



■ Let's smash engineering stereotypes

■ Play a role in the governance of the IET

■ HMS Collingwood officers DARE to innovate

■ The UK's first 'faculty on the factory floor'

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# Foreword



Welcome issue 37 of *Partner News*. In this issue, we highlight how we are trying to smash stereotypes around careers in STEM (science, technology, engineering and maths) and the engineering industry with our new campaign #SmashStereotypesToBits. Turn to pages 4-5 to read more and to find the link to the exciting video we have created featuring the finalists of last year's Young Women Engineer of the Year award.

We also feature an article on the RAF100 celebration event we held recently in conjunction with the RAF. Guests heard from speakers including the Air Marshal Sue Grey and Raytheon's Engineering Director, Dr Alex Rose-Parfitt as well as our MOD Development Manager Kayleigh Winter. The event not only celebrated the RAF's 100-year anniversary, but also showcased the RAF Engineering Competition entries by Air Cadet teams from around the country.

We showcase several of our Enterprise Partners' recent ventures in this issue, including Comau's wearable exoskeleton. Turn to page 23 to find out how the Muscular Aiding Tech Exoskeleton (MATE) has been designed to improve work quality by providing advanced movement assistance to the wearer.

Finally, I am delighted to announce that Durham University have become the newest addition to the IET's partnership community by signing an Academic Partner agreement with us last month. Myself and IET Academic Account Manager Jake Godfrey attended the signing ceremony alongside our CEO Nigel Fine, turn to page 19 to find out more details.

If you have any comments or would like to submit an article, please contact [partnernews@theiet.org](mailto:partnernews@theiet.org) or tweet us @TheIET using the hashtag #IETPartnerships.

**Sally Davidson Jones**  
Partnership and Development Manager



#IETPartnerships

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# Let's smash engineering stereotypes

IET campaign #SmashStereotypesToBits aims to change pre conceived stereotypes around engineers and the engineering sector as a whole.

Statistics highlight a stark difference between boys and girls considering careers in science, technology, engineering and maths (STEM).

Research, led by the IET, also found that just 26% of girls are looking to pursue a career in STEM compared to 43% of boys, which could dramatically impact the diversity of young talent coming into the sector.

These statistics come from a poll of 13-23 year-olds that also showed it isn't just girls who have fears over starting

a career in STEM. Over a quarter (29%) of respondents who identified as LGBTUA+ (Lesbian, Gay, Bisexual, Transgender, Undefined, Asexual) opted against having a career in STEM due to worries they would be discriminated against.

To commemorate International Women in Engineering Day, the IET launched a new #SmashStereotypesToBits video campaign designed to remove pre conceived industry

stereotypes that might be stifling young people's career choices within STEM.

## Turning stereotypes on their head

The video shows five real-life female engineers turning the idea of a stereotypical 'pillow fight' on its head by using their skills in engineering.

Featuring IET Young Woman Engineer of the Year Awards winners and finalists Dr Ozak Esu, Dr Larissa Suzuki, Nadia Johnson, Sophie Caffrey and

Ellie Wilson, it aims to inspire young people to consider STEM and engineering as a career, as only 12% of those surveyed said their current STEM studies makes them want to pursue it.

"Engineering in the UK suffers from a huge image problem. The research backs up fears that gender stereotyping within STEM careers is alive and well, potentially damaging the diversity of talent coming into the industry. This, coupled with the fact that there is an



estimated annual shortfall of 59,000 engineers and technicians to fill roles, clearly demonstrates a need for action,” says Jo Foster, IET Diversity and Inclusion Manager.

“The IET is one of the world’s largest professional bodies to promote engineering to multiple audiences and we want to continue to utilise our position to raise awareness of this issue. The #SmashStereotypesToBits campaign is one of the ways in which we can achieve this

by flipping stereotypes on their head and spreading the message that engineering is a cool and recognised career choice for women.”

#### **What can we do to encourage young people into STEM?**

The IET believes that more needs to be done to ensure that STEM is being promoted as a viable career path for everyone, a belief shared by many. Over a quarter of people (27%) surveyed for the campaign say the responsibility lies with

our teachers, and over one in 10 (14%) think the Government needs to step in and do more. A further one in 10 believe this responsibility lies with parents.

The IET research also looked at things most likely to encourage young people in considering a career in STEM.

The ability to work in interesting fields (34%), the large number of job opportunities available (26%) and greater earning potential (20%) came out as top three.

To find out more about the #SmashStereotypesToBits video campaign please visit [www.theiet.org/smashstereotypetobits](http://www.theiet.org/smashstereotypetobits).

Find out more about this year’s Young Women Engineer of the Year Awards ceremony at <https://conferences.theiet.org/ywe/>.

# 2018's UK Young Engineer of the Year announced



Josh Mitchell, UK Young Engineer of the Year 2018.

**Josh Mitchell, 18, was awarded the title of UK Young Engineer of the Year at the Big Bang UK Young Scientists and Engineers Competition.**

Josh received the accolade thanks to his ground-breaking project on the development of a £49 flat-pack 3D printer prototype named The Plybot.

In his project, Josh aimed to prove it was possible to build a 3D printer for a fraction of the commercial cost, which was easy to assemble at home and didn't compromise on print quality.

His final creation fits inside two 13-inch pizza boxes when unassembled, snaps together using just 18 bolts and produces results indistinguishable from commercial printers.

For his prize, Josh received not only a trophy and certificate but also £2,000 in prize money to help him continue his science, technology, engineering and maths (STEM) journey.

#### Judges left stunned

"The winner stunned judges with the insight, creativity and hard work that went into their

brilliant entry," says Mark Titterton, Chief Executive of EngineeringUK, which organises the competition. "This innovative project was an extremely impressive piece of engineering that makes Josh a worthy winner of this year's award. I'm hopeful that seeing what he's achieved will encourage young people across the UK to enter next year's competition."

"The Big Bang Competition has been brilliant – I had such a fantastic time last year that I wanted to return this year with my project," says Josh. "I'm delighted to have won and I hope the success continues into my Kickstarter campaign for The Plybot to get these low-cost 3D printers into people's hands."

This competition is an annual contest designed to recognise and reward young people's achievements in all areas of STEM as well as helping them build skills and confidence in project-based work.

#### Winners enjoy further success

Winners of 2017's competition have since gone on to enjoy a range of other achievements off the back of their successes, including winning international awards, appearing on Springwatch, getting other young people involved in their citizen science project and taking part in conference presentations to industry professionals.

Josh reached the UK finals of the competition having won a place in the online heats. Over 500 finalists from across the country were selected to show their ideas at this year's Big Bang Fair.

10 projects were then shortlisted to pitch Dragon's Den-style to a panel of VIP judges including Rolls-Royce aerospace engineer and former Great British Bake-Off contestant Andrew Smyth, engineer and astrophysicist Jessica Jones and Met Office meteorologist and weather presenter Alex Deakin.

"While it's easy to see why this project was a hit with judges, I have been blown away by the quality of entries from all of our finalists – both in terms of the work that went into them and the way they showcased that work with such confidence at the fair," Mark says. "It certainly bodes well for the future that the scientists, engineers and inventors of tomorrow are already producing such astute and creative project work."

The Big Bang Fair is an annual event made up of engaging theatre shows, interactive workshops, exhibits and career information from STEM professionals. Online entry for this year's competition is open until Friday 2 November. Students who would like to enter are able to submit projects at [www.thebigbangfair.co.uk/competition](http://www.thebigbangfair.co.uk/competition).

“ Innovation is a critical theme for the engineering and technology sector, the country, and the IET ”



Attendees at the Enterprise Partner roundtable comprised IET Academic and Enterprise Partner contacts.

# Bringing innovation to the roundtable

Innovation is crucial to the growth of the global economy and raising living standards around the world. Following the launch of a survey to explore how small and medium-sized enterprises (SMEs) approach innovation and the biggest barriers they face, IET President Nick Winser recently chaired an innovation roundtable at IET London: Savoy Place.

“Innovation is a critical theme for the engineering and technology sector, the country, and the IET,” says Nick. “Our organisation has a long history of celebrating innovative ideas and showcasing the

achievements of incredible innovators each year through our awards programme and range of activities. These include the Innovation Awards, AF Harvey Prize, EngTalks and Present Around The World competition, as well as events such as this roundtable, which bring together our partnership communities to try and solve problems.”

