

Events Newsletter

Mersey and Western Cheshire Network

September 2022 – December 2022

All our events are
free to attend for
IET members and
non-members alike,
pages 18–21

Celebration of Engineering –
Research and Knowledge Exchange
at Liverpool John Moores University



Welcome to our new face-to-face events and webinars!

The 2023 Annual Dinner

Friday 3th February 2023 at
The Hilton Hotel, Liverpool

£ 60 for individual tickets for Members, Non-Members and Guests
£ 40 for Student Members

Friends of the Network

The Mersey and Western Cheshire Local Network is run by volunteers, who each year arrange free-to-attend lectures, technical visits, workshops, and annual dinners.

These activities would not be possible without the support of our Friends of the Network. These organisations support the Local Network in many different ways, from sponsorship of the local network, taking advertisements in the two events newsletters that are published each year,

taking tables at our Annual Dinners, funding places at our Annual Dinners for young engineers, providing speakers for lectures and allowing technical visits to their factories, engineering offices and academic institutions. Without their help and support, it would not be possible to run the high-quality events that we strive to deliver.

We are grateful for the support given both in the past and going forward into the future by our Friends of the Network.



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SP ENERGY NETWORKS



SIEMENS



TATA STEEL



Thank You for Your Support!

Chair's Message

As Engineers, we spend large amounts of discussion time lamenting on the lack of available skills, engagement with the community, return on investment (IET membership fees) and the apparent apathy of children and young people toward entering our Trades or Profession.

Social Media and journalistic content generally seems to promote the idea that Stardom and Fame should be the goal and that it is easy to achieve!

We all understand that the 'real' world doesn't work like that and, only, through encouragement, aptitude, hard work, passion, determination to develop and succeed is it 'possible' to get anywhere close to the Public Eye!

...unless, of course, you are either very lucky – or, have a large inheritance!

Our position as Engineers – and Volunteers – gives us the unique experience and opportunity to change 'perceptions', encourage engagement and to help the journey towards personal success (whatever form that takes) by Engaging, Encouraging and Enthusing young people to join in with the most fundamental of human endeavour – making things!

Not everyone can create gaming software, sing, play guitar (or both) but without Engineers to make the computers, the



audio and recording equipment or that guitar – those 'few' that do gain (instant) stardom and fame now, would simply be "one of the crowd"!

Through our Education Team we engage with young people of all ages to encourage their creative minds – but there is only "so much" that two Volunteers can achieve!

We need you to get involved and use your time effectively rather than "lamenting". We (that is the Local Network – and Engineers) need YOU to find the time to get involved.

There are over 4000 registered members in our Network, just over 40 active volunteers and two Education Officers – numbers like this simply do not translate into an ability to make a difference with the apathy of our "future Engineers".

This edition of your Local Newsletter is packed with information and examples that, for some, are 'everyday' jobs but, are "unseen" by the many – especially children.

Your Volunteers are working hard and are producing excellent activities, presentations, and events and with your help we can do so much more!

I take this opportunity to thank you (in advance) for getting involved and to thank all our fantastic, active, volunteers and our Friends in Industry that provide so many opportunities for us all to learn and progress.

Please, read on!

Godfrey Evans
Chair M&WC LN

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Harry Currie Memorial Award 2021

The recipient of the Harry Currie Memorial Award for 2021 is Adam Wilson.

Adam is currently Vice Chair of the Young Professionals Group (YPG) and Social Media Manager for the Local Network and he is employed by Sellafield Ltd as a CE&I Design Engineer.

The Harry Currie Award is presented to a member of the YPG who has met at least two of the following criteria:

- (a) To have succeeded in obtaining at least two new committee members for the Young Professionals Section.
- (b) To have been responsible for at least one Young Professionals event.
- (c) To have proposed a new event to encourage growth of the Young Professionals Section.
- (d) To have visited local schools, colleges, universities, and industries with apprenticeship schemes, to encourage student membership from those who intend to meet IET requirements.
- (e) To have undertaken any other activity which has delivered exceptional results in promoting the values and vision of the IET to young persons.

In his application for this award, Adam clearly demonstrated having met, not just two but, all five criteria and is a very worthy winner!

In recognition of his contributions to the YPG and his achievements, Adam receives an award of £250 from the LN Social Fund and a commemorative trophy.



Godfrey Evans (LN Chair) presents the 2021 Harry Currie Memorial Award to Adam Wilson (Vice Chair YPG)

Congratulations Adam – keep building on your efforts!
Godfrey Evans

Education Officers

Big Bang Event

The Education Team attended this years Big Bang Event at the NEC in Birmingham on the 22nd of June 2022.

The IET Stand featured a very large box of LEGO pieces. The challenge for the students was to construct items and structures that they thought contributed to sustainability, such as wind turbines as one example. How a three gun tank got in there we don't know.

They manned the IET stand alongside David, Natalie, Cathy and Lizzie, Education Staff from IET Stevenage. The event was over a three day period and attracted some 40,000 students and featured over 200 organisations from the public, private, and voluntary sectors.

The event was led by Engineering UK in partnership with the Royal Academy of Engineering and supported too by numerous sponsors from industry, academia and the public sector.

IET staff were on hand also to talk to students and teachers alike regarding careers in STEM subjects.

Teaching staff who visited the stand were given the latest Education Information Pack in a nice IET Carrying Case.



We were very pleased to be visited by the outgoing IET Chief Executive and Secretary Nigel Fine on the first day. He said he was impressed by the work we were carrying out and wished us all the best for the future.

Roger Todd

Education Officers' Activities

To say that the past two years have been difficult for us is certainly an understatement. We have not been able to visit schools and places of higher education but fortunately things are now starting to change. The earliest event we could attend in person was a mock interview day at Shavington Academy near Crewe. This seemed to go quite well but was only attended by Roger who interviewed eight students. The strangest interview was with a young man who wanted to become a politician. Other students, a mixture of boys and girls wanted to become engineers or skilled trade's people.

Roger is now visiting Queen's Park High School once a week to help out at a STEM club. Things are just starting to move along as students are working out what their projects will be. A few are certainly in the area of climate change. A small group is investigating if items labelled as bio-degradable really are. Others are looking at ways to replace plastics.

Roger recently visited the Ancora Hospital School at the Countess of Chester Hospital. There were three young people that Roger saw, two girls and one boy aged around fifteen. We made a few of our LED torches and Roger handed Kerry Dilley, who runs the school, a copy of his story about a family of rats who get involved in science projects. Roger mentioned that there is a character in the story called Bob the pigeon. The young boy grabbed a pencil and quickly produced a very good drawing of Bob.

Roger and Alan supported a Careers Event at Christleton High School Nr Chester on the 21st of April. Some 20

employers attended the event including our IET Stand. As ever the stand was well attended with students participating in the Light Quiz and making LED Torches, some 30 students we spoke to are positive about Careers in Engineering.

Alan was asked to join Middlewich High School on a visit to the Goyt Valley Nr Macclesfield on the 13th of May. The trip aimed at STEM Students to understand the subject of HYDROLOGY, being a study of the flow of water. Some 24 students and 4 teachers went on the trip and were divided into three teams, the session was led by two rangers from the Peak District National Park. The students measured the width of a tributary of the River GOYT, its depth, speed, angularity and resistance at four locations, these results will be taken back to the classroom, analysed and show their affects on flow.

Middlewich High School will also be participating in this year's next round of the IET FARADAY Challenge Event, so no doubt Roger and Alan will be supporting this.

IET website for Education Officers & Ambassadors:
<https://www.theiet.org/involved/volunteering-for-the-iet/volunteer-roles/education-roles/education-officer-and-education-ambassador>.

STEM Learning website for STEM Ambassador:
<https://www.stem.org.uk/STEM-ambassadors/join-stem-ambassador-programme>.

Roger Todd

Where Do Engineers Come from?

All of the 'active' members and volunteers within the Mersey & Western Cheshire Local Network are aware of the excellent work that has been done for many years by our Education Officers. Unfortunately, there are only two at the moment.

Education Officers and STEM Ambassadors are our Institution's direct connection to schools and colleges – and it is this contact that will help encourage the next generation(s) of Engineers and Technicians that the country really need in all areas of Engineering.

For that to happen we must create a stronger Education Officers Group to reach out to more Schools and Colleges.

YOUR NETWORK NEEDS YOU!

But, more importantly,

YOUR COUNTRY NEEDS YOU!



This is simply because, without Engineers we *will* become a Nation of Shopkeepers!

This is our message to all those Engineers and STEM professionals, in our Network, to step up and help reach as many of the 100s of schools and colleges in our region as possible.

So that we can create a solid foundation to this, we have set out ambitious mission and vision statements of what success could look like in 12 months time.

Mission Statement

The IET M&WC Education team works with Schools and Colleges to promote the values of the IET, encourage students to consider a career within STEM, work with teachers to improve learning experiences *and inspire the next generation of Engineers*.

Vision Statement

The IET M&WC Education team will become the 'model' for all IET Local Networks. It will create and promote a sustainable and consistent relationship with as many Schools and Colleges in the region as practicable, provide sufficient education officers across our region, ample resources to aid STEM curriculum and by working with All About STEM to reach schools in need of assistance.

GET INVOLVED!

JOIN THE EDUCATION OFFICERS GROUP!

PROMOTE ENGINEERING TO YOUNG PEOPLE!

