WE MOVE BRITAIN

Our new *BOMBARDIER AVENTRA* trains for the Elizabeth line, London Overground and the East Anglia, South Western, West Midlands and Essex Thameside rail franchises are designed and built here in Britain.

The trains our Service teams maintain keep Britain moving on one of the busiest and most complex networks in the world, travelling a distance equivalent to 4,000 times around the world every year.

#WeMoveCities

BOMBARDIER

Year of Engineering 2018

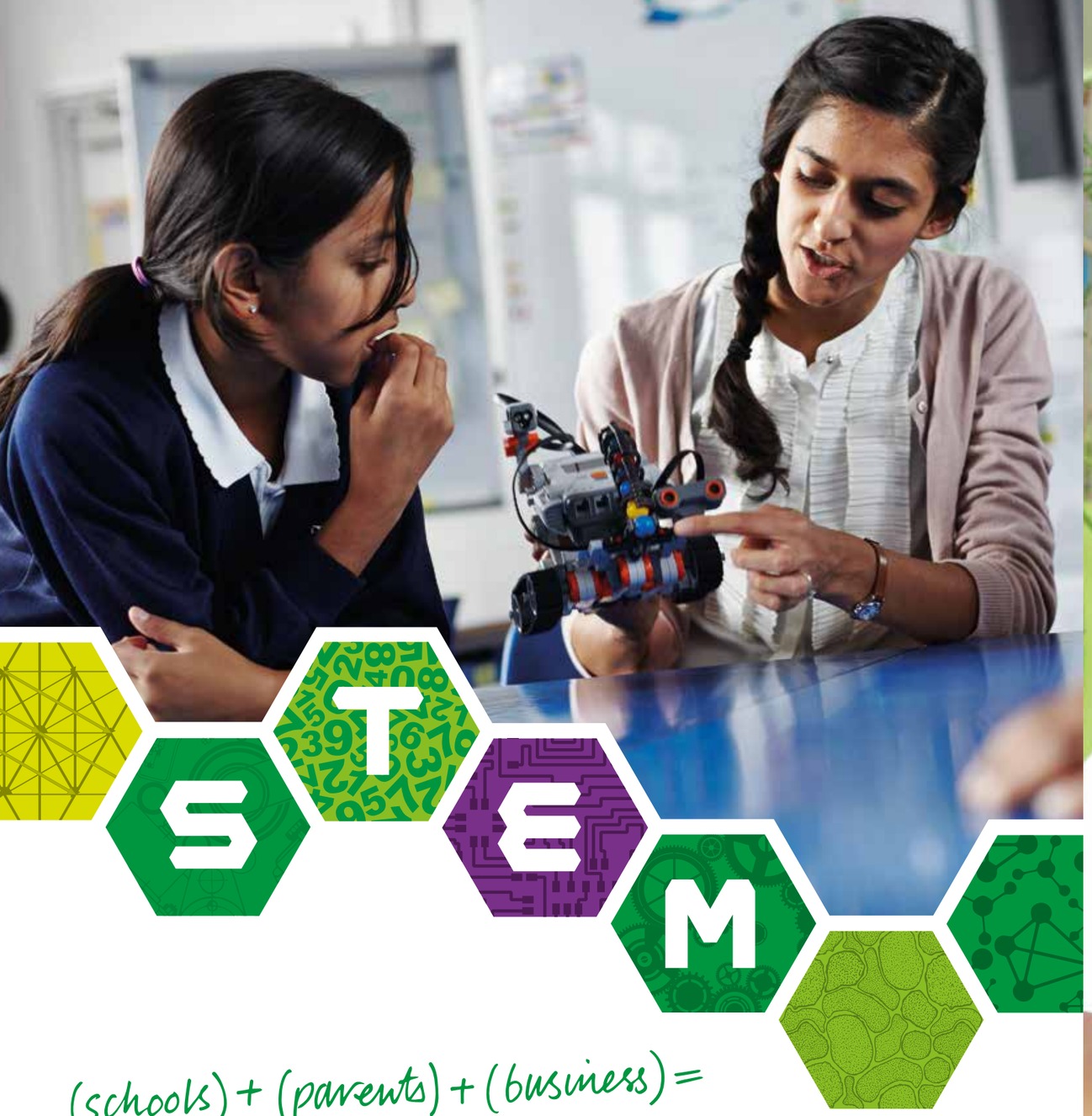
2018. THE YEAR OF

ENGINEERING

Engineering a better future - and everyone is welcome to apply!

£8.95
(Free to the next generation of engineers)

Edited by Robert McCall.



(schools) + (parents) + (business) =
how we bridge the STEM skills gap.

To fill the high-skilled jobs that will power our economy in the future, we need more students to study science, technology, engineering and maths (STEM). That's why BP partnered with King's College London, University College London and the Science Museum Group to understand the STEM skills gap and find ways to close it. Schools, parents and businesses must work together to ensure STEM plays an important role in young people's lives. BP remains committed to this goal every day.

To find out more visit bp.com/STEM

bp

ENGINEERING

TAKE A CLOSER LOOK

Publisher Arthur Moore
Managing Editor Robert McCall
Administration Lynsey Moore
Designer Louise Crawford
Advertising Sales John Huss, Phil Campbell, Allan McCarthy, Libby Galbraith

Published by West Argyll Technical Publications Ltd
www.westargyll.org

Year of Engineering 2018. A personal introduction by Nusrat Ghani MP, Under Secretary of State for Transport.

Picture a world where nothing is engineered and you start to realise what an empty, uncomfortable and alien life you would experience. The building you are sat in, the roads you travel upon, the technology you are using, the clothes you are wearing and even the food you eat has been engineered.

While things are working, most of us give little thought to engineering and engineers. Why does that matter?

For one thing, there aren't enough engineers in the UK. When you consider that we're relying on engineers to tackle the world's biggest problems, from environmental issues to medical advances, you begin to appreciate that's an issue. Then there's the fact that engineering contributes much to our prosperity as a nation – one quarter of the UK's Gross Domestic Product (GDP), with a whopping value of £420.5 billion.
With fewer engineers we collectively lose out, but it's also about our individual stories. There's a real opportunity for more of us to become engineers, especially girls, those from black, Asian and minority ethnic communities and those from disadvantaged backgrounds. Right now, only 12 per cent of engineers are women and only 8 per cent are from ethnic minority groups. We need to change that to give more people the opportunity for a great career and to make sure the things we engineer work for everyone.

Engineering is a well-paid, varied and creative profession, which offers young people a real opportunity to make a difference to the world. We want more young people to experience engineering to discover if it's for them.
Unfortunately, too many young people and even their parents and teachers do not know enough about engineering. Only one third of parents know what people in engineering do. Too few people appreciate what a great career choice engineering can be.

That is why the government has made 2018 the Year of Engineering and why I am personally very excited and committed to being the minister for the Year of Engineering. And I am not alone. We are working with over 1300 enthusiastic organisations from businesses to schools and charities to improve understanding of engineering and to offer young people at least one million experiences of engineering over the course of 2018.

I hope you enjoy everything the Year of Engineering has to offer: from school visits to exciting events and activities, many of which you'll find detailed in this commemorative brochure. I look forward to celebrating everything engineering has to offer and to inspiring the next generation of engineers. Join us and take a closer look at engineering.


ROYAL NAVY
STEM
SCIENCE, TECHNOLOGY, ENGINEERING
Apprenticeships
ENGINEERING
TAKE A CLOSER LOOK

A Year in Focus

by Jo Parry, Head of the Year of Engineering Communications Unit.

When the idea for the Year of Engineering was conceived five years ago as one response to the engineering skills gap, we couldn't have envisaged just how popular the Year would be.

Now with the support of the engineering profession and over 1300 organisations, thousands of young people, along with their families and schools are being offered a diverse range of exciting and inspirational opportunities to get a taste of engineering with events and activities across the UK.

The perception of engineering as being exclusively the preserve of Brunel, hard hats and building sites is being tackled head on, as organisations doing everything from food to software engineering invite young people to directly experience what the profession has to offer. By the end of the year with their help, the government aims to have delivered at least one million direct experiences of engineering, encouraging more young people to consider engineering as a career.

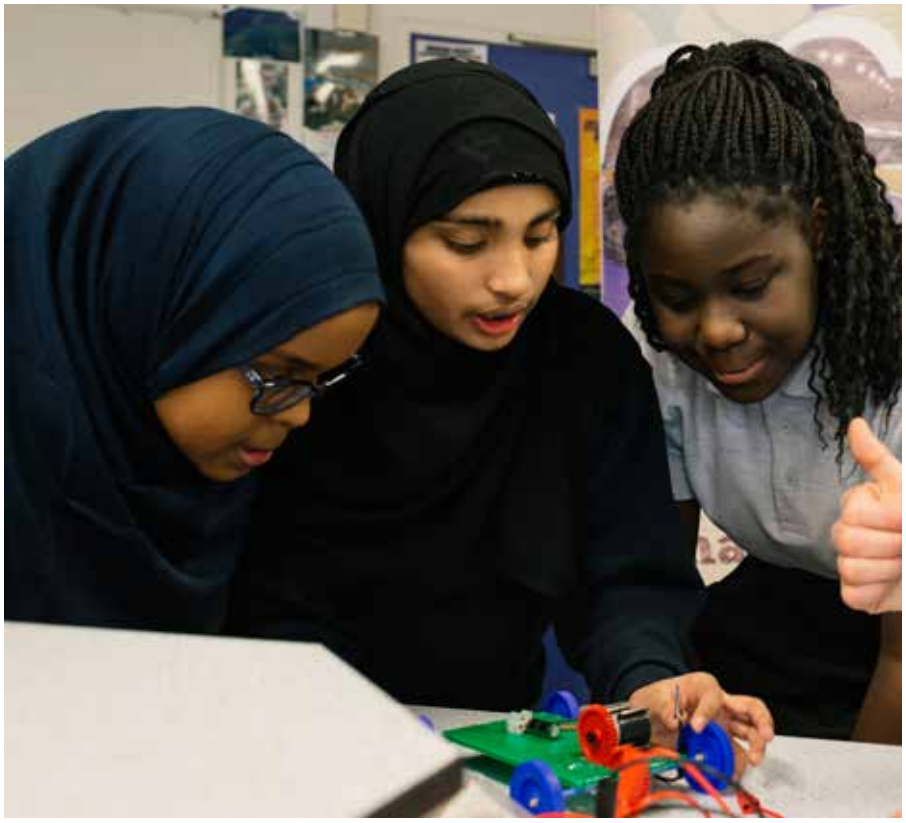
Rather than simply talking about engineering, these direct experiences are crucial for engineering to be appreciated for the varied, creative and forward-looking profession it is - offering young people from all backgrounds exciting opportunities to improve the world. The Year of Engineering is proud to be working with a host of inspiring role models, who prove first hand that engineering isn't just for white males. If you have the creativity and problem-solving skills that are so much in demand, engineering could be the career for you.

You'll discover lots more information about the organisations involved in the Year of Engineering in this brochure alongside a summary of Year of Engineering events that could give you that introductory taste of engineering that sets you on the path to a rewarding career. Every month we are exploring a different aspect of engineering in more detail. You can also look forward to the 'Summer of engineering', when a host of our partners will be opening their doors over the summer holidays to the budding engineers of the future.

I'd also encourage you to visit the Year of Engineering website at www.yearofengineering.gov.uk to find a range of inspiring ways to get involved in the year, whether you are a parent, teacher, or potential partner. There's an events map which allows you to find out about activity in your area and details of ways to forge engineering connections that we hope will endure long after 2018.

Here's to the next generation of engineers!

Tomorrow's Engineers - A More Diverse Workforce



Engineering is everywhere and the people that work in engineering are responsible for helping us to meet some of the world's biggest challenges from improving energy efficiency and tackling climate change, to providing clean water and better food, more sustainable housing and transportation, and enabling us to communicate better with each other, as well as helping to keep us safe and well.

Yet, while perceptions engineering are improving, many people have an outdated, narrow and stereotypical idea of engineering and are unaware of the breadth of the industry and the enormous range of career opportunities within in.

The Engineering UK 2018: State of Engineering report indicates that between 2014 and 2024 there will be 2.5 million jobs in engineering companies and across the workforce overall, demand for engineering roles are projected to reach 2 million. Over the past year, the engineering sector grew by 6%, which means it now equates to 27% of UK industry.

Engineering employs 19% of the workforce and generates 23% of total turnover in the UK. However, for it to continue to grow and contribute to the economy in this way, it's vital that the long-standing skills shortage is addressed.

We need more young people continuing to study maths and science at A level (and equivalent), this keeps their options open as the routes into engineering are largely based around these subjects. Design and technology, computing, electronics and construction and the built environment are also useful for engineering careers.

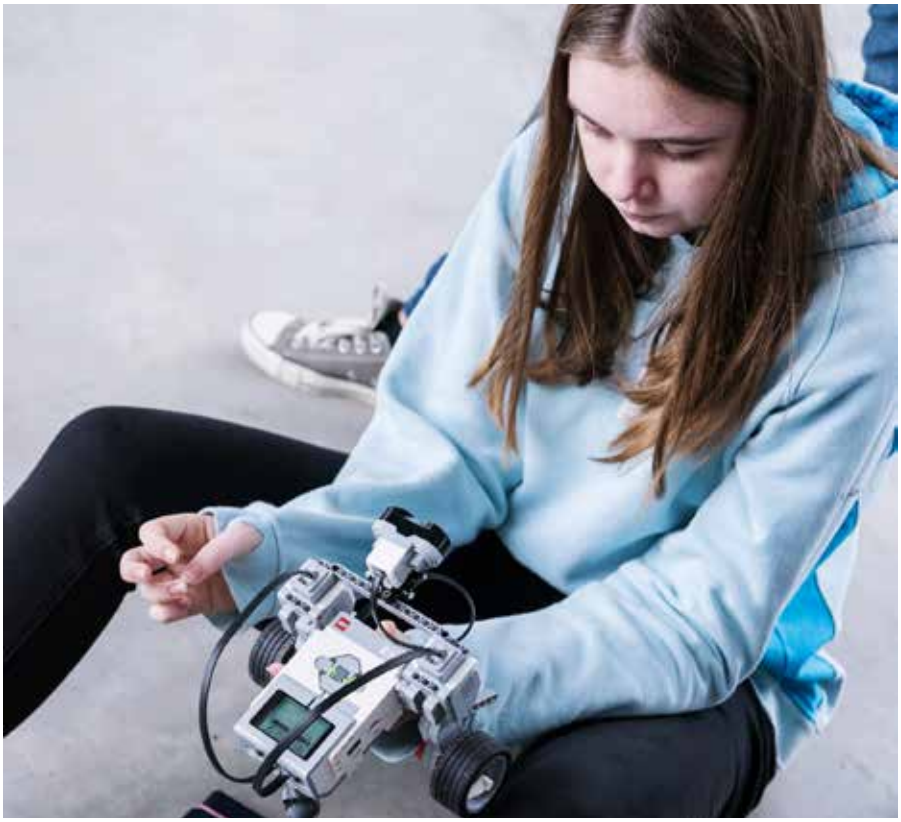
An apprenticeship is an appealing route into engineering for many people and over the past year, there has been an increase both in the number of workplaces offering apprenticeships and the number of engineering apprentices starting their training across the UK. The number of engineering and technology graduates is also on the rise, which is particularly notable given the decline in overall student numbers.

Importantly, engineering needs to attract a more diverse workforce, both in terms of gender and ethnicity. The industry is working to inspire young people of both genders and all ethnic backgrounds to consider a career in engineering. Failing to do so means potentially missing out on some of the country's best talent.

Engineering is a solid career with great earning potential and good employment prospects. Like doctors and lawyers, professional engineers are well respected and professional registration is recognised around the world, demonstrating academic ability, expertise and competence developed by workplace experience. We want more people to understand the role of engineers, how to get into the industry and the career options and benefits.

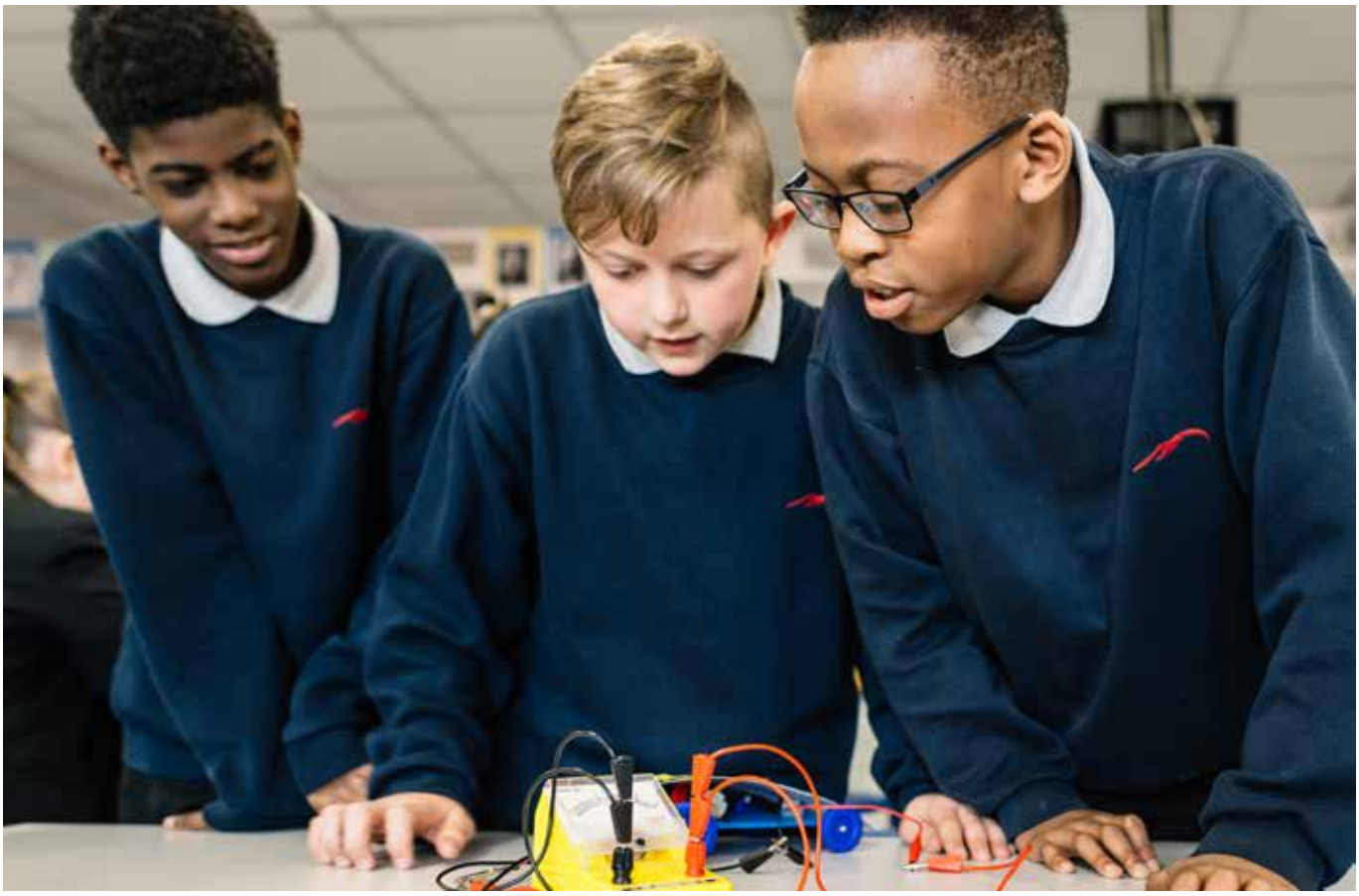
Through Tomorrow's Engineers and The Big Bang programme, EngineeringUK works with employers, educators and professional institutions to inform and inspire young people (and those who advise them) about careers in engineering.

This includes Tomorrow's Engineers EEP Robotics Challenge where teams learn how to build, program and control autonomous LEGO robots to complete a series of short, exciting aviation missions, competing against other schools. Tomorrow's Engineers Energy Quest, funded by Shell, is a free schools programme that encourages young people to find out all about sustainable energy and learn about associated engineering careers.



Showcasing the incredible things engineers achieve can be truly inspiring and helps to create a more accurate image of modern engineering. Engineers are at the forefront of shaping the world we live in, helping to solve our biggest challenges.

Tomorrow's Engineers Week in early November has a focus on 'engineers on a mission' and in 2017 profiled incredible engineers, all working to make a difference. These included Thilo, whose work brought together his two loves (engineering and animals) in a job helping horses with mobility issues. Other examples included engineers creating fully functional starter housing from shipping containers to help the



homeless, teams building bridges across the world to connect remote communities and two talented teenagers who have created an epileptic fit detection vest. Research shows that 90% of young people are interested in a career that makes a difference to the world and that 67% of them would consider a career in engineering if it made that possible. An engineering career really can give you the opportunity to achieve your life goals.

EngineeringUK works with schools and employers to inspire and inform young people and those who advise them. That includes through direct contact with STEM (science, technology, engineering and maths) professionals, engaging hands-on activities and up-to-date careers information.