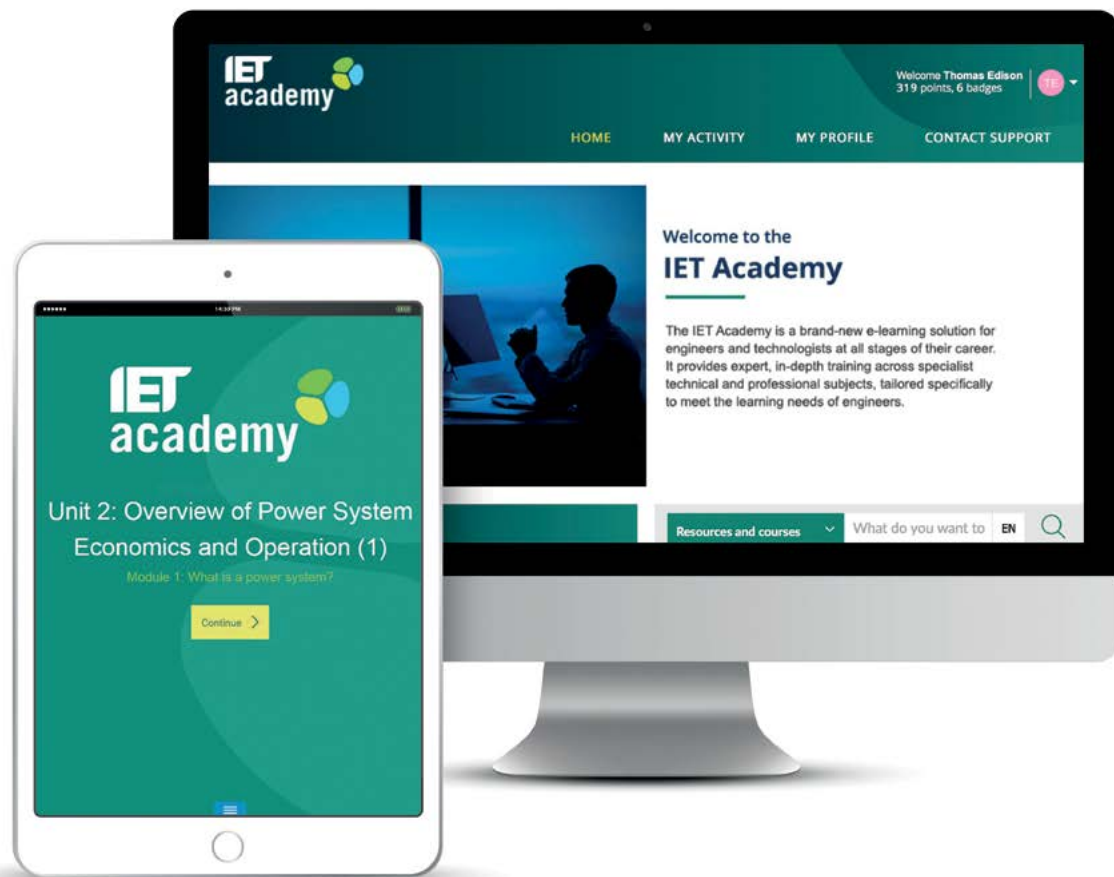
Representatives from 16 Enterprise Partners and nine Academic Partners attended the event, where topics discussed included the skills SMEs need to be innovative and how the IET can add value. Some

of the suggestions to come from the meeting included supporting recruitment and providing support to upskill the workforce through continuing professional development (CPD) opportunities.

The discussion also highlighted how the IET is well positioned to create new professional networks for SMEs with similar technologies, and to bring together SMEs in other potential markets. Business mentoring and partnerships to help companies develop and enhance innovative approaches were also seen as important routes to supporting innovation.

Following the roundtable, the IET will begin work on developing a plan around how it can support innovation not just amongst SMEs but also right across the engineering sector. The aim is to set up a volunteer working group, which will include some of the roundtable’s attendees.

If you have a topic you would like to see covered at a future IET roundtable event, please contact [partnerships@theiet.org](mailto:partnerships@theiet.org) to discuss further.



# The IET Academy: supporting workplace learning anytime, anywhere

The IET has launched a first-of-its-kind online learning platform that offers engineers and employers comprehensive yet flexible engineering courses.

## Supporting employees and employers

With the IET's latest skills survey showing that nearly two thirds of employers struggle to recruit engineers with the right skills, the IET Academy has been developed by industry experts to support engineers who want to improve their technical skills and knowledge whilst fitting training around their day job.

The online courses, which are fully interactive and broken into manageable bite-size chunks, also benefit engineering

companies who want to upskill and retain their workforce.

Available via a handy app, the IET Academy can be accessed anywhere, anytime, providing easy access to in-depth training across a broad range of engineering fields.

"Engineers are the most in demand jobs globally, yet with the increasing skills gap and concerns around how traditional engineering roles are changing to adapt with the likes of digitisation, employers are worried that they won't be able to recruit engineers with the right skills," notes Martin Davies, Head of the IET Academy.

## A flexible approach to learning

"We provide a customisable and

flexible approach to technical learning and knowledge, allowing engineers and employers to be in control of how their learning is delivered.

This not only ensures that courses are manageable around working hours, but lets engineers learn at their own pace, ensuring that they develop the highly specialist skills they need to thrive within their business," he adds.

The courses are suitable for all engineers at any career stage, from apprentice to senior engineer, and will support CPD as well as career development.

Initial specialist courses cover key subjects in power systems engineering, mobile communications, courses

that support the 18th Edition IET Wiring Regulations and management and leadership.

## Upcoming courses

Further courses are being developed in engineering ethics, entrepreneurship in engineering, professionalism, risk management, transport, BIM, cyber security and telecommunications.

To view the courses available and watch a demonstration of the interactive, media-rich course content available via The IET Academy, visit [academy.theiet.org](http://academy.theiet.org).



# New national standard recognises competence of UK electricians



In collaboration with the Engineering Council, the IET has launched a new national standard that marks the competency of individual electricians in the UK.

The national Recognised Electrician EngTech Standard is for electricians undertaking electrical installation, maintenance and remedial works in buildings and dwellings and is awarded via competence based peer assessment. It will provide a national benchmark of competence for electricians working in safety critical roles and means companies will be able

to confidently recruit and retain highly qualified and professionally registered electrical workers.

“The IET has, for some time, been concerned that electricians working on both basic electrical installations and complex high-rise buildings should have the appropriate demonstrable qualifications and competence,” notes Michelle Richmond, IET Director of Membership and Professional Development.

“We believe that safety critical, electrotechnical work is largely hidden within the fabric of buildings and it is, therefore, down to the individual electrician

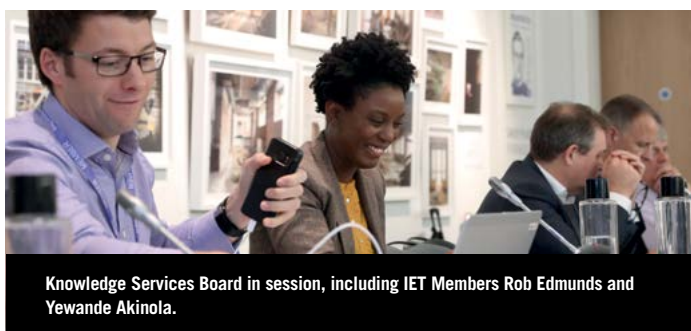
to be accountable for the work they do, both in design, installation and maintenance. This recognised standard will not only provide the industry with a competency benchmark, but will give companies reassurance that they are recruiting a highly skilled workforce. Other benefits would see a reduction in recalled work and associated unplanned costs, providing financial efficiencies too.”

Developed through an IET-led national working group of sector stakeholders, the new standard provides the foundation for the recently awarded national IET

Certification Mark Registered Professional Electrician (RPE). Electricians achieving RPE will meet the highest ethical standards, operate under a professional code of conduct and commit to continuing professional development and audits.

A similar approach of developing recognised standards could be applied across different disciplines in order to gain similar recognition for competency and compliance to the highest level of industry and safety standards.

For more information visit [www.theiet.org/electrician-engtech](http://www.theiet.org/electrician-engtech) or email [electechs@theiet.org](mailto:electechs@theiet.org).



Knowledge Services Board in session, including IET Members Rob Edmunds and Yewande Akinola.

The IET plays an important role in supporting professionalism, promoting the engineering and technology profession and bringing together stakeholders to apply engineering to society's major issues. With members in 150 countries and a highly respected publishing presence, it's a forward-thinking organisation with a long history of evidence-based influence.

Leading this international organisation is our Board of Trustees, supported by a council and three additional boards. All these roles are voluntary and we encourage IET members to lend their experience and support their profession by standing for election.

Although a different environment to purely commercial organisations, becoming involved in

## Play a role in the governance of the IET

governance at a professional body such as the IET is a great opportunity to build skills and networks, while giving something back to your profession and supporting the IET's charitable objectives.

Interest is especially welcome from younger members and those with specialist professional experience, such as working in unusual fields. We'd also love to see more Incorporated

Engineer (IEng) or Engineering Technician (EngTech) qualified professionals stand for election, as the IET seeks to balance representation and create a diverse pool of expertise to build a strong future for the engineering profession.

If you are interested in supporting the IET in this way you can find out more about volunteering for governance roles at [theiet.org/elections](http://theiet.org/elections).



# Matthew Foyle announced as winner of 2018 Baroness Platt of Writtle Award

**M**atthew Foyle, a project manager at Wessex Water, has been announced as this year's winner of the Baroness Platt of Writtle Award. The prestigious award recognises engineering excellence leading to Engineering Council registration as an Incorporated Engineer (IEng).

Matthew impressed the judges by his career progression supported by academic development. He began his career as an apprentice electrician, working his way up to technician and most recently mechanical and electrical (M&E) project manager.

Presently working as M&E

Project Manager for a large-scale refurbishment of a dated water treatment works, Matthew has financial responsibility for approximately £16m, and overall responsibility for the M&E programme, design, procurement and construction activities. He is currently evaluating the feasibility of using new technologies such as powerpack batteries and other carbon footprint reduction activities and was also the first M&E project manager in Wessex Water to embrace Building Information Modelling (BIM).

Matthew was presented with his medal, certificate and prize money of £1,000 at the

Annual Awards presentation of the Worshipful Company of Engineers this July. The judges praised his passion for new technology and his focus on driving innovative engineering practices within Wessex Water. Matthew embraced 3D design, halving meeting times and improving clients' understanding and involvement in projects.