Godfrey Evans

From Idea to Scaleup: Tackling Fundraising, Team Building & Financial Modelling to Successfully Commercialise Engineering Innovations

On January 26 2022 Caena facilitated a session for the Biomedical Engineering Group.

Why would a company that packages water in cans (Liquid Death) be worth nearly 40 times as much as a biotechnology company (Bloomer Technology) seeking to save lives through innovative diagnostic products for women? Both companies were formed in the same year, and the water company reports a revenue range of \$1 million compared to \$1–10 million for the biotech company.

Valuing private companies is a fuzzy exercise that is more art than science but it should be relatively easy to pick at a glance which of two companies is more valuable.

The webinar opened with an interactive discussion around the comparative valuation of Liquid Death and Bloomer Technology. It was a bit of a shock when we revealed that Liquid Death has raised over 40 times more money for its fun, canned water business than Bloomer Technology has raised for its women focused, diagnostic products. The conclusion from the opening exercise was a perfect introduction to the discussion of the day – engineering innovations have to be combined with commercial considerations in order to build successful commercial ventures. We covered two main areas - team formation and financial modelling.

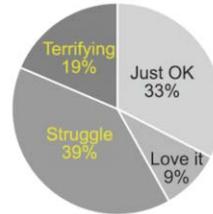
Building a dream team: Unarguably forming a team is one of the most important tasks every innovator faces on the path to taking their product to market. The challenge is that it is extremely difficult to find a formula that works all the time. However, we discussed a few dos and don'ts to help engineers and innovators crack this task.

- **Build a team with complementary skills:** The general guidance is that at the very least, your founding team should comprise founders who can deliver the product AND sell.
- **Don't rush, be patient:** Finding the right people takes time and if you rush into it, you will rush out of it as well.
- **Ensure your values align:** You want to change the world but your partners want a quick buck. NGMI! You are Not Going to Make It.

Financial modelling – selling your vision with numbers: Most founders, even those with strong analytical skills freeze up when thinking of financial projections for a new business. According to a poll during the webinar, the IET audience wasn't much different with almost 60% reporting either struggling or being terrified of financial modelling.

It is important to demystify the concept of financial modelling so entrepreneurs realise it is not as terrifying as it is made out to be. In an interactive discussion with great participation from the audience, we covered a broad overview of financial modelling as it relates to fundraising:

How do you feel about financial modelling?



1. **It's all about storytelling:** If there is one innate skill in humans, it is telling stories. In our experience speaking to hundreds of founders, when they frame fundraising and financial modelling in terms of storytelling, the process starts to make sense as it is a concept everyone understands. Financial modelling is simply selling a vision with numbers. Like every good story, it has to be well thought out and structured. The most important thing to remember is that your story has to be consistent, concise and compelling.
2. **Know when to use different elements of financial models:** When founders hear “financial model” they instinctively think of a complex, three-statement financial model. In the context of fundraising however, there are two other elements – charts and metrics. A common mistake is spending thousands of pounds and wasting months to build a complex model when a simple chart combined with key metrics would suffice for a pitch deck.
3. **Assumptions are the bedrock of financial models:** We described the importance of assumptions to the process as akin to the building blocks of a complex tower. An engineer who wants to achieve a fully functional tower but is able to decompose the building into constituent parts is 80% on the path to achieving their objectives. As an entrepreneur, it is important to understand what the drivers of revenues and costs are and how these combine together to form a full model. See more details here on how to put together assumptions to build a compelling financial story.
Today, most founders have to rely on consultants to help put together their forecasts. Caena's approach is premised on empowering founders to build their own financial models and thus control their storytelling. As a member of the audience said, “A consultant has to rely on you to provide the assumptions that YOU are making for YOUR business. A good consultant will hold your hand while you are getting YOUR story straight / consistent. Any reworking of your assumptions will add to their timescale/costs.”

Kayode Odeleye

Co-Founder and CEO of [Caena.io](https://caena.io),
a fundraising platform for
Startups and Investment Firms

Optical 3D Metrology in Advanced Healthcare Applications

On 25th May 2022 the Manufacturing and Management Group delivered a webinar jointly GOM UK Ltd. a ZEISS company and the Biomedical Engineering Group on Optical 3D Metrology in Advanced Healthcare Applications.

Stuart Dix, GOM Sales Manager explained, that Optical 3D metrology has been established in biomechanics for dynamic analyses of implants and prostheses, but also of bones, tendons and ligaments. During strain, load and fatigue tests, the mechanical properties of biomaterials and their behaviour under load are analysed.



Fatigue tests

Fatigue tests are to determine the vibration resistance of materials and components using optical 3D metrology and are separated into different categories:

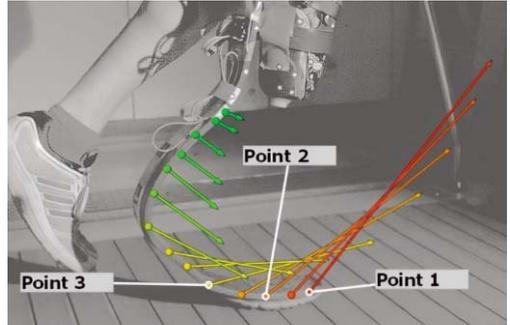
- Low Cycle Fatigue Tests according to ISO 12106 and ASTM E606.
- High Cycle Fatigue Tests according to DIN 50100, ASTM E466-15 or ISO 1099.

The High Cycle Fatigue Test (HCF), also referred to as S-N test, Woehler fatigue test or continuous vibration test, is a cyclic load test to determine the fatigue behavior of materials and components. The fatigue behavior or vibration resistance provides information on the deformation and failure behaviour of a material or component under dynamic oscillating load. The test results play an important role for using the materials and components in practice, as cyclic mechanical load is often the cause of component failure. Knowing the fatigue behaviour allows for precise conclusions on the finite-life fatigue strength and fatigue limit of a material or component. The knowledge about the fatigue behaviour of materials and components ensures that no critical material damage or sudden fatigue failure occurs during the end product's life cycle.

Stress Concentrations and Notch Effect

The High Cycle Fatigue Test (HCF) can be used for basic research, for instance, when it comes to novel fiber-reinforced composites in fields such as automotive engineering, aerospace or biomechanics. Besides, the High Cycle Fatigue Test (or Woehler fatigue test) is an integral part of prototype testing, where it can be used to assess the component

design or calculate the durability, for example. Designers cannot rely on the general material characteristics during product development without testing, as the characteristics cannot be transferred 1:1 to any component. The reason is that bore holes, the component size and shape as well as other design characteristics lead to a changed stress concentration on the component compared to the stress concentration on standardised specimen geometries in materials testing. As a consequence, the individual design characteristics significantly affect the fatigue behaviour of the components and possibly accelerate failure. This phenomenon is called notch effect (or stress concentration effect) in technical literature.



Which GOM measuring system is suitable for the High Cycle Fatigue Test (HCF)?

The ARAMIS optical 3D measuring system records with high precision 3D coordinates, 3D displacements and 2D surface strains both over the entire surface and at specific points of interest. The measuring area of the ARAMIS system can be flexibly adapted to the test specimen. No matter if it is a small component or special construction of several metres length, the ARAMIS sensors always cover the complete test setup. In contrast to conventional strain gauges, the system records the measuring data completely in a non-contact way. If required, the user can also apply virtual strain gauges to the component via the connected GOM Correlate software without having to worry in advance about where the highest deformation will occur. The software guides the user through the complete measuring procedure: starting with the acquisition of measuring data through the analysis of surface deformations or point-wise 3D displacements up to the creation of meaningful measuring reports that are easy to understand and interpret even for users who do not have any experience in measurement technology (e.g. cooperation partners or customers). The extent of the deformation of the test specimen can be visualised in a colour deviation representation, for example.

For more information on any of the products from the portfolio please visit www.gom.com.

Green Surface Engineering: The Importance of Coating Technologies to Preserve Global Resources

On 11th May 2022 the Manufacturing and Management Group presented a webinar, Green Surface Engineering: The Importance of Coating Technologies to Preserve Global Resources.

David Elliott, CEO of The Surface Engineering Association (SEA) started this event with a couple of videos showing the “how and why” things work – surface engineering.

Everyone interacts with items that are treated to give them a decorative appearance with durability and a Smartphone is one of the examples described. But the internal components of that same Smartphone need surface-engineered coatings to function – ranging from the copper plated tracks on the printed circuit boards to the gold plating on the terminals to improve conductivity!

The modern motor car is made up of over 10 000 parts with the majority being surface treated to protect against corrosion and wear. The numerous tools that are used to manufacture the parts for that same motor car also must be treated so they can cut, bend, form and spray the parts.

Dave shared two short videos with the second depicting just one, common, everyday event of starting the daily commute at a train station picking out just “some” of the surface engineered items that we encounter.

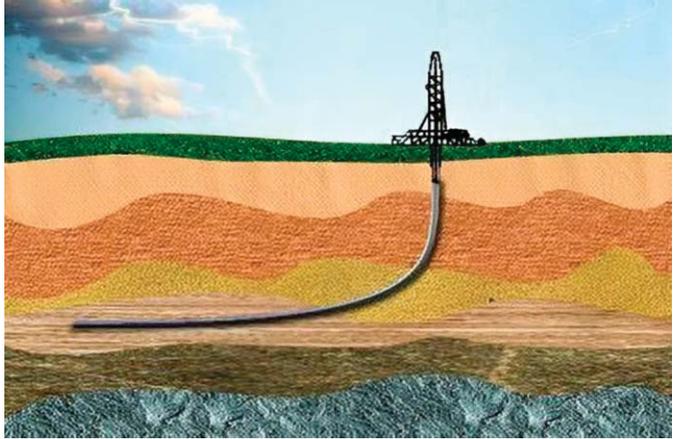
Green surface engineering is a process allows ‘things’ to:

1. Work better: that energy is used more efficiently.
2. Last longer: there is a more efficient use of resources and less need for replacement.
3. Look better: we are less likely to want to replace it!