Continuing to study science and maths keeps open the door to careers in engineering and so raising interest and attainment in those subjects is an important consideration. Through the Tomorrow's Engineers programme employers are developing a tailored, strategic approach to local outreach to drive home that message and work with schools to give young people engaging interactions with engineering.

If we are to address the skills gap, we need to more young people from all backgrounds to understand 21st century engineering and for more of them to understand how what they learn at school is used in the real world. The opportunity to speak to industry professionals and to discover different roles via case studies and films helps that understanding.

2018 has been named the Year of Engineering, bringing with it the opportunity to focus on the range of ways in which engineering shapes the world we live in. This year will also see the launch of This is Engineering - a high profile promotional campaign that brings into sharp focus the creativity and innovation of 21st century engineering. Tomorrow's Engineers free careers resources, the inspirational case studies and accurate, up-to-date information will give the young people (and their parents and teachers) inspired by the campaign further insights into the industry and how to get into it.

From strong employment prospects and competitive salaries to a varied career at the cutting edge of technological advances, engineering has a lot to offer. We owe it to the potential engineers of the future to give them every opportunity to understand that and encourage them to study the subjects that allow them to be part of that.

www.tomorrowsengineers.org.uk
www.engineeringuk.com

EDT

Industrial Cadets

INSPIRING THE **NEXT GENERATION** OF **STE(A)M PROFESSIONALS**

Established over 30 years ago, the EDT provides over 40,000 work related practical learning experiences each year through taster days, industry-led projects and placements to aspire young people considering a STE(A)M based career.

The nationally recognised Industrial Cadets accreditation (inspired by HRH The Prince of Wales in 2010), is a quality standard for programmes to meet a national standard of excellence.

The introduction of Industrial Cadets strengthens EDT's links between educators, partners and employers and continues to enable organisations to make invaluable connections with STE(A)M based young talent across the UK.

TASTERS

AGE	DURATION	PROGRAMME	FRAMEWORK
9-16	1 day	**FIRST EDITION**	Hands on STEM experiences at schools or universities. Also incorporating STEM Family Challenge evening events
13-15	3 days	**ROUTES INTO STEM**	Three day course including a day at; a college, a university and a company
15-16	3 days	**INSPIRE**	Residential and non-residential courses at universities
16-17	4-5 days	**HEADSTART**	Residential courses at universities

PROJECTS

AGE	DURATION	PROGRAMME	FRAMEWORK
12-14	10 weeks	**Go4SET**	STEM projects led by industry mentors
16-17	6 months	**ENGINEERING EDUCATION SCHEME**	Real-life projects based on industry-related issues & led by mentors from industry

PLACEMENTS

AGE	DURATION	PROGRAMME	FRAMEWORK
17-21	9-12 months	**THE YEAR IN INDUSTRY**	Mentored work placements

www.etrust.org.uk
www.industrialcadets.org.uk

info@etrust.org.uk
industrialcadets@etrust.org.uk

Challenging Stereotypes and Driving Education is Key to Inspiring Future Engineers

The Institution of Engineering and Technology (IET) is leading the way to encourage more young people into the profession by showing how fun, creative and modern careers in engineering can be. From designing the latest app, to putting people in space, engineering is all about finding solutions to the world's greatest problems – often without a spanner or grubby overall in sight!

This work is more important than ever, when one considers the bare statistics. Engineering contributed £486 billion to the UK GDP in 2015* and engineering jobs account for 19% of the total UK employment. Despite this, EngineeringUK predicts 186,000 people with engineering skills will be needed annually through to 2024 in order to meet demand.

The IET's Engineer a Better World campaign, launched in 2015, was set up to challenge both parents' and young people's outdated views about the engineering profession. Its main aim is to inspire more parents to encourage their children, especially girls, to become engineers and to understand the potential that careers in engineering offer.

Research behind the campaign showed that fewer than half of parents of girls would encourage their children to consider a career in engineering, compared to two thirds of parents of boys. This is fundamentally down to a lack of understanding about how creative, interesting and diverse engineering roles can be.

Opening young people's eyes to the many exciting and challenging real world scenarios in which they can use the skills they learn at school is vital to solving the engineering skills gaps and shortages there are in many parts of the world, including here in the UK.

Last year's campaign saw the IET invite well know vloggers, who are followed in their thousands by young people, down to Harry Potter World, Chessington World of Adventures, Twitter and Shazam to uncover the latest engineering jobs that help run and advance these cool attractions and top brands.

Then the IET partnered with Mondelez International, home of Cadbury, to invite young people to design their chocolate bar of the future, in a bid to show the diversity of the industry and its role in creating chocolate!

In July 2017, the IET held its third Engineering Open House Day to give

Catherine, 16, won the IET's Chocolate Bar of the Future competition with her creation, Rocket Fuel.

Children enjoying the Engineering Open House Day at ITN studios.

children and their parents the chance to explore how engineering and technology careers play a key role in some of the UK's best known organisations. 39 organisations – including the BBC, THORPE PARK Resorts and Dr. Martens opened their doors to over 3,000 young people and their parents, the most successful Engineering Open House Day to date.

"Engineering is a diverse and creative career."

The campaign is returning in 2018 with a fresh take on modern engineering and technical careers. Parents and young people can find out more about the IET's Engineer a Better World campaign, and how to get involved in the 2018 projects, via www.engineer-a-better-world.org

According to a representative sample of children aged 9 to 16, a typical engineer is described as white (51%), middle aged (31%), male (67%), with glasses (40%), a beard (27%), short (36%), brown hair (44%), brown eyes (21%), of tall stature (44%) and slim build (42%).

In terms of the tools of the trade that engineers might have at their disposal, 44% of children thought an engineer would wear a hard hat and 40% said a high vis jacket.

Shockingly, it appears that school children aged 9-16 can't see the opportunity for future female engineers, with less than one in ten (9%) children describing the typical engineer as a woman.

Portrait of an Engineer photoshoot of the Young Woman Engineer of the Year winners and finalists, past and present.

And it seems this outdated stereotyping is being passed down from their parents. When asked to describe a typical engineer, parents returned almost identical answers.

Jo Foster, IET Diversity and Inclusion Manager, said: "These outdated and fixed ideas of what a 'typical engineer' looks like are damaging to the industry, especially when the significant shortage of engineers in the UK is posing a serious threat to the economy.

"Currently only 11%** of the engineering and technical workforce is female. Wide ranging reasons have been cited for this lack of women, from gender stereotyping and limited female role models to misconceptions about the job itself and parental attitudes.

"Engineering is perceived as masculine, unglamorous and usually depicts people wearing hard hats and overalls. The reality is very different. Engineering is a diverse and creative career which offers the opportunity to do something life – or even – world changing."

Of course, it is never too early to nurture young people's curiosity about the world and to start learning about the endless opportunities engineering presents.

The IET's Education 5-19 team runs fun and engaging initiatives to excite young people about the possibilities studying Science, Technology, Engineering and Maths (STEM) creates.

"Engineering is about finding solutions to the world's greatest problems."

The Faraday education service for Secondary and Primary, supports teachers of science and technology and provides a range of free curriculum support, resources and information for schools. The team also supports partnership organisations in the provision of STEM resources and experiences for both teachers and students across the UK and internationally. The full range of resources, as well as more information, can be found on the Faraday Secondary website: www.faraday-secondary.theiet.org, with additional links to the dedicated Faraday Primary website.

As part of the IET's work to inspire the next generation, the Education team, with a network of volunteers and partner organisations, work together to run both UK based and global STEM events and challenges. The annual Faraday Challenge Days sees teams of schools across the UK compete to solve a modern engineering challenge, this year set by THORPE PARK Resorts. Likewise, the global *FIRST*® LEGO® League is the largest STEM competition in the world and the IET is the UK and Ireland delivery partner. The competition challenges young people to solve real-world engineering problems and build, test and program an autonomous robot using LEGO MINDSTORMS®.

David Lakin, IET Head of Education 5-19, says: "The IET's STEM initiatives, such as the IET's Faraday Challenge Days and *FIRST*® LEGO® League, aim to inspire, inform and nurture young people's natural curiosity about how things work

IET Education
The Institution of Engineering and Technology
Faraday

Bring STEM learning to life in your classroom!

FREE curriculum-linked resources to help you deliver inspirational and interactive lessons for science, maths, design & technology and computing.

- Teacher-created downloadable activities and materials.
- Classroom poster sets.
- Real-world engineering challenge competition.
- Careers information.

Download or order FREE classroom posters and careers packs at

www.ietfaraday.org/secondary

IET Education
The Institution of Engineering and Technology

FIRST LEGO LEAGUE
FIRST LEGO LEAGUE JR.

FIRST® LEGO® League

The largest STEM Competition in the world!

/FirstLegoLeagueUK
@FLLUK

A global robotics-based life skills competition for young people aged 9-16

Look out for *FIRST*® LEGO® League Jr. for 6-9 year olds

Take part at

www.firstlegoleague.co.uk

and why – a key principle in engineering. As well as developing key STEM skills, young people learn how to apply modern engineering skills to the challenges, such as problem solving, teamwork and communication. Inspiring young people about STEM and its endless possibilities will set them on an exciting path that could lead to a fulfilling career in engineering and technology."

> *"It is never too early to nurture young people's curiosity about the world."*

The IET provides around £1million every year in awards, prizes, bursaries and scholarships, to celebrate excellence and innovation in the sector and encourage the next generation of talent.

Students can find out how they can apply for funding to support their early career development and studies, via the IET's website: www.theiet.org/awards

Looking forward, one of the biggest challenges continues to be the shortfall of engineers, not only coming into the industry, but those who do qualify as engineers, do not always have the right practical skills needed for careers in modern engineering. This is compounded by a step-change in the skills needed from our next generation of engineers as automation and digitisation takes hold. The IET's latest Skills Survey found that nearly two thirds (61%) of the engineering and technical workforce consider the recruitment of engineering and technical staff with the right skills as a barrier to achieving their business objectives over the next three years.

The Government's Industrial Strategy marks a future that will see highly skilled engineers work across multiple disciplines and we now need to ensure that those coming into the industry can meet these demands.

One way the IET is tackling the skills gap in the UK is by promoting the importance of work experience and skills-based learning by launching a campaign 'Engineering Work Experience for All'. It calls for universities, further education colleges and policy makers to collaborate on developing the quality of work experience and internships for those in education or training, to improve the supply of engineers and technicians coming into the industry. A Government-led work experience framework, supported by the existing apprenticeship levy, could also be successful, particularly with smaller companies that typically struggle with the time and cost implications of offering work experience opportunities.

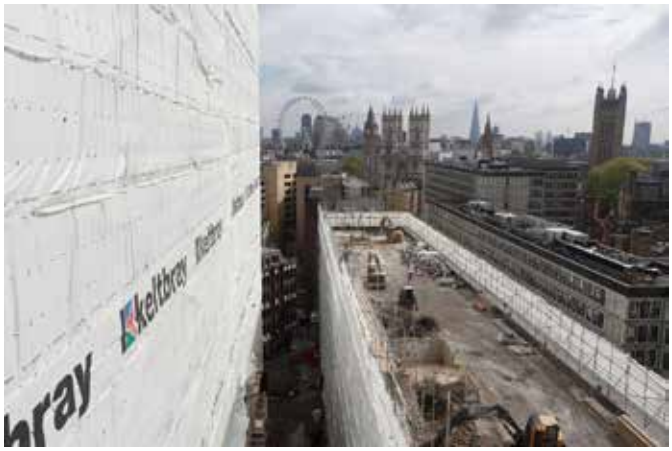
For more about the 'Engineering Work Experience for All' campaign, visit: www.workexperience.theiet.org

* EngineeringUK

**The IET's Skills and Demand in Industry Report 2017

Budding engineers get to work at one of the IET's Faraday Challenge days.

THE FUTURE LOOKS BRIGHT



Keltbray Group is a UK leading specialist contractor and a key player in developing and maintaining Britain's built environment. The company dates back to 1976 and employs more than 1,500 people.

The Group provides the services needed to make new infrastructure and developments a reality, and our people are experts on working in highly regulated environments; from electrifying the railways, and decommissioning power stations to demolishing skyscrapers and remediating brownfield sites.

As a result we have worked on some of the most complex and high profile construction projects in this country, including The Shard, Queen Elizabeth Olympic Park Stadium, St Pancras International, Crossrail, Earls Court and Battersea Power Station.

Services

Within construction our services range from pre-construction advice and environmental planning to engineering design, demolition, enabling works, specialist foundations works, remediation and the erection of new concrete structures.

We also provide rail overhead line electrification design and build, and other rail-related civil engineering solutions, such as groundworks, piling, demolition, welding, waste management, platform work and other construction services.

Investment

Despite challenges in the industry, we keep going from strength to strength. We attribute this success to our people, and our investment in skills, equipment and innovation.

Last year Keltbray invested £15 million in equipment and technology alone. This included a range of new and innovative solutions, a number of which were developed by our own people. A further £2 million was invested in the provision of 60,000 hours of training and assessments services to develop the competence and expertise of our people, and be fit for future growth.

Our challenge

Our focus on the recruitment of and investment in young people to plug the skills shortage gaps means that one in 13 of Keltbray's people now is an apprentice, intern or trainee.

However, forecasts suggest an additional 200,000 jobs will be created in the construction industry over the next five years. This means we need to widen the talent pool further and tap into the real diversity that exists in this country.

We can offer great benefits and a good working environment, and are always looking for great candidates from a broad range of backgrounds to help us lay the foundations for a better future.

Check out our Facebook and LinkedIn pages, and for vacancies, please visit www.keltbray.com

St Andrew's House
Portsmouth Road
Esher, Surrey KT109TA

T 02076431000
F 020 7343 1001
E enquiries@keltbray.com

www.keltbray.com

THE BIG BANG

The UK needs many more engineers and scientists and equipping young people with skills in science, technology, engineering and maths (STEM) is key to their future employability. The Big Bang is a wide-ranging programme, exploring the exciting opportunities out there and the routes into these rewarding careers.

The Big Bang UK Young Scientists & Engineers Fair is the largest celebration of STEM for young people in the UK, bringing together an award-winning combination of exciting theatre shows, hands-on activities, interactive workshops and careers information from STEM professionals.

From **rebuilding disaster-struck communities and creating dazzling special effects for film**, to **inventing apps that transform our lives** and **making sure there's enough food for everyone in the world**, visitors to The Big Bang Fair can find out from inspiring engineers and scientists about the incredible jobs they do and see how school subjects – like science, maths, D&T, computing and art – can set them off on a journey to landing that dream job. The 2018 Fair will be held at **The NEC in Birmingham, 14-17 March.**

This year, The Big Bang Fair will see a return of some firm favourites as well as lots of new activities and shows, with amazing opportunities to build a laser orchestra, create a 3D selfie, take part in hands-on operating theatres, make slime, journey through space, discover the maths behind magic, handle live insects and much, much more!

Teachers also find the experience a positive one. Not just in terms of what their students learn and experiment with but also with regards the information and resources they gather during the day.

"We're really trying to promote STEM and get our students enthusiastic about it. We're hoping they have a really fun day, and that they're inspired to learn more and hopefully take on science or engineering at A level and take it further."
Dr Stephanie Scott, Teacher

"The Big Bang Fair is really impressive, there's lots to see, lots to learn and lots to think about as to what to do when I'm older."
Matthew, School Group Visitor

Book your FREE tickets at
www.thebigbangfair.co.uk

The Big Bang Fair also hosts the finals of **The Big Bang UK Young Scientists & Engineers Competition** where finalists compete for a number of exciting prizes, including the coveted titles of UK Young Engineer of the Year and GSK UK Young Scientist of the Year.

Tomorrow's Engineers

From idea to career

Explore 12 areas of engineering

The Big Bang Competition looks for the very best projects from every area of science, technology, engineering and maths and aims to celebrate and raise the profile of young people's achievements and provide them with the opportunity to build their skills and confidence in project-based work. The 200 finalists get to showcase their projects at The Fair, where they have their own stands to show off all their hard work to scientists, engineers, students, parents, employers, teachers and celebrities.

All UK residents in full-time education or training (year group 7-13 and Scottish/NI equivalent) can apply with their engineering or science projects online or through a regional heat at a **Big Bang Near Me Fair.**

For anyone who can't make it to Birmingham in March there are other opportunities to experience the Big Bang. The UK Fair is complemented by a series of **Near Me Fairs**, smaller events that take place across the country and are an important part of the programme, helping 11-18 year olds from all backgrounds to discover close to home the exciting and rewarding engineering and science careers that their science and maths subjects can lead to. Because Near Me Fairs can be regional, local or school-based there are lots of opportunities to get involved. In 2016/17, over 150,000 young people visited a Big Bang Near Me or @School Fair. They are free to attend but you do need to register.

Big Bang @ School supports teachers in bringing the Big Bang to their own schools and delivering an event to excite pupils about STEM subjects, inspiring them to consider engineering or science careers.

A Big Bang @ School Fair can be as big or as small as you like. You could invite local businesses to take part, involve STEM ambassadors, bring in activity providers or do it all by yourself. The important thing is that pupils have fun finding out where their STEM studies can lead them.

What are the benefits of hosting a Big Bang @ School?

- **It's FREE**
- **Enhance the STEM curriculum**, showing students how their science, technology, maths and design technology subjects apply to the real world of work
- **Improve student motivation and outcomes**, showing students where their qualifications could take them helps them focus on taking the right GCSE courses and achieving the necessary grades
- **Showcase your facilities** by inviting other schools to participate and aid uptake by holding workshops for feeder schools in the area
- **Highlight the achievements of your students** through showcasing your school STEM Club or project work
- **Raise the profile of your school** in the local area through **building and strengthen links** with local businesses, MPs and the media
- Contribute to achieving a **positive Ofsted report**
- WContribute as evidence towards **school or teacher CPD** and STEM quality marks and awards

"Societies, companies, learned institutions - they're all out there wanting to help; everyone has heard of The Big Bang Fair. It's a brand that'll help you open doors and bring people into your school that your pupils will be thrilled to meet."
Teacher, Sutton Grammar

Find out more:
www.thebigbangfair.co.uk
www.thebigbangfair.co.uk/competition
www.thebigbangfair.co.uk/nearme
The Big Bang UK Young Scientists & Engineers Fair

Build a laser orchestra, create a 3D image of yourself, take part in hands-on operating theatres, make slime, journey through space, discover the maths behind magic or handle live insects; The Big Bang Fair is full of exciting theatre shows, interactive

workshops and hands-on activities, from all areas of science, technology, engineering and maths!

Here's a selection of some of the companies and organisations you'll get to meet at The Fair:

Aimhigher Plus
Air Products
Arm
BAE Systems
EDF Energy
E-ON
Gatsby
GSK
Helsington Foundation
JCB
Leonardo
National Grid
Royal Academy of Engineering
RAF
Rolls-Royce
Shell
Siemens
Sellafield Ltd
Severn Trent
Specsavers
Tata Consultancy Services
Thales
Zeiss

See all activities and shows at: www.thebigbangfair.co.uk

From idea to career – explore 12 areas of engineering

Engineering is a **diverse, wide-ranging sector** and it can be hard to decide which of the many areas to pursue. **Tomorrow's Engineers** has produced a booklet with an overview of several different types of engineering, w**hich subjects are useful**, what you might **learn about** and **how much you could earn.**

General engineering
'General engineering' is one of the broadest subjects and the most common type of engineering taught in FE colleges. It's ideal for those who want to see what it's all about before choosing to specialise in a particular area of engineering; you get a basic introduction to specific branches and develop your science, maths and computing skills whilst solving practical problems.

Aerospace and Aeronautical
Aerospace and aeronautical engineering covers the design and engineering of the systems, equipment and components that make up flying vehicles such as aeroplanes, helicopters, spacecraft and rockets. It also involves designing, testing and manufacturing components such as engines, wings, fuselage, electrical systems, landing gear, satellites and drones.

Biomedical Engineering
Biomedical engineering refers to the innovations that improve our health and healthcare systems, for example 3D organ printing, prosthetic limbs and wearable technology. Engineers in this field combine their problem-solving techniques with knowledge of biological and medical sciences and clinical practice.

Chemical Engineering
Chemical engineering is all about the design, management and operation of large- scale processes that turn raw materials such as oil into everyday products such as smartphones. Chemical engineers work out how to make all these products, while also helping to manage the world's resources and protect the environment.

Civil and Structural Engineering
Civil engineers and structural engineers build all sorts of things so we can get around and live our lives safely – from roads, bridges and tunnels to railways, hospitals and airports. They also give us clean water and purify it so we can use it again, they protect us from flooding and extreme weather as well as supply us with energy.

Electrical and Electronic Engineering
Electrical engineers work on a huge range of things - from wind turbines to electric cars; power networks to battery design. As we move to a more sustainable future the intelligent use of electricity is going to be crucially important and electrical engineers will drive many of the energy efficiency improvements.

Energy Engineering
Energy keeps the world moving and provides access to the things we need in order to survive, such as clean water, food and healthcare. Energy engineers are at the forefront of finding solutions, harnessing natural resources to make sure energy is available where it's needed, while taking into account other important factors such as safety and impact on the environment.

Marine Engineering
Marine engineers design, build, test and repair boats, ships, underwater craft (remotely
operated vehicles – ROVs), offshore platforms and drilling equipment. Duties could include shipbuilding, boat-building and repair and designing, building and operating offshore platforms, rigs, pipelines and equipment.