Matthew is using his registration to help encourage and support others within Wessex Water to register as professional engineers. He is also encouraging school and college leavers to join the engineering profession,

developing Wessex Water's M&E apprenticeship programme and mentoring new apprentices.

"I am delighted to have won the Baroness Platt of Writtle Award – it is a huge honour that an IET selection panel nominated me and judges from across the engineering industry have recognised my achievements. Attaining IEng status with the IET has been a key milestone in my career," Matthew says. "It demonstrates the dedication, experience and technical knowledge required to be recognised as both a professional and competent engineer and is valued by my employer."



L-R Sgt Chambers, Cfn Hanigan, Cpl Murray, Cfn Thornton, LCpl Tiernan, SSgt Watterson, LCpl Davies, Cpl Cartwright, Cpl Pacitti, LCpl Morris and Sgt Baker.

# IET awards best REME Minor Unit

The IET has awarded Light Mechanised Infantry unit 1st Battalion The Royal Irish Regiment Light Aid Detachment (1 R IRISH LAD) the annual award for best REME Minor Unit.

This award recognises the detachment's engineering excellence in maintaining the Royal Irish Regiment's fleet of Foxhound vehicles on operations in Afghanistan. A critical part of the 1 R IRISH team, LAD personnel are attached from the Royal Electrical and Mechanical Engineers (REME) and are responsible for keeping vehicles, weapons and equipment ready for action.

Split into a deployed (LAD Fwd) and a rear operations group (LAD ROG), the unit has recently undertaken a

wide range of tasks. Between November 2016 and August 2017 LAD Fwd spent its deployment delivering equipment support to the UK fleet and taking part in recovery operations for coalition partners.

The LAD ROG has been kept equally busy, successfully supporting the pre-deployment training of ROTO 2's Companies and assuring the operational Foxhound exchange, directly supporting Operations TORAL and SHADER. Thanks to the soldiers' diligence, risk to operations was significantly reduced.

The work of the 1R IRISH LAD has delivered many benefits. For example, in Kabul the LAD initiated a theatre-interim safety inspection trial to increase the legacy 21-day periodicity. This has

now been adopted, saving 1,750 maintenance hours per year across the TORAL fleet. Furthermore, the LAD published a Foxhound Lessons Paper from TORAL for all maintainers, operators, and the CoC command operating centre.

Heat mitigation trials were run to reduce overheating faults, proving a reduction of under bonnet temperatures of at least 10°C. These modifications and an air conditioning modification were embodied reducing initial heat fault rates by 84%.

"2017 saw 1 R IRISH LAD intimately support operational success both at home and away," says P A Casell, Captain Electrical and Mechanical Engineer (EME) 1 R IRISH LAD. "Success on TORAL has been a culmination of four hard years of Light Mech capability

development, where the LAD has continued previous themes of technical innovation and development and translated these to mission success."

Morale and team spirit is high in the unit, and the LAD regularly takes part in REME association sporting events and challenges. Recently this has included ocean sailing, the Exercise Supreme Glacier four-week race in Austria, the 25km DANCOM March in Kabul and the New Kabul Compound 10km international road race.

"Despite its small size and along with its focus on output, the LAD has retained an emphasis on activity that promotes Esprit de Corps and continues to deliver opportunities such as adventurous training and sport," Cassell enthuses.



AM Julian Young, Chf Tech Andy Brook, Gp Capt Robert Woods and Alex Rose-Parfitt with the RAF 100 batons.

# IET joins the RAF100 celebrations

On Thursday 21 June, the prestigious Riverside Room of IET London: Savoy Place welcomed almost 300 guests to celebrate the 100th anniversary of the RAF.

In conjunction with the IET, the event formed part of the RAF100 celebrations, which are taking place throughout the country during 2018.

After a welcome speech from IET Head of Membership, Mark Organ, Air Vice Marshal Sue Grey spoke about how events such as these celebrate the past and shape the future of the RAF. She also mentioned some of the initiatives the RAF has set up to inspire the next generation, including the RAF Engineering Competition, RAF100 Inspire and RAF 100 National Tour STEM Zones.

## Inspirational talks

Dr Alex Rose-Parfitt, Engineering Director at Raytheon took to the stage next, giving an inspiring speech on Raytheon's enduring support to the RAF and the synergy between the two in their passion to inspire young people in STEM subjects. Alex also highlighted Raytheon's sponsorship of two key RAF100 events – the RAF Baton Relay and RAF Engineering Competition – both of which were featured in displays around the room.

Air Cadet teams from Flitwick, Barnes, Horsham, Cambourne and Ballynahinch showcased the

Engineering Competition stands – these individuals will all be taking part in the competition's final, set to take place at the Duxford Air Show later this month (September).

## A special relationship

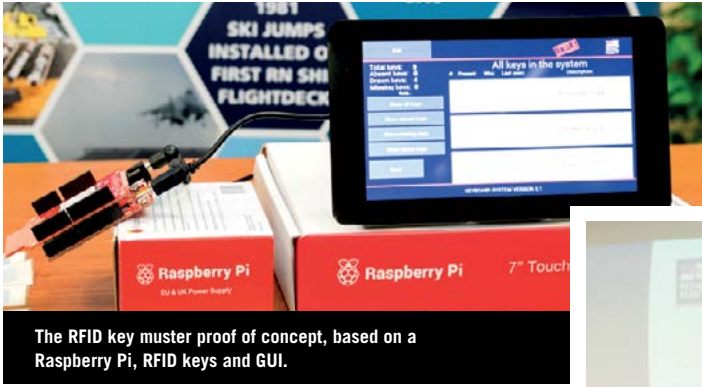
IET MOD Development Manager Kayleigh Winter rounded off the speeches by congratulating the RAF on their 100-year legacy and explaining the relationship the IET has with the RAF.

"We are delighted the RAF wanted to hold this event in conjunction with the IET," she says. "We have an excellent working relationship with the

RAF and I was honoured to speak at this event on behalf of the Institution. This is a fantastic campaign and a great opportunity to celebrate engineering excellence over 100 years. Hopefully more people will want to get involved with both the RAF and the IET as a result of its success."

The event finished with a networking session which allowed guests to peruse the Engineering Competition and RAF Baton Relay stands, as well as take in the view from the venue's impressive roof terrace, which gives a 180-degree view over the River Thames.





The RFID key muster proof of concept, based on a Raspberry Pi, RFID keys and GUI.



SLt Boag NZN demonstrating the RFID key muster proof of concept to Lt Marin-Ortega.

# HMS Collingwood officers DARE to innovate

A group of 18 weapon engineer officers from New Zealand, Pakistan and the Royal Navy recently finished their 13-week engineering principles course at HMS Collingwood, which culminated in a presentation of their projects to VIPs from the Royal Navy.

This was made possible thanks to HMS Collingwood's newly opened DARE:Hub, which received funding from the MOD for Raspberry Pi's sensor suites, robot sets and a 3D printer.

“By supplying students with the tools and freedom to explore and experiment we empower our engineers to solve problems, come up with innovative solutions, and constructively challenge the

system both now and later in their careers,” says Course Leader Lt Marin-Ortega.

The projects posed were based on current issues or processes that technology could improve upon. One such issue was the amount of time it takes to muster keys on board, which was resolved by utilising radio frequency identifier (RFID) technology controlled by a Raspberry Pi. The group behind this project wrote 2,600 lines of Python code, 3D designed and printed a casing and demonstrated a working prototype.

Another team took on the challenge of the ShipHaz board. Their prototype demonstrated a working system that enabled the user to immediately see

if an area onboard the mock Type 45 ship was safe to go to using RFID keys and an LED board. Both the solutions offered ideas that could be easily and rapidly implemented at minimal cost compared to existing off-the-shelf solutions.

“In my opinion this was an excellent example of innovation, learning whilst doing, and we should continue to mature its delivery,” says Lt Cdr Packer from Maritime Capabilities (MarCap), under which the DARE (Discovery, Assessment and Rapid Exploitation) team sits.

In a unique twist, the officers had to pitch their projects to a mock ‘Dragon’s Den’, which scored them based on feasibility and potential.

One VIP who acted as a ‘dragon’ was Cdr Goldsmith, Staff Weapon Engineering Officer (SWEO) to Flag Officer Sea Training (FOST).

“These prototype projects have provided a tangible example of how cheap, capable and versatile modern microprocessors can provide potential technical solutions to many of current challenges we face,” he says. “Our junior engineer officers’ eyes were opened to the importance of understanding of how these systems interface with each other and how they are programmed, so they’ll be better placed to exploit innovative technology to solve real-world problems when they reach the front line,” he concludes.

“ Students are encouraged to undertake CPD in preparation for professional registration ”

# RSME course opens doors to wider career opportunities

**Sgt Bowes** discusses his experiences as a student undertaking the Royal School of Military Engineering's Clerk of Works Electrical Course 62.

The Royal School of Military Engineering (RSME) Chatham has the responsibility of providing training for the Army's future engineers. Through a partnership with Greenwich University, Holdfast and Mid Kent College, the Professional Engineering Wing (PEW) of the RSME provides the training and exposure to students of the Clerk of Works Electrical courses. The course offers a foundation degree in electrical engineering management, with modules on electrical installation design, facilities management, contract management and project management.