Dave detailed the vast range of surface engineering processes and gave the examples of the coating inside a bottle of ketchup to help get that last bit out rather than throwing it away.

Also, the coating techniques for sheet glass that are used for ‘self-cleaning’, ‘energy management’, ‘light control’, ‘switchable transparency’, ‘digital signage’, ‘solar thermal heating’ and ‘integrated PV generation’. All possible by coatings of less than 100 nm.

Another example was the various ‘paints’ used within an aero-engine that will withstand up to 800°C, allowing the engines to operate at higher



temperatures and make better use of the fuel and increasing its efficiency.

Dave’s parting information detailed just some of the further advances in coating technologies being developed in the UK such as “smart coatings” that will adapt to their operating environment capable of becoming hydro-phobic to stay clean, to create texture to retain a lubrication film or, even, to self-monitor and report on wear and performance of critical machine components.

Godfrey Evans, Surface Engineering Protection Ltd and Chair of MWC LN, then presented some of his experiences gained over 29 years in the surface engineering industry.

Godfrey gathered his experience while working for, and ultimately owning, Swinton Electro Plating Ltd. One of the main business activities being the hard chromium coating of rotors for hydraulic motors (commonly called Mud Motors) for oil and gas drilling services.

These rotors, machined from solid bars of 17/4PH stainless steel are hard chromed to protect against wear and



erosion from the high-solid content fluid (mud) that is pumped through the motor to drive the drill bit.

The Drill-String i.e. the whole assembly, progresses into the earth in 15 metre stages as lengths of drill-pipe are added at the rig floor.

As shown from the image (above) this drilling operation is directional and can be 'steered' around obstacles such as a hard, rock formation.

If the rotor was used without a chromium coating, it would wear out very quickly, in a matter of just a few hours.

With the chromium coating, the operational time can be extended to many thousands of hours.

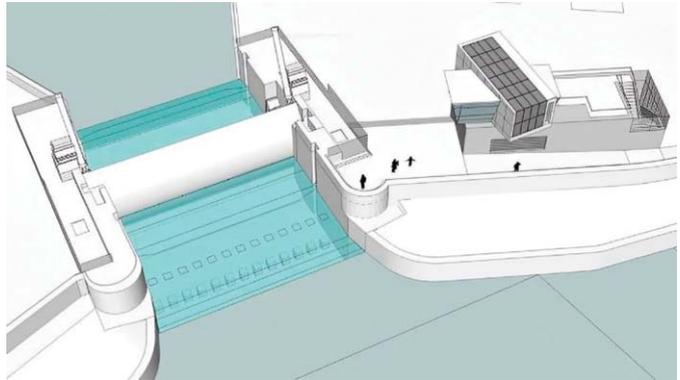
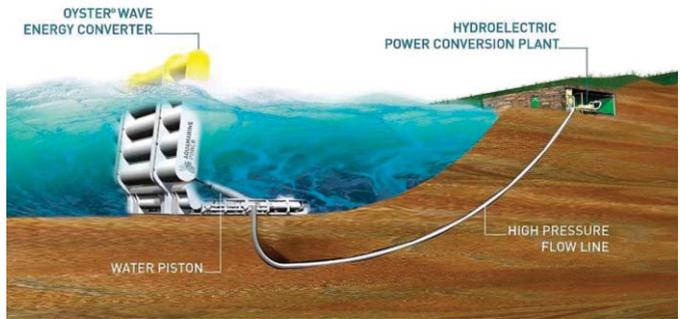
The 'uncoated' rotor would be a 'single-use' piece that is beyond repair. While the coated rotor can be repaired once it has been damaged in service. This is done by chemically stripping the damaged coating, re-polishing the base material and re-chroming the surface. The repaired rotor is then ready for re-use. This can be done many times over.

The monetary cost to re-plate a rotor is 'typically' around 10–15% of the cost of replacement.

The environmental cost is much more.

For an 'average' sized rotor (around 6 metres long) the 'cost' of complete manufacture is estimated at 3330 kg CO₂e whereas the 'cost' of re-coating is estimated as 300 kg CO₂e, in addition to raw materials to manufacture around 600 kg of stainless steel.

Godfrey showed examples of parts that were coated and are being used in applications to generate energy from renewable sources and in coastal protection installations.



The webinar was finished off with a Q&A session that both 'tested' the presenters – and also showed the understanding of other related environmental aspects from the audience.

Our thanks to Dave and Godfrey for an excellent online presentation.

Note: this webinar was recorded and is available to view on the Local Networks' YouTube channel at <https://www.youtube.com/watch?v=PpKAZ5MHfxQ&t=3s>

Godfrey Evans



Search "IET Mersey & Western Cheshire"
on social media sites to keep up to date with events and activities!

Leadership Seminar

The Manufacturing and Management Group invited Jerry Hopkins, author of *The Why Force for Leaders*, to deliver the Leadership Seminar on 21st June 2022, which was a highly interactive session to a group of 40 members of the IET via an online workshop.

The session started with a look at the Infinite Cycle and challenged delegates to measure their team's performance based not just on traditional measures relating to cash flow / productivity, but importantly on Employee Engagement and Customer Engagement, two measures that are absolutely key to developing sustained cash flow for any organisation and to take responsibility of measuring this down at team level.

The workshop then focused on the first "Why..." that of oneself and making sure that you are connected with your own strong sense of purpose and doing the things personally that will allow you to bring sustained levels of engagement and motivation to your own role, as a leader or not. Key points as well as developing your Personal Why were having the habit of prioritising thinking time every day, making sure you engage in a daily 'beacon' – something you are really looking forward to doing and being focused – including having a 'Not to do list'. Delegates broke out into groups of three to five to share their ideas with each other.

The second "Why..." that of your team's purpose was the topic of the concluding part of the workshop. Jerry



encouraged delegates to imagine a world where the product or service currently delivered by each delegate's team to an internal or external customer had been banned by international law! The challenge set was what would be the change that customers of each team still needed (imagining it was delivered by a magic wand!). Delegates developed their Why-Statements and then once again broke out into groups to share them.

We were delighted with the insightful points and questions that members made at the end. Overall a hugely enjoyable and challenging leadership seminar.

Many thanks go to Jerry for this thought provoking, lively webinar.

Andrew Kaldos

IET North West & North Wales Development

IET Partnerships Engagement 2022

It has been a much changed 2022 in the Partnerships team following a restructure during the Covid pandemic. The appetite for Professional Registration has only increased and it is exciting to see more and more engineers pursuing their Chartership, Incorporated, EngTech & ICTTech status.

IET Partners can access free bespoke support for engineers wishing to become Professionally Registered. Company schemes have recently been launched with Bentley Motors in Crewe and Tata Steel in Flintshire with several engineers looking to achieve their Professional Registration status. If you or your company would like to arrange some Professional Registration support, it comes free with Membership and gives candidates guided access to webinars, workshops, and PRA (Professional Registration Advisor) reviews before submitting the final draft.

I would also like to mention IET's EngX platform, an online platform where engineers can share best practice, ask questions and find out more about what is going on in their area and in their discipline. EngX is going from strength to strength and is now being used by over 26 000 engineers.

We have also celebrated our first Partnership event outside of London in June 2022. Hosted at Old Trafford



Football Stadium, we welcomed over 100 of our Partners to network and celebrate collaboration across IET networks. We are looking forward to taking the event on the road in 2023 and in the years to come.

Matt Walton

Senior Corporate Account Manager
matthewwalton@theiet.org, 077252 07931

Technical Visit to Drax Biomass Power Station

On 4th May, I visited Drax Power Station at Selby, North Yorkshire. The visit was organised by the Manchester Local Network of the IET. Drax Power Station was built in the 1970s by the Central Electricity Generation Board (CEGB) to use coal from the local coalfields in and around Selby. The station consists of six boiler and turbo alternator sets with twelve cooling towers. The station is directly connected to the National Grid for electricity export. Each turbo alternator set has a net output of 650 MW.

On this excellent technical visit, our Drax guides were first class hosts with full regard for our health and safety. The tour started in the Drax visitor centre with many displays and a detailed model of the site, followed by visits to the boiler house, turbine hall and by mini bus, to the biomass fuel storage domes. The visit ended with a visit to the main control room where the boiler and turbines are controlled. The systems are now controlled using distributed control systems (DCS) in place of the panel mounted instruments and controls the plant was originally built with.

Over the history of Drax much has changed. The station now operates four units on biomass wood pellets, with two units in reserve for burning coal if required. The pellets are imported into east coast ports from North America by ship. The wood is waste material and is not high-grade timber. The waste wood material is pelletised to make it easier and safer to process. The pellets are delivered to the station by train and stored in four very large domes. The pellets are conveyed to the boiler house where the pellets are

pulverised in to powder using the mills that were originally used to pulverise coal. It is expected that the remaining coal units will be finally decommissioned later in 2022, depending on the energy situation and the UK Government's requirements.