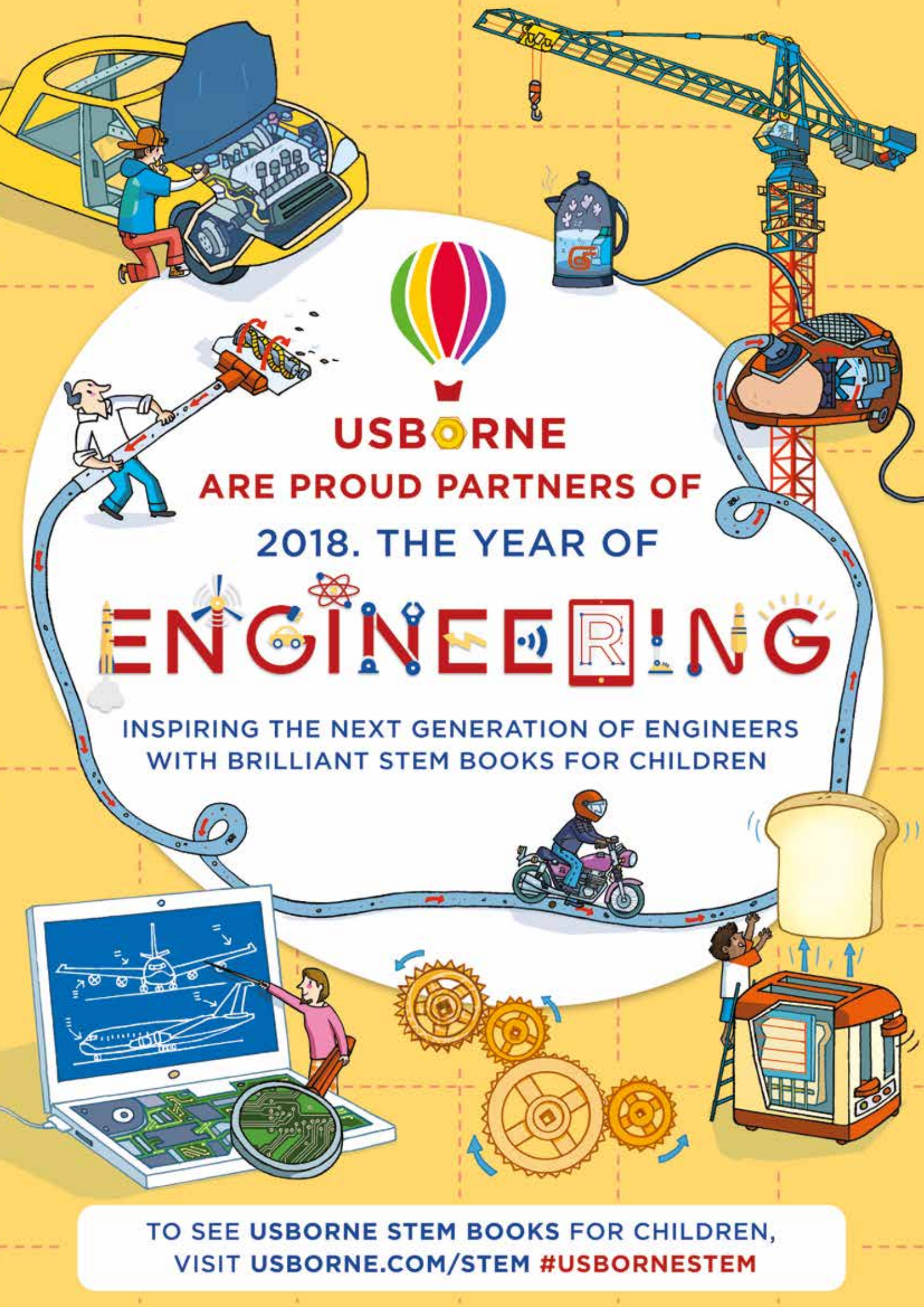
Materials Engineering
Everything around you is made out of something, from the clothes you are wearing to the phone in your pocket; from the aircraft you fly in to your neighbour's hip replacement. It is their job to discover ways of sourcing, using and reusing these materials responsibly.

Mechanical Engineering
Mechanical engineering is about designing, developing and improving mechanical components and systems that make our world and lives function; everything from nuclear fusion and artificial hearts to driverless cars. Put simply, mechanical engineering deals with anything that moves, including human beings!

Production and Manufacturing
Production engineering and manufacturing engineering are linked to the creation of products. Together, process and manufacturing engineers design, prototype and produce high quality goods in the most time-efficient, cost-effective way, with the aim of reducing the impact of production on the environment.

Software Engineering and Computing
Software engineering and computing are about creating systems that automate tasks using computers. This involves developing hardware such as tablets, laptops and control systems and designing and writing the software that make them work.

Find out more about the different **types of engineers, what they do** and the **routes into the sectors** by downloading the Tomorrow's Engineers booklet: http://www.tomorrowsengineers.org.uk/from-idea-to-career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Science capital and the STEM skills gap

When was the last time you discussed science at home in a way that didn't involve physics homework? What about when you were younger? Perhaps your family were as comfortable discussing how clouds are made as your favourite television show. Or perhaps you felt like science simply wasn't 'for you'.

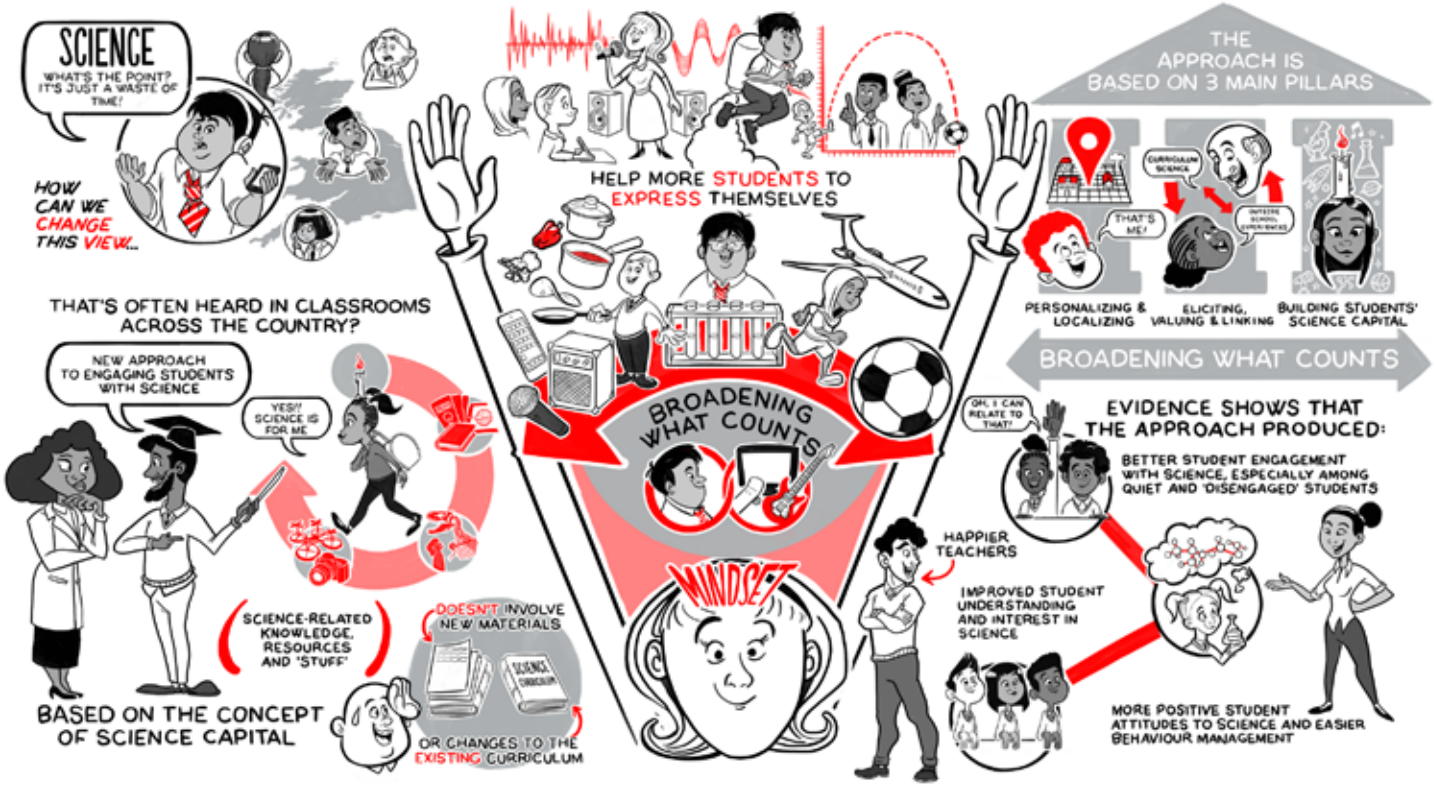
As a long-standing supporter of STEM education in the UK, and a partner to the Year of Engineering 2018, BP wanted to understand why there is a STEM skills gap in the UK and what needs to be done to close it.

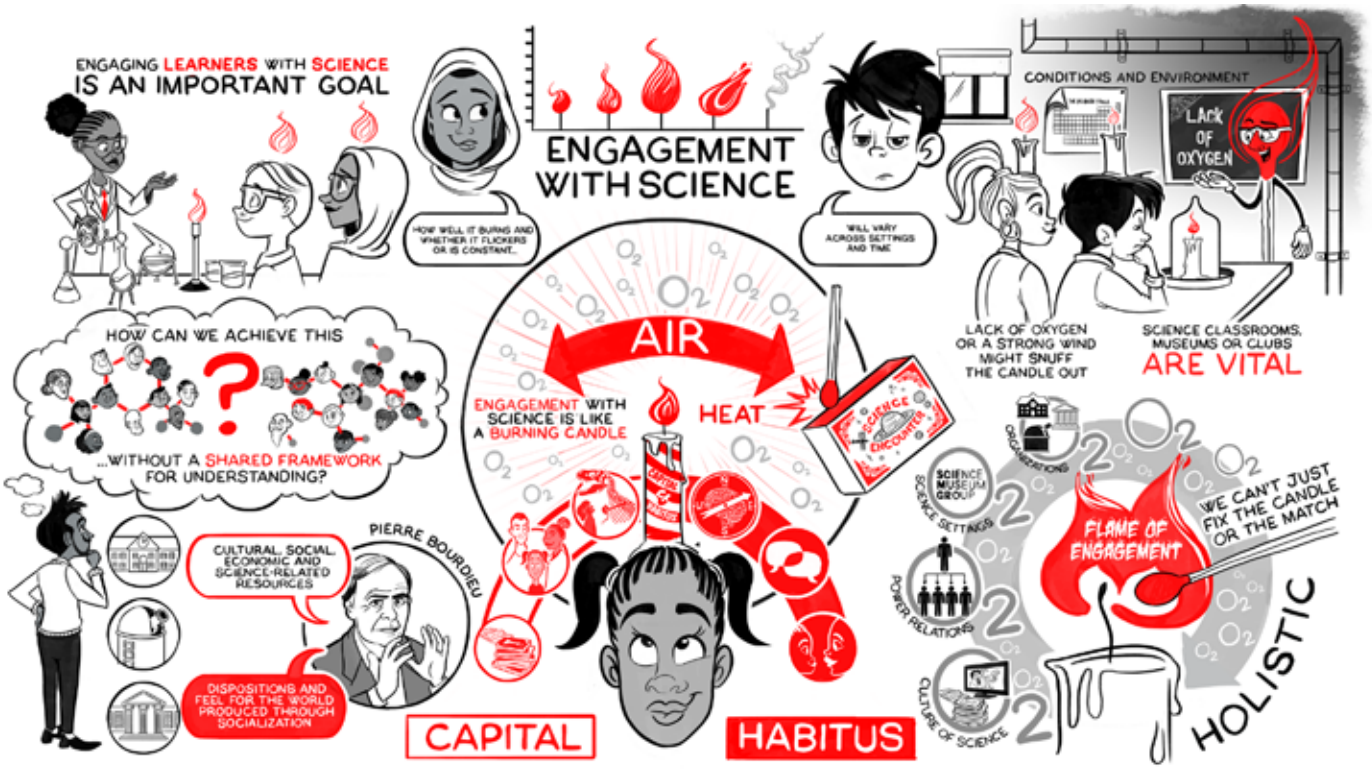
We partnered with King's College London, University College London Institute of Education and the Science Museum Group on a major collaborative research and development programme for science education. It's called Enterprising Science.

Enterprising Science and the concept of science capital

The academic research has found a clear relationship between a student's level of science capital and their future aspirations in STEM subjects. Science capital is determined by an individual's science-related qualifications, their understanding and knowledge about science and knowing someone who works in a science-related job. The higher an individual's science capital, the higher the likelihood they will aspire to continue with STEM after the age of 16.

Working with secondary science teachers from schools in four cities, researchers co-developed a 'science capital teaching approach' that can be applied to an existing curriculum. Evidence shows that this approach produces significant increases in student science capital, attitudes to science and post-16 aspirations. We have also developed courses for schools and resources for science organisations to use science capital to build engagement with STEM and to raise levels of science capital amongst young people.





Our partners in Enterprising Science

Enterprising Science is a BP-funded partnership of academics and practitioners working together to support schools and other professionals in engaging more young people with science. Our approach aims to highlight the relevance of science to young people's futures and find ways to connect school science with students' diverse identities and lives. It involves collaboration between schools, young people and their families, and museums and science centres.

University College London and King's College London
Enterprising Science is underpinned by the rigorous and evidence-based research carried out by teams at University College London Institute of Education (UCL IOE) and King's College London. Their academic teams originated the concept of science capital and developed the science capital teaching approach. You can find out more about their work at **ucl.ac.uk/ioe-sciencecapital**

Science Museum
The Science Museum is applying and delivering the research in practice by supporting teachers, designing resources, developing a CPD programme and providing practitioner-based expertise about museum learning. You can find out more about their work at **sciencemuseum.org.uk/sciencecapital**

How BP is raising young people's science capital

The insights from the Enterprising Science research inform all of BP's work with schools, from employee volunteering to production of teaching resources.

BP is working with young people, their families, their teachers and museum educators to help them understand how to inspire, engage and support many more young people in their science education, including supporting young people to understand the careers possibilities within and from STEM subjects.

We want to help teachers to become more skilled and confident to use museums and science centres to support their teaching. We are developing tools and techniques for them to engage all young people with science and sharing these through the professional development courses at the Science Museum and through Project ENTHUSE at the National STEM Learning Centre and Network.

You can find out more at
bp.com/stem and bp.com/sciencecapital

THE SCIENCE CAPITAL TEACHING APPROACH

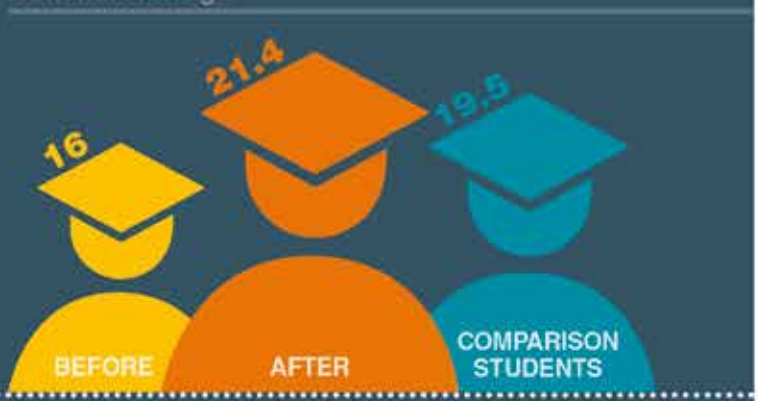
The science capital teaching approach was co-developed by researchers and 43 secondary teachers over 4 years. This summary presents headline findings from the 2016-17 implementation of the approach in schools with low science capital scores across three cities in England.

THE EVIDENCE BASE:

KEY FINDINGS

1 INCREASE IN STUDENTS WANTING TO STUDY SCIENCE AT A LEVEL

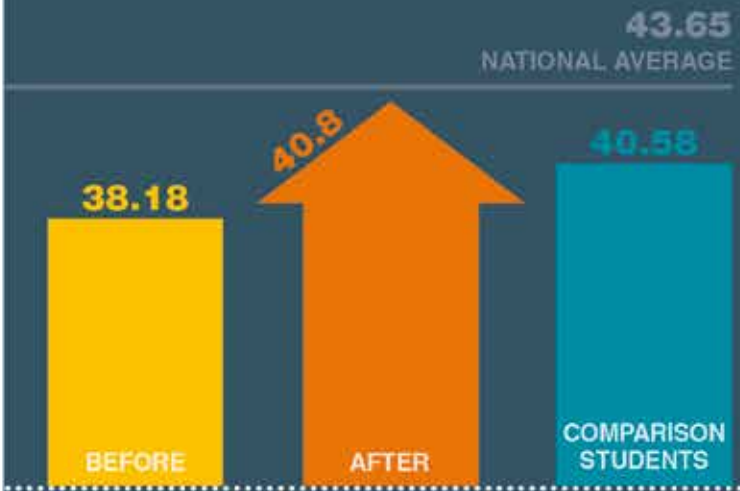
Following one year of implementing the science capital teaching approach, the percentage of students expressing an interest in studying at least one science A level increased significantly.



% AIMING FOR 1+ SCIENCE A LEVEL

2 CLOSING THE GAP - SIGNIFICANT INCREASES IN STUDENTS' SCIENCE CAPITAL

The approach has significantly increased the science capital of students with previous scores considerably below the national average.



MEAN SCIENCE CAPITAL SCORES

3 IMPROVED STUDENT SCIENCE ATTITUDES

Implementing the approach has led to students seeing science as more relevant to their lives.

SCIENCE LESSONS RELATE TO MY LIFE
Percentage agreeing

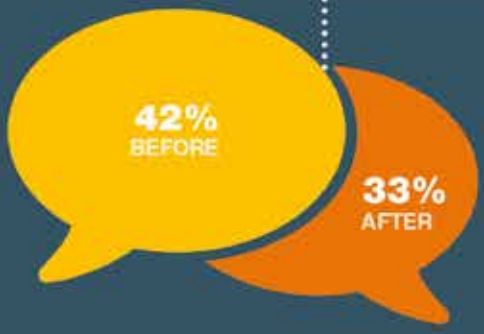
KEY:
- Before implementation of approach
- After implementation of approach
- Comparison students

4

REDUCTION IN NON-PARTICIPATION IN SCIENCE OUTSIDE OF SCHOOL

Following the intervention year, students are less likely to report 'never' taking part in science activities outside of school.

% STUDENTS **NEVER** DOING OUT OF SCHOOL SCIENCE ACTIVITIES



NEVER TALK WITH OTHERS

NEVER ENGAGE WITH SCIENCE ONLINE

NEVER GO ON NATURE WALK

5

MORE INCLUSIVE CLASSROOM PARTICIPATION

6

CHANGING TEACHING PRACTICE

Participating teachers' practice changed significantly in line with the ethos of the approach.

% OF STUDENTS WHO REPORT THAT THEIR TEACHERS ASK ABOUT THEIR EXPERIENCES AND IDEAS IN EVERY LESSON

> *"The approach has really changed how I teach"*
> (Teacher)

7

POSITIVE TEACHER EXPERIENCES

Teachers are overwhelmingly positive about the approach – it has generated positive changes in their professional identities and sense of purpose. The approach has provided space for reflection and given them agency. Almost all have cascaded the approach to colleagues and departments.

READ ABOUT OUR WORK AND DOWNLOAD THE SCIENCE CAPITAL TEACHING APPROACH PACK FOR TEACHERS.

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Supporting Diversity In Engineering Since 1919

The Women's Engineering Society (WES) is a professional network of women engineers, scientists and technologists offering inspiration, support and professional development. It started life in 1919 when the pioneering women who worked in engineering and technical roles during the war campaigned to retain these roles after the armistice.

Working in partnership, they support and inspire women to achieve their potential as engineers, scientists and as leaders; supporting in turn those companies which work towards gender diversity and inclusion.

WES inspires and supports girls and women to achieve their potential in these fields. They work with educators, employers and influencers of all kinds in working towards a diverse engineering community.

They have three primary roles, which very much mirror the aims and ambitions of the Year of Engineering itself.

As a supporter, connecting women engineers, linking between WES members and wider networks, providing technical and leadership development opportunities and sharing good practice with members and WES partners.

As a collaborator, by strengthening engineering, working with partners to plug the leaks along the pipeline from education to leadership, consulting with industry and companies and cooperating with government and policy makers.

As a challenger, changing cultures and urging partners to continue to further the diversity and inclusion agenda within their organisations and more widely across the engineering sector.

WES has a thriving membership, consisting of individual and company members and education partners. They run or support many high profile campaigns and programmes to promote and support women in engineering. These include International Women in Engineering Day (INWED); the Top 50 Women in Engineering campaign; and the MentorSET scheme.