The Clerk of Works Electrical Course 62 is a two-year, full-time tertiary level course that couples the modules set out by Greenwich University with key military courses required

by a military senior non-commissioned officer (SNCO).

To be considered for the course, students must show the requisite skills and experience in related trades, such as electrician or electrical and mechanical draughtsman. Potential students must have a zest for learning, show the potential to become a SNCO and have gained some experience in command, leadership and management in previous roles within the Corp of Royal Engineers.

The core focus of the course is the academic qualification, with students encouraged to undertake continuing professional development (CPD) through mentoring junior courses, conducting various site visits and attending IET events.

The continuing professional and personal development



A student conducting soil resistivity in preparation of siting Field Power Station.

of students is promoted by encouraging them to become professionally registered through mapping their experience while on course and any industrial attachment to the UK- SPEC – in preparation of Incorporated Engineer (IEng) or Chartered Engineer (CEng) registration.

During the course, students are exposed to industry standards through a six-week attachment at various engineering companies across the UK. This provides them with the ability to consolidate the lessons covered on the course while gaining valuable work experience and exposure to industry standards. Students are able to forge working relationships and conduct networking activities.

The attachment exposes students to facilities and

project management, contract and commercial management and safe systems of work among other activities imperative to becoming a well-rounded engineer.

Then, in line with course requirements and in preparation for their new assignment, students finally embark on a four-week exercise with simulated scenarios that sees them apply the skills they've acquired and lessons they've learnt over the last two years.

The course is demanding, time consuming and at many points stretches individuals beyond their comfort zone. However, it is well worth the qualification, as it opens doors to various employment opportunities within the Corps of Royal Engineers and the wider engineering world after military careers come to an end.



A researcher connects a pantograph test at the Birmingham Centre for Railway Research and Education.

# Birmingham brings home Queen's award

**T**he Birmingham Centre for Railway Research and Education (BCRRE) has been awarded the Queen's Anniversary Prize for Higher Education. Professor Clive Roberts, Director of the Centre, and University of Birmingham Vice-Chancellor Professor David Eastwood, received the prize from HRH The Prince of Wales and HRH The Duchess of Cornwall at a special event held at Buckingham Palace earlier this year.

The Queen's Anniversary Prizes are overseen by the Royal Anniversary Trust, which aims to promote innovative work in UK universities and colleges that impact society. Since the awards were launched in 1994, 253 prizes have been awarded to 125 universities and colleges.

"We're so pleased that our research has been

acknowledged as being one of the leading activities in the UK at this time. Rail has a vital role in creating the world of tomorrow and we are looking ahead to the next phase of railway's transformation," says Clive.

## World-class research

The BCRRE employs over 150 academics, researchers and professional staff, working with more than 50 companies in over 20 countries to deliver world-class research into the operation, leadership and management of 21st century railway systems. Within the UK, the centre also plays a leading role in key bodies such as RRUKA, Young Rail Professionals, the Railway Industry Association, Rail Alliance and is the lead partner in the UK Rail Research and Innovation Network (UKRRIN).

## UK consortium

UKRRIN is a consortium of eight UK universities and 16 companies which have committed to lead new rail technologies over the next 10 years.

£92m funding has been secured, which will include the creation of four centres of excellence, including a Centre of Excellence in Digital Systems within the University of Birmingham's new School of Engineering buildings on campus.

Internationally, the centre works with organisations in Singapore, Malaysia, China, Japan, USA, the Middle East, Australasia and across Europe - if the country has a railway, it's likely to have a connection with the centre!

## Degrees tailored to the rail industry

The University of Birmingham

is unique in the UK in offering specialist degrees tailored to the needs of the rail industry and accredited by the IET.

At undergraduate level these include bachelor's and master's programmes in electrical and railway engineering and civil and railway engineering. The impact of the programmes extends into other engineering degrees, with interdisciplinary project work and research projects.

Last year at least 30 final year students carried out their projects within the centre.

"We're so pleased that our research has been acknowledged as being one of the leading activities in the UK at this time.

"Rail has a vital role in creating the world of tomorrow and we are looking ahead to the next phase of railway's transformation," says Clive.





Two current AME BEng Manufacturing Engineering students working on a manufacturing cell located on the Unipart Powertrain Applications factory site.



Students outside of the AME building.

# The UK's first 'faculty on the factory floor'

By Coventry University's **Dr D.G. Waugh**, Course Director for Manufacturing Engineering, at the Institute for Advanced Manufacturing and Engineering, and **Professor Carl Perrin**, Institute for Future Transport and Cities' CEO.

**W**ith great significance being put on the need to meet the skills gap throughout the manufacturing industry, there is a requirement for higher education institutions to rethink how this issue can be tackled.

Many universities are now aligning themselves with industry more than ever. However they seem to fall short of fully immersing themselves with their industrial collaborators, potentially having severe implications on the students who are not fully 'industry-ready' upon graduation.

## The Institute for Advanced Manufacturing and Engineering

The Institute for Advanced Manufacturing and Engineering (AME) is a partnership between Coventry University and Unipart Manufacturing Group, part-funded by the Higher Education

Funding Council for England (HEFCE) and has established the UK's first 'faculty on the factory floor'. AME brings together the best in academia, industry and R&D in a 'live' manufacturing environment.

Coventry University has located the AME on the Unipart Powertrain Applications manufacturing factory site. This ensures that staff (both university and Unipart) and students are co-located in a unique environment which can provide invaluable industrial experience to the students, providing 'live' manufacturing projects throughout their degree.

With AME now in its fifth year, its aims and objectives are well established and shared by all stakeholders. These are to:

- Develop industry-ready engineering graduates.
- Research and develop

innovative technology for automotive, aerospace, oil and gas, power generation and rail sectors.

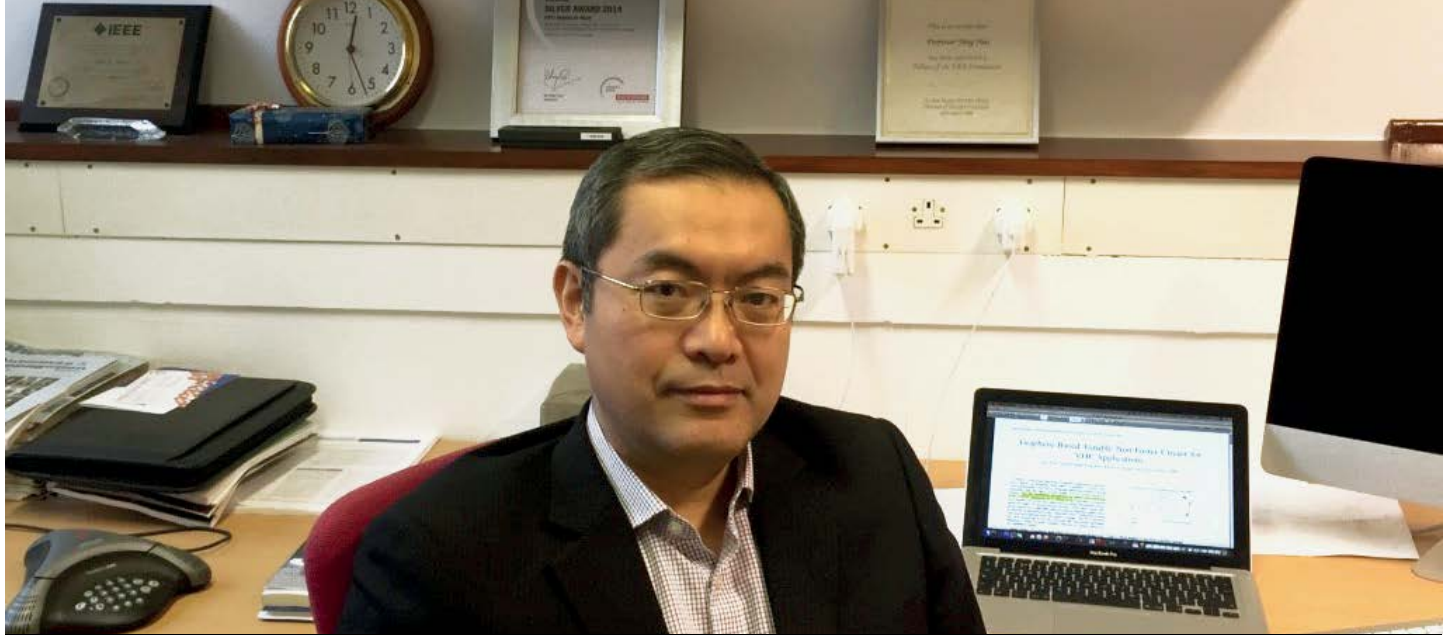
- Disseminate research and technologies for the benefit of Unipart, its suppliers and UK manufacturing.
- Create new postgraduate learning opportunities and professional development courses for industry.
- Drive economic growth by making the UK globally competitive.

The manufacturing engineering degree courses address the domestic skills shortage and the need for more graduate engineers to enter industry and have an immediate impact. This in part is owed to the fact that all students are provided with training in Unipart best practice manufacturing methodology and given the opportunity to

benefit from working with some of the most talented engineering professionals in the UK.

This, in addition to the research and development which is carried out by AME academics, arms UK industry with the skills, technologies and competitive advantage required to trade globally, creating jobs across the supply chain and generating real economic value.

