engineering Policy Committee’s role is to advise and be responsible to Council for the engineering policy of the Academy and for all matters concerned with the application of engineering knowledge and principles (other than education and training). It should identify, monitor and promote attention to emerging and generic issues of importance to engineering in pursuit of this role.

Chair:
Professor R Parry-Jones CBE FREng

Members:
Dr P W Bonfield OBE FREng
Professor P S Cannon OBE FREng
Professor P J Clarkson FREng
Professor B S Collins CB FREng
Mr L Dopping-Hepenstal FREng
Professor G N Gilbert FREng
Professor J W Hall FREng
Mr R H Maudslay CBE FREng
Professor M J Norton FREng
Professor A H Sherry FREng
Dr M Short CBE FREng
Dr L M Smith FREng
Professor J D M Watson CBE FREng
Mr N P Winser CBE FREng

Ex Officio:
Professor L Tarassenko CBE FREng

Committee Secretariat:
Dr A Walker

ENTERPRISE COMMITTEE

The role of the Enterprise Committee is to advise and be responsible to Council for the Academy’s Enterprise activities. In pursuit of this role, the Committee members oversee the successful establishment and subsequent operation of the Royal Academy of Engineering Enterprise Hub and promote and support the Academy’s Enterprise activities, including through the development of appropriate partnerships, funding relationships and marketing and communication activities.

Chair:
Mr I Shott CBE FREng

Members:
Professor S Beaumont OBE FREng FRSE
Professor R Brook OBE FREng
Mr S Chandratillake FREng
Ms A Glover CBE HonFREng
Dr D Grant CBE FREng
Dr H Hauser CBE FREng FRS
Professor A Hopper CBE FREng FRS
Mr J Leggate CBE FREng
Mrs P Liversidge OBE DL FREng
Dr M Lynch OBE DL FREng
Mr C Mairs CBE FREng
Professor A Noble OBE FREng
Sir Alan Rudge CBE FREng FRS
Dr J C Taylor OBE FREng

Committee Secretariat:
Mr A Jullens

EXTERNAL AFFAIRS COMMITTEE

The role of the committee is to provide strategic direction to the Academy’s communications activities on behalf of the Council, with particular emphasis on ensuring the soundness of the Academy’s reputation and on developing the Academy’s profile. It oversees all aspects of the Academy’s communications and public engagement activities, ensuring they are delivered in line with Royal Charter and business plan commitments.

Chair:
Dr M Thomas CBE FREng

Members (Fellows):
Mr K Clarke CBE HonFREng
Dr P Cochrane OBE FREng
Dr D J Goodman OBE FREng
Professor D A King FREng
Dr G Masterton OBE FREng FRSE
Professor J A Noble OBE FREng
Professor S Spurgeon FREng
Dr S Steedman CBE FREng
Mr D Waboso CBE FREng

Members (Non-Fellows):
Mr J Greaves
Dr R Highfield
Sir Roland Jackson
Ms L Shepherd

Committee Secretariat:
Mr J Blake

FINANCE AND AUDIT COMMITTEE

The Finance and Audit Committee is responsible for all financial and auditorial affairs of the Royal Academy of Engineering. This includes management of Academy budgets, external investment fund managers, insurance policy, risk register, audit arrangements and compliance with external financial reporting standards.

Chair:
Mr I C Ritchie CBE FREng FRSE

Members:
Mr J Baxter FREng FRSE
Dr S Bold FREng
Mr A Cook CBE FREng
Dr J Venables CBE FREng
Mr N Whitehead FREng

Committee Secretariat:
Mr H Beeston

INTERNATIONAL COMMITTEE

The International Committee’s role is to advise and be responsible to Council for promoting the international interests of the Academy. In pursuit of this role, the Committee’s interests include oversight of the Academy’s relations with the Council of Academies of Engineering and Technological Sciences (CAETS) and the European Council of Academies of Applied Sciences, Technologies and Engineering (Euro-CASE).

Chair:
Professor Sir William Wakeham FREng

Members:
Mr T E A Askew FREng
Professor I D L Bogle FREng
Mr M A Brinded CBE FREng
Dr A K C Chan FREng
Dr A M Glass FREng
Professor Sir Michael Gregory CBE FREng
Professor A J G Hey CBE FREng
Dr S A Jackson FREng
Professor W E Lee FREng
Dr T Leverton FREng
Professor J Loughhead OBE FREng
Dr S Myers OBE FREng
Professor A Neville FREng FRSE
Professor Sir Martin Sweeting OBE FREng FRS
Dr G Williams FREng

Committee Secretariat:
Mr S McHugh

MEMBERSHIP COMMITTEE

The Membership Committee is responsible for considering candidates for election to the Royal Academy of Engineering and for submitting a list of not more than 60 names to Council for approval before each Annual General Meeting. Each of the five Members of the Committee chairs a Panel covering a specific area of expertise. These include:

Panel 1 (Mechanical, aeronautical, marine and manufacturing engineering)

Panel 2 (Civil, structural, public works and building services engineering)

Panel 3 (Electrical, electronic, control engineering and computing)

Panel 4 (Chemical, fuel, process, mining and materials engineering)

Panel 5 (Informatics)

Chair:
Dr J E Roberts CBE FREng

Ex Officio:
Sir John Parker GBE FREng

Panel Chairs:
Panel 1
Vice Admiral Sir Andrew Mathews KCB FREng

Panel 2
Professor T W Broyd FREng

Panel 3
Sir Patrick Haren FREng

Panel 4
Ms J Hackitt CBE FREng

Panel 5
Mr M D Carr FREng

Members:
Panel 1
Air Marshall S J Bollom CB FREng
Mrs C R Burke FREng
Professor S W Cameron MBE FREng
Dr S T Elston FREng
Professor S J Garwood FREng
Professor R J Godwin FREng

Professor E Harkin-Jones FREng
Professor T G Leighton FREng
Professor H Spikes FREng
Professor P G Wrobel FREng

Panel 2
Professor C G Bailey FREng
Professor N R Buenfeld FREng
Ms S R F Clarke CBE FREng
Dr M J Cook FREng
Professor J W Hall FREng
Professor O Hassan MBE FREng
Ms M J McDowell MBE FREng
Professor P C Robery FREng
Professor T Stephenson FREng
Professor I H Townend FREng

Panel 3
Professor C H Buckberry FREng
Mr K W Burrage FREng
Professor J A Chambers FREng
Mr D W A East OBE FREng
Dr M Grant FREng
Professor H McCann FREng
Professor R V Penty FREng
Dr M Perkins FREng
Dr F C Saunders CB FREng
Professor T Wilson FREng
Professor G Z Yang FREng

Panel 4
Professor J Cilliers FREng
Mr M J Goulette FREng
Dr A Jamieson OBE FREng
Professor E B Martin OBE FREng
Professor A Matthews FREng
Professor T F Page FEng
Professor K E Tanner FREng
Professor N Titchener-Hooker FREng

Panel 5
Dr S Allpress FREng
Dr R Appleby FREng
Professor A Bradley FREng
Professor A Bundy CBE FREng
FRSE FRS
Professor I C Hunter FREng
Professor I Leslie FREng
Professor S H Muggleton FREng
Dr R P Whittington FREng

Committee Secretariat:
Ms J Ryley

PROACTIVE MEMBERSHIP COMMITTEE

The Proactive Membership Committee is responsible for ensuring that the pool of candidates proposed for election as Fellows better reflects the society within which the Academy exists. Activities include identifying and tracking potential candidates from novel and overlooked areas, and engaging more existing Fellows in the process.

Chair:
Mr N Cooper FREng

Ex Officio:
President Sir John Parker GBE FREng

Members:
Dr P Bennett FREng
Professor M C Forde FREng FRSE
Dr R I Laming FREng
Professor G C Maitland FREng
Professor W Powrie FREng
Professor K Ridgway CBE FREng
Mr A D Roche FREng
Professor A Unsworth FREng
Professor B Weiss FREng

Committee Secretariat:
Dr C Coulter

RESEARCH AND SECONDMENT SCHEMES COMMITTEE

The role of the Research and Secondment Schemes Committee is to advise and be responsible to Council for the supervision of research and secondment schemes other than those concerned with education and training.

Chair:
Professor R Parker CBE FREng

Members:
Professor P Bayvel FREng
Professor J Fisher CBE FREng
Professor P J Fryer FREng
Professor C A Goble CBE FREng
Dr A J Hosty FREng
Professor I Leslie FREng
Professor A G McNaughton FREng
Professor P A Nelson FREng
Professor A J Sellen FREng
Professor S M Springman CBE FREng
Professor J D M Watson CBE FREng
Professor S Williamson FREng
Professor P L Younger DL FREng

Committee Secretariat:
Dr I Forristal

Awards

The Academy recognises excellence through the presentation of awards and medals. The Academy’s wide range of awards covers every aspect of engineering.