INWED is an international awareness campaign to raise the profile of women in engineering and to focus attention on the amazing career opportunities available to girls in this exciting industry. It celebrates the outstanding achievements of women engineers throughout the world and for the last two years has been under the patronage of UNESCO. Taking place annually on June 23rd, it's a day in which women engineers should all

be involved! In 2018 it will be celebrating its fifth year, with the theme of "Raising the Bar", ahead of the WES centenary in 2019. Look out for #INWED18 #RaisingTheBar or find out how to get involved at www.inwed.org.uk

WES launched the Top 50 Women in Engineering campaign in partnership with the Daily Telegraph in 2016. The annual list features the UK's top rising female stars of engineering and shows the breadth and depth of talent across all engineering sectors. Publicising the great things which women routinely achieve within engineering is a great way of encouraging the next generation to enter the engineering and allied sectors and for women to succeed in that quest.

MentorSET is a successful yet unique monitoring scheme to help young women working in STEM (Science, Technology, Engineering and Mathematics). It provides independent mentors who understand the challenges faced and who can provide support and advice. WES have now created many hundreds of mentoring pairs across the UK and encompassing many different STEM careers. Feedback shows conclusively that participants are benefiting enormously and that MentorSET is playing a very useful part in helping women in STEM in the UK.

Of course, WES is particularly relevant to those setting out in their engineering career. The WES Young Members Board (YMB) is made up of early career-stage women engineers who are working, training or studying in an engineering field. The YMB enables the voices of these younger women engineers to be heard. The women making up YMB act as role models for other young women, who might be considering engineering sector careers. Involvement can offer the opportunity for personal, professional and leadership development through board experience and involvement in the YMB's own agenda of projects and strategy setting, under the umbrella of the WES vision.

WES gives out a number of awards each year, including the Karen Burt Award for the best newly qualified chartered engineer. The Amy Johnson Award honours an individual who has made a remarkable achievement in furthering the diversity agenda within engineering and applied sciences. This was complemented by the "Men as Allies" Award, introduced in 2017, which celebrates a male engineer who has gone above and beyond the call of duty to support his female colleagues, in addressing the gender imbalance within engineering. The WES Young Woman Engineer Prize is awarded by the IET, on behalf of WES, to a young female engineer who ia able to engage and inspire young people's involvement in STEM.

In other initiatives, WES operates regional cluster groups and 17 university based student groups which run a range of networking events, covering the breadth of the UK. They also produce a quarterly printed journal, The Woman Engineer, a monthly e-newsletter, and run the busy @WES1919 twitter account to spread awareness of opportunities and support for women in engineering.

WES turns 100 on the 23rd June 2019 - and they will be celebrating that first one hundred years in some style.

The University Of Sheffield.

Inspiring Engineers of the Future

Student Representatives for the iForge

Students using the 3D printers in the iForge

If the core objectives of the Year of Engineering are to inspire the next generation of young engineers, enthusing them with a passion for the challenges of the future, then it will find a natural bedfellow at one academic institution in particular.

The University of Sheffield is a Russell Group University with a reputation for world class teaching and research; and at the heart of the University, the Faculty of Engineering provides unrivalled information, inspiration and accessibility to the field of Engineering.

Covering the full spectrum of Engineering disciplines, the level of expertise and experience which is available to prospective students at the University of Sheffield is extremely impressive. Indeed, some of the departments within the Faculty celebrated their centenary in 2017, and are going from strength to strength even now.

Variety compliments speciality on the educational menu, seasoned by an outstanding commitment to personal innovation. Individual achievement and collective repute continue to enhance the burgeoning reputation of the Faculty and underwrite the growing credibility and currency of University of Sheffield qualifications.

Of course, no one at the Faculty of Engineering is content to rest on their laurels. They believe passionately that Engineering is, and must be, a relevant and fully accessible career path for today's young people. As a result, they are constantly exploring, and implementing, an exciting range of new challenges and opportunities, both academic and vocational.

For instance, each new crop of first year students takes part every year in the Global Engineering Challenge, where they work together as a team to tackle a series of real-world engineering problems. These have been identified by Engineers Without Borders, a renowned international group who this year are working in Kenya, addressing issues ranging from water provision and quality, to creating value from organic waste.


Matt & Natalie with their Handy Fastener shirt invention

Using the custom built iforge, a workshop space run by students for students, these young engineers of the future can use laser cutters, circular saws, 3d printers and many more specialised tools to bring their projects to life.

Hence, the students gain vital practical experience and application, whilst at the same time helping to make a positive contribution to the collective wellbeing of the Kenyan people.

Meanwhile, at a different end of the Engineering spectrum, but equally valuable in its own way, the Faculty are helping students with an entrepreneurial flair to take that first vital step in to the cut-throat world of commerce. Take Aerospace Engineering students Matt, Tom and Natalie, for instance, who launched their own business "**Handy Fasteners**", which produces magnetic buttoned shirts for sufferers of arthritis. They came up with the idea from a module they studied which allowed them to fast track the product to market. Take a look at their exciting story at www.handyfasteners.co.uk.

Those three talented young people have demonstrated a clear willingness to grasp the nettle; and strong, positive leadership is another admirable quality which the University actively encourages. Sheffield Engineering Leadership Academy (SELA) develops Engineering


SELA 2017 on a skills workshop


Amy Nicholson

undergraduate students to become leaders of tomorrow, able to create a positive impact in research and industry. These students gain valuable insight into business, supported by mentors from industry, skills workshops, guest speakers and group projects. SELA recruit based upon potential, not just previous achievement, and gives students the opportunity to work with industry partners and academics, to develop the skills and confidence to lead in an Engineering context.

In today's global economy, of course, the importance of an international reputation for any major academic institution is never forgotten, least of all at the University of Sheffield. Amy Nicholson, for instance, completed a degree in Computer Science and is now a Technical Evangelist in DX at Microsoft, which means she gets to work with all the latest technologies.

Amy says, "I chose Computer Science mainly because I really enjoyed subjects like Maths, IT and Design. The education which I got from the University of Sheffield was really fantastic as the department was brilliant and it didn't matter that I came in with no coding experience previously, as I was able to get up to speed and start learning new stuff. That led me to apply for an internship here at Microsoft and then I finally came back in as a graduate which has been fantastic."

Of course, amidst all of this innovation and technology, the fundamentals are not disregarded at the University of Sheffield. They never forget that Engineering is about making things for the real world. From candy floss to robots; from brick towers to exploring the aquatic depths.

What can YOU do with Engineering?

For more information please visit sheffield.ac.uk/engineering

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1 Learn from experts

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YEAR 1

2 Common Year 1, then specialise

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- Chemical Engineering
- Electronic and Electrical Engineering
- Mechanical Engineering
- Mechatronic Engineering
- Nuclear Engineering

3 Great learning environment

Students love studying and working in our cutting-edge facilities, including labs and workshops. 93% of our students agree that the IT and facilities at Lancaster 'supported my learning well.' *(National Student Survey 2017)*

YEAR 2

4 Change to MEng

Subject to meeting the requirements, you may want to change to a MEng degree and work towards Chartered status.

5 Industry and travel

Gain industry experience and earn while you work! With our excellent industry links, we can help you find the perfect placement. Or travel overseas and study with one of our partners in Europe, America or Australia. Both are optional.

6 Individual project

Often linking in with research, you will develop your project management skills as you work on an exciting specialist project. This experience will be invaluable as you begin your professional career.

7 Congratulations!

You've graduated with a BEng! Our average employment rate is 93.4%, demonstrating that our graduates are highly employable.

YEAR 3

TEF Gold

THE TIMES THE SUNDAY TIMES GOOD UNIVERSITY GUIDE 2018 UNIVERSITY OF THE YEAR

YEAR 4

8 Integrated masters

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9 Congratulations!

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www.southampton.ac.uk/thinkbig

The shape of things to come

The transforming work of civil engineers

What is civil engineering? It is question that is sadly asked all too often and one that we at the Institution of Civil Engineers (ICE) are hoping to answer once and for all during 2018 while we celebrate our bicentenary – ICE 200.

First and foremost civil engineering is a creative and rewarding career which allows professionals to tackle some of the most pressing issues of our time.

The work carried out by civil engineers over the past two centuries has transformed millions of people's lives for the better. By using innovative approaches and fresh thinking civil engineers have helped to shape the world around us.

Since our institution was founded by three young engineers in a coffee house in London it has grown into a global organisation with 92,000 members and offices in the UK, Middle East, Hong Kong and beyond. Our members work hard on projects that save lives, connect communities and safeguard populations against threats such as climate change and disease.

Two of the three engineers who founded the ICE were under the age of 30. They had the forethought and passion for the profession to establish the world's oldest engineering body.

Since then there has been a long history of civil engineers keeping people safe and transforming their lives for the better. Joseph Bazalgette, one of our past presidents, eradicated cholera from London by designing and building a world-leading sewer system. Isambard Kingdom Brunel, another famous member of the institution, changed the way the world was connected with his rail networks. Current member Parthajit Patra helped to build a metro system underneath the ancient streets of Delhi and Dr Anne Kemp works to integrate cutting edge digital technology into the fabric of the built environment. Meanwhile engineers like Brittany Harris develop sustainable water and sanitation solutions for the developing world so that people no longer have to fear the water they drink.

Few people know that this work goes on behind the scenes, day in day out, or that civil engineers are responsible. In many ways these engineers are 'invisible superheroes'.

To recognise these efforts, ICE has launched an Invisible Superheroes exhibition, which will run throughout

ICE 200. The exhibition will help to illustrate how civil engineers shape the world and safeguard the future but also demonstrate the real-world problems they are tackling. For those of you who are not able to make it to our London headquarters at One Great George Street there is a fully interactive 3D visual walkthrough available through the exhibition website.

It would be wrong, however, to think that civil engineering is solely about large projects and global challenges. Civil engineers provide many of the things we need and take for granted every day – like clean water, transport and electricity – helping people to live safer and easier lives. From designing and building flood defences to ensuring stable and sustainable energy supplies, civil engineers work to protect people and the places where they live. Ultimately they improve people's quality of life.

To illustrate the breadth and depth of the work of civil engineers ICE is sharing 200 of the most influential people and projects throughout 2018 on the 'What Is Civil Engineering?' web pages. Throughout the year we will be showcasing projects from throughout history and from around the world that illustrate just how important civil engineers are to society.

This is a fantastic opportunity to see behind the scenes of the London Underground system and learn about what it takes to build and maintain a mass transit system. You will also be able to learn about the work that went into the construction of the London Olympics, and the work done by the selfless engineers who work on projects in developing countries, or the Antarctic research base that can move by itself across the ice.

Once we've inspired you to become a civil engineer, you'll be able to find all the information you need on how to start your career. No matter what your age there are easy to follow guides on the subjects you need to study, and the routes to qualification, , be they through university or by taking an apprenticeship.

ICE 200 will also involve a range of activities in your local area that will give you the opportunity to learn more about civil engineering and offer insight into how projects near you are transforming lives. Search for 'Café 200' and find out if a civil engineer is giving a talk in your area.. Take part in an Explore Engineering event and go on a tour or follow a trail around the important projects local to you.

We live in a world where the dual threats of climate change and population growth are already beginning to have a serious effect on the way we live. In recognition of this and in an effort to

find lasting and achievable solutions ICE will host a Global Engineering Congress and ask world-leading civil engineers to address the pressing need for action on climate change, delivering clean water, sustainable energy and a better connected world. This is an opportunity for civil engineers to once again make the world a better place and safeguard the future for all of us in the same way that Bazalgette, Brunel and Telford did in their day. Following a career in civil engineering will provide you with an opportunity to have a similar impact in the future.

Many people assume that civil engineering involves pouring concrete while wearing high visibility jackets and hard hats, but that is an old-fashioned view. Civil engineers engage with cutting edge digital technology for designing and building projects – 3D modelling their designs and using state of the art sensors. Others work in remote areas of Africa building bridges that connect small isolated communities to schools and health centres, and provide clean water and sanitation. Or, in one special case they installed an enormous blue whale skeleton in the Natural History Museum in London.

Inspired? We hope so. There are now many ways that you can become a civil engineer and give yourself the opportunity to join the ranks of our invisible superheroes. You can take the academic route by studying at university, or gain on the job experience as an apprentice. You can also take a vocational qualification in civil engineering at a UK FE college.

The most important thing to have if you want to become civil engineer is positive, can-do attitude and an inquisitive mind. You should be thinking about studying some relevant subjects - English, maths and sciences at GCSE level are important as well as subjects such as geography, art, design & technology. Maths is fundamental to engineering so you will need a GCSE grade 4 or grade C or above to start an apprenticeship while A-level maths at grade C or above for could get you to university.

ICE is a key supporter of Year of Engineering and would encourage as many of you as possible to consider a career in engineering.

Web links

ICE 200 - https://www.ice.org.uk/ice-200

Invisible Superheroes Exhibition - https://www.ice.org.uk/events/exhibitions/ice-invisible-superheroes-exhibition

What is Civil Engineering - https://www.ice.org.uk/what-is-civil-engineering

ICE – ice.org.uk

ICE East Midlands Bicentenary Gala Dinner and Merit Awards

8 June, 2018 | 18:00 - 23:59

Event organiser: ICE
Event type: Networking
Price: From £50 excl VAT
Broadcast online: No
Contact: Fiona Turner

VENUE ADDRESS:
The Roundhouse
Roundhouse Road
Derby
DE24 8JE
United Kingdom

ICE are celebrating the Institution's 200th anniversary, and the work and achievements of the superhero civil engineers of the region, at a Gala Dinner and Merit Awards ceremony. A fantastic opportunity to network with other unsung heroes who help shape our world too! Come and celebrate and be part of ICE 200.

The prestigious ICE East Midlands Bicentenary Gala Dinner, on Friday 8 June 2018 at The Roundhouse, Derby, is the region's premier networking built environment event of the year and the biggest and best dinner event yet!

Join in to celebrate the winners and all aspects of their achievements, whether related to projects or people. ICE's President, Professor Lord Robert Mair will present the awards and certificates on the evening.

Join in and take part in celebrating East Midlands' civil engineering excellence and the 200th anniversary.

Dress code: Black tie

Annual Dinner Full Price
(Rate applies to booking(s) made after 20 January 2018)

- £600.00 +VAT - Academic Establishment Rate
- £90.00 +VAT - Individual Member/ Non-Member
- £55.00 +VAT - Concessions (Students, Graduates and Seniors)
- £900.00 +VAT - Table of 10
- £810.00 +VAT - Table 10 with -10%

Want to sponsor the event? Sponsorship opportunities are available. For further information contact: richard.davis@ice.org.uk

Global Engineering Congress, London

In October 2018, ICE and the World Federation of Engineering Organisations will hold the first Global Engineering Congress, an ambitious effort to agree a worldwide response to deliver the UN's Sustainable Development Goals.

Some people believe that the world urgently needs to take action on climate change, and engineers have a huge role to play delivering clean water, sustainable energy and a connected world. Wider discussion will consider how infrastructure and engineering can help alleviate poverty, promote responsible consumption and production, work towards gender equality and encourage worldwide health and wellbeing.

The event represents a unique gathering of ICE, the World Federation of Engineering Organisations, American Society of Civil Engineers, Canadian Society of Civil Engineers, European Council of Civil Engineers, Commonwealth Engineers, Engineers Australia and many more.

Taking place in Westminster, London, the week-long congress falls within ICE's bicentenary year, the 50th anniversary of WFEO and UK Government's Year of Engineering.

It is an unprecedented opportunity to bring the global community together and agree steps to creating a future proof world.

20 - 26 October, 2018

Event organiser: ICE
Event type: Conference
Price: TBC
Broadcast online: No
Contact: Events Team

VENUE ADDRESS:
Institution of Civil Engineers
One Great George Street
Westminster
London SW1P 3AA
United Kingdom

QUEST marks the ICE 200 bicentenary

QUEST is to boost the number of scholarships and awards granted in 2018 to 200, in support of the ICE 200 bicentenary celebrations.

QUEST is ICE's flagship scholarship programme which has provided financial help to civil engineering students for the past 40 years.

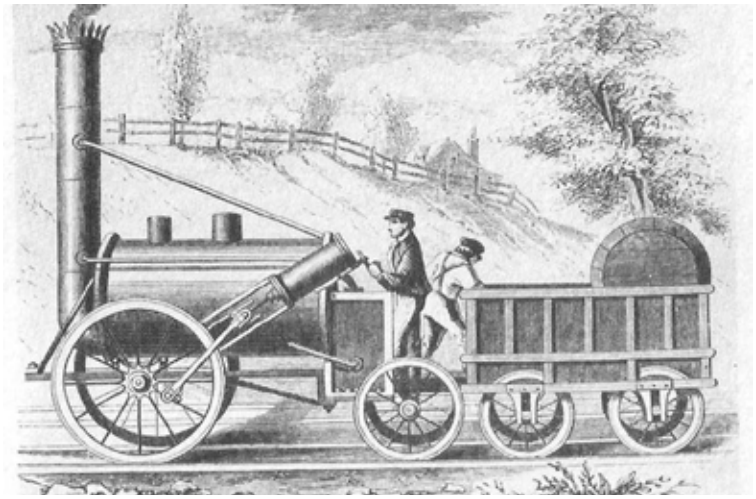
2018 will also see the first awards for the new QUEST Technician Plus Scholarship which further underlines the programme's aim to reach and support professionally qualified members at all levels.
You can read first-hand how QUEST has benefited the careers of past and present scholars in our special 40th anniversary publication.
QUEST Undergraduate Scholarships were awarded to 75 first year university students this year – supported by leading civil engineering companies, donors and members.

QUEST awards are offered to outstanding candidates who are put through a rigorous application process and interview day in order to be successful.

The scholarship is worth up to £10,000 over the course of study with paid placements for most scholars.

The world's first railway

- from inception to design



The L&MR is probably the most outstanding piece of Civil Engineering Heritage in the region, if not the country. Acknowledged as the world`s first locomotive hauled steam railway, it still performs its original function today. It was instrumental in enabling the Industrial Revolution in the UK and the technology and the engineers went on to build the railways of the world.

The talk will deal with the inception, planning, design and construction of the railway. It will go on to the choice of motive power and the opening of the railway.

The speaker is Jim Parry, a chartered civil engineer and retired senior lecturer (Liverpool John Moores University). Jim has a great interest in civil engineering heritage in general and in his native Liverpool. He views the heritage in terms of 'What has engineering done for the city?', and, 'What has the city done for engineering?'

Jim chairs the ICE NW Historical Engineering Group whose aims include saving valuable pieces of infrastructure for posterity and also publicising the works that still perform their original purpose, forming integral parts of the modern day infrastructure of the region.

This meeting is being run in conjunction with the Manchester library archive and a selection of items relating to the railway will be available to view before the presentation.

As part of ICE's bicentenary celebrations, the presentation is open to the public. Please feel free to bring friends and family along.

Organised by ICE Manchester Branch.

For further details please contact Katie Goode: Katie.Goode@arup.com

9 January, 2018 | 18:00 - 20:00

Event organiser: ICE
Event type: Lecture
Price: Free
Broadcast online: No
Contact: Janice Parkinson

VENUE ADDRESS:
Manchester Central Library
St Peter's Square
Manchester
M2 5PD

Masterchef Serves up a treat for ICE

MasterChef: The Professionals will be serving up a celebratory dinner at the Institution of Civil Engineers (ICE), the world's first professional engineering body, ahead of the Institution's 200th anniversary in 2018.

Episode 15, in Knockout Week, will see the chefs create a three-course fine-dining menu for ICE President Lord Robert Mair and other ICE VIPs at the Institution's Grade II listed headquarters at One Great George Street, London. Marking the Institution's upcoming bicentenary, the meal will celebrate civil engineering and its role in improving people's lives.

Lord Robert Mair,, outgoing President of ICE, said:
"Civil engineers are often unsung heroes, working behind the scenes to make society better and safer. We often take for granted the benefits of modern life – from our energy supplies to sanitation to our ability to travel – and many people are unaware that civil engineering makes these things possible. MasterChef: The Professionals has given us a unique opportunity to shine a spotlight on our profession and introduce to a wide audience how we work to transform people's quality of life and safeguard the future.

"As an award-winning venue, our One Great George Street building is no stranger to high-profile events and we were pleased to provide a suitable stage for the competition. We look forward to seeing the episode's contestants on screen."

The MasterChef: The Professionals episode kicks off a full programme of ICE bicentenary celebrations, with events planned around the UK throughout 2018 to showcase and explain civil engineering to the public. One Great George Street will host a year-long Invisible Superheroes exhibition, celebrating the history of civil engineering and showing the improvements that engineering and engineers have made to people's lives. The ICE will also publish a commemorative coffee table book, which will profile 200 influential civil engineering projects, organisations and individuals from the past 200 years

Transform and protect lives - Hong Kong summit marks ICE 200

Event organiser: ICE
Event type: Lecture
Price: From HK$1,500
Broadcast online: No
Contact: Crystal Fung

VENUE ADDRESS:
JW Marriott Hotel Hong Kong
One Pacific Place
88 Queensway
Admiralty
Hong Kong

The Institution of Civil Engineers (ICE) celebrates its 200th anniversary in 2018 and will be organising signature events across the globe. One of the flagship programmes is the ICE Bicentenary Hong Kong Innovation Summit. This high profile event will be graced by The Hon Mrs Carrie Lam Cheng Yuet-ngor, GBM, GBS (The Chief Executive of HKSAR and Honorary Fellow of ICE), and Professor Lord Robert Mair (incoming ICE President and Sir Kirby Laing Professor of Civil Engineering at the University of Cambridge).