One thing is for sure, now is a great time to be considering a career in manufacturing engineering. The UK industry's reputation is strong across the world and the Government is providing specialist support to help manufacturers achieve sustained growth. At AME we believe in delivering the best – the best learning, the best practical experience, the best equipment and the best access to future technologies that will help to future-proof students for their long-term careers.



Professor Yang Hao, Leader of the ANIMATE programme.

# Queen Mary awarded £3m to develop software defined materials

Queen Mary University of London has been awarded approximately £3m to develop software defined materials that will enable rapid development of future generation communication systems, intelligent technologies and infrastructures including the Internet of Things (IoT), security imaging systems and robotics.

The Engineering and Physical Sciences Research Council (EPSRC) has granted £1.6m to the university's School of Electronic Engineering and Computer Science, with 50 per cent of the remaining funding coming from industrial partners and Queen Mary institutional support.

This includes £600,000 from QinetiQ, a company with expertise in innovative new technologies providing solutions to the defence, public and private sectors and a student placement opportunity from Thales UK, a provider of aerospace, space, defence, security and transportation services and solutions. In addition, Queen Mary will support

## three PhD studentships. **Ambitious research project**

The money will fund an ambitious four-year research project to develop software defined materials which will enable dynamic control of electromagnetic waves over a broadband of the frequency spectrum.

Queen Mary's Professor Yang Hao is leading the project, which is known as ANIMATE (softwAre defiNed materlals for dynaMic control of electromAgneTic wavEs). He and his team are gearing up to take on new challenges to research a future antenna system known as a 'magic black box', whose properties are programmable according to functional requirements.

"The project is inspired by the concept of software defined radio," says Yang. "Together with the recent development of metamaterials and transformation optics, it is now possible to develop artificial materials with properties that can be modified by software-controlled digital hardware, whilst new functionalities could be added simply by loading or updating new software."

## **At the heart of future smart materials**

Yang envisages that ANIMATE is designed at the heart of future smart materials and technologies. His vision is to unlock contributions and expertise from multiple disciplines to develop a core programme of science and engineering research on electromagnetic materials for applications in sensing, communications and computation.

"ANIMATE will be the catalyst around which our industrial partners can ensure UK industry maintains its leading position in the marketplace and capitalises on the industrial strategy initiative, facilitating retention and growth of highly skilled jobs and supporting the UK's knowledge economy," he says.

"Our strategic partnership with QinetiQ will enable the design, development and integration of novel electromagnetic devices and structures and reshape the future of the UK manufacturing and electronics industry. Combining world-leading researchers with

unique facilities to provide technical assurance, test and evaluation and training services, this project has the potential to reinforce the UK's competitiveness in the field of radio frequencies (RF) and microwave devices at both commercial and academic levels."

## **New products**

"The impact of ANIMATE's research will be demonstrated by transitioning the technology into new products to create revenue across the wider UK supply chain," continues QinetiQ's Professor Sajad Haq. "QinetiQ is committed to this exploitation through its current and future customers, who will be engaged from the inception of the programme."

The success of the ANIMATE project will be demonstrable through the establishment of an industrial steering group, whose mission is to incubate novel technologies and mature to product through partnership with UK industry. This includes Thales UK and small to medium enterprises, along with the Satellite Applications Catapult and academia.



# Durham University's Department of Engineering partners with the Institution of Engineering and Technology

**D**urham University and the Institution of Engineering and Technology (IET) have today signed a formal partnership, enabling Durham Engineering students to access a professional community of engineers and build stronger relationships with industry.

The Academic Partnership signing took place within the Department of Engineering on Tuesday 31 July. Professor Jon Gluyas, Dean of Knowledge Exchange and Executive Director of Durham Energy Institute (DEI), represented Durham University, whilst Nigel Fine, Chief Executive, represented the IET.

## Benefits for students

Durham University is

recognised as being one of the leading centres of research in engineering in the world. Engineering students, at both an Undergraduate and Postgraduate level, work on inter-disciplinary research challenges, with the aim of generating new insights into global challenges.

The IET is one of the world's largest engineering institutions, with a large international membership-base and a partnership community spanning industry, education and the Armed Forces. Becoming a member will give students at the University access to industry speakers and professional networks.

The partnership will further

connect the University and its Engineering students to the SME community, facilitating many more research opportunities and practical engineering challenges.

## Building relationships with industry

Professor Jon Gluyas, Dean of Knowledge Exchange said: "This is a really exciting step for the Department of Engineering. The partnership will help to further strengthen the Department's excellent track record in engineering research, facilitating greater links with industry and offering students the opportunities to develop their professional skills, alongside their academic research."

## Informing and inspiring engineers of the future

Nigel Fine, Chief Executive, the IET, said: "We are very proud to have Durham's Department of Engineering on board as an Academic partner. At the IET, part of our mission is to inspire and inform the next generation of engineers. We aim to bring people together, enabling and developing networks of professionals from different engineering disciplines."

"We know that these ambitions are closely shared by Durham University – we both want to improve the quality of life around us, develop skilled individuals, and promote and share knowledge."



Female engineering students attending the Women in Engineering conference at The Open University's Walton Hall Campus in Milton Keynes.

# Open University hosts Women in Engineering conference

Article by **Mr Jan Kowal**.

It's well-known that women are still under represented in the field of engineering, so it was with great pleasure that The Open University's (OU) School of Engineering and Innovation welcomed 50 female engineering students to an inspiring conference this June.

In celebration of International Women in Engineering Day, the conference provided students and professionals the opportunity to share their passion for engineering and publicise the brilliant work being done to encourage more women into this field.

The event began with a networking dinner, which gave attendees the chance to connect and share their stories. This was followed by an entertaining after-dinner speech from comedian Rosie McMahon. Rosie spent six years in industry as a production engineer, which

gives her plenty of source material for her stand-up comedy.

The following day the Science, Technology, Engineering and Mathematics (STEM) faculty's Executive Dean, Professor Josie Fraser, opened the conference and introduced an exciting programme of speakers from a variety of engineering disciplines. Several practising female engineers talked about their experiences, career progression, and work-life balance. Students also heard about the importance of networking and professional bodies from Sarah Kucklewicz, who was instrumental in setting up the Women's Engineering Society Student Group at the OU.

A specially designed workshop then enabled students to learn about tackling everyday sexism in engineering, before the conference ended with an inspiring talk from

the University's careers advisory team. The event was a big success, providing encouragement and motivation for our aspiring female engineers of the future.

## **OU senior lecturer makes Top 50 Women in Engineering**

We are also delighted to announce that Carol Morris, Senior Lecturer at the OU's School of Engineering and Innovation has been selected as one of the Top 50 Women in Engineering (WE50): Returners and Transferrers 2018.

Carol transferred into engineering in her mid-thirties after initially training as a chemist. She took a lengthy career break to care for her two sons while at the same time studying for a degree in electronic engineering.

She consistently challenges stereotypes and provides support and encouragement for female students in engineering at the OU. In

addition, Carol is also the instigator and organiser of the OU's annual Women in Engineering conference.

Carol was nominated by her Head of School, Professor David Sharp.

"I am thrilled that Carol has been recognised as one of 2018's WE50: Returners and Transferrers; it is thoroughly deserved. She is a role model for all female colleagues and is an inspiration to any woman looking to move into engineering," he enthused.



The OU's Carol Morris, one of 2018's 50 Top Women in Engineering: Returners and Transferrers.



IMAGE CREDIT: China Southern Power Grid

Sucheng HVDC Converter Station.

# Helping China achieve its green energy goals

**C**hina is the world's largest primary energy consumer. However, its overreliance on coal has resulted in environmental issues such as air pollution and water contamination, leading to health issues, biodiversity loss and climate change.

China's government has committed to 'going green' with the rapid expansion of carbon-free renewable power generation. Today surplus renewable energy is being ferried from remote areas to China's fast-growing megacities thanks to the development of high-voltage direct current (HVDC) grids.

A core technology that connects HVDC lines with AC grids is the voltage source converter (VSC). This manages the power flow with high-voltage insulated gate bipolar transistors (HV-IGBTs): specialised

transistors that can be switched quickly and controlled simply.

## Academia-industry partnership

China Southern Power Grid (CSG), one of China's national grid operators, plans to accelerate the development of press-pack IGBTs (PPIs) over the next decade and has joined a new academia-industry partnership set to optimise the design and operation of these devices.

"CSG has accumulated a wealth of experiences in the construction and operation of HVDC grids and we'd like to accelerate its technical development by harnessing the best research resources," says Leishi Xiao, a project leader at CSG.

"By sharing our field operational data and experience with academic experts we hope

some fundamental issues related to subsystem design could be resolved, helping us to meet our clean, affordable energy goals," adds Chao Sheng, General Manager of the Electric Power Research Institute of Guangdong Power Grid Co. Ltd. a wholly-owned subsidiary of CSG.

Dr Zhiqiang Wang from Dalian University of Technology is leading the academia-industry consortium, which also includes researchers from the University of Leicester and Newcastle University.

"Through this three-year project involving CSG and internationally-leading research groups we hope to answer some underpinning questions at the heart of the HVDC power station," he says.