2013 Queen Elizabeth Prize for Engineering
The Queen Elizabeth Prize for Engineering is a global £1 million prize that celebrates the engineers responsible for a groundbreaking innovation that has been of global benefit to humanity.
Awarded to:
Dr Robert Kahn, Dr Vinton Cerf, Louis Pouzin, Professor Sir Tim Berners-Lee FREng and Marc Andreessen

2013 MacRobert Award
The premier award for UK innovation in engineering, with a prize of £50,000. The award recognises the successful development of innovative ideas in engineering, together with commercial success and societal benefit.
Awarded to:
Real VNC for VNC Remote Access Software

2013 President’s Medal
The Medal is awarded to a Fellow of the Academy who has contributed significantly to the Academy’s aims and work through initiative in promoting excellence in engineering. One medal will be awarded at the end of a President’s term.
Awarded to:
Terry Hill CBE FREng, Chair of Arup’s Board of Trustees

2013 Sir Frank Whittle Medal
Awarded to an engineer, normally resident in the UK, for outstanding and sustained achievement which has contributed to the wellbeing of the nation. The field of activity changes annually, and in 2013 the medal was awarded for engineering innovations in manufacturing that have directly benefited the UK economy.
Awarded to:
Professor Lin Li, University of Manchester

2013 Silver Medals
Awarded to individuals in recognition of outstanding and demonstrated personal contribution to British engineering which is resulting in successful market exploitation. Up to four medals may be awarded in any one year.
Awarded to:
Elsbeth Finch, Director, Atkins

Dr Andrew Fitzgibbon, Principal Researcher, Microsoft Research, Cambridge

Tim Morgan, Managing Director, Mountain Trike Company Ltd

Dr Eben Upton, Trustee and Technical Director, Raspberry Pi Foundation; Technical Director, Broadcom Corp Cambridge

2013 Rooke Award
Awarded to an individual, small team or organisation who has contributed to the Academy’s aims and work through their initiative in promoting engineering to the public.
Awarded to:
Professor Mark Miodownik, Professor of Materials and Society, University College London

2013 Sustained Achievement Award
Awarded to an engineer, normally resident in the UK, whose sustained achievements over a number of projects have had a profound impact upon their engineering discipline.
Awarded to:
Dr H Peter Jost CBE

2013 Sir George Macfarlane Medal
Awarded to younger engineers working in the UK, who have demonstrated excellence in the early stage of their careers.
Awarded to:
Dr Michael Porton, Technology Programme Manager, Culham Centre for Fusion Energy (CCFE)

2013 ERA Foundation Entrepreneurs Award
The £40,000 award identifies entrepreneurial researchers, working in UK universities, in the field of electro-technology, who are at an early stage in their careers. The Award is presented to an individual or small team demonstrating considerable entrepreneurial promise and the potential to benefit the UK’s future prosperity.
Awarded jointly to:
Dr Reuben Wilcock and Dr Robert Rudolf, University of Southampton and Dr Julien Reboud, University of Glasgow

Innovation Hothouse
This award aims to encourage new innovations and designs from any engineering discipline, providing young, talented engineers with an opportunity to showcase their new ideas that can become commercially viable businesses.
Awarded to:
James Eaton, Brunel University London

Academy staff

As at 31 May 2014

Chief Executive
Philip Greenish CBE

QUEEN ELIZABETH PRIZE FOR ENGINEERING
Director, QEPrize
Caroline Evans
Communications Manager, QEPrize
Katya-yani Vyas
Prize Manager, QEPrize
Bridget Sawyers

DEVELOPMENT
Director, Development
Sarah Philbrick
Trusts Manager
Dominic Geyer
Corporate Development Manager
Jon O’Neill

POLICY AND EXTERNAL AFFAIRS
Director, Policy and External Affairs
Beverley Parkin
Head of Communications and Engagement
Dr Lesley Paterson
Manager, Communications
Jane Sutton
Press and Communications Officer
Dr Giorgio De Faveri
External Relations Manager
Junior Blake
Publications and Web Editor
Dominic Joyeux
Manager, Web and Publications
Emily Bick
Manager, Public Engagement
Manisha Lalloo
Head of Engineering Policy
Dr Alan Walker
Policy Advisors
Joe Chapman
Katherine MacGregor
Philippa Shelton
Head of Events
Ivana Mackintosh
Manager, Events
Helen Berrington (maternity leave)
Jane Divito (maternity cover)
Events Administrator
Jessica Burgess

Events Coordinator
Emma Calvert
Events Intern
Ewan Dickson

PROGRAMMES AND FELLOWSHIP
Director, Programmes and Fellowship
Dr Hayaatun Sillem
Senior Policy Advisor
Dr Kedar Pandya
Head of International Activities
Shane McHugh
Manager, International Partnerships and Missions
Cuong Dang
International Policy Advisor
Meredith Ettridge
Head of Fellowship Services and Awards
Sylvia Hampartumian
Manager, Membership
Jo Ryley
Departmental Administrator
Anne Mahabal
Pauline Stillman
Fellowship Advisor
Dr Chris Coulter
Head of Research and University Programmes
Dr Ian Forristal
Programme Manager, Research
Angus Baker
Tapsi Khambra
Dr Louise Manfredi
Programme Manager, Bursaries
Eunice Hung
Programme Manager, VPs and CPD
Kerry Brandon
Head of Enterprise
Arnoud Jullens
Programme Manager, Enterprise
Catherine Lawrence (maternity cover)
Katie Melton (maternity leave)
Enterprise Intern
Miriam Nweze

ENGINEERING AND EDUCATION
Director, Engineering and Education
Dr Rhys Morgan
Head of Engineering the Future
Claire Donovan

Programe Manager - Engineering the Future
Dr Wahida Amin
Head of 5-19 Education
Lynda Mann
Head of Further and Higher Education
Stylli Charalampous
Manager, STEM Curricula
Dominic Nolan
STEM Education Projects Officer
Jonathan Lowe
Manager, Diversity
Bola Fatimilehin
Jenny Young

FINANCE AND CORPORATE SERVICES
Director, Finance and Corporate Services
Howard Beeston
Head of Executive Services
Kim Turner
Executive Assistants
Gillian Birkbeck (maternity cover)
Karen Childe
Alyx Clarke (maternity leave)
Senior Administrator
Christine Dowling
AV Technician
Barry Weekes
Receptionist/Security
Paul Morant
Carolyn Clarke
HR Consultant
Jackie Carter
Head of Finance
Lisa Kiew
Management Accountant
David Lewthwaite
Finance Assistants
Sanjay Jethwa
Michelle Lai
Nazia Malik
Head of IT
Hakan Altinisik
Lead Web Developer
Syed Adeel
Web and Data Administrator
Josephene Amirthanayagam

Grants, fellowships and programmes

INGENIOUS PUBLIC ENGAGEMENT AWARDS ROUND 8 AWARDS

Ingenious provides funding for projects that enable engineers to enhance their public engagement skills, consider the societal applications of their work and take part in debate with the public on engineering and its impact on society.

Awardee	Organisation	Project title
Stuart Ballard	Magna Science Adventure Centre	It's a rubbish adventure
Dawn Bonfield	Women's Engineering Society (WES)	Magnificent women and their flying machines
Dr Claire Brockett	University of Leeds	Engineering the Tour de France: From body to bicycle
Dr Diane Crann	The Royal Institution	Robotics in engineering
Dr Rebecca Crawford	University of Glasgow	Three minute engineering
Christine Davis	The Architecture Centre	Bridge150! Festival
Dr Marianne Ellis	University of Bath	The futures of cultured meat
Professor Paul Fleming	De Montfort University	The festival roadshow
Natalie Ford	Science Oxford	Creative computing
Andy Franzkowiak	LASTheatre	The Enlightenment Café: New Atlantis
Mark Gadd	4science	Champion the researchers
Dr Simon Gage	Edinburgh International Science Festival	Bridging the divide
Tara Gibson	Glasgow Science Centre	Primary engineering
Dr Maiwenn Kersaudy-Kerhoas	Heriot-Watt University	Small plumbing! Empowering the next generation of microfluidic engineers
Faisal Khan	Market Bosworth School	#InLoveWithEngineering
Shane McCracken	Gallomanor Communications Ltd	I'm an Engineer, Get me out of here!
Laura Meikle	Lambda Jam	First Lego League in Scotland: Growing a passion for engineering in children
Laura Fogg Rogers	University of the West of England	Robots vs. Animals: Learning from the ingenuity of nature
Dr Chris Smith	The Naked Scientists	Broadcast internships in engineering
Elaine Steele	W5	Ultimate farming
Dr Peter Theobald	Cardiff University	Putting the 'spark' back into electrical engineering
Victoria Thornton	Open-City	'Structure Rocks' at Archikids Festival
Dr Djuke Veldhuis	Cheltenham Festivals	Supporting FameLab engineers: helping today's engineers to inspire tomorrow's engineers

RESEARCH CHAIRS

Research Chairs provide funding, together with industry and other research organisations, to support strategically important research in UK universities. The Academy provides funding initially for a period of five years.