The theme of the summit is "Transform and Protect Lives". There will be two plenary sessions covering the topics of Smart City and Climate Change Resilience respectively. The format of the summit will consist of inspirational keynote addresses setting out the vision, strategic directions, barriers and threats, and mainstreaming innovations and technological solutions. A highlight of the summit will be the roundtable discussions by the keynote speakers debating and probing into the key issues and what breakthroughs are needed to transform and modernise the industry in order to better meet emerging societal needs and embrace the challenges.

Tees Barrage recognised as part of ICE's regional anniversary celebrations

ICE North East is recognising the positive impact Tees Barrage has had on Stockton, as part of its 125th regional anniversary celebrations.

Tees Barrage, which forms part of the Canal & River Trust, has been presented with a commemorative ICE 125 plaque, in celebration of the 125 years since the Institution was established in the region.

ICE North East members were asked to vote for the projects they believe have had a positive impact on the region, based on their engineering technical excellence, public benefit, sustainability and influence on raising the profile of civil engineering.

Tees Barrage, along with the Gateshead Millennium Bridge, were unanimously selected as the top two projects by ICE North East, as part of its prestigious Robert Stephenson Awards, which recognise engineering excellence across the region.

Penny Marshall, ICE Regional Director in the North East, said: "It is an important period in the Institution's rich history as we gear up for our bicentenary, and it is equally important to recognise the impact key landmarks have had on the North East. There are many projects and structures throughout the region that have contributed a great to deal to the region's infrastructure and people's everyday lives in the region.

"Tees Barrage has boosted its regional economy as it has facilitated the regeneration of the adjacent land for amenity, leisure, educational and commercial uses. It was resoundingly selected as one of the region's top infrastructure projects by our members, as a result of its importance to Stockton and the wider North East economy."

Mike Marshall, Customer Operations Manager at the Canal & River Trust, said: "The Tees Barrage is a unique structure in the 2,000 miles of canals and rivers our charity looks after and we're thrilled this impressive structure has been recognised by ICE North East with their special anniversary award."

He added: "As well as the day-to-day running of the Barrage and the River Tees, our team has been working with some brilliant volunteers who meet monthly to help transform the waterscape at the Barrage into a place where visitors and the local community can enjoy and relax. With new wildlife displays in our Welcome Station, a dipping pond, bug hotel, flower displays, outdoor seating and of course opportunities for fishing, boating and seal-spotting - it's a must-see destination! Please get in touch through our website if you'd like to join our volunteer group."

Yorkshire & Humber Engineer Photography Competition launched

In 2018 the Institution turns 200. Help ICE celebrate some of the civil engineering projects and schemes that have had the greatest impact on people's lives over the past 200 years by entering this photography competition.

A showcase for the very best digital photography of the built environment in the region, the competition is open to all schools, colleges, photo clubs, members of the public, as well as industry colleagues.

The institution has selected 20 significant civil engineering projects across the region, and entrants are invited to capture a photograph of one of the structures. There is no limit to the number of photographs you can enter. The photographs will be featured in a number of public spaces at a prestigious anniversary exhibition next year, as the institution celebrates its bicentenary. There are also three cash prizes. Prizes: Winner £250, Second Prize £150, Third Prize £100.

Top 10 subjects:

- *Blackburn Meadows Waste Water Treatment Works, including Sheffield Megatron*
- *Drax Power Station*
- *Emley Moor transmitting station*
- *Humber Bridge*
- *Humber ports*
- *Middleton Railway*
- *Saltaire and Leeds & Liverpool Canal*
- *Scammonden Dam/M62 Pennine section*
- *Tinsley Viaduct*
- *Washburn valley reservoirs*

Alternative subjects:

- *Cleethorpes Pier*
- *Huddersfield Narrow Canal/ Standedge Tunnel*
- *Hull Tidal Barrier*
- *Leeds-Bradford Airport runway*
- *Leeds Station southern entrance*
- *Lockwood Viaduct*
- *Nidderdale Aqueduct*
- *Selby Diversion*
- *Underpinning of York Minster*
- *York Railway Station*

Good luck

ICE 200 West Midlands Awards Dinner

2018 is ICE's bicentenary and to celebrate ICE have introduced four special ICE 200 Awards for people and projects which which have made a significant impact on society or transformed lives over the last 200 years.

The Awards Dinner is an excellent opportunity for those involved in the built environment industry to develop their network and enjoy fine food. Join in at this special bicentenary event to celebrate great West Midlands engineers and projects of the past, present and future.

Every year delegates say that the Awards Dinner is great value for money, an enjoyable event, and they always rate the venue and catering as excellent.

The evening includes a three course meal with coffee.

Dress code: Black tie

Annual Dinner Full Price (Rate applies to booking(s) made after 20 December 2017)

- £600.00 +VAT - Academic Establishment Rate
- £90.00 +VAT - Individual Member/ Non-Member
- £55.00 +VAT - Concessions (Students, Graduates and Seniors)
- £900.00 +VAT - Table of 10
- £1080.00 +VAT - Table of 12

Want to sponsor the event? Sponsorship opportunities are available. For further information contact: jane.clinton@ice.org.uk

9 May, 2018 | 19:00 - 23:00

Event organiser: ICE
Event type: Networking
Price: From £45 excl VAT
Broadcast online: No
Contact: Daniel Stanyard

VENUE ADDRESS:
The ICC
Broad Street
Birmingham
B1 2EA
United Kingdom

Millenium Bridge Commemorated in ICE regional awards

ICE North East is recognising the positive impact the Gateshead Millennium Bridge has had on Tyne & Wear, as part of its 125th anniversary celebrations.

A commemorative ICE 125 plaque has been installed at the bridge, in celebration of the 125 years since the Institution was established in the region.

ICE North East members were asked to vote for the projects they believe have had a positive impact on the region, based on their engineering technical excellence, public benefit, sustainability and influence on raising the profile of civil engineering.

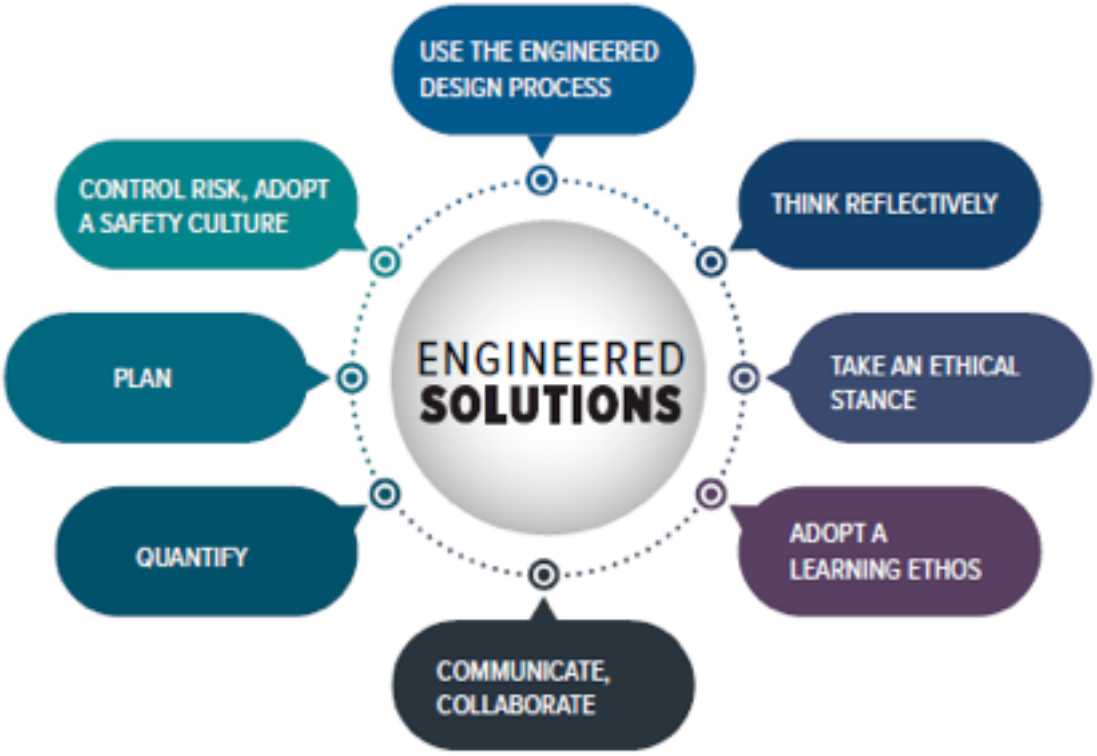
Gateshead Millennium Bridge, along with Tees Barrage, were unanimously selected as the top two projects by ICE North East, as part of its prestigious Robert Stephenson Awards, which recognise engineering excellence across the region.

Penny Marshall, ICE Regional Director in the North East, said: "It is an important period in the Institution's rich history as we gear up for our bicentenary, and it is equally important to recognise the impact key landmarks have had on the North East. There are many projects and structures throughout the region that have contributed a great to deal to the region's infrastructure and people's everyday lives in the region.

"The Gateshead Millennium Bridge is an iconic structure that has benefited the Newcastle-Gateshead quayside economy immensely, and has become a symbol of Tyneside. It was resoundingly selected as one of the region's top infrastructure projects by our members, as a result of its importance to the region and the wider North East economy."

Cllr Angela Douglas, Cabinet Member for Culture Sport and Leisure at Gateshead Council, said: "The Gateshead Millennium Bridge is now a distinctive part of the Tyneside skyline and we're very proud that it's been unanimously chosen by the Institution as one of the most important engineering projects in the North East over the last 125 years."

What strategies do professional engineers use when they successfully solve complex problems?



You can find out more by reading:

To Engineer

This 18 page paper, written in an easy to understand format summarises professional engineering methodology. It can be downloaded from www.iesis.org/toengineer

An IESIS Strategy Paper
Published by IESIS, a multi-disciplinary engineering institution. www.iesis.org

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Professional development recognised - by ICE review awards.

In order to celebrate the achievements of those who've completed their professional review, ICE offers a number of awards.

There are three awards for newly qualified members. These go to members who show an exceptional standard of civil engineering knowledge in their Member or Chartered Professional Review.

The awards are:

•The James Rennie Medal – for the best Chartered Professional Review candidate

•The Renee Redfern Hunt Prize – for the best written exercise produced at Chartered or Member Professional Review

•The Tony Chapman Medal – for the best Member Professional Review candidate of the year

They also nominate a recently chartered female member to represent ICE for the Karen Burt Award, which is run by the Women's Engineering Society.

James Rennie Award

The James Rennie Medal recognises the best Chartered Professional Review candidate of the year. It's open to candidates who have passed their review the year before the medal is awarded. James Rennie was a well-known civil engineer. He passionately believed that to work in civil engineering you need in-depth and thorough training. This is not only in design, but also in programming and planning construction work.

Rennie spent most of his 70-year career carefully tutoring his pupils to make them great civil engineers. Former ICE President Douglas Oakervee was one of these pupils.

After his death in 1994, ICE created the James Rennie medal. It celebrates Rennie's commitment to training young engineers and encouraging them to become ICE members.

The James Rennie Medal promotes the achievements of newly qualified chartered civil engineers. The competition was first held in 1996 and is won by the best Chartered Professional Review candidate.

Professional reviewers nominate candidates who show outstanding qualities in their review and really promote developments in civil engineering. Their project reports and presentations also need to show they thoroughly understand engineering design and construction principles.

Each finalist presents their report and participates in a lively question and answer session with the audience and judging panel. The winner is announced on the night.

Winners receive the James Rennie Medal and £1,000, which are presented at the ICE Annual Awards Ceremony. All three finalists also get a certificate and the chance to have their reports published in an ICE journal.

Renee Redfern Hunt Prize

This prize is awarded for the best written exercise produced during the Chartered or Member Professional Review session. Miss Renee Redfern Hunt MBE was a devoted Examinations Officer at ICE from 1945 – when professional interviews were introduced – until her death in 1981. The award was created in her memory.

You can be nominated if you have passed your Chartered or Member Professional Review. To be nominated, candidates must have a well-structured argument in their written exercises. They also need a high-standard of clear, concise written English. Nominations are made by reviewers from each review session.

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INSPIRED WORK

The winner is awarded £100 and presented with a certificate at the ICE Annual Awards Ceremony. Nominees' names are published in the NCE/NCEI magazines and on the ICE website. The winner also gets the opportunity to have their work published in an ICE journal.

Tony Chapman Medal

The Tony Chapman Medal is awarded to the best Member Professional Review candidate.

This award promotes the role of newly qualified incorporated members (IEng). It's open to all applicants who passed their review in the year before the medal was awarded. Tony Chapman (1948-2004) worked hard to promote ICE incorporated members. He was a member of the ICE Council, Finance Committee and Professional Development Committee and chaired the Building Committee.

Tony was also a former Chairman of the Board of Incorporated Engineers and Technicians, and played an important role when it was integrated into ICE. He was also an ICE reviewer.

Karen Burt Award

The Karen Burt Award goes to a high-calibre female who is a recently chartered engineer, applied scientist or IT professional. This award, which commemorates Dr Karen Burt, is given by the Women's Engineering Society.

Dr Karen Burt was a respected physicist and a member of the Women's Engineering Society. She campaigned tirelessly for women to have careers in science and engineering. Her experience and extensive research helped women working in engineering to manage their career breaks and return to work.

What sort of person wins these awards?

The Women's Engineering Society (WES) selected ICE's nominee Helen Randell as the winner of the 2015 Karen Burt award . Helen worked for Interserve Construction Ltd when she became a Chartered Engineer in Spring 2015. She has had a variety of experience including work on the Hereford and Worcestershire Energy from Waste Scheme as the Temporary Works Co-Ordinator.

Helen said: "I am thrilled and honoured to receive the prestigious Karen Burt Award from WES. I feel extremely fortunate that my love of problem solving has formed the basis of my rewarding career where I can point to a finished project and say I did that! I really enjoy having the opportunity to share my experiences so far with other young women and hope to encourage and inspire others to join the exciting and ever changing world of engineering where we really can make a difference."

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LIEBHERR

The Engineer at the heart of the Bloodhound project

No major engineering project can succeed without a knowledgeable, experienced engineer leading its team. At BLOODHOUND, this is Engineering Director Mark Chapman, who has been with the Project since 2008.

Mark followed a well-trodden road into engineering via science and maths A levels, a year's apprenticeship with BAE Systems and then a degree in Aeronautical Engineering from the University of Bath. Like BLOODHOUND Driver Andy Green, he also had early links with the RAF – in this case as an acting pilot officer for 3 years at Cranwell.

Once qualified, Mark began to establish a solid CV, describing himself as "Lucky enough to work on a wide range of projects, from designing the rotor control actuators for the AB139 helicopter, to a sewage works in Totnes, though this perhaps was pushing the limits for what could be termed fluid dynamics!" Primarily, though, Mark's jobs were related to aerospace projects, including a couple of years in Seattle in the USA for Boeing with its Propulsion Systems Division, and quite a while based in Bristol working for Rolls-Royce. He also spent nearly 4 years as part of the design team on the STOVL system for the F-35 Lightning II, the Joint Strike Fighter.

Moving into motorsport

BLOODHOUND isn't the first time Mark has worked with Project Director Richard Noble. "I've been involved with Richard on a couple of previous ventures, and I can safely say that they've never been dull! So when I had a call about whether I'd be interested in being involved in a car-based project, it didn't take long to say yes."

It's quite a project to start with as your first professional foray into the world of motorsport. Mark admits, though, that he did once attempt driving a rally car: "I managed to convince my wife (after a little wine or two) that for our honeymoon it would be a great idea to enter a Lancia Stratos replica into the London to Athens World Cup rally, which was – how shall I put it – character forming."

Mark started at the BLOODHOUND Project as Senior Design Engineer, later becoming Chief Engineer and then Engineering Director. His brief is as broad as the Car is long, and it's safe to say that without Mark on board, BLOODHOUND would not have been roaring up the runway at Cornwall Airport last October

Solving the unexpected

"Working on BLOODHOUND is a fantastic job. No one knows what the right answer is going to be. For example, when we started, we never would have expected the Car to take the shape it has, but that's what our research and testing came up with. You wake up in the morning and don't know what the problem will be, but more excitingly, you don't know where you are going to find the answer. But thanks to our great Engineering Team and the support of our sponsors, we always find it."

Mark is also passionate about the educational side of BLOODHOUND and is himself a STEM Ambassador, despite the pressures of his role. "It is great to meet 10 year old kids who have really thought hard about the Project. They do research online and come up with some really interesting questions. They seem really excited by it – their eyes light up when they learn about it. If this doesn't get people excited about STEM, nothing will."

A Man of Many Engineering Talents

Photographer, Mountaineer, Rock climber, Skier, Explorer, BGA Gliding instructor, CAA Instrument-Rated Aviator, RYA Yachtmaster Ocean Instructor, Inventor, Patentee, Entrepreneur, Company director, Safety-critical Control Manufacturer, Automator, Horologist, Collector, Author, Architect, Developer, House-Builder, Philanthropist, et cetera.

Dr John C Taylor was born in Buxton, Derbyshire in 1936 and was sent as an evacuee to Canada in 1940 during the Second World War. He was educated at King William's College in the Isle of Man followed by Corpus Christi College, Cambridge, where he studied Natural Sciences and participated on Cambridge Spitsbergen Expeditions of 1958 and 1961.

After graduating, John joined Otter Controls Ltd, founded by his father, Eric, and in the early 1960s began inventing and designing controls using bimetal. Many of these inventions are still in production today.

In 1977 John moved to the Isle of Man and in 1981 founded Strix Ltd, retiring in 1999. The company was named UK Manufacturer of the Year in 1995 and has received four Queen's Awards - three for export and one for innovation, granted for John's 360° cordless kettle connector and underfloor heating element, inventions that spread the acceptance of British electric kettles to Europe and then throughout the World, gaining a 76% market share.

In 2000, John was granted an Honorary Doctorate of Engineering from the University of Manchester Institute of Science and Technology (UMIST). This was followed in 2017 by an Honorary Doctorate of Science from the University of Durham.

His inventions are used every day by almost every household and workplace in the UK and many throughout the World. Strix has manufactured an estimated 2 billion kettle controls which operate every day more than 1 billion times. As well as being one of Britain's most prolific inventors with over 400 patents registered in his name, Dr Taylor has also conducted extensive research into horology and has a fine collection of early English clocks. He is one of the world's leading experts on the work of John Harrison, an early pioneer in timekeeping and sea clocks. This has led Dr Taylor to design and have Stewart Huxley build the Corpus Chronophage, a three-metre-high clock that is displayed on an exterior wall of the Corpus Christi College undergraduate Taylor Library as his tribute to John Harrison. This time-eating Chronophage clock has become the premier visitor attraction of Cambridge.

Apart from his two honorary doctorates, Dr Taylor has also been the recipient of many other honours including but not limited to:-

- The appointment as a Fellow of the Institute of Patentees and Inventors
- The appointment as an Officer of the Order of the British Empire in 2011 New Year's Honours List for his services to 'business and horology.'
- Appointment as a Fellow of the Royal Academy of Engineering for his outstanding contributions to the advancement of British engineering, innovation and commerce.
- The Harrison Medal awarded by the Worshipful Company of Clockmakers for excellence in horology.
- The Chancellor's 800th Anniversary Medal for Outstanding Philanthropy to the University of Cambridge, presented by HRH the Duke of Edinburgh at Buckingham Palace on 22nd July 2009.

Contact details

For more information about Dr John C Taylor and his work, please visit:- www.JohnCTaylor.com.

Dr Taylor's team is based more on the Isle of Man and can be contacted at:- office@johnctaylor.com or by phone on +44 1624 828 880

Isle of Man STAMPS & COINS
Cowraghyn Post as Cooinaghyn Ellan Vannin

BRITISH ISLES

New stamp issue honours Dr John C. Taylor

With a set of six stamps, the Isle of Man Post Office is celebrating the life and work of one of the Island's most prominent and highly-acclaimed residents, world-renowned inventor and businessman Dr John C Taylor OBE.

The stamps focus on various aspects of the successful inventor's career, passions and philanthropy.
"I have lived my life deliberating, inventing, creating, producing and perfecting. Through this unique issue of stamps, the Isle of Man Post Office has captured my life's work. It would be marvellous if others seeing the stamps were to follow my motto, 'Cogitate Incogitata', Think the Unthinkable."

Chronophage

Taylor Clock Collection

Chronophage

The first iconic Chronophage clock is the Corpus Chronophage, which stands proud on the wall of Corpus Christi College, Cambridge, from where Dr Taylor graduated in 1959.
The clock, which has a unique, patented mechanical mechanism, was installed in 2008 and unveiled at a ceremony hosted by Professor Stephen Hawking. It has since become the most popular and visited landmark in Cambridge. Dr Taylor donated the Chronophage to the College together with funds for the new Taylor Library.

Each Chronophage – meaning 'time-eater' in Ancient Greek – features a formidable creature slamming its jaws shut at the end of each minute, representing the fact that time has gone forever."