Newcastle University researchers, led by Prof Volker Pickert, will be optimising the

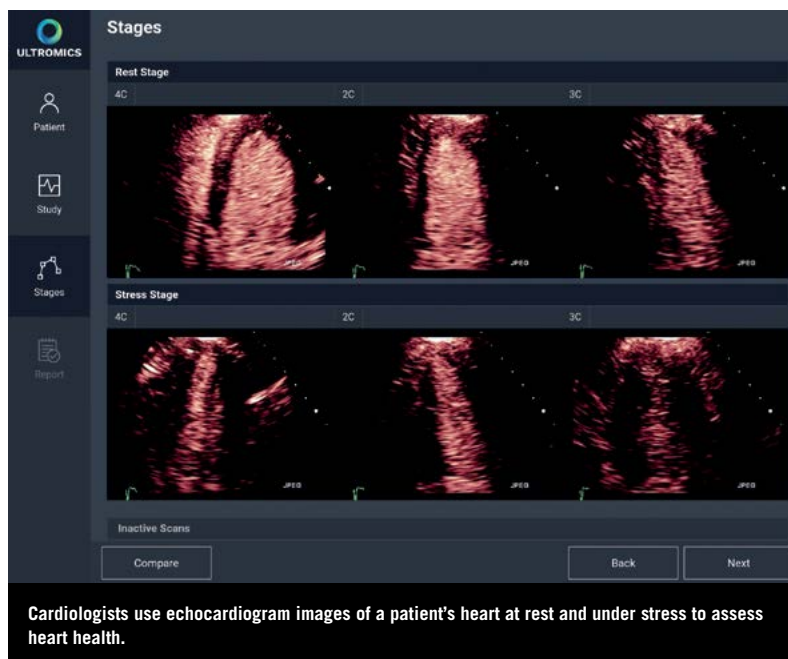
design of a standardised press pack module by focusing on its electro-thermo-mechanical coupling effects, while the PPI's intelligent gate driver units are under construction at the University of Leicester.

## UK research

"We believe that digitalised gate drivers (DGDs) are the future of power converters, especially for high-voltage and high-power applications," says Dr Bing Ji, Lecturer in Electrical Power Engineering at the University of Leicester.

"Our DGDs are specially designed for the smart power converters to make them Industrial Internet of Things ready. The operational conditions of PPIs, normal or abnormal, can be constantly monitored, recorded and analysed."

# AI at the heart of diagnosis



OCC software is enabling the use of a new product that could save the NHS £300m a year in avoidable operations and treatment, reports freelance science journalist **Sally Croft**.

A system that uses an algorithm trained by artificial intelligence (AI) to diagnose heart disease has been developed by Oxford University spin-out company Ultromics using software created by IET Enterprise Partner, Oxford Computer Consultants (OCC).

OCC specialises in software that makes a useful contribution to society, particularly in health, science and engineering and the delivery of social care. Its innovation delivery team is expert at transforming ideas and research software into commercial applications.

OCC's involvement in the cardiology project began in 2016 when Ross Upton, a doctoral student working with Paul Leeson, Professor of Cardiovascular Medicine at the University of Oxford, was pointed towards the company. The two academics had developed an algorithm to computationally assess heart scans and wanted to create a user-friendly prototype product to secure funding and create a company.

Heart disease affects almost

50% of people over the age of 40. Patients with a suspected problem are generally given a series of echocardiograms – ultrasound heart scans – which view the heart, both at rest and under stress, from different positions. Clinicians assess these images by eye, looking for behaviours that could indicate the presence of heart disease and the likelihood of a heart attack. But even the most experienced cardiologist is making judgements based on only a fraction of the data contained in the images.

Currently around one in five scans is misdiagnosed – equivalent to 12,000 patients a year in the UK.

Ultromics' algorithm extracts more than 80,000 datapoints from a single echocardiogram and analyses them using machine learning techniques. It was trained to identify potential heart problems by looking at the scans of over 1,000 patients and whether they went on to have heart attacks

or similar difficulties.

"We were involved in the design of the product from a very early stage," explains Rachael Bartholomew, Project Lead at OCC. "Before we started to devise the software we undertook detailed user research, talking to clinicians and sonographers to make sure we understood exactly what they need to do and how to present information to them in an accessible way."

The Ultromics product and its Echuity software

enables clinicians to upload the echocardiogram images to a portal. At Ultromics, the best images are selected and the position of the heart wall is identified in successive images. The algorithm then processes this information and produces a topological analysis report that can be used to underpin clinical decisions.

The system has now been trialled on echocardiograms from six cardiology units in the UK and Ultromics expects to launch its first product in 2019.





# Comau unveils its exoskeleton MATE

Comau unveiled its first wearable exoskeleton at Automatica, the international trade fair for Automation and Mechatronics. The Muscular Aiding Tech Exoskeleton (MATE) is able to fully replicate any movement of the shoulder while adhering to the body like a second skin. It has been designed to improve work quality by providing consistent and advanced movement assistance during repetitive as well as daily tasks.

Using an advanced spring-based passive structure, MATE delivers lightweight, breathable

and highly effective postural support without the need for batteries, motors or other failure-prone devices. It's also compact and ergonomically designed thanks to the partnership between Comau, ÖSSUR; a leading non-invasive orthopedics company and IUVO; a spin-off company of The BioRobotics Institute.

"MATE has been designed in close collaboration with factory workers, thus responding directly to their specific needs," says Tobias Daniel, Comau's Vice President Robotics and

Automation Products, Global Sales & Marketing. "With our exoskeleton they will be able to do the same tasks but with less fatigue.

"For Comau this is also an opportunity to reach a global market that, according to the IFR, grew more than 60% from 2015 to 2017 and is estimated to continue growing at a rate of 25% each year until 2020. We believe that the industrial sector will represent about one third of the exoskeleton's applications."

MATE is an important part of Comau's HUMANufacturing

Technology strategy, a concept in which people are protagonists within the smart factory together with cutting-edge digital tools, enabling technologies and 'intelligent' industrial robotics within a networked production system. It is also the first of a series of wearable robotics the company is developing and commercialising.

For further information, please visit [www.comau.com/en/](http://www.comau.com/en/)

# Introducing Sinewave Energy Solutions

Sinewave Energy Solutions is a specialist engineering company that provides high and low voltage electrical services across the UK. Providing turnkey solutions for any electrical problem up to 132kV, the company employs highly skilled engineers with sound technical understanding of electrical engineering and is accredited as an Independent Connection Provider (ICP) through the

National Electricity Registration Scheme (NERS).

The company provides bespoke solutions in a variety of fields including civil groundworks, installations of electrical plant and equipment and electric vehicle (EV) charging stations. It's highly skilled protection and commissioning engineers are available for solutions to any network protection

issues, grading studies and for commissioning of any high and low voltage equipment. It also provides a 24/7 emergency call-out and, and clients are offered electrical system operation and safety training courses.

Sinewave Energy Solutions customers range from distribution networks operators and consultants through to major industrial conglomerates across the UK. It also has

a strong presence in the renewable sector, looking after over 1.5GW of assets.

If you would like to find out more about what Sinewave Energy Solutions has to offer, please telephone **01672 541292** or alternatively email [enquiries@sineenergy.co.uk](mailto:enquiries@sineenergy.co.uk).



Holovis launches LearnView AR, a training and maintenance tool that combines real-time tracking with augmented data overlays.



An example of LearnView AR in operation on a scale Eurofighter Typhoon showing the weaponry.

# Holovis launches LearnView AR

LearnView AR combines real-time tracking with augmented reality data overlays for training and maintenance on real-world platforms and assets.

**H**olovis has launched LearnView, a proprietary software suite that translates training materials into intuitive, immersive and interactive scenarios.

This allows engineers to delve deeper into the mechanics of real-world systems by overlaying data and visualisations accurately onto products and assets. Operating in real-time for training, reviews and live maintenance assistance or to identify the causes of problems, it acts as a virtual manual with real-time

database connectivity that is always instantly accessible.

To operate, users simply use handheld devices such as iPads to scan the surface of the machine and see real-time datasets virtually reconstructed and overlaid on their screen. The solution highlights areas of the component that can be explored and interacted with to bring up additional information such as training, damage inspection, operational and maintenance data.

The training option also allows the user to virtually lock

onto part of the model, such as an engine, and expand it to see the inner workings and components. It can then be used to launch videos or step-by-step guides showing how to replace or change elements, troubleshoot problems or instantly log and reference them for further attention, all linked in real-time to a back-end database system.

This instant access to information saves time in trying to locate physical user manuals and ensures engineers can complete tasks with reduced

training. If a problem needs to be escalated, this can also be done in real-time from the device, alerting a specialist engineer instantly.

Information can be linked to manufacturing and enterprise management systems for even greater functionality and added value. Data can be recorded, and insightful analytics generated, reporting on how often certain parts are failing and the reasons why, which can then be collated as part of a service level agreement with a supplier.



# Servelec Controls powers up legacy systems



A compressor station.

**S**ervelec Controls, an integrator of mission critical control and safety systems for major national infrastructure, has been awarded two major projects with high profile clients.

The first is a series of several major contracts with Costain, upgrading the existing Huntingdon and Peterborough compressor stations to keep National Grid ahead of the Industrial Emissions Directive.

Servelec Controls will supply state-of-the-art supervisory control and data acquisition (SCADA) systems for two new compressors being built at each site, compressor controls and safety, site fire and gas detection and control systems, and a remote telemetry solution to provide real-time data back to a centralised, national control centre.

The challenge lies in not just creating the new control systems, but integrating them

into the existing infrastructure so that there is a seamless, safe and secure switch over providing control of both new and old compressors.