Name	Co-sponsor	Subject	University
Professor Guglielmo Aglietti	Surrey Satellite Technology (EADS)	Space engineering	University of Surrey
Professor Robert Akid	BP	Corrosion and materials	University of Manchester
Professor John Andrews	Network Rail	Infrastructure asset management	University of Nottingham
Professor Matthew Angling	Dstl	Space environment and radio frequency engineering	University of Birmingham
Professor Ashraf Ayoub	Pell Frischmann	Nuclear infrastructure engineering	City University
Professor Luke Bisby	Arup	Fire and structures	University of Edinburgh
Professor Richard Butler	GKN Aerospace	Composites manufacturing	University of Bath
Professor Jonathan Cooper	Airbus	Integrated design of advanced novel wing architectures	University of Bristol
Professor George Constantinides	Imagination Technologies	Energy-efficient high-performance embedded processing in an uncertain world	Imperial College London
Professor Yulong Ding	Highview Power Storage	Cryogenic energy storage	University of Birmingham
Professor Daniel Esser	Selex ES	Laser devices and engineering	Heriot-Watt University
Professor Steve Evans	RiverSimple	Industrial sustainability	University of Cambridge
Professor Brian Falzon	Bombardier	Advanced aerospace composites	Queen's University Belfast
Professor Chris Gerada	Cummins	Electrical machine technology	University of Nottingham
Professor Alistair Gibb	ECI	Management of complex projects	Loughborough University
Professor Kenneth Grattan FREng	George Daniels Trust	Next generation optical and fibre optic instrumentation	City University
Professor Hugh Griffiths FREng	Thales UK	Intelligent radar systems	University College London
Professor Susan Grimes	SITA Trust	Environmental waste management	Imperial College London
Professor Ian Hunter	Radio Design Limited	Microwave signal processing	University of Leeds
Professor Neil Hyatt	The Nuclear Decommissioning Authority	Nuclear waste management	University of Sheffield
Professor Lorenzo Iannucci	Dstl	Multiscale composite armour design	Imperial College London
Professor Alan Kemp	Fraunhofer UK	Advanced laser engineering	University of Strathclyde
Professor Philip Mawby	Converteam	Power electronics	University of Warwick
Professor John Miles	Arup	Energy transitions	University of Cambridge
Professor James Moore	Bagrit Trust	Medical devices	Imperial College London
Professor Stephen Muggleton FREng	Syngenta	Applications of automated theory-formation using meta-interpretive machine learning	Imperial College London

Name	Co-sponsor	Subject	University
Professor Bernard Mulgrew FEng	SELEX Galileo	Multi-sensor signal processing	University of Edinburgh
Professor Andrew Neely	IBM/BAE Systems	Complex engineering systems	University of Cambridge
Professor Kamran Nikbin	EDF Energy	Structural integrity assessment	Imperial College London
Professor Peter O'Hearn	Microsoft Research	Logic software verification	University College London
Professor Sven Schroeder	Infineum UK/Diamond light source	Engineering applications of synchrotron science	University of Leeds
Professor Sridhar Seetharaman	TATA Steel	Low carbon technologies	University of Warwick
Professor Ajit Sheno	Lloyd's Register	Lightweight structures	University of Southampton
Professor Spencer Sherwin	McLaren Racing	Transient flow simulation for advanced race and road cars	Imperial College London
Professor David Smith	Rolls-Royce/EDF Energy	Structural performance of energy systems	University of Bristol
Professor Philip Webb	Airbus	Aerostructures design for assembly and systems installation	Cranfield University
Professor Anton Ziolkowski	Petroleum Geoservices	Petroleum geoscience	University of Edinburgh
Professor Zi-Qiang Zhu	Siemens Wind Energy	High efficiency and power density wind power generator systems	University of Sheffield

RESEARCH CHAIRS IN EMERGING TECHNOLOGIES

These Chairs allow recipients to conduct research at a pre-competitive level and develop an area of technology to a stage where it will attract interest from the wider research community and subsequently be taken forward by industry.

Name	Subject	University
Professor Anne Neville FEng FRSE	Bio-inspiration for functional surface design	University of Leeds
Professor Jeremy O'Brien	Photonic quantum ICT	University of Bristol

SENIOR RESEARCH FELLOWSHIPS

The Senior Research Fellowships (SRFs) scheme provides funding for Senior Lecturer / Reader level appointments. Like Research Chairs, SRFs are funded jointly with industry for a period of five years.

Name	Co-Sponsor	Subject	University
Dr Matthew Hall	British Geological Survey	Rock-fluid interactions in carbon capture, storage and alternative hydrocarbons	University of Nottingham
Professor Nicholas Hills	Rolls-Royce	Computational engineering	University of Surrey
Dr Stephen Neethling	Rio Tinto	Heap and in situ leaching	Imperial College London
Dr Rongshan Qin	TATA Steel	Steel research	Imperial College London
professor mc schraefel	Microsoft Research	Supporting work in progress for innovation and discovery	University of Southampton
Dr Graham Spinardi	Ove Arup Foundation	Integrating technical and social aspects of fire safety engineering	University of Edinburgh
Professor Sethu Vijayakumar	Microsoft Research	Learning robotics	University of Edinburgh

LEVERHULME TRUST SENIOR RESEARCH FELLOWSHIPS

These Fellowships provide mid-career engineers working in UK academic institutions with the opportunity to focus on research activities for a period of up to 12 months with their academic and administrative responsibilities being taken over by an early-career academic.

Name	Project title	University
Dr Steve Burrow	Energy harvesting for wireless sensors in turbulent flows	University of Bristol
Dr Haofeng Chen	Modelling the fatigue and creep of metal matrix composite	University of Strathclyde
Dr Marianne Ellis	Scale-up of immune cell therapies for organ transplants	University of Bath
Dr Alexandros Feresidis	THz reconfigurable antennas for communication and imaging systems	University of Birmingham
Dr Paola Lettieri	A life cycle approach for nuclear waste management and plant decommissioning	University College London
Dr Geoff Moggridge	Engineering anisotropic polymer nano-composites for Improved prosthetic heart valves	University of Cambridge
Dr Dmitry Nerukh	Personal supercomputer for modelling complete virus at all atom resolution	Aston University
Professor Thomas Nowotny	Enabling scientific computing with GPUs with domain specific languages and metacompile	University of Sussex
Dr Nick Pears	3D face modelling for surgical planning, guidance and assessment	University of York
Dr David Sanders TD	Improving mobility and quality of life for children with disabilities	University of Portsmouth

Name	Project title	University
Dr Sebastian Savory	Realising the capacity in fibre-optic networks with uncertainty and nonlinearity	University College London
Dr Helen Treharne	Formal modelling technology for the analysis of European rail traffic management systems	University of Surrey
Dr Dagoue Zeze	Nanoscale characterisation and integration platform for nanowires	University of Durham
Dr Yonghao Zhang	A platform for enabling highly automated and integrated microdroplet technologies	University of Strathclyde

DAPHNE JACKSON TRUST FELLOWSHIPS

These Fellowships enable engineers to return to academia following a career break, to pursue a research project and training.

Name	Subject	University
Dr Helen Cornwell	Estimating the through-life-in-service costs for long-life high value assets in the water industry	University of Bath
Dr Nokuthulua Dube	Characterisation of organic solar cells	Imperial College London
Dr Margarita Fernandez-Chas	Effect of changes in the spatial properties of the myocardial tissue mechanics on the overall efficiency of the heart	Kings College London
Dr Divya Tiwari	LPG sensors for measuring carbon dioxide concentration at carbon capture and storage sites	Cranfield University

RAENG/EPSRC RESEARCH FELLOWSHIPS

These Fellowships, which are funded jointly with the EPSRC, are aimed at outstanding researchers from all branches of engineering who are about to finish their PhDs or have up to three years’ post-doctoral experience.