The creature on each Chronophage is an essential part of the clocks' mechanism, a 'grasshopper escapement', invented by one of Dr Taylor's greatest clock-making influences, John Harrison; who designed the first accurate sea going clocks and also invented bimetal for the clocks' temperature mechanism.
Dr Taylor has created four Chronophage clocks: The Corpus Chronophage, Dragon Chronophage both featured on this stamp, the Midsummer and a private commission in Texas, USA.

Taylor Clock Collection

Dr John C Taylor has one of the world's most comprehensive collections of early English clocks, including one of only three surviving and working John Harrison longcase clocks.

His interest in clocks first began by watching his father repair clocks, disassembling, cleaning and carefully reassembling them. Throughout his life, his passion for clocks and the great horologists and innovators has not diminished.

Dr Taylor is known in the horological circles as an expert in early English clocks, and the technological advancements that these clocks made possible. His knowledge of the life and work of John Harrison is particularly well-respected. On the unveiling of the memorial to John Harrison in Westminster Abbey, conducted by Prince Philip, Duke of Edinburgh, Dr Taylor held an exhibition in the Jerusalem Chamber of clocks from his own private collection, including one made by Harrison and lectured to explain Harrison's genius.
Dr Taylor was awarded the Percy Dawson Medal by the Antiquarian Horological Society and the Harrison Medal by the Worshipful Company of Clockmakers for "his services to horology" as also stated in his OBE citation.

Bimetal Kettle Switch

Early electric kettles would not turn off when the water was boiling, requiring constant supervision with danger of starting fires if not properly used. Dr Taylor created his solution to this problem: a small, bimetallic control to automatically switch off the element when the water boils or if no water is in the kettle.

The inventor's simple but remarkable solution uses a bimetal strip of two metals bonded together, one of which expands more than the other when exposed to heat. This means that the strip bends one way when it is heated and the other way when it cools. Dr Taylor's invention uses bimetal strips to manufacture round bimetal blades pressed spherically, changing the creep action strip into snap action calibrated components. The movement of the centre leg in the blade (shown above) is used to switch off the kettle when it boils, whilst other Taylor blades protect a kettle switched on without water. Thus each operation of every control is safety critical and is tested throughout its life against an absolute physical standard – water boiling point 100°C.

This is one of Dr John C Taylor's most beneficial inventions, utilised in switching off boiling kettles worldwide over a billion times every day. Over two billion controls have been manufactured and sold worldwide by Strix Ltd.

Otter G Switch

The Otter Gs are very small controls designed by Dr Taylor in the early 1960's, used as a temperature-sensitive thermostat or safety cut-out for electric blankets, hairdryers and other small domestic appliances. It is also current-sensitive, widely used in electric motors as in washing machines and the many electric motors in cars such as window lift, windscreen wipers and seat movers.

Technological innovation has seen car design and production changes over the past fifty years, but the design of the Otter G electro mechanical switch has remained the same throughout.

An average of approximately a quarter of a million Otter G switches and derivatives are made every week, and this has been the case each week for the past fifty years. This is thanks to the switch's versatility and its simple but intelligent, cost-effective design.

Arragon Mooar

Arragon Mooar is Dr Taylor's home on the Isle of Man, which he designed himself and had built in the rugged natural countryside overlooking the Irish Sea. Built from traditional materials, the house has a copper roof, used as a landmark for pilots landing at the Isle of Man Airport. It is also less than five miles from the school Dr Taylor attended from 1950-56, King William's College.

Named after an ancient stone circle near to the house, Arragon Mooar is designed around an elliptical atrium and exterior using Palladian details in a new way, unique in the Isle of Man and the whole of the British Isles. Such is Dr Taylor's passion for elliptical design, he requested that this set of stamps have elliptical perforations, which is a first for the Isle of Man Post Office.

Dr Taylor opens his house for charity fundraisers, horological, archaeological talks and school visits.

Taylor Library & Professorship of Innovation

Dr Taylor is committed to inspiring and supporting the next generation of engineers, inventors and innovators, and has made generous philanthropic donations to many individuals and institutions:-

- In 2008, a donation making possible the building of the new Taylor Library at Corpus Christi College, Cambridge, followed by the gift of the Corpus Chronophage Clock that has become the main visitor attraction of Cambridge.
- In 2015, he became the main sponsor of the new Dr John C Taylor Enterprise Hub, otherwise known as the Taylor Centre, in the Royal Academy of Engineering, London.
- In 2017, establishment in perpetuity The Dr John C Taylor Professorship of Innovation in the Engineering Department of Cambridge University.

Dr John C Taylor said, "The UK has a great history of invention and enterprise, and our reputation as a nation of problem-solvers and innovators continues to this day. In a globalised world, it is vitally important that we support the next generation of innovators, who will support their communities by creating jobs, financial growth and opportunities for others."

Bimetal Kettle Switch

Otter G Switch

Arragon Mooar

Taylor Library & Professorship of Innovation

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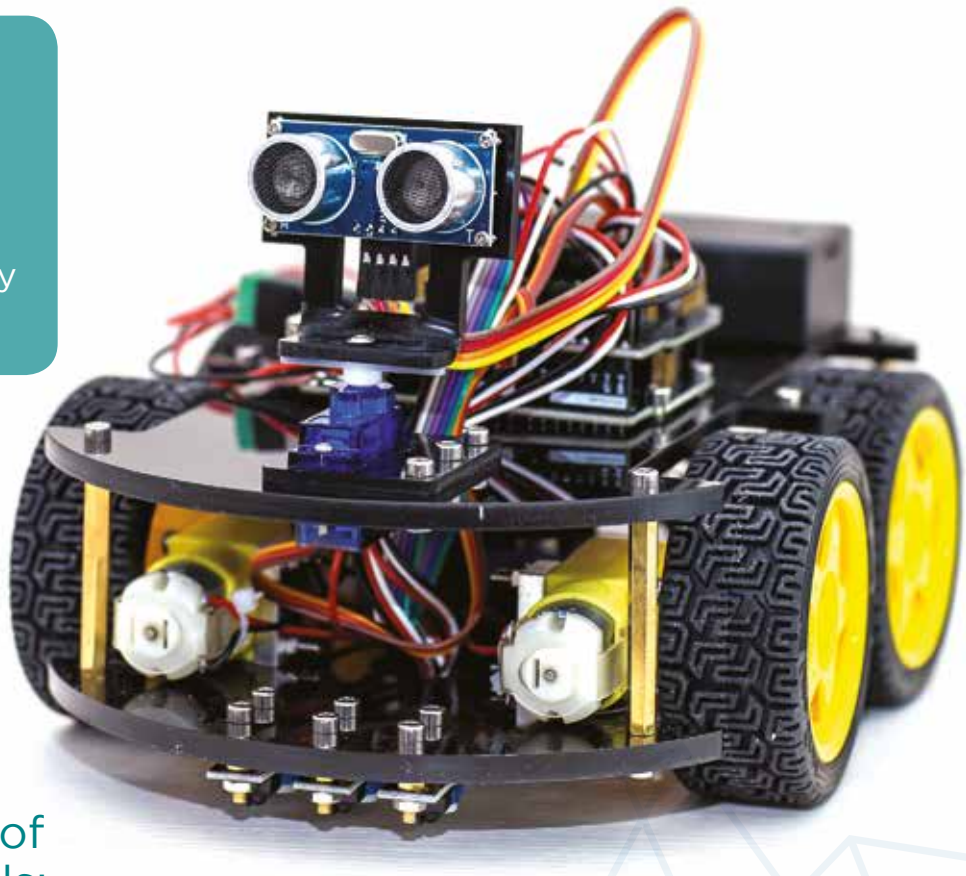

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http://bsa.sc/crestsilver

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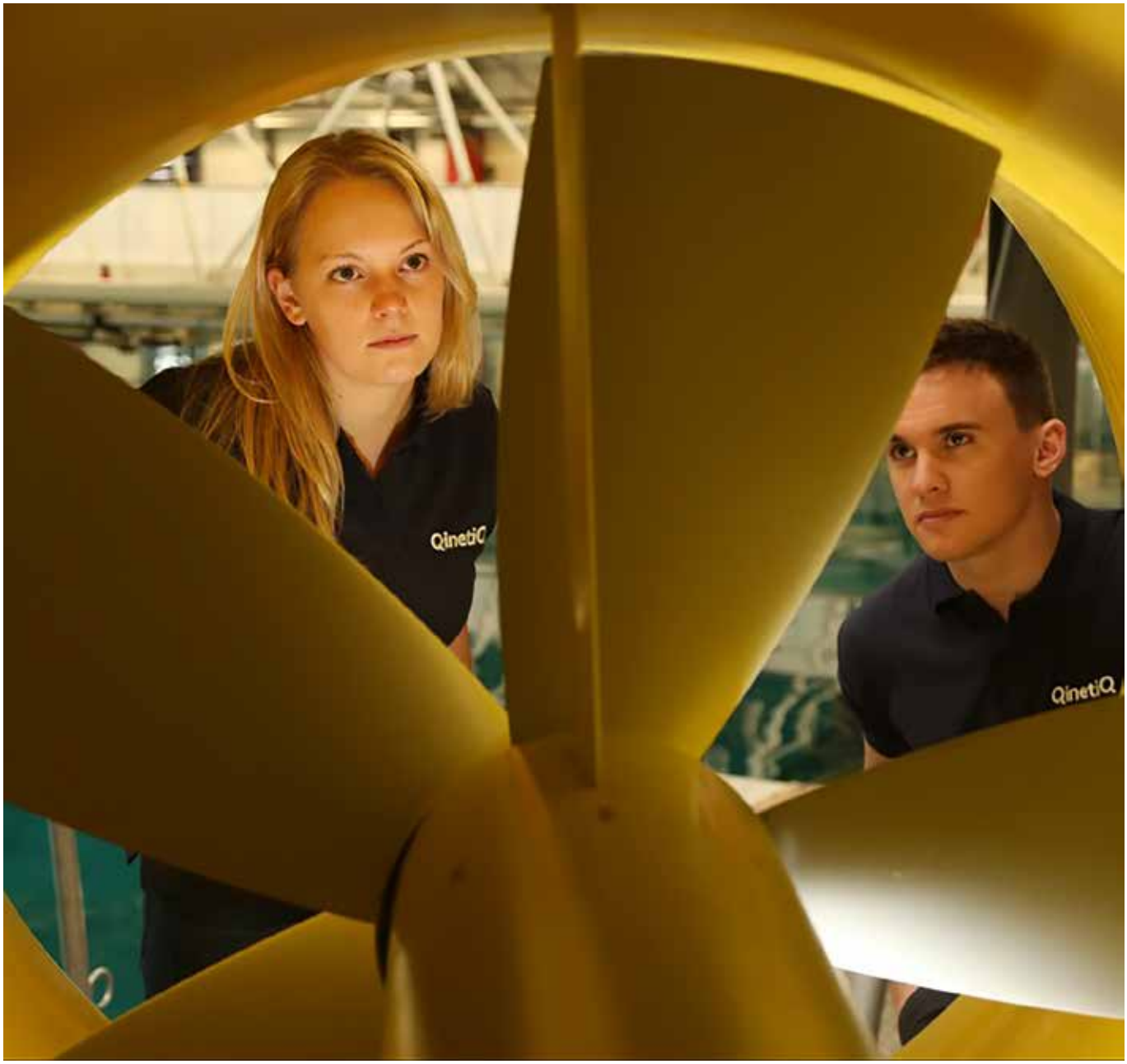
UKNEST

-the unheralded role of UKNEST in naval engineering and the national defence.

UKNEST is a forum that promotes the Engineering, Science and Technology interests of UK Naval Defence. The forum is focused on topics that are important across the Ministry of Defence (Royal Navy, Defence Equipment & Support and the Defence Science & Technology Laboratories) and UK Industry. Topics of interest include the sustainability of the work-force, research & development to underpin future naval capabilities and a focal point for engagement with Government initiatives.

Since it was founded in 2005, UKNEST has managed numerous successful initiatives. These have included:

An employee survey that highlighted the high proportion of older employees and the need for a significant increase in graduates;



A very successful undergraduate scholarship scheme that provides industrial mentoring, opportunities for work-placements and financial support for studies;

A University Career Officer briefing, that was opened by the Minister for Business, Innovation and Skills;

Establishing a thriving FutureNEST community based on graduates within the sector;

Plus representation on the Marine Industries Leadership Council and Defence Growth Partnership with leading roles on the Skills, Science & Technology and Supply Chain Working Groups.

UK NEST Members offer employment packages that include attractive salaries together with career development programmes and opportunities to enjoy a wide range of life-styles; from sailing to surfing, hill-walking and many other outdoor activities.

Most UK NEST Members offer Graduate development programmes with salaries between £22k and £28k together with "Welcome" payments or benefits. The programmes offer planned placements and mentoring by experienced managers to ensure that employees are prepared fully for their future careers. Graduate programmes are structured to provide the training and experience to satisfy the requirements for Membership of the major Engineering Institutions and thus Chartered or Incorporated Engineering status.

With an established future programme of design, build and in-service support for warships and submarines, the Naval sector offers a wide range of opportunities across all activities including project management, design engineering (that covers all disciplines), systems engineering (and particularly for future combat systems that will exploit leading edge technology), supply chain management, research & development and general business functions.

The Naval sector includes many diverse individual opportunities for scientists, engineers and technologists. Generally it is expected that employees will be, or have the potential to be, registered through one of the appropriate professional bodies that include:

Institute of Engineering & Technology (IET)
Institute of Marine Engineering Science & Technology (IMarEST)
Institute of Mechanical Engineers (IMechE)
Royal Institute of Naval Architects (RINA)
Institute of Physics (IOP)

For engineers and technologists, the Institutes are licensed by the Engineering Council to ensure consistency in terms of academic qualifications and professional experience. There are four categories of registration, dependent on academic achievements, experience and levels of responsibility:

Engineering Technician (EngTech)
ICT Technician (ICTTech)
Incorporated Engineer (IEng)
Chartered Engineer (CEng)

The starting point for a career in Naval engineering, science & technology depends on your qualifications.

The four primary levels are:

Level 3 Qualifications (AS & A level, Cambridge International Award, International Baccalaureate and BTEC/ NVQ/SVQ Level 3)
Advanced Apprenticeships (HNC, HND, BTEC Level 3)
Bachelors Degree (BEng, BSc)
Masters Degree (MEng, MSc)

Hence, the Naval sector covers the widest possible range of career opportunities, to match each individuals qualifications, abilities and ambitions.

"As a teacher, you're always looking for ways to incorporate interesting and exciting, real life engineering situations into your lessons."
Physics Teacher Anneka Streule is one of over 1,000 teachers to have discovered BT STEM Crew and in doing so she found an easy-to-use, high-quality free resource which immediately captured the imagination of her pupils. The resources made an instant impact across her lessons:

"BT STEM Crew is so easy to use, and the videos are such high-quality that they are naturally engaging, starting with an eye-catching clip and introducing just the right level of detail. All I have to do is show my class the video of the flying boats and they want to know how it works and find out about the engineering and physics behind it!"

Ms Streule went on to explain how she is using the resources with pupils in Years 8, 9 and 10.

"I ran the BT STEM Crew 'Design a Boat' competition with my class of Year 8 girls, using it to bring together three different modules: Energy Stores & Transfers; Materials & Their Uses; and Mechanisms. The pupils were fascinated to learn how the sailors on the boat are powering the hydraulic systems and they got really creative when designing their own boats. It was fun for them to have a problem and consider different ways to solve it."

The resources have been so well received that Ms Streule has incorporated BT STEM Crew into the school's Scheme of Work for Year 8. Download them here: www.stemcrew.co.uk

Topics covered include Maths, Physics, Biology, Chemistry and Design & Technology subjects, each demonstrating the applications of STEM through real-life examples from Land Rover BAR, the British America's Cup sailing team led by 4-time Olympic medallist, Sir Ben Ainslie.

In addition to the resources, the 1851 Trust offers school visits to their UK-wide Roadshows and the Education Centre on the Land Rover BAR Tech Deck. Visits incorporate workshops aligned to the national curriculum, showcasing the technology and innovation behind the Team at their base in Portsmouth. Visits can be booked here: www.1851trust.org.uk/education/visit-the-tech-deck/

Ms Streule's students took part in an 1851 Trust Roadshow day and commented:

"Today has inspired me to work hard in science and maths."

"I've learnt about all the different jobs women can do in science and how it can impact the world."

"Today I've learnt that girls can do anything if they put their mind to it. This has definitely opened my eyes, it's been really inspirational."

The Trust are looking to expand their reach through education and corporate partnerships. If you would like to learn more, please email: enquiries@1851trust.org.uk

Inspire your pupils with the technology and innovation behind our British America's Cup team, Land Rover BAR.

100%
of Teachers say they would recommend the BT STEM Crew website

99%
of Teachers say the resources are of high quality and are engaging for students

95%
of Teachers say they would use the resources again

> "I used the sustainability film/worksheets which were excellent and tied into the AQA GCSE Chemistry syllabus really well."
> **Teacher**

The 1851 Trust aims to inspire and engage young people about the roles that engineering can play in their future.

STEM Crew is our free digital learning platform of STEM resources for teachers of 11-16 year olds and includes immersive videos, practical investigations and worksheets. The resources have helped over 1,000 teachers bring to life the role of STEM subjects at Land Rover BAR to thousands of students across the UK.
stemcrew.co.uk

The 1851 Trust also host educational visits to the Land Rover BAR base in Portsmouth.
1851trust.org.uk/visit-the-tech-deck

Over **1,000** teachers are signed up to BT STEM Crew

1851 TRUST TECH DECK @ LAND ROVER BAR

Supported by BT

BT STEM crew

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John Moyes Lessells Engineering Travel Scholarships

John Moyes Lessells Scholarships support **Honours Graduates in Engineering** from Scottish Higher Education Institutions. These travel scholarships allow graduates to **study some aspect of their profession outwith the UK.** The Scholarships arise from a bequest from the late Professor John Moyes Lessells, an eminent mechanical engineer, and it was his wish to give young engineers the opportunity to widen their knowledge and experience in other parts of the world, and to bring this knowledge back to Scotland.

RSE
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KNOWLEDGE MADE USEFUL

Key information:

- Awarded annually
- Award duration of 2-6 months
- Open to all branches of engineering (including computer and software engineering)

For more information and to apply, please visit
www.rse.org.uk/funding-awards

Engineering in the spotlight for 2018 as government launches campaign to inspire the next generation

The Year of Engineering will see government and industry tackle a major skills gap and inspire the engineers of tomorrow.

Schoolchildren meeting engineers at an Inspiring the Future event organised by Year of Engineering partner Education and Employers.

A pioneering campaign to transform the way young people see engineering and boost numbers entering the profession has been launched.

Ministers from across government are joining forces with engineers, industry experts and hundreds of businesses to change perceptions around engineering – and highlight the scale of opportunity that careers in the industry hold for young people in the UK.

2018 is officially the Year of Engineering and will see a national drive in all corners of the country to inspire the young people who will shape our future.

Engineering is one of the most productive sectors in the UK, but a shortfall of 20,000 engineering graduates every year is damaging growth. There is also widespread misunderstanding of engineering among young people and their parents and a lack of diversity in the sector – the workforce is 91% male and 94% white.

The new campaign is aimed at filling those gaps and changing misconceptions, and will see government and around 1,000 partners deliver a million inspiring experiences of engineering for young people, parents and teachers.

Activities will include:

- a Siemens See Women roadshow aimed at inspiring women, including more black, Asian and minority ethnic girls, into pursuing STEM careers
- a brand new children's book on engineering from Usborne
- the Science Museum and London Transport Museum will be capturing children's imaginations with interactive exhibitions
- schools will get the chance to go behind the scenes at Airbus to meet engineers working on the Mars Rover
- Thales in the UK will be inspiring inventors of the future with robot clubs in primary schools
- Sir James Dyson, through the Dyson Institute, the James Dyson Foundation and the James Dyson Award, will continue to invest in inspiring young engineers by providing opportunities to apply engineering principles to projects that solve real world problems

Secretary of State for Transport Chris Grayling said:

"Engineers – whether they are working on cutting-edge technology in aerospace, energy or artificial intelligence – are vital to the lifeblood of our economy.

We want to show young people and their parents the immense creativity, opportunity and value of the profession. By bringing them face to face with engineering role models and achievements we can send a clear message that engineering careers are a chance for all young people, regardless of gender, ethnicity or social background, to shape the future of this country and have a real impact on the lives of those around them."

Skills Minister, Anne Milton commented:

"I want to see everyone whatever their background, wherever they live to have a chance to get a rewarding career or job in engineering whether they come via a technical or academic route.

The Year of Engineering gives us a great opportunity to work together with business to inspire a new generation of world class engineers. We want to build the science, technology, engineering and mathematics skills that we need for a growing economy, as highlighted in the government's Industrial Strategy."

Crossrail Chair Sir Terry Morgan added:

"The Year of Engineering will be a fantastic opportunity to inspire others to take a fresh look at engineering and show the range of opportunities there are for training and jobs in this sector. We look forward to showcasing the role engineers have played in creating such an amazing project before the Elizabeth line opens to passengers at the end of 2018."