The pulverised wood is burnt in the boilers to generate high pressure steam and in turn the steam is used to drive the turbo alternators. Each turbo alternator is directly connected to the National Grid 400 kV switch yard that sits next to the power station. The wood pellets create less carbon dioxide than coal and the wood pellets are a sustainable resource, however carbon dioxide is still emitted.

The future plans for Drax foresee the installation of a carbon capture unit to remove the carbon dioxide from the flue gas. We saw the prototype carbon capture unit on the minibus tour. The future carbon capture plant will be built on the large area occupied by the flue gas desulphurisation plant that was installed when the station was burning sulphur containing coal. This plant is not required with the use of biomass fuel. The captured carbon dioxide gas will be collected and join a carbon capture and storage pipeline network planned for the east coast. The carbon dioxide will be injected in to saline aquifers deep under the North Sea.

This was an excellent visit, and it would be interesting to visit the plant in future when the carbon capture and storage system is in place.

Rob McDonald





Your partner in product development

Work collaboratively with our technical experts to rapidly translate new ideas into reality.

Whether it's prototyping, product design or improving manufacturing processes – we provide SMEs with impartial support and flexible access to leading 3D printing and VR equipment, reducing the risks associated with the development and trial of new products and accelerating time to market.

For a confidential conversation please contact us today!

Email: innovations@stfc.ac.uk

Follow us: [Twitter](#) @STFC_B2B [LinkedIn](#) showcase/stfc-business-innovation/

Digital Technologies Enabling Business Re-Imagination

On Wednesday 15th June 2022 the Manufacturing and Management Group presented a webinar jointly with University of Liverpool Virtual Engineering Centre (VEC) on "Digital Technologies Enabling Business Re-Imagination". The presentation was delivered by Craig Beck, Industrial Innovation Lead of VEC.

Craig introduced the Virtual Engineering Centre (VEC), based in Sci-Tech Daresbury, and explained how it was formed initially to support partners such as BAE Systems, Airbus and the National Nuclear Laboratory in the adoption of new digital and emerging technologies. The VEC currently supports SME's in Merseyside and Cheshire through ERDF funded projects. In the Liverpool City Region alone, together with their partner organisations, the VEC has supported over 300 Companies in the adoption and utilisation of Digital Technology.

The VEC has a unique approach to assisting businesses: At the project scoping stage they employ a "sandpit model" exchanging ideas with their clients to gain an understanding of the organisation, its people and the operations within; this is followed by a sharing of information on the technologies available to the organisation; eventually a specific need or problem that can be digitally resolved rises to the surface and the VEC is able to identify solutions that could be delivered either through its, or its partners, technical teams.

Craig introduced and explained a number of Digital Interventions such as:

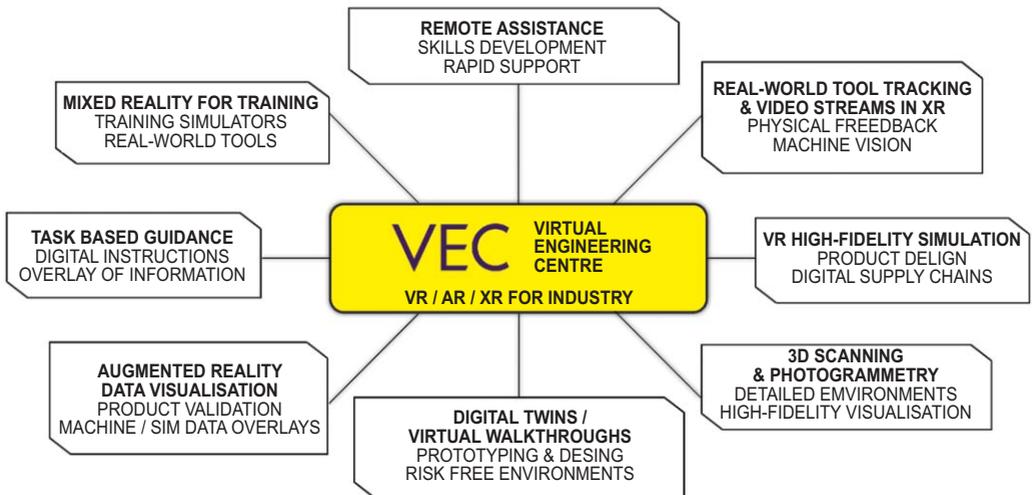
- Advanced Visualisation;
- Digital Twinning;
- AI and Data Analytics;
- Advanced Modelling and Simulation;
- Robotics and Autonomous Systems.

He discussed how the VEC needed to adopt a multidisciplinary approach to best serve SMEs, as often the knowledge and skills needed crossed several specialisms. The VEC has a dedicated technical team including Digital Engineers, Data Analysts, Artificial Intelligence and Robotics Technologists, Systems Engineers and Immersive Technologists. As a consequence they are able to give effective and pioneering support to their clients.

The VEC is currently providing Innovation Support to manufacturing and engineering businesses in the Cheshire and Warrington region through the ERDF funded programme CW4.0. The partners to the VEC on this project include the Science & Technology Facilities Council, Liverpool John Moores University and the Northern Automotive Alliance.

Feedback from businesses supported by the VEC shows a high level of satisfaction. More importantly providing digital support has helped companies develop new products and processes. It has enabled organisations to remain competitive in the face of global competition and increased mechanisation. As a consequence of improvements in productivity, efficiency and competitiveness those supported businesses have a greater potential to thrive and provide economic growth and stability in their region.

Craig Beck



Search "IET Mersey & Western Cheshire" on social media sites to keep up to date with events and activities!

The Surface Engineering Association

History

The Surface Engineering Association can trace its beginnings back to 1887 with the formation of the Platers' and Gilders' Trade Section of the Birmingham Jewellers' and Silversmiths' Association. This brought together numerous small, specialised electroplating plating companies who, in the main, serviced the Birmingham jewellers and silversmiths. It's worth remembering that electroplating was first commercialised in the Jewellery Quarter of Birmingham by the Elkington Cousins.



English Heritage plaque on the site of the Elkington electroplating factory in Newhall Street, Birmingham.

During the First World War member companies, in general, diversified their activities and were involved in providing more generalised plating finishes for the engineering industries. This diversification was retained after the cessation of hostilities and following lengthy discussions, the decision was made in 1934 that the Platers' And Gilders' Trade Section be re-organised to become the Metal Finishing Association (MFA). This enabled provision to be made to meet the specialised needs of companies operating as trade finishers and manufacturing companies who were operating in-house metal finishing plants.

This new organisation was strengthened in 1939 when the London Electro-Platers' and Enamellers' Association became affiliated to the Birmingham Jewellers' and Silversmiths' Association, enabling London and Birmingham interest in metal finishing to combine and thus enhance the scope of the MFA. In 1944 the organisation was reorganised to take account of all the problems in the industry.

With the great expansion in finishing techniques during World War II and the knowledge accumulated by the MFA, together with that provided by the research facilities of member firms, the Association published, in 1946, the first series of booklets entitled 'Electro Plating and Metal Finishing Standards', the forerunner of many British standards and of the current Kite Mark scheme. Over subsequent years close association with BSI was developed culminating in the joint Quality Assurance scheme BS5750.

Administrative services and accommodation links have been maintained with the former parent body which became the British Jewellery and Giftware Federation in 1970. The SEA began to take shape in 1997 when the Metal Finishing Association (MFA) joined forces with the British Surface Treatment Suppliers Association (BSTSA), and they were joined in 1998 by the Paint & Powder Finishing Association (PPFA), which had originally been a special interest group within the MFA. In 2000, the Contract Heat Treatment Association (CHTA) joined the SEA and at the start of 2005, the Wolfson Heat Treatment Centre (WHTC) became an integral part of the SEA.

The SEA is based in Federation House, Jewellery Quarter as part of what is now called the British Allied Trades Federation.



SEA headquarters in Federation House, Vyse Street, Birmingham.

Supporting our members

As a trade association, the SEA endeavours to be the voice that represents our members in areas surrounding legislation and government that affect our ability to produce and compete successfully in an increasingly competitive global market. We are very proud of the contribution that the UK treatment industries have made to current technology employed around the world and as an association, we work tirelessly to offer our members the very best advice and assistance in all aspects of their activities.

Environmental and Health & Safety issues dominate our industry as legislation continues to be passed down from the EU without any real consideration of its impact on day to day operations. The SEA has been instrumental in making sure that members are kept informed of these changes and are well represented in various forums to protect our members' interests.

It is no secret that the world economy has been through turmoil in recent times and manufacturing generally has been affected particularly badly during this period. So, now more than ever, we need to stand together as an industry

and act collectively to influence serious issues we face. At our recent House of Lords briefing luncheon meeting, we made some real progress regarding fuel charges, carbon footprint issues and climate change, which is just a flavour of what we can achieve as a group.



SEA Chief Executive, David Elliott speaking at a European Parliament breakfast meeting.

Leading the way with new technologies and coatings

We travel the world to discover new information and technologies that ensure that the UK remains at the forefront of the world's manufacturing powers, enabling our members to compete successfully in an increasingly competitive global market.