Name	Subject	University
Dr Sachi Arafat	Foundations research in information retrieval inspired by quantum theory	University of Glasgow
Dr Helen Bridle	Biosensors in engineering: From in situ pathogen detection to global impacts	Heriot-Watt University
Dr Tore Butlin	Modelling the vibration of complex structures with localised nonlinearities	University of Cambridge
Dr Maria Ana Cataluna	Compact and ultra-versatile lasers based on quantum-dot materials	University of Dundee
Dr Daniel Clark	Random set filtering techniques for multisensor multi-object tracking and data fusion	Heriot-Watt University
Dr Simon Cotton	Next generation body-centric communications: a joint analytical-statistical approach to modelling quasi-cyclostationary anisotropic signal reception	Queen’s University Belfast

Name	Subject	University
Dr Christophe Dubach	Adaptable processor architecture and software for energy-efficient computing	University of Edinburgh
Dr Dino Distefano	Software model checking with separation logic	Queen Mary, University of London
Dr Filippo Fazi	Electroacoustical inverse problems	University of Southampton
Dr Maria Galano	Development of aluminium metal matrix complex nanocomposites for high strength applications	University of Oxford
Dr Christopher Gourlay	The granular rheology of partially solidified alloys and defect formation in advanced metal casting processes	Imperial College London
Dr Deborah Gunning	Neural interfaces for studying cortical processes	University of Strathclyde
Dr Matthew Himsworth	Atom-chip integration for quantum-enabled devices	University of Southampton
Dr Timothy Jones	Power-aware compilation in a multi-core era	University of Cambridge
Dr Hugh Leather	Optimising the mobile net	University of Edinburgh
Dr Ioannis Lestas	Analysis of complex heterogeneous networks: Scalability, robustness and fundamental limitations	University of Cambridge
Dr Andrew Marshall	Exploiting emerging interface misfit epitaxy to engineer cheaper, higher performance photodiodes for imaging, communications and gas monitoring	Lancaster University
Dr Davide Mattia	Nanoparticle factory-on-a-chip	University of Bath
Dr John Murphy	Improved multi-crystalline silicon for solar cell applications	University of Warwick
Dr Steven Neale	Micro-actuators controlled by optoelectronic tweezers (MACOET)	University of Glasgow
Dr Francesca Parmigiani	Optical processing of high spectral efficiency phase encoded signals for future generation optical networks	University of Southampton
Dr Andrew Robertson	Intelligent interactive musical performance systems	Queen Mary, University of London
Dr Silvia Schievano	FEM before FIM - Finite element modelling prior to first-in-man in heart valve technology	University College London
Dr Aleksey Shitvov	Distributed passive intermodulation phenomena in microwave circuits	Queen’s University Belfast
Dr Susannah Speller	Superconducting metamaterials for near field NMR microscopy applications	University of Oxford
Dr Danail Stoyanov	Real-time intra-operative navigation for robotic assisted minimally invasive surgery	University College London
Dr Manlio Tassieri	Rheology at the microscale: New tools for bio-analysis	University of Glasgow
Dr Kosmas Tsakmakidis	Ultralow and stopped light in metamaterials	Imperial College London
Dr Kevin Webb	Optical stimulation for the long-term control and monitoring of neural network activity	University of Nottingham
Dr Amanda Wright	New horizons in adaptive optics for life science research: adaptive microscopy	University of Nottingham

RESEARCH EXCHANGES WITH CHINA AND INDIA AWARDS

The Research Exchanges with China and India scheme promotes academic collaboration between high-quality engineering researchers in the UK and China/India, aims to strengthen relations between leading partners in these countries, and supports the expansion of international networks of excellence, offering funding (to cover travel, accomodation and subsistence) for exchanges of 3-12 months.

UK Academic	Chinese/Indian Academic	Project title
Dr Abir Al-Tabbaa (University of Cambridge)	Professor Liwu Mo (Nanjing University of Technology)	Sustainable construction materials: Green shrinkage-free blended cements containing magnesia
Dr Daniel Barreto (Edinburgh Napier University)	Dr Zhongxuan Yang (Zhejiang University)	A micro-scale (DEM) investigation on driven pile cyclic behaviour
Professor Phil Coates FEng (University of Bradford)	Dr Zhiyong Jiang (Changchun Institute of Applied Chemistry, Chinese Academy of Sciences)	Deformation and fracture behaviour of polymer materials
Professor Michael Fairweather (University of Leeds)	Dr Jun Yao (Xiamen University)	Modelling and simulation of nuclear waste flows
Professor Steven Gao (University of Kent)	Dr Xueshi Ren (Xidian University)	Advanced reflectarray antenna for small satellites synthetic aperture radars
Carlos Molina Hutt (University College London)	Professor Lin-Hai Han (Tsinghua University)	Seismic assessment of existing tall buildings in Beijing
Professor Zhaohui Luo (Royal Holloway University)	Professor Yu Zhang (Institute of Software, Chinese Academy of Sciences)	HoTT-based computer-assisted reasoning
Professor John Marsh (University of Glasgow)	Professor Hongliang Zhu (Institute of Semiconductors, Chinese Academy of Sciences)	Flip-chip compatible, integrated laser sources for 100 Gb/s systems
Professor Dhiraj K Pradhan (University of Bristol)	Dr Rajat Subhra Chakraborty (Indian Institute of Technology, Kharagpur)	Trusted electronic system design with untrusted integrated circuits: theory and implementation
Dr Guogang Ren (University of Hertfordshire)	Professor Ke Yang (Institute of Metal Research, Chinese Academy of Sciences)	Creating antiviral and antibacterial stainless steel by doping antiviral nanoparticles
Professor Qiang Shen (Aberystwyth University)	Professor Ying Li (Northwestern Polytechnical University)	Sparse representation-based super-resolution restoration of remote sensing images
Professor Yichuang Sun (University of Hertfordshire)	Professor Baoyong Chi (Tsinghua University)	Low-power reconfigurable filter techniques for flexible wireless transceiver chip development
Dr Paul Topham (Aston University)	Professor Linge Wang (South China University of Technology)	Incorporating electrospun block copolymer fibres into organic photovoltaics

UK Academic	Chinese/Indian Academic	Project title
Dr Xin Tu (University of Liverpool)	Professor Yifei Sun (Beihang University)	Plasma-catalysis for the conversion of tar from biomass gasification into clean fuels
Professor Velisa Vesovic (Imperial College London)	Dr Xianyang Meng Xi'an (Jiaotong University)	Viscosity of CO ₂ -alkanes mixtures: measurement and modelling
Dr David Werner (Newcastle University)	Dr Zhantao Han (Chinese Academy of Geological Sciences)	Environmental remediation applications of iron/carbon composite sorbent materials
Dr Sophie Wuerger (University of Liverpool)	Professor Changjun Li (University of Science and Technology Liaoning)	Development of a human 3D face imaging system
Dr Pei Xiao (University of Surrey)	Dr Qingchun Chen (Southwest Jiaotong University)	On the enhanced multi-carrier technology for high-mobility 5G broadband systems
Dr Xinggang Yan (University of Kent)	Professor Qingling Zhang (Northeastern University, China)	Variable structure control for complex singular systems with applications to industrial systems
Professor Yong Yan (University of Kent)	Professor Shi Liu (North China Electric Power University)	Advanced monitoring and computational modelling of burner flames for environmentally friendly power generation from biomass and pulverised coal
Dr Zhong You (University of Oxford)	Dr Yan Chen (Tianjin University)	Origami-inspired deployable polyhedra
Dr Hui Gary Zhang (University College London)	Professor Suyash P Awate (Indian Institute of Technology (IIT) Bombay)	Compressed sensing and statistical shape analysis for advancing dementia imaging
Professor Zhibing Zhang (University of Birmingham)	Dr Xiao-Jie Ju (Sichuan University)	Fabrication and characterisation of stimuli-responsive smart microgels
Dr Kaiming Zhou (Aston University)	Dr Yongguang Huang (Institute of Semiconductors, Chinese Academy of Sciences)	Ultrafast laser micromachining of semiconductor materials for solar cells

RAENG RESEARCH FELLOWSHIPS

These Fellowships are aimed at outstanding researchers from all branches of engineering who are about to finish their PhDs or have up to three years’ post-doctoral experience.