Mark Richardson, Ocado Chief Operating Officer, said:

"Encouraging more young people to enter the engineering profession is essential to ensure the growth and development of new technologies

and businesses in the UK. At Ocado we build the world's most advanced automated warehouses for online grocery, and we hope our involvement in this campaign will offer young people from diverse backgrounds a real insight into the exciting and rewarding life of an engineer."

Engineers, businesses, schools and universities will allbe marking the launch of the campaign by celebrating the positive impact of engineering. Events include:

•students in Bolton using engineering to tackle real life challenges for people with disabilities with charity Remap
•pupils at a London school taking on a cybersecurity competition
•engineers, STEM ambassadors and schoolchildren will gather for the unveiling of Tim Peake's spacecraft at the National Railway Museum in York
•Ocado in Birmingham will give schoolchildren the chance to see robots in action

To find out more about the Year of Engineering:

•visit the website
•follow the campaign on Twitter
•follow the campaign on Instagram

Government-backed Oxford company opens 100,000 capacity clean electric motor factory

Business Secretary announced £184 million investment in next generation of scientists and engineers.

A multi-million pound government investment has helped create a new 100,000 capacity electric motor production facility for the Oxford-based British electric motor manufacturer YASA.

The new site will support 150 high-skilled jobs for the successful University of Oxford spin-out company and help deliver the next generation of environmentally-friendly hybrid and pure electric vehicles, 80% of which are destined for export around the world, including China.

An Oxford university spin-out founded in 2009, YASA has received extensive government support and investment for its development through auto programmes including the Advanced Propulsion Centre, Innovate UK and Regional Growth Fund. The company is now established as a world-leading electric motor manufacturer with 80% of its production destined for export across the world, including China.

In his speech at the opening of the new site, which will support 150 high-skilled jobs, the Business Secretary will also announce as part of the Industrial Strategy a significant government investment of £184 million for 41 UK Universities to help train the next generation of world-class engineers and exceptional scientists at British universities. The announcement follows the launch of the government's Year of Engineering campaign in January, a year-long campaign to tackle the engineering skills gap and widen the pool of young people who join the profession.

The money will support Doctoral Training Partnerships (DTPs) that fund 4-year doctoral studentships, providing UK and international students at British universities with PhD training in science, engineering and mathematics. The DTPs will support students entering training in the academic years beginning October 2018 and October 2019.

Investment in training future engineers and scientists will help deliver the ambitious vision set out in the government's Industrial Strategy which aims to make the UK the most innovative economy in the world and build a Britain fit for the future through a stronger, fairer economy with 'good work', high-quality infrastructure and businesses that can lead the world in high-tech, highly-skilled industries.

Business Secretary Greg Clark said:

"Innovation is the lifeblood of our Industrial Strategy and our economy. This spirit is embodied by YASA, a thriving business that has emerged from one of our finest academic institutions and is now helping to deliver the UK's ambition to lead the world in meeting the Grand Challenges presented by Clean Growth and Future of Mobility.

Through our Industrial Strategy, we are helping businesses and our world-leading researchers turn incredible ideas into scale-up products and services that are available to everyone.

Government investment in programmes that have supported YASA have helped propel this company forward. The factory I will be opening today is testimony to what can be achieved through our industrial approach, when academia, government and industry come together."

Clean Growth and Future of Mobility
YASA's electric motors will help deliver on the government's ambition, through the Automotive Sector Deal, to be at the forefront of the electric vehicle production, powering the next generation of innovative, environmentally-friendly vehicles, with leading auto companies like Jaguar using YASA motors to give

its models like the C-X-75 the speed of a Bugatti Veyron but the emissions of a Toyota Prius.

The government's vision for its Industrial Strategy sets out 4 Grand Challenges – major global trends that the UK will face in the next decade – including Clean Growth and Future of Mobility. Each Grand Challenge represents an opportunity for the UK to establish itself as a world-leader at the forefront of the future industries that will drive these trends.

The new production facility, and the environmentally friendly engines it produces, will help the UK to meet the challenges presented by the Future of Mobility and by Clean Growth and ensure the UK is capitalising fully on the economic opportunities offered by the global shift to low-carbon economies and the increased demand for electric and hybrid auto technologies.

Chris Harris, YASA's CEO said:

YASA is a great example of what the UK can and should expect to achieve if we invest in the innovative and creative ideas emerging from our best universities, and have the determination and patience to turn those great ideas into world-beating companies.

With the right support and investment, companies like YASA can become the powerhouse of the UK's future economy, creating a wide range of high-skilled jobs and benefiting the communities of which they are a part.

Minister of State joins EDT to celebrate the launch of the Year of Engineering with an all-girls First Edition event

The Government and industry are on a mission to tackle a major engineering skills gap and to inspire the next generation of engineers. This week is the official launch of the Year of Engineering, a government campaign aimed at raising the profile of engineering amongst 7 – 16 year olds and to encourage more young people to consider engineering as a career. Throughout 2018, organisations will be coming together to tackle the skills gap and encourage more young people into the sector by giving them, their families and teachers an opportunity to 'take a closer look' at engineering.
The EDT recently delivered an all-girls First Edition event at Plumstead Manor School with 120 Year 7 girls, supported by RAF who are particularly passionate about programmes that support and promote more girls into engineering. The Minister of State for the Department for Digital, Culture, Media and Sport, Margot James, also attended the event to show her support and address the importance of engineering and STE(A)M related subjects.

Margot James commented:

It was fantastic to see first-hand how varied and exciting careers in engineering can be, with talented young people demonstrating the opportunities in robotics, cyber security and digital skills as part of our Year of Engineering Campaign. Engineering is open to everyone, irrespective of gender, ethnicity and social background, and I encourage all students to consider a future career in the field.

Julie Feest, Chief Executive of EDT highlighted the importance of the digital aspect of engineering,

The Year of Engineering is challenging false ideas about engineering. EDT works to make sure that even young people early in their school careers start learning the skills in engineering, science and technology that they will need in the future and receive the information that they need about careers in the 4th Industrial Revolution, which will be in full swing as they come to working age.In particular, the nature of the 4th Industrial Revolution will mean that digital must be an important part of the portfolio of skills that engineers will need for the future. Successful careers will increasingly rely on a breadth of expertise as different disciplines are required to co-operate to create new products and services that have not even been thought of yet. It may well be that in depth knowledge of narrow subject areas becomes less prized and artificial intelligence becomes able to take over such roles."

The Year 7 girls undertook a number of activities including:

Code Breakers – a cyber detective style exercise to introduce the principles of coding. The students undertook a 'Cluedo' style mystery in which they must identify a hacker and uncover the details of their next cyber-crime and Robotics Challenge – the students plan a robotised mission to get supplies to survivors of a natural disaster. The teams work out the best route for their robot to use and code accordingly, so they need to measure the route and avoid danger zones.

Events such as First Edition, encourages young people, especially girls to know that there are a variety of jobs in engineering, as well as give them the opportunity to learn with first-hand practical activities that are different to those from the classroom environment.

Primary school children are 'Aiming for Awesome' with new RAF-themed education kits

The Royal Academy of Engineering and the Royal Air Force have teamed up to bring 100 years of RAF engineering marvels to life in classrooms across the UK with an exciting new RAF Centenary 'Aiming for Awesome' teaching resource for primary schools.

Education teams from both organisations have combined their expertise to create 10 different STEM challenges for teachers to set for school children this year. The challenges reflect some of the key engineering innovations that have enabled the RAF to shape the modern world and protect UK skies for 100 years:

•Aircraft design - explore the forces acting on an aircraft during flight
•Radar - design and build a radar tower
•Speed record - explore the maths and science of calculating speed before investigating vortices created by wing tips
•Ejector seats - explore the impact of ejecting from an aircraft on the human body
•Code breaking - make a code wheel and explore the maths behind code breaking
•Satellite age - use scientific investigation to learn how the law of reflection is used in a satellite receiver
•Disaster relief - design and make a lander for aid delivered by aircraft
•Logistics challenge - use maths to work out how to pack an aircraft effectively
•Remotely piloted air systems - use computing and maths skills to create an automated flight plan
•Stealth - investigate the impact of STEM on the development of stealth vehicles

This series of special RAF100 teaching resources have been developed for delivery into primary schools. The boxes are linked to the national curriculum to target the end of Key Stage Two (primary) and the start of Key Stage Three (secondary). They are specifically designed to provide resources not typically available in school in order to open up the world of engineering experimentation to more students. The boxes are being made available to schools free of charge, and teachers also receive a short training session to learn how make the most of the contents.

Lynda Mann, Head of Education Programmes at the Royal Academy of Engineering, said:

'The Academy has a long-term commitment to making STEM education more engaging and fun and what could be more exciting than bringing RAF engineering to life in the classroom? This is the latest in a series of education boxes that we have designed and the most we have ever produced. We will send 1,000 of them out to primary schools across the UK this year.'

Air Vice-Marshal Sue Gray, Air Officer Commanding Number 38 Group and head of the RAF's Engineer branch, said:

'I am delighted that we have partnered with the Royal Academy of Engineering as part of our expanded youth programme for RAF100. These exciting STEM resources will deliver free and curriculum-based education in schools across the UK. This is one of the many initiatives where we are working with partner organisations to address the engineering skills shortage; helping to benefit our economy by inspiring the next generation of innovators.'

This project is part of the RAF100 Youth & STEM programme. To demonstrate the RAF's commitment to use its centenary to inspire the next generation, the expanded youth engagement programme aims to reach up to two million students, aged 9 to 15, to build interest in science, technology, engineering, mathematics (STEM) careers.

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

#ThisIsEngineering campaign to tackle critical shortfall of engineering talent

•Findings from a forthcoming EngineeringUK report identify an annual demand for at least 124,000 engineers and technicians with core engineering skills

•To help meet this demand, the Royal Academy of Engineering is launching the #ThisIsEngineering campaign in collaboration with EngineeringUK and industry partners

•The campaign is designed to reshape the perception of engineering, and give more young people from all backgrounds the opportunity to explore how they could follow what they love into a varied and fulfilling engineering career

•#ThisIsEngineering is a partner in the Year of Engineering, a government campaign, which celebrates the world and wonder of engineering.

•The #ThisIsEngineering campaign has been launched by the Royal Academy of Engineering in collaboration with EngineeringUK and industry partners to give more young people from all backgrounds the opportunity to explore how they could follow what they love into a varied and fulfilling engineering career across a range of industries from film, to sport, gaming and music.

Launched in the government's Year of Engineering, the campaign is being backed by a consortium of major engineering companies, and has been created in response to significant demand for engineering talent in the UK. Findings from a forthcoming EngineeringUK report show that there is an annual demand for at least 124,000 engineers and technicians with core engineering skills, and an additional 79,000 roles that require engineering knowledge and skills alongside other skill sets.

Research conducted by YouGov on behalf of #ThisIsEngineering shows that 63% of young people (aged 13 to 18) think they will have a career that taps into their existing passions. They also said that when it comes to talking about the kinds of jobs they would like to do, they would prefer their parents to talk to them about their current interests, rather than what they want to be when they grow up.

However, the research also shows that young people are not inspired by talking to parents about their jobs, and only 35% of young people believe their parents' careers involve something they are passionate about. Instead, young people online are increasingly turning to the internet for information about careers (52%), with search engines overtaking conversations with parents (41%) and teachers (37%) as a source of advice and inspiration.

Historically, the full breadth of engineering opportunities has not been widely understood or acknowledged, resulting in the perception that a career in engineering is narrow, technical and traditional. The #ThisIsEngineering campaign will help to reset the conversation about engineering, tapping into young people's passions for subjects such as sport, technology and design, and illustrating through social media that the profession is diverse, challenging and creative.

It aims to bring engineering to life for young people from all backgrounds, demonstrating the role it plays across multiple industries – from fashion to sport - and give young people a better understanding of how their current passions could become rewarding careers through engineering.

Dr Hayaatun Sillem, CEO, Royal Academy of Engineering, comments:
"Engineering is essential to the future growth of the UK economy and underpins so much of our day to day lives, but we are still facing a chronic shortfall of talent. Engineering can provide a unique opportunity for young people from all backgrounds to develop their passions into rewarding careers involving everything from sport, film and space, to music and fashion. It opens the door to careers that can shape the future – from developing the next smartphone to creating medical devices that will save lives.

"The #ThisIsEngineering campaign brings together some of the UK's leading engineering businesses to communicate this, and to address the skills shortage. The campaign is designed to reflect how young people think and feel about their futures, and illustrate how, through engineering, it's possible to have a job that is truly inspiring."

Mark Titterington, CEO, Engineering UK added:

"The demand for people with engineering skills continues to outstrip supply; and provisional figures from our forthcoming report suggest that a continued focus on encouraging more pupils to choose STEM subjects and increasing diversity in engineering throughout the education system and into employment is vital to meeting demand.

But there's more to be done. I continue to be amazed by the diversity of the opportunities that engineering can provide and the challenges that engineers can overcome. It's vital that young people are able to see and be inspired by the diversity and the creativity of the profession. That's where #ThisIsEngineering comes in."

Skills Minister Anne Milton said:
"I want to see everyone regardless of their background, where they live or who they know have the chance to get a rewarding career in engineering whether they follow a technical or academic route. As this report makes clear, we must inspire the younger generation and expose them to the exciting range of fulfilling careers and jobs available today.

"The government's Year of Engineering gives us a great opportunity to address this by working with business to inspire a new generation of world class engineers. Through our ambitious new careers and skills strategy we will be strengthening careers leadership in schools with £4m of training and support, to help young people make the right choices for their future."

Minister for the Year of Engineering Nusrat Ghani said:

"The Year of Engineering 2018 is all about transforming perceptions of engineering, showing young people from all backgrounds the immense creativity and opportunity of the profession. Careers in the industry are a chance for young people to shape the future and have a real impact on the lives of those around them.

"Role models are a vital way of showing this, and it's fantastic to see This is Engineering celebrating exciting and unexpected stories of modern engineers. We look forward to working with the Royal Academy of Engineering and industry partners to inspire the next generation."

The #ThisIsEngineering campaign launches today with a high profile online advertising campaign, which brings to life the stories of five young engineers who have turned their passions into careers involving sport, fashion, tech, design and space. More information about the campaign is available at www.ThisisEngineering.org.uk

The Royal Academy of Engineering and EngineeringUK are partners in the government-led Year of Engineering, a year-long programme to 'open the doors' to engineering and encourage the public, particularly young people, to take a closer look.

February 2018

Tech Deck Open Days
Thursday 1st February 2018 til Monday 31st December 2018 | Portsmouth | http://land-rover-bar.americascup.com/en/tech-deck.html

Tim Peake's Spacecraft
Wednesday 17th January 2018 til Thursday 8th March 2018 | York | http://nrm.org.uk/planavisit/events/soyuz

Engineer Your Future
Wednesday 3rd January 2018 til Friday 21st December 2018 | London | https://www.sciencemuseum.org.uk/see-and-do/engineer-your-future

ICE 200: A year of celebratory events
Monday 1st January 2018 til Tuesday 18th December 2018 | London | https://www.ice.org.uk/what-is-civil-engineering

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Engineer a Better World campaign
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Enterprising science
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CREST Awards
Tuesday 3rd January 2017 til Friday 21st December 2018 | http://www.crestawards.org/

March 2018

Edinburgh Science Festival
Saturday 31st March 2018 til Sunday 15th April 2018 | https://www.sciencefestival.co.uk/

RAEng Professor Danielle George MBE
Thursday 22nd March 2018 til Thursday 22nd March 2018 | https://www.raeng.org.uk/events/list-of-events/2018/march/the-robot-orchestra-(2)

STEM Taster Workshop
Wednesday 21st March 2018 til Wednesday 21st March 2018 | http://www.uwtsd.ac.uk/face-visit-days/

Norwich Aviation Academy tour
Wednesday 14th March 2018 til Wednesday 14th March 2018 | Norwich | https://www.eventbrite.co.uk/e/international-aviation-academy-tour-aviation-engineering-courses-registration-41422376443?aff=erelexpmlt

Digging Deeper gallery opening
Wednesday 14th March 2018 til Saturday 17th March 2018 | London | https://www.ltmuseum.co.uk/collections/178-whats-on/year-of-engineering

The Big Bang UK Fair
Wednesday 14th March 2018 til Saturday 17th March 2018 | Birmingham, West Midlands | http://www.thebigbangfair.co.uk

Girls into STEM
Tuesday 13th March 2018 til Tuesday 13th March 2018 | Leicester College | https://leicestercollege.ac.uk/about/news-and-events/events/girls-into-stem/

WiME Careers Event
Saturday 10th March 2018 til Saturday 10th March 2018 | Hull | http://greenporthull.co.uk/jobs-training/women-into-manufacturing-and-engineering/careers-event

British Science Week
Friday 9th March 2018 til Sunday 18th March 2018 | https://www.britishscienceweek.org/

Festomane
Thursday 8th March 2018 til Thursday 15th March 2018 | Gloucester | https://www.festomane.co.uk/

CIHT Annual Conference 2018
Thursday 8th March 2018 til Thursday 8th March 2018 | London |http://www.ciht.org.uk/en/events/events-listing.cfm/ciht-annual-conference-2018-highways-change-innovation-and-the-future

Imeche Rail challenge
Wednesday 7th March 2018 til Wednesday 28th March 2018 | Stapleford Miniature Railway | http://www.imeche.org/events/challenges/railway-challenge

Children as Engineers Conf.
Wednesday 7th March 2018 til Wednesday 7th March 2018 | http://info.uwe.ac.uk/news/uwenews/news.aspx?id=3753

Ingenuity and Beyond iniative
Monday 5th March 2018 til Friday 9th March 2018 | http://www.ingenuityandbeyond.com/

Careers Hive
Monday 26th February 2018 til Friday 2nd March 2018 | Edinburgh | https://www.sciencefestival.co.uk/careershive

Smallpiece Trust Family Engineering Days
Monday 19th February 2018 til Saturday 3rd March 2018 | https://www.smallpeicetrust.org.uk/free-family-engineering-days-book-now/

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Thursday 1st February 2018 til Monday 31st December 2018 | Portsmouth | http://land-rover-bar.americascup.com/en/tech-deck.html

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CREST Awards
Tuesday 3rd January 2017 til Friday 21st December 2018 | http://www.crestawards.org/

April 2018

Learning Unlimited
Tuesday 24th April 2018 til Tuesday 24th April 2018 | 15-21 Royal Scot Road, Pride Park, Derby, DE24 8AJ | http://www.learningunlimiteduk.com

The role of forensic engineering science
Tuesday 17th April 2018 til Tuesday 17th April 2018 | https://www.raeng.org.uk/events/list-of-events/2018/april/east-midlands-regional-lecture

Cambridge Science Festival
Friday 13th April 2018 til Sunday 22nd April 2018 | https://www.cambridgesciencefestival.org/current-festival/

Global Day of the Engineer
Wednesday 4th April 2018 til Wednesday 4th April 2018 | http://discovere.org/our-programs/global-day

Edinburgh Science Festival
Saturday 31st March 2018 til Sunday 15th April 2018 | https://www.sciencefestival.co.uk/

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May 2018

Arup: Designing the Queensferry Crossing
Tuesday 1st May 2018 til Tuesday 1st May 2018 | https://www.raeng.org.uk/events/list-of-events/2018/may/rse-raeng-annual-joint-lecture-(1)

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Tuesday 3rd January 2017 til Friday 21st December 2018 | http://www.crestawards.org/

June 2018

Big Bang East Midlands
Thursday 28th June 2018 til Thursday 28th June 2018 | Derby | http://nearme.thebigbangfair.co.uk/view/?eve_id=1811

Big Bang South West
Wednesday 27th June 2018 til Wednesday 27th June 2018 | Bristol | http://nearme.thebigbangfair.co.uk/regions/707

Big Bang South East
Wednesday 27th June 2018 til Thursday 28th June 2018 | Haywards Heath | http://nearme.thebigbangfair.co.uk/regions/704

Learning Unlimited June
Tuesday 26th June 2018 til Tuesday 26th June 2018 | 15-21 Royal Scot Road, Pride Park, Derby, DE24 8AJ | https://www.learningunlimiteduk.com

Great Exhibition of the North
Friday 22nd June 2018 til Sunday 24th June 2018 | https://getnorth2018.com/

Big Bang Fair Scotland
Tuesday 12th June 2018 til Tuesday 12th June 2018 | Crieff Road, Perth | http://nearme.thebigbangfair.co.uk/regions/703

Cheltenham Science Festival
Tuesday 5th June 2018 til Sunday 10th June 2018 | https://www.cheltenhamfestivals.com/science

Tech Deck Open Days
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CREST Awards
Tuesday 3rd January 2017 til Friday 21st December 2018 | http://www.crestawards.org/

July 2018

Big Bang London South
Friday 13th July 2018 til Friday 13th July 2018 | Surrey | http://nearme.thebigbangfair.co.uk/regions/699

Big Bang North West
Tuesday 10th July 2018 til Tuesday 10th July 2018 | Liverpool | http://nearme.thebigbangfair.co.uk/regions/701

Home Automation Challenge
Friday 6th July 2018 til Friday 6th July 2018 | http://www.imeche.org/events/challenges/hac-challenge

Big Bang Eastern
Thursday 5th July 2018 til Thursday 5th July 2018 | Hertfordshire | http://nearme.thebigbangfair.co.uk/regions/698

Eco Marathon
Thursday 5th July 2018 til Sunday 8th July 2018 | https://www.shell.com/energy-and-innovation/shell-ecomarathon.html

Big Bang @ Get Ahead
Wednesday 4th July 2018 til Wednesday 4th July 2018 | Edgmond, Phoenix Way, Newport | http://nearme.thebigbangfair.co.uk/regions/705

Engineering Taster Week
Monday 2nd July 2018 til Friday 20th July 2018 | ME1 2XX | https://www.baesystems.com/en/our-company/education/engineering-taster-week/rochester

Tech Deck Open Days
Thursday 1st February 2018 til Monday 31st December 2018 | Portsmouth | http://land-rover-bar.americascup.com/en/tech-deck.html

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August 2018

Tech Deck Open Days
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CREST Awards
Tuesday 3rd January 2017 til Friday 21st December 2018 | http://www.crestawards.org/

September 2018

New Scientist Live 2018
Wednesday 19th September 2018 til Sunday 23rd September 2018 | ExCeL, Royal Victoria Dock, 1 Western Gateway, London E16 1XL | http://www.newscientistlive.com

District 100/ Acton Depot Open Weekend
Saturday 1st September 2018 til Sunday 30th September 2018 | https://www.ltmuseum.co.uk/whats-on/museum-depot/open-weekends

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Thursday 1st February 2018 til Monday 31st December 2018 | Portsmouth | http://land-rover-bar.americascup.com/en/tech-deck.html

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October 2018

Rail Week
Monday 8th October 2018 til Sunday 14th October 2018 | https://www.railweek.com/

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Thursday 1st February 2018 til Monday 31st December 2018 | Portsmouth | http://land-rover-bar.americascup.com/en/tech-deck.html

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November 2018

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December 2018

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Engineering technology brings flood prevention protection to Leeds.