With research and development into new environmentally friendly coatings reducing the use of more hazardous plating methods, the SEA, together with our members, is currently at the forefront of the advancement of the surface engineering industry, and we are continually working to ensure that it stays that way. Recent R&D projects include the EU funded projects

HardAlit – a new generation of coatings to replace hard chromium plating, PROCETS – Protective Composite Coatings via Electrodeposition and Thermal Spraying. UK funded projects include CRUPPAIL – Cadmium replacement using pulse plating and ionic liquids, and STOWURC – sustainable treatment of waste using recycled chitosans (crab shells).

(SEA) – www.sea.org.uk

Dave Elliott

Young Professional Engineers Group

Academia to Industry: The Challenge

One of the committees most recent webinars was about moving from education to the workplace. The talk focused on education of students moving into engineering but the general premise can be applied to all Young Professionals starting a new career. Dr Mohamed (Moe) Sufian talked about his education up to PhD level and the variety of companies he has worked for in engineering positions. He explained the challenges he faced of getting his first graduate role and some of the problems he had to solve.

The four challenges he describes are transition (challenge 1), realisations (challenge 2), expectations (challenge 3) and reality (challenge 4). He starts from his final year and the difficulty of completing a final year whilst applying for jobs. For Moe and many other students this part is probably the hardest part in their career, the very beginning. As someone who graduated during the pandemic a lot of challenge 1 (transition) was relatable as many companies stopped recruitment or limited recruitment and the world moved online, so a lot of interviews and assessment days were moved to the virtual world. The phrase "look into people's eyes in an interview, suddenly became look at the camera". The main surprise as mentioned in challenge 1 by Moe was just because a job wanted a mechanical engineer does not mean the role wanted the same skills as another mechanical engineering job. This is because engineering is a broad subject and companies want Young Professionals who can adapt rather than be a specialist in 1 subject even if the job advert appears that way.

He then moves onto expectations and this is different for everyone. People get degrees for different reasons and

people choose graduate jobs for different reasons, so everyone has their own expectations. This links and immediately leads to the challenge of realisations. Education and workplaces are 2 different experiences, education prioritise knowledge and workplaces prioritise experience. Some people prefer education and others work, but either way when someone moves to the other, they learn new things that they did not expect. A good example is industry is usually more fast paced than university and results have a greater impact.

The final challenge is reality and again this differs on people and their experience. A Young Professional may get a job out of desperation and end up enjoying it or achieve a dream job and hate it. A more common scenario is the lack of commercial awareness if a graduate job is a first full time job. Everything in a company is influenced by profit as all companies are affected by profit but in university it is rare to be in a project where you need to sell something to someone and are constrained in the same way.

The last advice Moe gives is focus on all skills not just knowledge and networking is an important skill to find opportunities. Relating to this what is the current market trend in the industry you are interested in? With the pandemic this is very important as supply chain issues and changes in society, market trend in many industries have changed. Even if you are not in a specific sector you may hear on the news/radio/social media about how the pandemic has affected and that could be relevant in a cover letter or interview.

Darshan Gale

The Digital Innovation Facility

A Hub for Digital Transformation



Updates from Academic, Industrial and Research Partners

Virtual Engineering Centre, University of Liverpool

The Digital Innovation Facility Officially Opens for Fostering Industrial Collaborations across the North West through State-of-the-Art Laboratories



Steve Rotheram, the Liverpool City Region Mayor, officially opened the University of Liverpool's Digital Innovation Facility (DIF), a £12.7 million Centre of Excellence in emerging digital technologies, alongside tech entrepreneur and visiting Professor at the University, Sir Robin Saxby.

Located on the University campus, the DIF provides a purpose-built environment to support collaborations and partnerships between academics, industry and organisations in the research areas of computer and data science, robotics and engineering where the University has world-class research capabilities.



The 1500 m² facility includes state of the art laboratories featuring cutting-edge equipment and highly skilled support to facilitate enhanced access for businesses and organisations that wish to collaborate with University experts across multiple technology areas including visualisation, robotics, artificial intelligence, data science, simulation, and modelling.

Sir Robin Saxby said: "This world leading facility and team will play a key role in the region's research and innovation capabilities, facilitating industry and academic collaboration in digital technologies with huge potential and opportunities across many sectors. Liverpool's global reach and connectivity will also stimulate what happens here."

The Virtual Engineering Centre manages DIF's Mixed Reality Laboratory which hosts Europe's most advanced large-scale Virtual Reality (VR) Powerwall, providing up to three independent viewers with their own accurate head-tracked perspective.

This new capability makes the space ideal for collaborative design, object interaction, design reviews or multi-person working. Teams can individually interact with their virtual model within the same physical location while still being able to see each other's non-verbal behaviour such as gestures and proxemics enabling more natural user interactions while



working. Moreover, with the use of avatars for user representation, solutions can be networked to enable remote experts to join the session.

The Mixed Reality Laboratory also features a large, tracked space where physical objects can be located to enhance the simulation experience. Participant and object tracking will be represented in high-fidelity with sub-millimetre accuracy with the capability to capture whole body motion of individuals and represent this in real-time and immersive simulations.

Activities within the Mixed Reality Laboratory focus on the solution of real-world industrial problems across all industry sectors, with particular emphasis on the realisation of complex high-fidelity digital twins and testbeds for industrial systems and processes.

The Virtual Engineering Centre are leading on multiple European Regional Development Funded (ERDF) projects across the North West enabling even more SMEs and businesses the opportunity to gain access to a unique mix of capabilities across visualisation, AI, robotics, drones and laboratory automation. This is matched by the latest research and technology within this collaborative and cutting-edge facility.

Dr Andy Levers, Executive Director of the Institute for Digital Engineering and Autonomous Systems, said: "Through the DIF we have created a dedicated hub to facilitate access to our world leading facilities, expertise and support so that business, industry and other organisations can benefit from the exciting advances in computing, robotics, artificial intelligence and virtual engineering and maximise the possibilities and impact of these emerging technologies."

Co-located in the DIF are the University's Virtual Engineering Centre (VEC), the Science and Technology Facilities Council's Hartree Centre and the Civic Data Cooperative. The DIF is a key addition to the science and technology facilities in Liverpool's Knowledge Quarter and is co-funded by the University of Liverpool and Liverpool City Region Combined Authority's Local Growth Fund.

Emma Green

Built Environment | Design and Manufacturing | Digital | Education and Skills | Energy | Engineering Safety | Healthcare | Transport | Innovation and Emerging Technologies

DATE	EVENT AND LOCATION	PRESENTER	SECTOR	GROUP	TIME	CONTACT	CPD
Tuesday, 6th September	Advances in Electronically Active Textiles YMCA Wirral, 56 Whetstone Lane, Birkenhead, CH41 2JT	Dr Theodore Hughes-Riley, Associated Professor in Electronic Textiles Nottingham Trent University	Digital	Electronics and e-Systems	Start: 6:30 p.m. Refreshment and Networking 6:00 p.m. Finish: 8:30 p.m.	Brian Clark Registration is essential by email or telephone	2
Wednesday, 21st September	Healthcare and the Internet of Things (IoT) – How to Identify and Avoid Technical and Commercial Pitfalls Zoom webinar	Mike Mckean, Chair, IoT Committee IET	Design and Manufacturing / Healthcare / Digital	Manufacturing and Management Group / Jointly with Biomedical Engineering Group	Start 6:00 p.m. Finish 7:30 p.m.	Mike Mckean, Michael Gilbert, Jiafeng Zhou Online registration	1
Tuesday, 27th September	The Red Box – the History, Evolution and Future of the Phone Box YMCA Wirral, 56 Whetstone Lane, Birkenhead, CH41 2JT	Nigel Linge, Professor of Telecommunications, University of Salford	Design and Manufacturing	Electronics and e-Systems	Start 6:30 p.m. Refreshments and Networking 6:00 p.m. Finish 8:30 p.m.	Brian Clark Registration is essential by email or telephone	2
Wednesday, 5th October	Synchronous Condensers – Supporting the Roadmap to 100% Renewables Zoom webinar	Christian Payerl, Sales Manager, Synchronous Condenser at ABB AB	Energy / Built Environment	Energy and Environment Group	Start 7:00 p.m. Finish 8:30 p.m.	Rob McDonald Online registration	2
Wednesday, 12th October	Technical Visit to Tata Steel: Engineering Innovations in Steel Coating Process Lines Tata Steel Colors, Shotton Works, Weighbridge Road, Shotton, Deeside, CH52NH	Steve Smith, Electrical Plant Engineering Manager Nick Bennett, Senior Electrical Project Engineer	Design and Manufacturing	Manufacturing and Management	Start 2:00 p.m. Refreshments and Networking 4:00 p.m. Finish 4:30 p.m.	Steve Smith, Andrew Kaldos Online registration	2
Wednesday, 19th October	Technical Visit – Jodrell Bank Jodrell Bank, Macclesfield SK11 9DL	Jodrell Bank Staff	Innovation and Emerging Technologies	Young Professionals	Start: 1:00 p.m. Finish 3:30 p.m.	Bibek Darjee, Darshan Gahle Online registration	3
Tuesday, 1st November	5G Demystified: The What, When and Where YMCA Wirral, 56 Whetstone Lane, Birkenhead, CH41 2JT	Professor Andy Sutton Principal Network Architect Architecture and Technology Strategy	Digital	Electronics and e-Systems	Start 6:30 p.m. Refreshments and Networking 6:00 p.m. Finish 8:30 p.m.	Gordon Nicholas Registration is essential by email or telephone	2
Wednesday, 9th November	Celebration of Engineering: Research and Knowledge Exchange at the Liverpool John Moores University (LJMU) School of Engineering. James Parsons Building, Liverpool John Moores University, 3 Byrom St, Liverpool L3 3AF	Dr Martin Sharp, Visiting Research Fellow Photonics in Engineering (LJMU) Dr Andre Batako, Reader in Sustainable Advanced Manufacturing Technology (LJMU) Andrew Burgess, PhD Researcher in Additive Manufacturing	Design and Manufacturing / Innovation and Emerging Technologies / Education and Skills	Manufacturing and Management	Start 2:00 p.m. Refreshments and Networking 6:00 p.m. Finish 8:00 p.m.	Andrew Burgess, Andrew Kaldos Online registration	3
Thursday, 17th November	Small Modular Reactors (SMRs) The Engine Rooms, 101 Faraday Street, Birchwood Park, Risley, Warrington, Sat Nav: WA3 6AE	Alan Woods Strategy and Business Development Director, Rolls Royce SMR	Energy / Built Environment	Energy and Environment Group	Start 6:30 p.m. Refreshments and Networking 6:00 p.m. Finish 8:00 p.m.	Rob McDonald Online registration	2
Wednesday, 23rd November	Christmas Lecture – 2022 Zoom webinar	Christopher Scales	All	Young Professionals	Start 2:00 p.m. Finish 3:00 p.m.	Andrew Burgess, Jashenpreet Singh Online registration	1