Servelec Controls has also been contracted by Sellafield Ltd to upgrade its THORP handling systems, built in the 1980s to reprocess spent fuel from nuclear reactors in the UK and overseas. The age of the equipment has rendered it obsolete due to the difficulty in sourcing reliable spares, so this upgrade will extend the plant's life by many decades.

This contract comes following Servelec Controls' successful Phase 1 option engineering program to determine the project requirements, which will involve replacing the obsolete controls with an upgraded system capable of handling a wider variety of loads within the inlet pond than previously. Operators will be provided with



One of the THORP handling systems at Sellafield.

optimised indication and the latest control technology, and the entire system will integrate with not only the existing legacy systems but also any future overall SCADA system.

"These awards exemplify the strong relationships we have with some of the major players in both the oil and gas and nuclear industries," says Andrew Mills, Servelec Controls' Managing Director. "We strive to supply innovative

solutions to all our clients, helping them to streamline their operations, increase safety and reliability, and make significant improvements to both their efficiency and their bottom line."

For more information on Servelec Controls' bespoke mission-critical control systems, please visit [www.serveleccontrols.com](http://www.serveleccontrols.com) or call **01246 437600**.

“ We’re keen to stay connected to local educational institutions ”

# Coderus live streams tech events to local community



Sponsored by Tech East and BT, in association with the tech cluster Innovation Martlesham, Coderus invited delegates to immerse themselves in exciting tech developments before watching the annual Google I/O Developer Conference, streamed live from Mountain View, California.

Computer software design company Coderus not only specialises in the design of embedded and mobile software, it also engages with its local community to encourage bright minds to choose a career in computer science.

For the past four years the company has held free ‘watch parties’ centred round the latest developments released by the Apple, Google and Microsoft communities. Through this, local schools, universities and tech enthusiasts come

together to learn about the latest technology, interact with the demos and network.

The live streams – arena-style presentations in front of thousands of gathered tech fans and broadcast worldwide – are eagerly awaited events within the Coderus community for the innovations they offer. Each stream is preceded by multi-platform demonstrations of embedded and mobile software, with this year’s smart doorbell, mirror and augmented reality mobile demo being some of the highlights.

For Coderus, the benefit of such events is to inspire young people to the extent that they choose computing as a career and give back to the community that encouraged them to code in the first place.

“We are always keen to stay connected to local educational institutions,” says company CEO Mark Thomas. “At Coderus, we’re committed to supporting a whole range of people with an interest in tech. This could involve sponsoring the DevelopHER awards – which recognise the

achievements of women in the tech industry – through to supporting charitable organisations such as the Creative Computing Club, a not-for-profit organisation dedicated to helping children learn the joy of coding through afterschool and weekend clubs.”

To learn more about Coderus and current opportunities for interns and graduates, visit [www.coderus.com/lifestyle](http://www.coderus.com/lifestyle).

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# GES awarded for management excellence

GES Group has been named as one of Ireland's best managed companies in the Deloitte Best Managed Companies Awards 2018.

**E**stablished in 1972, GES Group is a leading electrical and mechanical engineering company, serving customers throughout Ireland, the UK, and Europe. The company, which demonstrated superior business performance, was recognised at an awards gala symposium and dinner in Dublin earlier this year.

The Deloitte Best Managed Companies Awards programme is celebrating 10 years of recognising management excellence, with 22 new companies joining a requalifying network of more than 100 businesses, built over a decade of the programme.

The awards culminated with the Best Managed Companies Awards symposium and gala, which was attended by over

1,000 people from the Irish business community.

In total, 137 companies were recognised as Best Managed Companies, which have a combined turnover of over €12 billion, with 26 of the 32 counties across the island of Ireland represented by winning companies.

"I can't state clearly enough how proud I am of our company's success in achieving the the 2018 Deloitte Best Managed Company award. "We have been focusing our strategy to achieve growth and company-wide development, which has been a major catalyst in developing our award-winning solutions," says David Moore, Managing Director of GES Group.

"We pride ourselves on

working with our employees to create valuable brand recognition, and I believe this has driven ambition and success throughout our organisation. I am certain our ongoing success is down to best management practices, which creates successful people and successful outcomes in our core operation.

"My thanks to all of our team for their energy and ambition to gain this well-deserved award."

The Deloitte Best Managed Companies programme, in association with Bank of Ireland, promotes and recognises excellence in Irish/ Northern Irish owned and managed companies. It is the only awards scheme on the island of Ireland that considers

a business' performance from every perspective.

"The Deloitte Best Managed Companies Awards programme represents companies from different industries with many industry-specific challenges, but also common characteristics such as adaptability, innovation, and ambition," says Deloitte Partner, Glenn Roberts.

"Their stories are the tales of Irish business this past decade, and they are stories of resilience, recovery and confidence.

"It is pleasing to see continued strong representation from companies in Northern Ireland and we're also proud to recognise those who have been in the programme since it began in Ireland."



A snapshot from the international Fresh Thinking Labs event, held at the Booth Welsh offices.

# IET Enterprise Partner

## is achieving international reach with its digitalisation and industry 4.0 efforts

**B**ooth Welsh has been collaborating with a number of partners across academia, the public and the private sector to extend its digitalisation capability. Currently it's working with several clients on proof of concept studies focusing on how to best adopt Industry 4.0 technologies within their operations.

Over the last year, the company has been actively embracing innovation and digitalisation, hosting events and speaking on the subject across the UK and overseas, including Lisbon's Innovation Conference 2018.

In partnership with Workplace Innovation Europe, this June Booth Welsh hosted an international Fresh Thinking

Lab event at its Scottish Head Office, which saw delegates attend from the UK, Denmark, Norway, the Netherlands and Australia. The event was a great success and showed the company is achieving international reach surrounding its digitalisation and Industry 4.0 efforts.

The event explored how successful organisations have engaged employees in their full digital transformation process.

A key theme is that Digitalisation is not about replacing the human workforce, it is about a balance between technology and people which makes companies more effective in making faster, better decisions and consistently taking the best actions.

Martin Welsh, Booth Welsh Managing Director comments "As we discussed the changes required for digitalisation with our clients across all sectors, it is the human factor that is the most prevailing. The impact of digitalisation on people is probably even greater than the impact on business".

In line with this, Booth Welsh's latest focus on technological innovation is around helping companies take the first step to embracing digitalisation through their people and unlocking their digital advantage. Booth Welsh has developed a unique baseline survey which is a collaborative tool that allows companies to analyse their current position and evaluate digital readiness. Booth

Welsh digital experts have successfully helped clients start their digital journey through sharing knowledge and experience to help identify the added value and business benefits that can be realised through a human-centered digitalisation approach.

If you would like to find out more about Booth Welsh's upcoming events and how the organisation can help you embrace digitalisation, follow the hashtag #collaboratetoinnovate on social media or email Marketing and Communications Manager Aimee Doole at [aimee.doole@boothwelsh.co.uk](mailto:aimee.doole@boothwelsh.co.uk).

# Developing a Solar UAV with to stay airborne for a year



**A** new solar electric unmanned aerial vehicle (UAV), which has the potential to fly for up to a year before needing maintenance, has come a step closer to reality following a new agreement between British companies BAE Systems and Prismatic.

Engineers from both firms will collaborate on the development of the new solar powered high altitude, long

endurance (HALE) UAV known as PHASA-35 (persistent high altitude solar aircraft). Work is already underway to prepare the first aircraft to be ready for flight tests in 2019.

The technology would offer a year round, low cost persistent service for a wide range of needs including surveillance and vital communications to remote areas, using only the sun to power the aircraft during

the day and recharge the batteries for overnight operation.

#### **Low cost, long life**

Solar HALE vehicles offer a significantly cheaper alternative to conventional satellite technology, with PHASA-35 being a concept solar electric UAV that uses proven, long-life battery technology and ultra-lightweight solar cells to potentially maintain flight

for up to 12 months.

The PHASA-35 concept has a 35-metre wingspan and weighs just 150kg. Its lightweight, efficient build allows it to fly at high altitudes for long periods of time.

A quarter scale model named PHASE-8 completed a successful maiden flight in 2017, with Prismatic and BAE Systems now looking to take the technology a step further.

# the potential

“ PHASA-35 has the ability to revolutionise the way we think about beyond line of site communications ”



© Prismatic Ltd

## Collaborative working

BAE Systems will invest in the development and flight-testing of the PHASA-35 system as part of its drive to continually develop new technologies to support aircraft of the future, working collaboratively with SMEs and academia.

The company has a portfolio of patents and patent applications covering approximately 2,000 inventions

internationally, and under the agreement with Prismatic, it will provide expertise in aerospace technology and project management to progress the programme through to a marketable offering.

“Prismatic is a fast paced and forward-thinking company and PHASA-35 is a great example of what the team can achieve in a short space of time,” enthuses Michael

Christie, Strategy Director within BAE Systems’ Air sector. “We were keen to invest in the programme as part of our long-term strategy to explore new technologies and solutions in air and space. I look forward to working with the team and I’m sure the collaboration will add further strength to both Prismatic and ourselves.”

“PHASA-35 has the ability to revolutionise the way we

think about beyond line of site communications,” adds Paul Brooks, Founder and Managing Director of Prismatic. “It’s great to have the support of a world leading technology company like BAE Systems. I’d like to extend a huge thank you to the team who have worked tirelessly over the past two years to develop PHASA-35 as a proven, cost effective and reliable system.”