A ground breaking £50million flood alleviation scheme in Leeds which uses moveable weir technology – a first for flood risk reduction in the UK – was opened int October 2017

The first phase of the award-winning Leeds Flood Alleviation Scheme not only uses state-of-the-art flood defence engineering techniques but is one of the largest river flood alleviation schemes in the country.

Led by Leeds City Council in partnership with the Environment Agency, the scheme will provide more than 3,000 homes, 500 businesses and 300 acres of development land with increased protection against flooding from the River Aire and Hol Beck.

More than 22,000 jobs will be safeguarded over the next 10 years due to the increased level of protection and through the scheme's development and construction, 150 jobs and apprenticeships have been created.

It comprises three main elements: state-of-the-art mechanical weirs, the merging of the river and canal and flood walls and embankments stretching 4.5km through the city centre.

The scheme, which sees work on the River Aire now substantially complete and work at Holbeck continuing into autumn, is being officially opened by the Leader of the Council, Councillor Judith Blake CBE and Chair of the Environment Agency, Emma Howard Boyd.

Multiple funding streams have contributed towards the cost of this £50 million scheme, including £35 million of government Grant in Aid funding alongside £10 million of local funding from Leeds City Council and partnership funding from Leeds City Region Enterprise Partnership and others. Government is spending £2.5 billion to protect a further 300,000 homes by 2021.

Leader of Leeds City Council Judith Blake CBE said:

"We are delighted to see this much-needed first phase of the Leeds Flood Alleviation Scheme opened. As could be seen by the devastation at Christmas 2015, providing increased flood protection in Leeds is essential in

terms of reassuring our residents and businesses, and this fantastic state-of-the-art scheme provides it for the city centre and downstream at Woodlesford. The clever use of the mechanical weirs is a brilliant idea, and they have also brought about environmental benefits with the improved river quality bringing salmon and otters, while the new bridge looks stunning offering great views of the river and beyond as part of the Trans Pennine Trail.

"We'd like to thank everyone involved in this phase of the scheme and look forward to developing the plans for phase two and beyond, as only through an entire catchment and citywide approach can we protect all communities in Leeds from the threat of flooding."

Chair of the Environment Agency, Emma Howard Boyd said:

"This ground-breaking scheme will not only benefit hundreds of homes and businesses in the city but it will also safeguard 22,000 jobs over the next 10 years due to the increased level of protection it provides. It's been great to see Leeds City Council and the Environment Agency working together in partnership to better protect the city – and it is one of many schemes in the Defra programme investing £430 million to reduce flood risk across Yorkshire before 2021.

"We're always looking for new ways that we can use technology to reduce flood risk so it's exciting that this scheme is also a first for flood risk management in the UK thanks to the use of the moveable weirs which can be lowered when river levels are high. On a day-to-day basis, people won't even know they are being protected, and they can enjoy the river which is a key aspect of the city's South Bank regeneration plans."

Floods minister, Thérèse Coffey said: "No-one can forget the devastating flooding residents and businesses in Leeds faced over two years ago. We know how distressing flooding is for all those affected and I'm delighted that through this new state-of-the art £50 million scheme thousands more people living and working in Leeds will be better protected.

"Our commitment to strengthening flood defences across Yorkshire doesn't stop here – we are investing £430 million over six years up until 2021 to better protect the region using the best technology and engineering available."

It is the first time that moveable weirs have been used in the UK for flood alleviation purposes. The new weir gates are supported by giant inflatable neoprene bladders that can be lowered when high river flows are expected. It takes around two hours for the gates to lower, and thanks to the installation of these weir gates, it has been possible to keep flood defence wall heights to a minimum so as not to spoil views of the city centre waterfront.

The weirs have been installed at Crown Point in the city centre and further downstream at Knostrop, where a new locally manufactured bridge has been installed across the weir connecting the diverted Trans Pennine Trail with the north bank of the river.

Weighing approximately 150 tonnes a nd spanning approximately 70 metres, the bridge has been designed by Knight Architects, ARUP and BMMjv (a joint venture between BAM Nuttall and Mott MacDonald). It has been positioned to provide dramatic views of the weir gates. The very narrow piers and curving underside of the bridge deck are designed to give the bridge a slender appearance when viewed from up or downstream.

The new footbridge reconnects the much-used Trans Pennine Trail to the north bank of the river, providing users with a gateway into Leeds.

In addition to these measures, the removal of a manmade island, known locally at Knostrop Cut, which separated the canal and river has been removed to improve a bottleneck for flows. 180,000 tonnes of material excavated from the site has been reused on a local development site and also on diverting the Trans Pennine Trail which previously went across the manmade island. Reusing this material has saved the project in the region of £6 million.

The earlier stages of the scheme included work at Woodlesford further downstream, which were completed in 2015 and proved effective during the December 2015 floods.

Environmental enhancements have been integral within the scheme design with fish and eel passes installed at both weirs. Weirs have previously been barriers, preventing species such as salmon

migrating from the sea to the spawning grounds further up the river. Salmon have recently been spotted in the River Aire for the first time in 200 years, and now that fish passes have been installed on Knostrop and Crown Point weirs, as well as others on the River Aire, it is hoped that chances of a spawning population of salmon in the river in future will be increased.

Otter ramps and holts have also been installed and will support the local population and 700 trees will be planted along the Trans Pennine Trail later this autumn.

Roger Marsh OBE, Chair of the Leeds City Region Enterprise Partnership (LEP), said:

"The LEP, alongside Leeds City Council, the Environment Agency and other funding partners, moved quickly to improve flood protection in Leeds following the Boxing Day floods of 2015.

"Local Growth Deal funding into the flood alleviation scheme helped to improve the standard of protection for the city while our £5m Business Flood Recovery Fund, launched just weeks after floods hit, supported businesses to reopen and local SMEs to get back on their feet.

"Safeguarding businesses and residents from issues such as flooding is integral to growing an economy and the opening of the Leeds Flood Alleviation Scheme Phase One today is a huge step forward in helping businesses flourish in what is fast becoming one the busiest economic areas of the City Region."

December 2015 saw Leeds experience significant and widespread flooding with some of the highest river levels ever recorded. The flooding affected nearly 3,000 residential properties (including indirect impacts to high-rise accommodation) and 700 commercial properties.

A consultation on the second phase of the Leeds Flood Alleviation Scheme took place towards the end of 2017, looking to provide increased flood protection to communities upstream of the city centre. Proposals include measures further upstream such as the Kirkstall corridor which was badly hit by the floods as well as Stourton, an industrial area that was badly affected on Boxing Day 2015.

New Omagh Hospital open to Patients

The United Kingdom's newest hospital (the Omagh Hospital and Primary Care Complex) opened its doors to patients for the first time in June of 2017.

It signaled a new chapter in the history of healthcare for thousands of patients in the Omagh area and beyond who are set to benefit from the new facility.

The new £105million hospital and primary care complex located on the Donaghanie Road, Omagh has been designed with the needs of patients and clients in mind.

The fabulous new facility will provide clinical care and treatment to patients and clients in modern, well designed surroundings, using the latest technologies and equipment. It will provide hospital and community healthcare services previously delivered in the Tyrone County Hospital. The four GP Practices currently based at Omagh Health Centre will also transfer to the new hospital with all primary, secondary and community healthcare services conveniently located within the one building.

Western Trust Director of Acute Hospitals Geraldine McKay said: "The opening of this new hospital and primary care complex is a very exciting time for staff, patients and the wider community. The complex is now officially open and we are committed to providing high quality care in this tremendous new facility. I would like to thank everyone involved in this project and those who have worked tirelessly to make this happen ensuring a seamless transition from the Tyrone County Hospital to their new surroundings."

As a result of meticulous planning by staff with the support of the Northern Ireland Ambulance Service (NIAS) patients were moved from the former Tyrone County Hospital into the new complex almost at once. The Tyrone County hospital which was built in 118 years ago closed its doors for the last time as the final patients moved across to the new facility.

Professor Ronan O'Hare, Consultant Anaesthetist and Assistant Director of the South West Acute Hospital and Omagh Hospitals said: "I am incredibly proud of what our staff have achieved during today's move, which marks a new and exciting chapter in the history of health services in the West. We will always recognise the immense contribution the Tyrone County Hospital has made to the community over the years and we are mindful of this. Excitement though has taken over as staff look forward to providing services in our new hospital."

This excitement is wholly understandable, given the enormous improvement in medical facilities now available to medical staff, and which will inevitably be reflected in patient service.

Fully operational, the £105 million pound investment will have 40 single en-suite bedrooms for in-patients. There will be separate areas for Rehabilitation and Palliative Care. The complex will also include a range of services such as a 24 place renal dialysis unit, a Health and Care Centre including modern GP practices and an Urgent Care and Treatment Centre. In addition it will also provide advanced diagnostic services including a CT scanner. There will be three day surgery operating theatres and 22 recovery beds.

Chairman of the Western Trust, Gerard Guckian said:"For many years our staff in the Tyrone County Hospital have provided high quality care in less than ideal accommodation. We now look forward to that same high standard of care being delivered in modern facilities built and equipped for the 21st Century."

Stabilising Jackfield

One of the major engineering projects to take place in the UK over the past couple of years is the award-winning Jackfield Stabilisation Project.

Situated at the eastern end of the Ironbridge Gorge World Heritage Site, Jackfield has always been vulnerable to issues caused by land instability.

The Ironbridge Gorge originated about 10,000 years ago at the end of the last Ice Age and is deeply incised in rocks of Upper Carboniferous and Silurian age, both of which are relatively weak and prone to weathering and landslides.

The valley sides rise steeply from 40m at river level to over 140 m on the plateau above.

A major landslip in 1952 devastated the local community, wiping out cottages that had been abandoned weeks earlier by residents.

A total of 27 houses were engulfed by thousands of tonnes of mud in that land slip and there have been several further slips since, notably in 1984 when more houses were lost and Salthouse Road slipped into the River Severn.

The access road to Jackfield was subsequently replaced by a temporary wooden roadway following the route left by an old railway line.

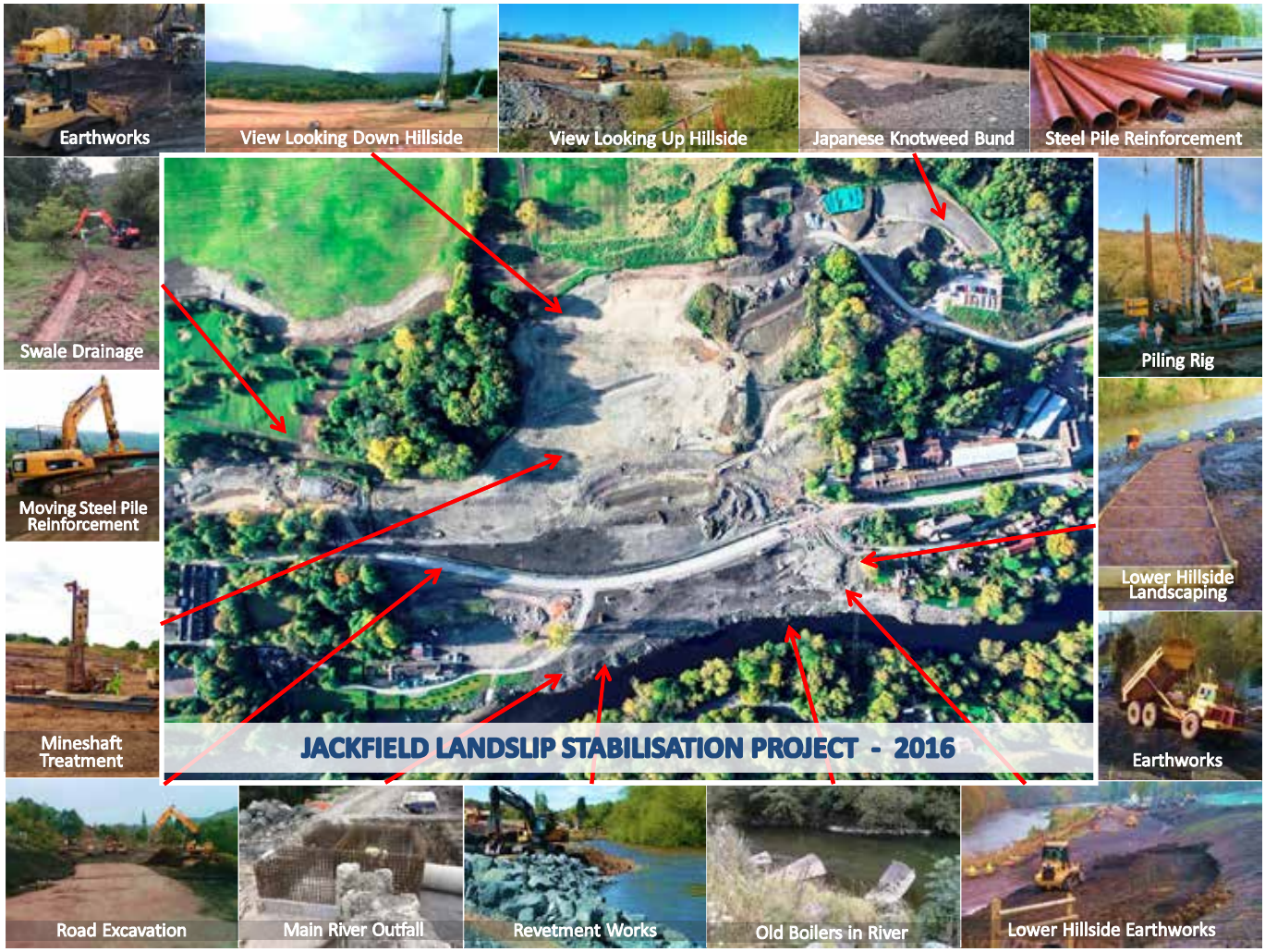
The hillside above the south bank of the River Severn in Jackfield has continued to remain unstable, with land moving at a rate of up to a metre per year locally.

Telford & Wrekin Council continued to lobby Central Government for funding to deliver a more permanent solution to the problem – and this met with success in late 2013 when it was announced that funding had been granted to carry out a scheme to stabilise the hillside.

It posed a major civil engineering challenge which involved constructing more than 2,000 piles into the hillside to stop the land from slipping.
Work started in March 2014 and were substantially completed by October 2016.
It comprised the following elements:

•drilling and grouting with a weak concrete mix to fill the historic mining voids beneath the site to prevent future collapse which could undermine the piles

•steel reinforced concrete piles, 600mm



diameter, and up to 14m length have been sunk into the ground and socketed into stable rock, in nine rows up the hillside

•the installation of concrete columns in the Maws Meadow to protect against future river bank erosion

•river bank revetment works including placing large boulders along the river bank to reduce river bank erosion

•earthworks to smooth out levels and re-grade slopes ready for replanting

•land drainage to manage rainwater runoff and reduce high groundwater levels

•major works to create temporary roads through the site to maintain public access to homes and businesses, and the eventual construction of a permanent road

•new highway construction and creation of river side footpaths

•creation of a 'tile' trail and picnic area

•extensive re-landscaping and ecology works

As work progressed to stabilise the hillside, an astonishing discovery came to light when remnants of eight houses buried by the 1952 landslip were uncovered.

Artefacts uncovered included an ornate Roman-style mosaic floor, an intact bread oven and an old kettle. However, because the 1952 residents of the cottages were given several months to leave their homes before they were swept away by the moving land, there was not much in the way of personal effects to find.
After this find, engineers from Telford & Wrekin Council and the main contractor McPhillips (Wellington) Ltd continued to undertake the technically demanding and complex project to stabilise the 350 metre length of moving hillside.

One of the key aspects for everyone involved in the project from the word go was ensuring the local community were kept fully informed about what was going on and why.

Regular newsletters were issued to residents and businesses within the project area and ten public drop in sessions were held between January 2013 and February 2016.

Plans and information were made available to view and discuss with the project team and residents and business people had the opportunity to raise any concerns they had.

The project delivery team also attended monthly Stakeholder Group meetings.
If the work had not taken place, there was a real threat of another major landslip into the river, causing a potential blockage of the River Severn and extensive upstream flooding.

The £17m Jackfield Stabilisation Project averted this possible disaster while allowing the construction of a new road into Jackfield and restoration of full access to the local community and businesses.

The project is a fantastic example of how engineers can improve lives and find solutions, keep our communities safe and preserve them for years to come.
In 2017, the Jackfield Stabilisation Project won both the Institution of Civil Engineers West Midlands Geotechnical Award and Overall Project Award and subsequently represented the West Midlands in the national ICE People's Choice Award.

East Midlands Airport Runway Refurbishment Project Takes Off

After two years in the planning, East Midlands Airport embarked on an ambitious project to resurface its 3km long runway, the joint 7th longest in the UK, in November and December 2016.

The work was completed over seven consecutive weekends, a UK first for airport runway refurbishment projects. During this time, the airport was closed to all traffic for 48 hours each weekend.

Around 360 workers laid 50,000 tonnes of specially formulated material across 150,000m2 in total. Furthermore, 1200 runway lights were replaced with more environmentally friendly LED lighting.

Prior to this, EMA's runway, which has a natural lifespan of only 12-17 years, had not been refurbished since 1999.

Project management experts Turner and Townsend and contractors Galliford Try worked closely with the airport's management and operations teams to ensure that disruption was kept to a minimum.

The scale and logistical complexity of the project created new challenges that had never been overcome at a UK airport. A pioneering, comprehensive and joint approach was adopted throughout which resulted in the first-class delivery of this exclusive £14.8 million aviation infrastructure project.

As a result, the project is now referenced as a model of best practice within the industry. The partnerships created from it, which delivered success beyond all expectations, will continue to grow and prosper in the future.

The project was delivered in 85,000 safe working hours, on time and to budget with no incidents. This was testament to the meticulous planning and procedures in place. This included:

scrupulous traffic management because of heavy plant movements both in and out of the site; segregated work areas to ensure no unnecessary plant and pedestrian interface; plus regular site inspections continually carried out by MAG and Galliford Try Health and Safety teams.

Andy Cliffe, Managing Director EMA, said: "We were delighted with the outcome of this project. Completing such a challenging programme in such a short space of time was a remarkable achievement and testament to the great collaboration and innovative approach to managing
risk and minimising impact."

"Colleagues from across MAG worked with Galliford Try as a seamless team, sharing a common, open ethos and drawing on each other's strengths and experience. This has not only benefited EMA and its customers but will allow us to continue to realise our growth potential in the medium term."

Earlier this year the airport, along with Galliford Try and Turner and Townsend, were announced as winners of the Institution of Civil Engineering East Midlands Merit Awards large project of the year category. The project was also shortlisted for the national People's Choice awards.

Molly McKenzie, ICE Regional Director for the East and West Midlands, said:

'We are delighted to be an official partner of the Department for Transport's 'Year of the Engineer'.

And as part of our bicentenary celebrations in 2018, ICE has launched its invisible superhero exhibition.

The exhibition showcases how engineers transform people's lives, safe guard our future and can enjoy a creative and rewarding career. The engineers who worked on the EM airport runway refurbishment are prime examples of invisible superheroes, working tirelessly to deliver a complex and innovative project that ensures the productivity of our industries. Winning our East Midlands Merit Awards is an honour and we were excited to be able to further showcase the work of these invisible superheroes through our national People's Choice Award.