Name	Subject	University
Dr Mark Ainslie	Engineering interactions of magnetic and superconducting materials for electrical applications	University of Cambridge
Dr David Armstrong	Micro-engineering advanced alloys for extreme nuclear power environment	University of Oxford
Dr Mahdi Azarpeyvand	Source and propagation modelling for wind turbine and turbomachinery noise	University of Bristol
Dr Peter Carrington	High-efficiency mid-infrared semiconductor materials and devices grown on silicon	University College London
Dr Alasdair Clark	Plasmon enhanced pyroelectrodynamic nanoscale trapping and sensing	University of Glasgow
Dr David Clifton	Machine learning for the intelligent patient record	University of Oxford
Dr Christian Fensch	Auto-tuned programming patterns and the programmability gap	Heriot-Watt University
Dr Peter Gammon	Novel interlayer cooling for harsh environment (NICHE) devices and circuitry	University of Warwick
Dr Tawfique Hasan	Graphlex: fully flexible graphene-based transparent conductors	University of Cambridge
Dr Edmund Kelleher	Next generation short-pulse lasers for the visible and ultraviolet	Imperial College London
Dr Maiwenn Kersaudy-Kerhoas	Towards better pregnancy monitoring: Miniaturised tools for noninvasive prenatal diagnosis in clinics and hospitals	Heriot-Watt University
Dr Edward Laird	Quantum computing devices based on carbon nanomaterials	University of Oxford
Dr Grigorios Loukides	Privacy protection in event-based data sharing and analysis	Cardiff University
Dr Fleur Loveridge	New thermal and geotechnical facility for ground heat exchangers	University of Southampton
Dr Mathieu Lucquiaud	Future-proofing fossil power stations with CO ₂ capture	University of Edinburgh
Dr Christos Masouros	Interference as a source of green signal energy in wireless communications	University College London
Dr Matthias Mauch	Software systems for computer-aided music understanding	Queen Mary, University of London
Dr Ruth Misener	Towards rational chemotherapy strategies: A hybrid computational/experimental approach	Imperial College London
Dr Mehran Moazen	Predicting skull growth in craniosynostosis for improved surgical treatment	University of Hull
Dr Oliver Payton	Mapping, measuring and manufacturing nanostructures via high-speed atomic force microscopy	University of Bristol
Dr Alberto Peruzzo	Quantum processors for quantum chemical engineering	University of Bristol

Name	Subject	University
Dr Paul Shearing	4-dimensional tomography of electrochemical devices	University College London
Dr Radu Sporea	Novel high performance transistors for use in large area electronics	University of Surrey
Dr Nikos Tzevelekos	Game semantics for program analysis	Queen Mary, University of London
Dr Freddie Withers	Light harvesting hybrid – Graphene-based devices (GrapheX)	University of Manchester
Dr Weijia Yuan	Advancing renewable energy integration by innovative SMES-battery storage systems	University of Bath

RAENG/MINISTRY OF DEFENCE RESEARCH FELLOWSHIP

This Fellowship offers innovative engineers the opportunity to work with research, development and modelling teams within the Defence Science and Technology Laboratory and some of the Laboratory's industrial and academic partners.

Name	Project Title	University
Dr Benjamin Russell	Energy mitigation and blast impact loading	University of Cambridge

ENGINEERING PROFESSIONAL DEVELOPMENT AWARD

The Engineering Professional Development Awards are aimed at supporting the training and development of engineers in UK industry, especially SMEs.

Aquatec Group Ltd	EKV Design Ltd	Ratcliff Palfinger
Balfour Beatty Civil Engineering Ltd	ETA Projects Ltd	React Engineering Ltd
BCS Design Ltd	Flight Dynamics Ltd	Rig Control Products
Bott Ltd	Infront Solutions Ltd	Safetec UK Ltd
BPE Design and Support Ltd	Itsus Consulting Ltd	Somers Forge Ltd
Buhler Sortex	Jacobs UK Ltd	Wartsila UK Ltd
Cadogan International Ltd	Johnson Matthey Davy Technologies	Waterman Energy Environ and Design Ltd
Cultech Ltd	Kellogg Brown and Root Ltd	West Mercia Fork Trucks Ltd
Dawson Precision Components Ltd	Malvern Instruments Ltd	Xtrac Ltd
Donaldson Filtration (GB) Ltd	Mildef Ltd	
Doosan Babcock Ltd	Morgan Tucker Ltd	

ENTERPRISE FELLOWSHIPS

Enterprise Fellowships provide funding and support to outstanding entrepreneurial engineering researchers, working at a UK university, to enable them to develop a spin-out business around their technological idea.

Name	University	Project title
Dr Benjamin Kingsbury	Imperial College London	Ceramic hollow fibre catalytic converter for automotive emissions control
Dr Richard Nock	University of Bristol	Configurable time to digital converter for medical imaging, laser radar and laboratory instrumentation
Dr Philip Orr	University of Strathclyde	Synaptec: Distributed photonic sensing for smart grids
Dr Loren Picco	University of Bristol	The future of nanoscale microscopy – the high-speed atomic force microscope
Dr Daniel Plant	Imperial College London	Hip protection for osteoporosis patients
Dr Sithamparanathan Sabesan	University of Cambridge	Pervasive accurate passive RFID tracking
Professor Jonathan Timmis	University of York	Auto-immune disease modelling and predication for diagnosis, monitoring and drug development
Dr Ian Wakeman	University of Sussex	Digital stadium

DISTINGUISHED VISITING FELLOWSHIPS

The Distinguished Visiting Fellowship scheme provides funding to enable an academic engineering department in a UK university to be a host for up to a month to a senior academic from an overseas academic centre of excellence, and to engage the fellow in a range of mutually beneficial activities. The scheme aims to promote sharing of the latest developments and allow the participating organisations to discover common and complementary skills and initiatives that could form the foundation for future collaborations, thereby strengthening UK capacity and international standing.

Award holder	Distinguished Visitor	Area of collaboration
Dr Zeeshan Aziz (University of Salford)	Professor Feniosky Peña-mora (Columbia University, USA)	Developing a framework for natural systems inspires robust disaster resource distribution
Professor Luke Bisby (University of Edinburgh)	Professor Mark F Green (Queen’s University, Canada)	Fire performance and safety of sustainable construction materials
Dr Mario E Giardini (University of Strathclyde)	Dr Gabor Kosa (Tel Aviv University, Israel)	Novel power coupling methods for medical implants
Professor Ken Grattan FREng (City University London)	Professor Greg Baxter (Victoria University, Australia)	Multi-parameter, multiplexed optical fibre-based chemical sensors for use in water sensing networks
Professor Dawei Han (University of Bristol)	Professor Ni-Bin Chang (University of Central Florida, USA)	Promoting next-generation environmental remote sensing and informatics platform design / Promoting stormwater management technologies in eco-cities under climate change impacts
Dr Zhaohui Huang (Brunel University)	Professor Guo-Qiang Li (Tongji University, China)	Hazard mitigation for steel and composite structures

Award holder	Distinguished Visitor	Area of collaboration
Dr Ivan Jordanov (University of Portsmouth)	Professor Nikola Kasabov (Auckland University of Technology, New Zealand)	Computational intelligence and spiking neural networks: methods, systems, and engineering applications
Professor Erich A Muller (Imperial College London)	Professor Alexander V Neimark (Rutgers, the State University of New Jersey, USA)	Thermodynamics and transport in nanomaterials
Professor Eann Patterson (University of Liverpool)	Professor John Lambros (University of Illinois, USA)	Thermo-acoustic fatigue research
Dr Bhaskar Sengupta (Queen’s University, Belfast)	Professor Arup K Sen Gupta (Lehigh University, USA)	Analysis of mutual interaction of iron and arsenic in subterranean and ex situ adsorption processes - considerations for treatment system design
Dr Fernando Soares Schlindwein (University of Leicester)	Professor Dr Adriaan van Oosterom (Radboud University, The Netherlands)	Inverse problem of electrocardiology: improved diagnostic tools for atrial fibrillation
Dr Junwang Tang (University College London)	Professor Wei Huang (Nanjing University of Technology, China)	New hybrid solar cell fabrication
Professor Paul Taylor (University of Oxford)	Professor Yoo Sang Choo (National University of Singapore, Singapore)	Full asset integrity management of offshore platforms to assess the performance of new and ageing platforms with reinforcement of critical joints
Dr Igor Timoshkin (University of Strathclyde)	Dr Nelly Bonifaci (The G2E Laboratory, France)	Breakdown mechanisms and processes in dielectric fluids
Dr Emile Toubert (Imperial College London)	Professor Jean-Christophe Robinet (DynFluid, France)	Control of the dynamics of shock wave/ transitional-boundary-layer interactions
Dr Barbara Turnbull (Nottingham University)	Professor Michel-Yves Louge (Cornell University, USA)	Transients shocks and billows: unsteady processes in avalanche fronts and a mini symposium
Dr Ramji Venkataramanan (University of Cambridge)	Professor Andre Barron (Yale University)	Design and analysis of sparse superposition codes and communication
Professor Jiangzhou Wang (University of Kent)	Dr Sumei Sun (Agency for Science, Technology and Research, Singapore)	Present and future in wireless mobile communications in Singapore
Professor Jin Wang (Liverpool John Moores University)	Professor Xinping Yan (Wuhan University of Technology, China)	An investigation into formal safety assessment of large complex ships
Professor Yong Chang Wang (University of Manchester)	Professor Lin-Hai Han (Tsinghua University, China)	Fire performance of concrete filled tubes, education of future civil engineers, practice on composite construction and research on construction safety
Professor Zidong Wang (Brunel University)	Professor Huijin Gao (Harbin Institute of Technology, China)	Distributed estimation and control for networked systems with link/node faults
Professor David Webb (Aston University)	Professor Boris Vayner Rzhano (Institute of Semiconductor Physics SB RAS, Russia)	Advanced infrared thermography methods for avionics and automotive industry