All our events are free to attend for IET members and non-members alike

Search "IET Mersey & Western Cheshire" on social media sites to keep up to date with events and activities!
For more information on how the IET supports CPD please visit <http://www.theiet.org/membership/career.cpd>
If you do not have access to the internet, registration can be done via e-mail or telephone to the contact listed
Contact details are shown on event synopses on pages 20

September

Advances in Electronically Active Textiles**Date:** Tuesday, 6th September**Time:** Start: 6:30 p.m.

Refreshment and Networking 6:00 p.m.

Finish: 8:30 p.m.

Venue: YMCA Wirral, 56 Whetstone Lane, Birkenhead, CH41 2JT**Speakers:** Dr Theodore Hughes-Riley, Associated Professor in Electronic Textiles Nottingham Trent University

Today, the demand for wearable electronic devices is growing. Textiles have a major role to play in this strategically important area and offer many advantages over traditional materials such as support for technologically advanced products, flexibility, softness and high strength-to-weight ratios. This presentation investigates how modern textile technologies can be used to create such wearable textiles and explains ways by which this is being achieved and yet maintains the required fashion sense expected of clothing in these modern times. Registration is essential by email or telephone / CPD 2 hrs

Contact: Brian Clark, bjclarkobe@btinternet.com

Healthcare and the Internet of Things (IoT) –**How to Identify and Avoid Technical and Commercial Pitfalls****Date:** Wednesday, 21st September**Time:** Start 6:00 p.m.

Finish 7:30 p.m.

Venue: Zoom webinar**Speakers:** Mike Mckean, Chair, IoT Committee IET

The Internet of Things (IoT) can deliver information about patients or medical machines, quickly to clinicians, or their IT support staff. The immediacy of such data, available from almost any location to any device, can help clinicians make more informed decisions, and enable IT staff to be better placed to offer their technical support when required. A new paradigm will be presented, which enable data from any medical machine to display that data in a standard format, so that a clinician can use any manufacturer's machine, and always see the data about the patient, in the same format. The recommended technology use "open source" software and "open standards" technology with benefits. Q/A session. Online registration / CPD 1 hrs

Contact: Mike Mckean, mmckean917@gmail.com,Michael Gilbert, michael.gilbert@ietvolunteer.org,Jiafeng Zhou, Jiafeng.Zhou@ietvolunteer.org**The Red Box – the History, Evolution and Future of the Phone Box****Date:** Tuesday, 27th September**Time:** Start 6:30 p.m.

Refreshments and Networking 6:00 p.m.

Finish 8:30 p.m.

Venue: YMCA Wirral, 56 Whetstone Lane, Birkenhead, CH41 2JT**Speakers:** Nigel Linge, Professor of Telecommunications, University of Salford

They have achieved iconic status; but are now seldom used! Nevertheless, they remain as an essential part of what makes Britain! This talk looks at the history and evolution of the humble British Phone Box through all its major models, including those that were introduced by organisations other than BT and also the one that is now more famous because it is used by a Time Lord. It will conclude by showing the latest designs that are appearing on our streets, looking at how many are being given a new lease of life as something quite different and show that, they are not all painted red! Registration is essential by email or telephone / CPD 2 hrs

Contact: Brian Clark, bjclarkobe@btinternet.com

October

Synchronous Condensers – Supporting the Roadmap to 100% Renewables**Date:** Wednesday, 5th October**Time:** Start 7:00 p.m.

Finish 8:30 p.m.

Venue: Zoom webinar**Speakers:** Christian Payerl,

Sales Manager, Synchronous Condenser at ABB AB

Transmission systems are facing increased challenges from the rise of renewables and inverter-based generation on the grid. This is coupled with a decline in inertia historically provided by large conventional power station generators. This presentation explains what Synchronous Condensers are and why, when and where they are needed to help the UK Grid.

Details of the synchronous condensers being installed at Lister Drive, Liverpool will be included in the webinar. The Lister Drive project is scheduled to go online in 2022.

Online registration / CPD 2 hrs

Contact: Rob McDonald, robert.mcdonald@ietvolunteer.org**Technical Visit to Tata Steel:****Engineering Innovations in Steel Coating Process Lines****Date:** Wednesday, 12th October**Time:** Start 2:00 p.m.

Refreshments and Networking 4:00 p.m.

Finish 4:30 p.m.

Venue: Tata Steel Colors, Shotton Works, Weighbridge Road, Shotton, Deeside, CH52NH**Speakers:** Steve Smith, Electrical Plant Engineering Manager
Nick Bennett, Senior Electrical Project Engineer

A lecture and guided tour showcasing modern engineering technology at Tata Colors, Shotton Works. From its humble beginnings Shotton Works has evolved over 125 years serving the construction and domestic market in quality coated steel products. The event will focus on advanced engineering technology for delivering the next generation of steel strip sustainable corrosion protection. Online registration / CPD 2 hrs

Contact: Steve Smith, steve.c.smith@tatasteeleurope.com
Andrew Kaldos, andrew.kaldos@ntlworld.com**Technical Visit – Jodrell Bank****Date:** Wednesday, 19th October**Time:** Start: 1:00 p.m.

Finish 3:30 p.m.

Venue: Jodrell Bank, Macclesfield SK11 9DL**Speakers:** Jodrell Bank Staff

This Young Professionals event is a technical visit to Jodrell Bank, Macclesfield. Jodrell Bank's bold and pioneering story is widely regarded to be of national and international significance.

For over 70 years, Jodrell Bank Observatory has been a world-leading science research institute, continuously pushing back the boundaries of our knowledge and understanding of the universe, while the scientists at Jodrell Bank continue to work at the cutting edge of modern astrophysics, there is a new awareness of the importance of those early developments that took place here.

Online registration / CPD 3 hrs

Contact: Bibek Darjee, Bibek.Darjee@ietvolunteer.org
Darshan Gahle, Darshan.Gahle@ietvolunteer.org

November

5G Demystified: The What, When and Where**Date:** Tuesday, 1st November**Time:** Start 6:30 p.m.

Refreshments and Networking 6:00 p.m.

Finish 8:30 p.m.

Venue: YMCA Wirral, 56 Whetstone Lane, Birkenhead, CH41 2JT**Speakers:** Professor Andy Sutton
Principal Network Architect Architecture and Technology Strategy

This talk will provide an update and review of the transformational plans, capabilities, and outcomes from 5G deployments in the UK. 5G networks are already enabling a step change in the range and capability of innovative applications from IoT to robotics. That pace of change is due to accelerate as 5G moves from its initial enhanced mobile broadband phase to deliver ultra-reliable and low latency communications along with massive machine type connectivity.

Registration is essential by email or telephone / CPD 2 hrs

Contact: Gordon Nicholas, gordon.nicholas@btinternet.com**Celebration of Engineering: Research and Knowledge Exchange at the Liverpool John Moores University (LJMU) School of Engineering.****Date:** Wednesday, 9th November**Time:** Start 2:00 p.m.

Refreshments and Networking 6:00 p.m.

Finish 8:00 p.m.

Venue: James Parsons Building, Liverpool John Moores University, 3 Byrom St, Liverpool L3 3AF**Speakers:** Dr Martin Sharp,
Visiting Research Fellow
Photonics in Engineering (LJMU)Dr Andre Batako,
Reader in Sustainable Advanced Manufacturing
Technology (LJMU)
Andrew Burgess,
PhD Researcher in Additive Manufacturing

This Celebration of Engineering presents the research and knowledge exchange of the School of Engineering of Liverpool John Moores University. Tracing its history to the founding of Liverpool Mechanics Institute in 1823, engineering is a key discipline in the development of the current LJMU. The Faculty of Engineering and Technology has been highly rated in the government's 2021 Research Excellence Framework, showing the international relevance of its outputs and impacts. The event will use talks, tours and posters to present the School's research and its knowledge exchange work with industry.

Online registration / CPD 3 hrs

Contact: Andrew Burgess, a.burgess@2016.ljmu.ac.uk
Andrew Kaldos, andrew.kaldos@ntlworld.com**Small Modular Reactors (SMRs)****Date:** Thursday 17th November**Time:** Start 6:30 p.m.