# Rampaging robots win over young engineers



Air Marshal Young with with ATC Squadrons: 287, 859, 870, 1192, 1296 and 2311.

To mark RAF100, Air Marshal Julian Young attended the first of this year's annual Rampaging Chariots Robotic Games.

**A**erospace, defence and security company Leonardo recently hosted the annual Scottish Robotic Games, the first in a series of events that took place across the UK this summer.

Attended by hundreds of school children and air cadets from across Britain, the aim of the games is to stimulate an interest in science, technology, engineering and maths (STEM) careers and inspire the next generation of engineers on whom our engineering industry depends.

Leonardo's Rampaging Chariots Robotic Games STEM programme involves the

company donating robot kits to children across the UK, giving them instructions and support on their construction and customisation in order to build their confidence in engineering. This programme culminates in a celebration of STEM at the annual Rampaging Chariots Robotic Games, with activities such as a robotic football tournament and tug of war.

Leonardo was delighted to welcome Air Marshal Julian Young to the Edinburgh games, particularly given that this year marks the 100th year of the RAF and the 75th anniversary of the company's Edinburgh site – initially built in 1943 to build

gun sights for Spitfires.

"The bottom line is our future is all about technology," Julian said during his visit. "It's about grasping technology and using it to make our world a better place. The only way we can do that is by understanding, developing and exploiting technology and that's why we need more engineers and technicians. At present, our colleges and universities aren't graduating enough of them. If we add the Brexit dimension, then chances are it's going to be even more difficult, as we won't necessarily be bringing in people from Europe to work alongside us. We've got to inspire our

youngsters across the UK to be curious about how things work.

"I find events such as this truly inspiring, because people are grasping that nettle, showcasing technology, bringing in youngsters and inspiring them to want to be a part of this world. When we look at the overall STEM activity within the defence sector it's not about competition; it's about getting more youngsters interested in STEM topics so we can all recruit from a larger pool.

"Working with industry partners like Leonardo is a great thing. We all need to work together to safeguard our future."





The IET's Nigel Fine with Guy Purchon from VIAVI Solutions.

# VIAVI Solutions becomes IET Corporate Partner

VIAVI Solutions, a global leader in network and service enablement and optical security and performance products and solutions, becomes one of the latest IET Corporate Partners.

This June IET CEO Nigel Fine visited VIAVI Solutions' office to sign an IET corporate partnership agreement alongside Guy Purchon, VIAVI's Vice President of Lifecycle and Programme Management.

"We are delighted VIAVI Solutions has become an IET Corporate Partner," says Nigel "They join a strong partnership community of organisations within academia, industry and the MOD and we hope this joining of forces will be of great benefit to VIAVI Solutions' engineers and technicians."

Prior to the signing Sarah Larkham, the IET's Regional Development Manager – East of

England, addressed VIAVI staff members, providing information on what the partnership means for them as well as upcoming IET events.

"Becoming an IET Corporate Partner means that VIAVI Solutions' engineers and technicians will be given the support they need to become professionally registered at every stage of their career," says Sarah. "We are also committed to providing guidance to enable them to undertake continuing professional development (CPD) to develop and maintain the knowledge, skills and behaviour required of a professional engineer."

"As an IET Corporate Partner, we are excited for the development opportunities ahead for our engineers and the further engagement with the wider engineering and technology community," continues Rachel Lloyd, Marketing Manager at VIAVI Solutions.

In the coming months, the IET will work with VIAVI Solutions to launch a series of staff development sessions.

These will include presentations on IET membership and professional registration, as well as a company based registration scheme (CBRS).

These schemes allow participants to progress their professional registration applications at a similar pace in a supportive environment, and offer members the opportunity to discuss their application with a Professional Registration Advisor (PRA) on a one-to-one basis.

If you would like to enquire about partnering with the IET, please contact [partnerships@theiet.org](mailto:partnerships@theiet.org). If you would like to know more about company based registration schemes, please contact [cbars@theiet.org](mailto:cbars@theiet.org).



'Ainnovators' from 24 leading universities gather at Cranfield University for the 2018 Airbus Ainnovation Summer Academy.



Airbus Ainnovation Summer Academy teams develop business proposals to address a major global challenge.



Nigel Fine with Jeremy Greaves after the official signing on the Savoy Place

# Airbus shows commitment

This June Airbus' Vice President Corporate Affairs and Strategy, Jeremy Greaves, met with the IET's CEO, Nigel Fine, to sign a corporate partnership agreement at the IET's prestigious home, IET London: Savoy Place.

This agreement shows the commitment from both organisations to support Airbus' engineers and technicians' professional development through every stage of their careers.

"Airbus strives to have the best technical workforce and therefore takes the professional development of its engineers

and technicians very seriously," says Rhys Phillips, Airbus Electromagnetism Scientist.

"As Airbus relies on a wide range of engineering disciplines and skills, the IET is a good match as a professional engineering institution and becoming a Corporate Partner of the IET reinforces our commitment to our engineering workforce in terms of their professional development".

## IET engagement

"Many Airbus employees are already involved with the IET," he continues. "We have many members and Fellows at sites

around the world and several employees actively volunteer in many different capacities including local and technical committees, mentoring and science, technology, engineering and maths (STEM) outreach work."

"The IET has worked very closely with Airbus' Newport site for some years which has seen several company based registration schemes (CBRS)," continues Paul Stephens, IET Senior Development Manager. "These have allowed staff to work through their professional registration applications at a similar pace in a supportive,

group environment. I am looking forward to working with Airbus in the future. We have already held a CBRS in Portsmouth this June, with others planned for the future."

## The Airbus Ainnovation Summer Academy

Airbus is also committed to promoting engineering through STEM engagement activities.

This includes its Airbus Ainnovation Summer Academy, which brings together students for a one-week programme based on the principles and methods of a business accelerator.



of terrace.

# to engineering industry

This July 50 students from 20 countries took part in the company's second academy event, held at Cranfield University.

Just as Airbus forms diverse, multidisciplinary teams to innovate and create value for customers and the wider society, the academy saw diverse student teams representing 24 Airbus partner universities develop business proposals with speed and agility.

This year their ideas were in response to the challenge to produce game changing concepts linked to the global

need for food and water security, which features highly in a recent survey ranking millennials' concerns.

#### **Guidance from industry experts**

By addressing challenges of global impact, the academy offers future aerospace professionals the opportunity to learn how to keep aerospace relevant to society, transforming and reinventing the industry.

Taking inspiration from Airbus experts in engineering and digital technologies and with the support of the leading Cranfield faculty, students applied state-of-the-art

innovation methods to develop their proposals.

Each team benefitted from the guidance of Airbus experts and Airbus intrapreneurship coaches throughout the week, which culminated in a pitching session to an expert jury, which was live-streamed globally.

Intense teamwork was interspersed with an energising series of interactive talks on highly digital, emerging technology and innovative business activities. Thousands of other students, as well as aerospace and digital enthusiasts, joined and contributed through the live-

streamed sessions to hear from some of the experts revolutionising aerospace today.

"At Airbus, we believe that the technology to radically change the world is within our grasp, and we will need talented people who can harness new tools, a new mindset, and work effectively in diverse and multi-disciplinary teams.

"The network and the skills that students developed this week will be invaluable for their future careers," says Airbus' Chief Human Resources Officer Thierry Baril.



This year Raytheon's Quadcopter Challenge features several novel designs including an eagle.

# Reaching new heights with Raytheon

Raytheon UK's quadcopter challenge inspires next-gen engineers.

Every second counts in defence – and at the Raytheon UK Quadcopter Challenge. Here, students from six schools across the UK will fly quadcopters they built themselves through loops, between poles and onto pads to test their precision landing skills. It's the final round of a competition Raytheon UK sponsors to show young people one of the many exciting applications of science, technology, engineering and maths (STEM).

But the competition doesn't stop at aerobatic skills – each finalist must also give a 10-minute presentation to explain their design process and how they managed their project. The goal is to give them practice in every aspect

of engineering, from the first sketches to the big sales pitch.

“A career in engineering can be as hands-on as you want. But if you're more comfortable presenting and selling products to customers, or managing programs or budgets, those are options, too,” points out Dr Alex Rose Parfitt, Engineering Director and Executive Head of science, technology, engineering and maths programs at Raytheon UK.

The finalists come from a field of more than 250 students, ages 14 and 15, who competed in a preliminary round. That's more than three times the number of students who participated in 2016 and orders of magnitude more than the 20 who took part in 2015.

Raytheon UK believes the competition fills a gap in education, showing students that engineering can be an outlet for what they want to do.

“Most young people have a desire to improve the world in which they live, but seldom appreciate that that's what modern engineering is all about,” says Dr Georgina Harris, Head of the School of Engineering at Manchester Metropolitan University and one of the judges at this year's final.

“Also, since mandatory careers guidance was pulled from the national school curriculum, it has fallen to the teachers to convey what kinds of opportunities exist in engineering, and how diverse and rewarding they can be.”

Sixty STEM ambassadors from Raytheon are involved in this year's Quadcopter Challenge, either visiting schools or coordinating the competition itself. The company, a leading aerospace and defence company with 1,600 employees in the UK, started the competition in 2015 from its Harlow office, with support from the Essex County Council.

This year's final is set to take place on 14 December at Old Granada Studios in Manchester. Raytheon UK and the Royal Air Force will announce the winning team and award prizes to the first, second and third place teams based on their quadcopter design, flying ability and presentations.

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