Award holder	Distinguished Visitor	Area of collaboration
Dr Qing Xiao (University of Strathclyde)	Professor Frederic Boyer (Ecole des Mines de Nantes, France)	An integrated analytical and simulation study on a bio-inspired flexible robotic swimmer
Professor Steve Young (University of Cambridge)	Professor Diane Litman (University of Pittsburgh, USA)	Dialogue systems for teaching and assessing conversational skills in second language learning
Professor Hua Zhao (Brunel University)	Professor Mingfa Yao (Tianjin University, China)	Research on high-efficiency and low emission heavy duty engines for buses and commercial vehicles
Dr Xiangming Zhou (Brunel University)	Professor Zongjin Li (Hong Kong University of Science and Technology, Hong Kong)	Graphene-based smart skin material/sensors for structure health monitoring
Professor Hua Zhao (Brunel University)	Professor Mingfa Yao (Tianjin University, China)	Research on high-efficiency and low emission heavy duty engines for buses and commercial vehicles
Dr Xiangming Zhou (Brunel University)	Professor Zongjin Li (Hong Kong University of Science and Technology, Hong Kong)	Graphene-based smart skin material/sensors for structure health monitoring

GLOBAL RESEARCH AWARDS

This scheme enables researchers to spend up to one year working at overseas organisations in order to access facilities and expertise which are unavailable in the UK.

Name	University	Project title	Host
Professor Stuart Burgess	University of Bristol	Biologically inspired mechanisms for autonomous robotic vehicles	Liberty University, USA
Dr Michael Smith	British Energy plc	Synthesizing residual stress measurement and modelling for welds	Australian Nuclear Science and Technology Corporation (ANSTO), Australia
Professor Fu Chen Zheng	University of Reading	Relay transmission in cellular networks: Its Impact on energy efficiency	Georgia Institute of Technology, USA

INDUSTRIAL SECONDMENTS SCHEME

This scheme facilitates knowledge transfer between universities and UK industry by providing engineering academic staff expose to industrial and commercial practice.

Awardees supported during the year			
Name	University	Project title	Host
Mike Anusas	University of Strathclyde	Product design engineering: advanced techniques in creative form generation	4c Design
Dr Nick Bryan-Kinns	Queen Mary, University of London	Tools for low-cost evaluation of mobile and social user experiences	Togeva Ltd
Dr Man-Chun Chau	Kingston University	Hybrid buses in London: Monitoring and improving their performance	Abellio London
Dr Robin Curtis	University of Manchester	Measurements of protein-protein interactions in formulation science	MedImmune
Dr Mojtaba Ghadiri	University of Leeds	Industrial challenges in particle technology	Procter and Gamble
Dr Patrick Harkness	University of Glasgow	AEOLDOS – development to TRL 6	Clyde Space Ltd
Dr Tim Katz	University of Brighton	Developing a new medical instrument from concept to the market	GB Electronics Ltd
Dr Sundar Marimuthu	Loughborough University	Numerical and experimental investigation of the laser drilling process	Manufacturing Technology Centre (MTC)
Dr Arnaud Marmier	University of Exeter	Cardboard surfboards: design and manufacture	Smurfit Kappa Barnstaple
Dr Carolina Mateo-Segura	Heriot-Watt University	Radiation protection of wideband active electronically scanned arrays	SELEX Galileo Ltd
Dr Donal McNally	University of Nottingham	Additive manufacture of spinal implants	3T RPD Ltd
Dr Sreejith Nanukuttan	Queen's University Belfast	Development of performance-focused maintenance management strategies for concrete structures	Roads Service, Department of Regional Development, Northern Ireland
Dr Tom Rendell	University of Bristol	Setting aerodynamics education in industrial context	Airbus UK
Dr Daniela Romano	University of Sheffield	Applications of agent-based modelling	COSTAIN Group PLC
Dr Andrea Szymkowiak	University of Abertay Dundee	The application of human-like agents in self-service technology	NCR Financial Solutions Group Ltd

Awardees appointed during the year			
Name	University	Project title	Host
Dr Akram Alomainy	Queen Mary, University of London	Advance traceable and cost-effective measurement solutions for characterising wearable antennas and body-centric wireless networks	National Physical Laboratory (NPL)
Dr Paul Bagot	University of Oxford	Advanced atom probe studies of critical engineering for Rolls-Royce	Rolls-Royce PLC

Name	University	Project title	Host
Dr Phil Brooke	Teesside University	Reliable approaches to gathering evidence and intelligence from network sources	Cleveland Police
Dr Gary Burnett	University of Nottingham	Human factors engineering methods for vehicle design	Jaguar Land Rover Ltd
Dr Jyoti Chaudrie	University of Hertfordshire	Evaluation cloud computing technologies development using vertical and horizontal communication	Xerox Europe
Dr Adam Clare	University of Nottingham	Non-traditional manufacturing technology deployment for future Rolls-Royce factories	Rolls-Royce PLC
Dr Martin Foster	University Of Sheffield	Development of 1-2kW power converter system for battery storage applications	Vxl Power Limited
Professor Stephanie Haywood	University of Hull	Energy Works Academy: Building industry-focused energy research and education for the future	C Spencer Ltd
Dr David Hessom	University of Wolverhampton	Industrial implementation of HD laser scanning for visualisation of building information modelling	The Severn Partnership Ltd
Professor Raffaella Ocone	Heriot-Watt University	Management of sour water: Translating SHE and ethics from industry into the engineering curriculum - the development of case studies	PETROINEOS
Dr Donal Reay	Heriot-Watt University	Lab-in-a-box hands-on DSP teaching materials for ARM Cortex M4	ARM Holdings Ltd.
Dr Jenna Tudor	Northumbria University	Sensor improvement on inline inspection tools	GE: PII Pipeline Solutions
Professor Jiangzhou Wang	University of Kent	Wireless in-building distributed antenna systems (WI-DAS)	Hutchison 3G UK Ltd
Dr Darren Watts	Loughborough University	Industrial application and implementation of CAE simulation	Majenta PLM Ltd
Dr Zena Wood	University of Exeter	Gaining insight from data collected from emerging technologies	IBM UK Ltd

ENGINEERING LEADERSHIP ADVANCED AWARDS:

This award funds ambitious engineering undergraduates to undertake an accelerated personal development programme in order to move into a leadership position soon after graduation.

The Academy has 113 awardees currently being funded, from the following universities:

Brunel University, Durham University, Heriot-Watt University, Imperial College of Science, Technology and Medicine, Loughborough University, Queen’s University Belfast, Robert Gordon University, Swansea University, University College London, University of Bath, University of Bristol, University of Cambridge, University of Edinburgh, University of Leeds, University of Manchester, University Of Nottingham, University of Oxford, University of Sheffield, University of Southampton, University of Strathclyde, University of Surrey.

The following students were newly awarded in 2013/14:

Arnaud Doko	University of Bath
Rebecca Jane Ede	University of Sheffield
Supun Fernando	University of Surrey
Radovan Gallo	University of Southampton
Andrew Zi-Xiang Gng	Imperial College of Science, Technology and Medicine
Oliver Groling	Durham University
Conor Hamill	Queen’s University Belfast
Gideon Hammond	Loughborough University
Claire Hughes	Queen’s University Belfast
Samuel David Kelly	University of Bristol
Ailsa Kiely	University of Sheffield
Rabia Lakhani	Imperial College of Science, Technology and Medicine
Eric Shut Wai Leung	Imperial College of Science, Technology and Medicine
Archie Lodge	University of Cambridge
Conor McGlacken	University of Bristol
Alan Middup	University of Sheffield
Rabbiya Naveed	University of Cambridge
Philip George Parr	Queen’s University Belfast
Sarah Parsons	Loughborough University
Shakti Patel	Loughborough University
Nicole Perrin	Loughborough University
Edward James Rogers	Loughborough University
Mark Runciman	University of Strathclyde
Cui Seow	University of Bristol
Aaron Smyth	Queen’s University Belfast
Laura Steedman	Robert Gordon University
Katherine Theobald	University of Southampton
Angie Theresia	University of Manchester
Aleksi Tukiainen	University of Cambridge
Rebecca Vaslet	University of Strathclyde
Fiona Walport	Imperial College of Science, Technology and Medicine
Neale Watson	Queen’s University Belfast
Jack Wilkinson	Imperial College of Science, Technology and Medicine
Cuebong Wong	University of Strathclyde
Wai-Ming Yap	Imperial College of Science, Technology and Medicine

ENGINEERING LEADERSHIP STANDARD AWARDS:

240 learning opportunities were awarded in 2013/14 to students from the following universities:

Bournemouth University, Brunel University, Cardiff University, City University, Coventry University, Heriot-Watt University, Imperial College of Science, Technology and Medicine, Kingston University, London South Bank University, Loughborough University, Plymouth University, Queen’s University of Belfast, Robert Gordon University, Swansea University, University of Aberdeen, University of Leeds, University of Manchester, University of Newcastle, University of Sheffield, University College London, University of Bath, University of Birmingham, University of Brighton, University of Bristol, University of Cambridge, University of Edinburgh, University of Glamorgan, University of Glasgow, University of Leicester, University of Liverpool, University of Nottingham, University of Portsmouth, University of Salford, University of Southampton, University of Strathclyde, University of Surrey, University of the West of Scotland, University of Ulster, University of Warwick.