Refreshments and Networking 6:00 p.m.

Finish 8:00 p.m.

Venue: The Engine Rooms, 101 Faraday Street, Birchwood Park, Risley, Warrington, Sat Nav: WA3 6AE**Speakers:** Alan Woods
Strategy and Business Development Director,
Rolls Royce SMR

Small Modular Reactors are an "intelligent way to meet our future needs". The SMR programme is one of the ways that Rolls Royce is meeting the need to ensure the UK continues to develop innovative ways to tackle the global threat of climate change.

Online registration / CPD 2 hrs

Contact: Rob McDonald, robert.mcdonald@ietvolunteer.org**Christmas Lecture – 2022****Date:** Wednesday, 23rd November**Time:** Start 2:00 p.m.

Finish 3:00 p.m.

Venue: Zoom webinar
Speakers: Christopher Scales

Join the Young Professionals Group to celebrate the end of 2022 with an exciting lecture about the life of Christopher Scales who works for HSE Energy Division – Offshore ED 4.7 as a Specialist Inspector in Materials and Corrosion.

Online registration / CPD 1 hrs

Contact: Andrew Burgess, a.burgess@2016.ljmu.ac.uk
Jashenpreet Singh, jashenpreet@gmail.com

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Updates from Academic, Industrial and Research Partners Liverpool Hope University

Update on Research at Liverpool Hope University

The Robotics and AI research teams at Liverpool Hope University is deeply involved on research activity in Multimodal Fine-Grained Visual-Haptics.

Haptics is a multi-disciplinary subject involving psychology, engineering, physics and much more. It aims at giving you the same tactile and kinaesthetic perception you have when you touch something, when you shake a hand, when you grab a cup of tea. It is not only about touch, it is also about what you feel, what you understand, what you perceive in a daily life interaction.

The team's recent work on Visuo-Tactile Sensing is featured in media locally and internationally and flagship journals in robotics. Haptics expert, Dr Anuradha Ranasinghe, teamed up with Prof David Reid, AI enthusiastic to initiate the idea and deliver the project with a PhD student, Alex Abad.

In this recent project, the team focuses on the design and development of a modular and lightweight high-resolution (fine-grained) haptic hand wearable system. Such a device can be very useful because during open surgery, a surgeon relies not only on the detailed view of the organ being operated upon and on being able to feel the fine details of this organ but also heavily relies on the combination of these two senses. In laparoscopic surgery, haptic feedback provides surgeons information on interaction forces between instrument and tissue. There have been many studies to mimic the haptic feedback in laparoscopic related telerobotic studies to date. However, cutaneous feedback is mostly restricted or limited in haptic feedback-based minimally invasive studies. Therefore, the team developed a fine-grained information matrix wearable which consists of five 4x4 miniaturised fingertip actuators, 80 in total, to convey cutaneous feedback. The wearable is described as modular, lightweight, Bluetooth, and WiFi-enabled with an average latency of 46.5 ms. The untethered fine-grained hand wearable would enhance multimodal perception in Minimally Invasive Surgeries to naturally feel the immediate environments of the instruments.

To complete a full sensing and actuating integration, the research team also developed a novel sensor called *HaptiTemp*.

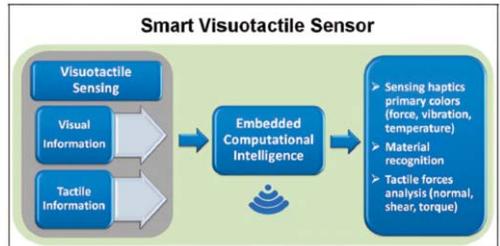
The research team at Liverpool Hope believe that *HaptiTemp* is the first sensor in the robotics community that can trigger a 'sensory impulse'. This is an exclusive feature that can be very useful when designing soft robotics: the prototype acts equivalent to humans' withdrawal reflex in touching hot surfaces and could be applied in different scenarios, such as search and rescue, industrial applications, and space explorations.

HaptiTemp is also inspired by a visuo-tactile based sensor which was previously developed at MIT in 2009. The team at Liverpool Hope University was able to measure a



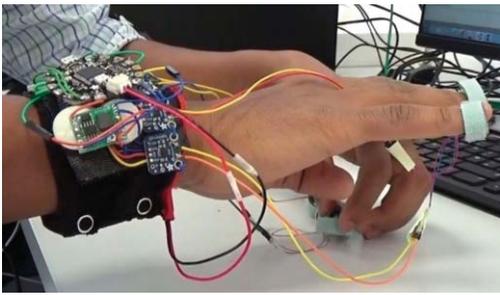
The multimodal fine-grained visual-haptics system developed at the Robotics and AI Labs, Liverpool Hope University

response time of 643 ms while the sensor perceived transitions between cold to-hot and hot-to-cold with the *HaptiTemp* sensor. The rapid temperature response of this VisuoTactile sensor is comparable to the less than one second time withdrawal reflex response of the human autonomic system vs extreme heat.



The architecture of the Smart Visuo-Tactile Sensing System developed at Hope

HaptiTemp might give robots the ability to react as humans and create thermosensitive softrobotics interfaces in the near future. Thermosensitive visuo-tactile sensor is the first monolithic elastomer temperature sensor and can be used to infer tactile forces based on the mechanical deformation of the gel. The integration of sensing and actuating system is called smart visuo-tactile sensor. This inexpensive and novel high-resolution haptic fine-grained wearable device is ideally suited for a number of intriguing



The vibro-tactile wearable system

robotics applications such as Telerobotic, Telemedicine, Augmented Reality, Virtual Reality, and Spatial Computing in general.

In this context, the team also developed devices enhancing tactile feedback, as well as kinaesthetic feedback: for example, a vibro-tactile wearable system was developed by Dr A. M. Tadesse and Dr EL Secco, which allows to 'touch' virtual objects while your hand navigate within a Virtual

Reality environment. Similarly, a 3D printed exoskeleton was design and integrated with the human hand in order to interact with end-users' proprioception and then provide sensations of physical contacts on the muscle and joint of the user's human hand. The team also look at how we could discriminate the stiffness of what we virtually touch with such devices: this can have important implication in industry, where we will be soon require interaction with such new tools.

The team is also looking at how to make robots more human like and how to take inspiration from nature in order to develop clever and biologically inspired robotics system: Professor Baxendale, for example, has designed a self-adaptive context aware audio localisation system based on artificial cerebellum models. Such systems could support the robot auditory sensors in different situation such as, for example, very noisy emergency scenarios where the robot is performing rescuing activity.

The Robotics and AI research teams at Liverpool Hope University is led by Professor A. K. Nagar. The team can be contacted at:

[MCSE School, Liverpool Hope University.](#)

Atuliyi Nagar

Electronics and e-Systems Group

Report on the Electronics and e-Systems Group

The event on 7th July 2022 "Aspects of the Radio-Frequency Distribution System for the European Spallation Source" was a great success and well attended. The European Spallation Source is being built at Lund in Sweden at an estimated cost in excess of 1.6 billion Euros. It will use a linear accelerator to accelerate protons into a tungsten target to create the most powerful spallation neutron source in the world. The U.K. is making several "in kind" contributions. One such contribution is the RF distribution system for the superconducting cavities. The talk described some high-level design decisions in the design of the accelerator and then focused on two detailed design issues in relation to the RF system. The speaker is Dr Norman Turner, PhD BSc, Researcher at the University of Huddersfield

"The Red Box – the History, Evolution and Future of the Phone Box" is planned on 27th September 2022. These boxes have achieved iconic status; but are now seldom used. Nevertheless, they remain as an essential part of what makes Britain. This talk looks at the history and evolution of the humble British phone box through all its major models, including those that were introduced by organisations other than British Telecom (BT) and in addition the one that is now more famous because it is used by a Time Lord. It will conclude by showing the latest designs that are appearing on our streets, looking at how many are being given a new lease of life as something quite different and show that, they are not all painted red.

On 1st November 2022 a presentation will be given by Professor Andy Sutton , Principal- Network Architecture and Strategy in BT. The talk is titled "5G Demystified, the What, Where and When", and will provide an update and review of the transformational plans, capabilities and outcomes from 5G deployments in the UK. 5G networks are already enabling a step change in the range and capability of innovative applications from IoT to robotics. That pace of change is due to accelerate as 5G moves from its initial enhanced mobile broadband phase to deliver ultra-reliable and low latency communications along with massive machine type connectivity

The event "Advances in Electronically Active Textiles" is planned to be in November by Associate Professor Dr Theodore Hughes-Riley from Nottingham Trent University. The demand for wearable electronic devices, e.g. to monitor blood pressure, body temperature, is growing. Textiles have a major role to play in this strategically important area and offer many advantages over traditional materials such as support for technologically advanced products, flexibility, softness and high strength-to-weight ratios. This presentation investigates how modern textile technologies can be used to create such wearable textiles and explains ways by which this is being achieved and yet maintains the required fashion sense expected of clothing in these modern times.

Gordon Nicholas

Optimising Delivery Through Reality Capture

On 2nd March 2022 the Manufacturing and Management Group presented a webinar jointly with Bilfinger UK entitled Optimising Delivery Through Reality Capture. The speakers were Mark Kelly – Head of Digital & Innovation and Andy Cooper, Automation Sales. The brief summary of the webinar is given below.