VISITING PROFESSORS IN ENGINEERING FOR SUSTAINABLE RESOURCES

This scheme promotes the integration of sustainable development into the engineering curriculum in universities.

During 2013-14 the scheme operated at the following universities:
University of Nottingham

VISITING PROFESSORS IN INTEGRATED SYSTEMS DESIGN

This scheme promotes the understanding of integrated systems design in undergraduate engineering courses.

During 2013-14 the scheme operated at the following universities:
Aston University; Cranfield University; University of Edinburgh; University of Glasgow; University of Kent and University of York.

VISITING PROFESSORS IN DESIGN AND INNOVATION

This Visiting Professors scheme seeks to improve the innovation content in undergraduate teaching and give a better understanding of the innovation processes that are utilised by industry in turning ideas and prototypes into wealth creating products.

During 2013-14 the scheme operated at the following universities:
Aston University; University of Birmingham; University of Bournemouth; University of Bristol; Brunel University; University of Cambridge; Coventry University; Cranfield University; University of Derby; University of Durham; University of East Anglia; Heriot-Watt University; University of Huddersfield; University of Hull; University of Leicester; University of Liverpool; Loughborough University; University of Northumbria; University of Plymouth; Queen Mary, University of London; Royal College of Art/Imperial College London; University of Salford; University of Sheffield; University of Southampton; University of Strathclyde; University of Surrey; and University College London.

VISITING PROFESSORS IN BUILDING ENGINEERING PHYSICS

This scheme aims to encourage engineering undergraduates to pursue a career in the field of building engineering physics, a new discipline which is concerned with achieving sustainability in the built environment and an understanding of energy efficiency.

During 2013-14 the scheme operated at the following universities:
Loughborough University and University College London.

SHELL/ROYAL ACADEMY OF ENGINEERING VISITING TEACHING FELLOWS

Shell has generously funded a scheme to enrich the curriculum in the technologies associated with the upstream and downstream operations of the petrochemical industry.

During 2013-14 the scheme operated at the following universities:
University of Aberdeen; City University London; University of Durham; University of Newcastle upon Tyne; and University of Surrey.

SAINSBURY MANAGEMENT FELLOWSHIPS

This scheme seeks to enhance the national potential of UK engineering industry by providing a human resource of high career potential chartered engineers who have complemented their technical training and knowledge with an MBA degree from a leading international business school.

Nine fellowships were awarded during the year, the recipients being:

Name	Business School	Name	Business School
Russ MacMillan	INSEAD	Adam Fudakowski	INSEAD
Christopher Shepherd	London Business School	Ali Korotana	London Business School
Nikhil Amin	INSEAD	Max Fieguth	INSEAD
Michael Smales	London Business School	David Rickwood	London Business School
Jonathan Smith	London Business School		

PETROFAC FELLOWSHIPS FOR THE ENHANCED GRADUATE ENGINEER

The Enhanced Graduate Engineer is developed through a combination of an appropriate full-time postgraduate master’s level degree coupled with additional learning and development opportunities provided by Petrofac.

In 2013-14 fellowships were awarded to:
Mustafa Aljaf – University of Aberdeen
Chukwuka Maduekeh – University of Sheffield
Syed Shah – University of Sheffield
Sean McKirdy – University of Aberdeen
Abdul Rafay Zafar – Imperial College London

SIR ROBERT MALPAS BURSARY

This bursary has been established by Sir Robert Malpas CBE FREng to enable outstanding graduate engineers to study for a full time MSc course in creative engineering at a UK university.

The 2013-14 bursaries were awarded to:

Robert Stiff – Aston University

Matt Tomlinson – Aston University

PANASONIC TRUST FELLOWSHIPS

The Panasonic Trust supports graduate engineers to acquire skills in environmental technology by supporting full-time study of appropriate master’s courses.

In 2013-14 Fellowships were awarded to:

Jack Barrie – University of Cambridge
Timothy Liptrot – University of Birmingham
Stephen Cressey – Loughborough University

Timothy Hull-Bailey – University of Cambridge
James Sweeny – University of Strathclyde

HERTHA MARKS AYRTON FELLOWSHIP

This prestigious award was established by the Panasonic Trust to encourage members of under-represented groups to reach their full technical potential by supporting them to study a full-time master’s course in a new technology subject.

Emily Lewis – Imperial College London

SIR ANGUS PATON BURSARY

The Panasonic Trust continued to award the Sir Angus Paton Bursary on behalf of the Academy. Enabled by an endowment in 1986 from Sir Angus Paton CMH FREng FRS, this annual bursary recognises excellence and seeks to inspire a suitably qualified engineer to study a full-time master’s course related to water engineering.

Heather Purshouse – University of Leeds

Queen Elizabeth Prize for Engineering

The Queen Elizabeth Prize for Engineering is a global award which celebrates outstanding innovations in engineering that have created significant benefit to humanity. The £1 million prize is awarded to an individual or team of people, of any nationality, directly responsible for a groundbreaking advance in engineering.

QEPrize panel of judges		
Name	Job Title	
Lord Alec Broers FREng FRS	Chair of Judges, Past President, The Royal Academy of Engineering	UK
Professor Sir Christopher Snowden FREng	Deputy Chair and Chair Elect of Judges, President and Vice-Chancellor University of Surrey	UK
Professor Frances Arnold	Professor of Chemical Engineering, Bioengineering and Biochemistry at Caltech, USA	USA
Professor Brian Cox OBE	Royal Society Research Fellow, University of Manchester	UK
Professor Lynn Gladden CBE FREng FRS	Pro Vice Chancellor for Research, Shell Professor of Chemical Engineering at University of Cambridge	UK
Professor John Hennessy	President, Stanford University	USA
Professor Dr hc Reinhard Huettl	President, German National Academy of Science and Engineering (acatech)	Germany
Dr Chen Jining	President, Tsinghua University, Beijing	China
Professor Calestous Juma HonFREng FRS	Professor of the practice of international development, Director of the Science, Technology and Globalisation Project, Harvard University	Global
Professor Hiroshi Komiyama	President, Engineering Academy Japan	Japan
Dr C D (Dan) Mote, Jr	President, U.S. National Academy of Engineering; Regents Professor, University of Maryland, USA	USA
Narayana Murthy CBE	Infosys founder	India
Professor Choon Fong Shih	Singapore University	Singapore
Professor Dr Dr hc Viola Vogel	Department of Health Sciences and Technology, ETH Zurich	Switzerland
Paul Westbury FREng	CEO, Buro Happold	UK

QUEEN ELIZABETH PRIZE FOR ENGINEERING FOUNDATION TRUSTEES

The Queen Elizabeth Prize for Engineering is run by a charitable company limited by guarantee and called The Queen Elizabeth Prize Foundation, which manages the prize and the funding for the prize.

Lord Browne of Madingley FREng FRS (Chairman)
Sir John Parker GBE FREng
Mala Gaonkar
Sir Paul Nurse HonFREng PRS
Sir John Beddington CMG HonFREng
Sir Mark Walport, Chief Scientific Adviser to UK Government, is adviser to the board.

Development and fundraising

QEPRIZE DONORS

The Queen Elizabeth Prize for Engineering Foundation extends its gratitude to the corporate donors whose generosity has funded an endowment to enable the continuing development of the Queen Elizabeth Prize. Support has been received from the following:

Founding donors

BAE Systems plc	Jaguar Land Rover	Sony
BG Group plc	National Grid plc	Tata Steel Europe
BP plc	Shell UK Ltd	Tata Consultancy Services
GlaxoSmithKline	Siemens UK	Toshiba

Donors

Nissan Motor Company Ltd

QEPRIZE SEARCH GROUP

The role of the Search Group is: profile raising, engaging the global professional engineering community in making nominations for the prize; acting as global ambassadors for the prize, promoting awareness throughout networks, participating in events and seeking intelligence of emerging areas of accomplishment and innovation; and assisting in the search for nominations.

Name	Job Title	
Professor Sir William Wakeham FREng	Chair of Search Group	UK
Professor Stephen Williamson FREng	Deputy and Chair Elect of Search Group, Former Deputy Vice-Chancellor Research and Innovation, University of Surrey	UK
Professor David Balmforth	Senior Vice President and President Elect ICE	UK
Dr David Clarke FREng	CEO Energy Technologies Institute	UK
Professor Carlos Henrique de Brito Cruz	Scientific Director of Fapesp (São Paulo Research Foundation)	Brazil
Professor Dave Delpy FREng FRS FMedSci	Former CEO EPSRC, Chair of DSAC (Defence Scientific Advisory Council)	UK
Professor Dr Igor Emri	Chairman of The Scientific Committee for Engineering Sciences, Chair of the ICR	Slovenia
Dr Alan Finkel AM FTSE FIE Aust	President of Australian Academy of Technological Sciences and Engineering (ATSE) and Chancellor of Monash University	Australia
Professor Il Soon Hwang	Seoul National University, Director, Nuclear Transmutation Energy Research Centre of Korea (NUTRECK).	South Korea
Dame Julia King DBE FREng FEI	Vice-Chancellor Aston University, Universities UK, EPSRC	UK
Professor Venkatesh Narayanamurti	Director of the Science, Technology and Public Policy Program at the Belfer Center for Science and International Affairs at the Harvard Kennedy School	USA
Professor Bjorn O Nilsson	President of the Academy Royal Swedish Academy of Engineering Sciences (IVA)	Sweden
Dr Baldev Raj	President, Indian National Academy of Engineering, Director Indira Gandhi Centre for Atomic Research (IGCAR)	India

DEVELOPMENT ADVISORY BOARD

The role of the Development Advisory Board is to support the realisation of the Academy's goals and in particular its fundraising efforts. Board members are:

Sir Richard Olver FREng – Chair	Steve Holliday FREng
Professor Haroon Ahmed FREng	Fred Kindle
Ian Barlow	Dr Mike Lynch OBE FREng FRS
Malcolm Brinded CBE FREng	Professor Richard Parry-Jones CBE FREng (until July 2013)
Iain Conn FREng FRSE	Roberto Quarta
Vivienne Cox	Simon Robey
Andrew Gould	David Thomlinson FREng
Dr David Grant CBE FREng FLSW	

CONTRIBUTORS TO ACADEMY PROGRAMMES

The Academy extends its gratitude to the Fellows, companies and charitable trusts whose generosity has enabled the continuing growth and development of its programmes and activities in the UK, and its engineering capacity-building work in sub-Saharan Africa. In the financial year, new support has been received from the following:

ABB Ltd	The Sir John Fisher Foundation	Network Rail
Airbus	David Gammon	The Nuffield Foundation
The Anglo American Group Foundation	The Garfield Weston Foundation	The Panasonic Trust
Atkins	The Gatsby Charitable Foundation	Petrofac Ltd
BAE Systems plc	GKN plc	QinetiQ plc
BG Group plc	IBM Ltd	Rolls-Royce plc
Robert Bosch Ltd	Jaguar Land Rover	Royal Commission for the Exhibition of 1851
BP plc	The Leverhulme Trust	Sir Robin Saxby FREng
BT plc	Lloyds Register Foundation	Shell Centenary Scholarship Fund
The Commercial Education Trust	Sir Robert Malpas FREng	Shell International Ltd
ConocoPhillips Nigeria	Motorola Solutions Foundation	URS Corporation
Consolidated Contractors Company	Mott MacDonald Group Ltd	Weir Group plc
EDF Energy Nuclear Generation Ltd	National Grid plc	Worshipful Company of Engineers
The ERA Foundation	NATS Limited	W S Atkins plc

In addition, John Taylor OBE FREng generously pledged a substantial sum towards the proposed redevelopment of the lower ground floor area at Prince Philip House to provide high-quality space and facilities for the Enterprise Hub.

THE ROYAL ACADEMY OF ENGINEERING 2013 ANNUAL FUND

In November 2013, the Academy launched its second Annual Fund to its Fellowship. The Academy would like to thank the following* including those Fellows who have made regular annual gifts for some years:

Hugh Allen FREng	Professor Robert Dover FREng	Michael Reeve FREng
Charles Betts CB FREng	Professor Rodney Eatock Taylor FREng	Professor Peter Rowe FREng
Ian Bott FREng	Dr Cecil French FREng	Philip Ruffles CBE RDI FREng FRS
Robert Brander, FREng	Dr Peter Hackett OBE DL FREng	Professor Sarah Springman CBE FREng
Professor Paul Cannon OBE FREng	Professor Joseph Helszajn OBE FREng FRSE	Dr Scott Steedman CBE FREng
Keith Clarke FREng	Dr John Lazar FREng	Stephen Vbranch FREng
Dr James Cowley CBE FREng	Professor Robert Mair CBE FREng FRS	Albert Wheeler CBE FREng
Peter Cox FREng	Charles Massey OBE FREng	

*a further 11 Fellows wished their gifts to remain anonymous.

The Academy also wishes to acknowledge a legacy left by Air Marshall Sir Charles Pringle KBE FREng.

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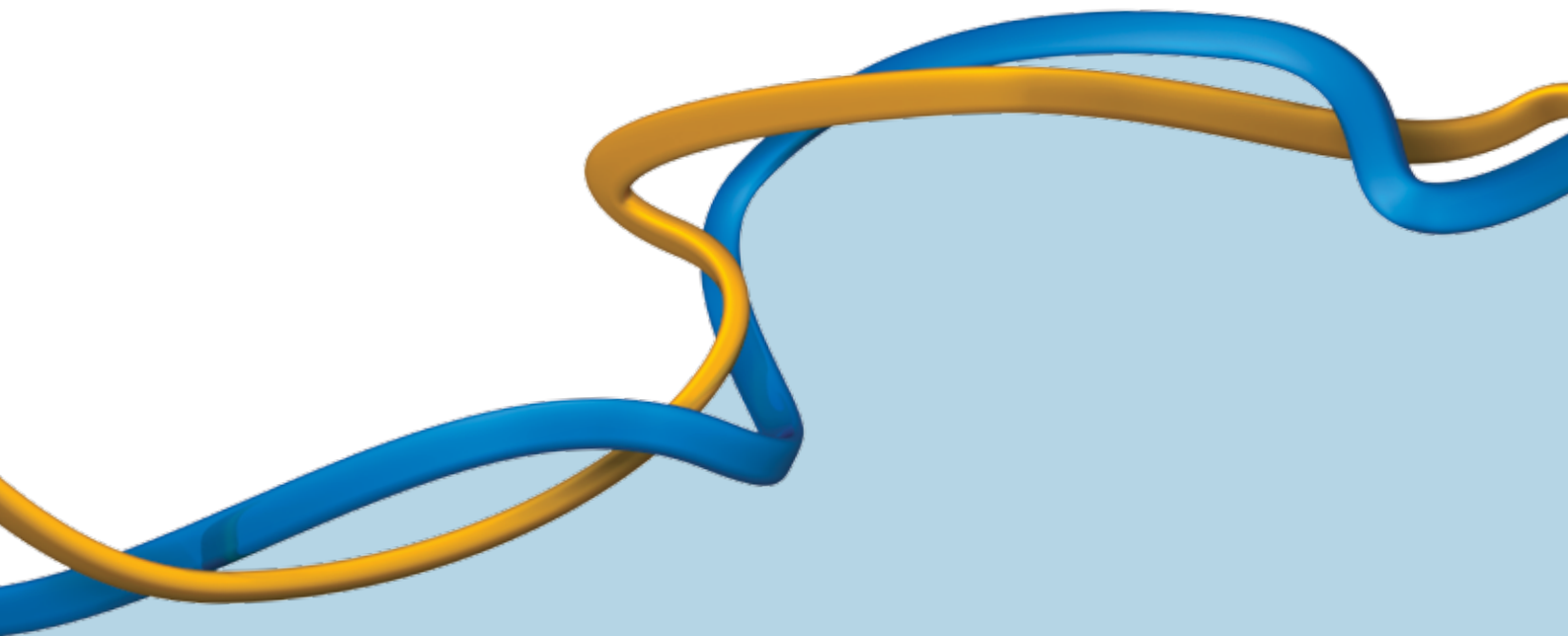
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