Introduction

When we are working in production or in process environments, engineering design projects, maintenance or planning activities, capturing all information that we need can be challenging.

Traditional methods of site survey included measurement tools, endless site notes and photographs to capture this detail but still we have all been there when you just wish you know what was to the left of that panel / instrument / asset. The introduction of modern reality capture technologies can dramatically improve the efficiency of this process and give us access to site information like we've never had before.

Bilfinger have adopted a range of data capture technologies that we combine under our "Industrial 360" banner. The focus is on fast, non-intrusive, visual and dimensional data capture with a view to minimising survey time but maximising data. These systems are proven in multiple industries including Nuclear, Offshore and Oil & Gas and we bring them together as a scalable offering to support BIM (ISO 19650 Building Information Modelling) compliant design and construction engineering.

Applications

Bilfinger UK's Industrial 360 principle provides clients with a digital representation of a site or installation. Visual and spatial data is captured through one or a combination of technologies including high-resolution HDR photography, infrared ranging and laser scanning to provide the customer with a virtualised instance of their environment, which can then be used for applications such as:

- Project planning and workface familiarisation – Desktop familiarisation and reconnaissance saves time and resources on-site, reduces travelling costs and minimises exposure to potential hazards. Customers wishing to reduce site access due to environmental conditions such

as radiological, hazardous area (ATEX) or COVID compliance use these techniques to prevent unnecessary site attendance.

- HAZOP (Hazard and Operability Studies) support. The virtual tour is used to support the HAZOP process (including HAZID and HAZCON) providing a platform for all stakeholders to engage with the plant both visually and by giving the capability to make measurements and add documents & metadata.
- Visual method statements and safe systems of work. By augmenting the virtual tour with metadata (which can include documents, photographs, audio and video) we can build a comprehensive and immersive environment where project scope and methodology is concisely communicated throughout the team.
- Detailed design implementation. Using the higher accuracy laser scanning option of Industrial 360 the representation produced is of higher-than-construction grade accuracy ($\pm 3\text{mm}$) and the dimensional data from it can be used for detailed civil, structural, mechanical, piping and E&I engineering. This leads to time and cost savings in both the design and construction phases and a higher quality of deliverable and documentation.
- Review meetings, construction updates and remote monitoring. Using the representation and BIM methodologies as a vehicle for collaborating during the design and construction phases Industrial 360 provides a single point of focus and ensures that the team can work with one set of data. The tour can be updated periodically to reflect construction progress and remotely reviewed by the entire project team regardless of time zone.
- Site inductions and HSEQ Briefings. Bilfinger regularly use this technology for undertaking site inductions and toolbox talks as well as HSEQ reviews. Industrial 360 has assisted Bilfinger UK to work effectively and efficiently during the COVID19 pandemic and supported our HSEQ drivers for reduction of travelling and CO₂ emission.

A Note on Digital Twin

There may be some among you thinking, "Is this a digital twin" or "This is a digital twin" and I have very deliberately avoided the use of the terminology throughout this article. There exist a variety of interpretations of digital twin of which the visual representations of plant here fall into. However although these kind of models can form part or even the starting point for a digital twin they are not in themselves a digital twin. The true digital twin is about the culmination of plant information into a single platform not just the model/visualisation element, when we bring together, design, process, maintenance, asset information and visualisation into the same model, we then have a digital twin, everything else is just a step along the journey.

Mark Kelly



Bilfinger UK Sets Five-Year Apprenticeship Commitment to Deliver Future Talent

Engineering and maintenance provider Bilfinger UK, has pledged to hire 400 apprentices over the next five years to deliver future growth and attract and retain more young people across the sector.

The new commitment will see the firm hire 86 new trainees this year across its network in England and Scotland, with the majority of the positions created within its maintenance, modifications and operations (MMO) business.

Bilfinger UK, which is headquartered in Warrington in Cheshire, is one of Britain's largest tier one contractors with 4500 employees and 13 locations across the UK's key industrial hubs.

Each apprentice will undertake either a three or four-year programme of work experience and appropriate off the job training relevant to the discipline being worked towards, which will be certified by a recognised awarding body.

Damian Redmond, HR Director at Bilfinger UK, said: "It is common knowledge that there is a skills shortage in the UK engineering industry and as a major contractor and employer, we recognise the importance of our role in attracting new talent into the sector."

"This is an exciting time to come into engineering. The sectors we operate in are changing rapidly as the UK accelerates towards the energy transition, from our traditional markets of oil and gas and utilities, through to major renewables in onshore and offshore wind, nuclear, hydrogen and carbon capture.

"Our scheme represents a significant opportunity for those with a curiosity of how we make and maintain the infrastructure that makes the world turn. And it's this proposition that the industry collectively needs to embrace to attract tomorrow's generation of engineers."

Molly Fox from Minehead, Somerset, started her apprenticeship with Bilfinger UK in November 2019, with on-site training at Hinkley Point C, where the company is delivering inspection work and maintenance services for NSSS (Nuclear Steam Supply System), BNI (Balance of Nuclear Island) and BoP (Balance of Plant).

Molly said: "My apprenticeship has been such a valuable experience. Not many people my age will have had the same opportunities that I've had: getting hands on experience on one of the UK's biggest engineering projects of the century."

"I'd really encourage anyone with an interest of science and engineering to see how they could build a bright future as a Bilfinger UK apprentice."

To apply for the roles, please visit: <https://jobs.bilfinger.com/>.

Bilfinger UK is a leading engineering and maintenance provider, supporting customers across the chemical & petrochemical, nuclear, oil & gas, pharmaceuticals & biopharma, power & energy, utilities, renewables and food & beverage markets. The company enhances the efficiency of assets, ensuring a high level of availability and reducing maintenance costs.

Bilfinger UK has extensive experience in offshore and onshore facilities; specialising in asset management services throughout all life cycle phases from consulting, engineering, manufacturing, assembly, operations, maintenance, and decommissioning.

This commitment is delivered by an experienced and highly competent workforce of over 4500 employees operating from 13 offices in strategic industrial hubs, upholding the highest standards of safety, compliance and quality.

Mark Kelly

Mersey and Western Cheshire Network

Report on the Network

The LN is proud to have an approximately 4600 strong membership living in a considerably large region.

The Local Network (LN) facilitates the dissemination of knowledge and the advancement of science, engineering and technology through the provision of various activities including school visits, lectures, seminars, workshops, technical visits, biannual recognition events, group meetings, and our Annual Dinner. The LN is governed by the Network Committee (NC). The LN publishes two Events Newsletters per year, one in January and one in September. The NC endorses major proposals, propose strategic direction, provides a forum for the sub-committees to network, delegates authority to the sub-committees and manages the event programmes and financial budget.

The sub-committees or groups are: Education Officers, Young Professionals Group, Energy and Environment Group, Electronics and e-Systems Group, Manufacturing and Management Group, Biomedical Engineering Group.

The LN works in close cooperation with the region's Universities, Research and Development Institutions, Schools, Colleges and Industrial Companies both small and large, whose contribution to the events programme is absolutely instrumental to maintaining the provision of high quality activities.

The LN is keen to have new members to contribute to the work of the Network Committee and all sub-committees. Are you interested? Please contact any of the Key Contacts on page 35.

Andrew Kaldos

Updates from Academic, Industrial and Research Partners

Ford Halewood Transmissions Ltd

Combined Heat and Power Solution to Grid Connection Requirement, Ford Halewood

Background: The automotive body and assembly, and transmission plant at Halewood has been in operation for nearly 60 years. Originally a Ford facility, the site went through a change of ownership in the 2000's with the body and assembly operation becoming a Jaguar Land Rover (JLR) facility and the transmission plant under joint Getrag and Ford (GFT) ownership. Site services (electricity, gas and water) for the transmission plant continued to be supplied from the JLR plant under a Service Level Agreement (SLA), but in 2018 JLR gave notice to the transmission plant as they needed to increase their electrical capacity, requiring the GFT plant to seek independent grid connections with electricity as a priority.

The obvious solution was to approach utility companies directly for new grid connections, but GFT took the opportunity to explore alternative solutions. Working with an independent supplier, the opportunity of using a Combined Heat and Power (CHP) for on-site generation combined with external electricity and gas grid connections became the favoured option.

Why CHP: A CHP plant burns natural gas to produce electricity and generates a roughly equal amount of usable heat energy. For each MW of gas consumed approximately 400 kW of electricity and 400 kW of usable heat is generated, with 20% losses. The viability of CHP depends on the cost differential per MWh between gas and electricity. At the time of the investigation in mid-2018 cost of gas was £23/MWh and electricity £105/MWh, which is sufficient margin to make CHP generation worthwhile. It also provides the opportunity for a supplier financed solution avoiding GFT capital outlay, with capital repayment included within the purchase price of the electricity.

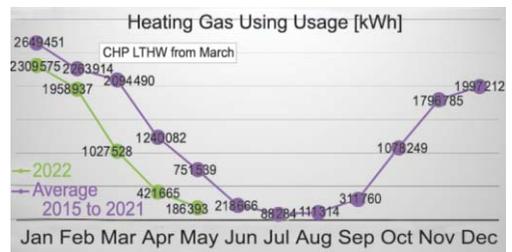
Good Quality CHP (CHPQA): The UK government operates a CHP Quality Assurance scheme which assesses the efficiency of a CHP operation based on its inputs and outputs. A scoring scheme is used and if the CHP exceeds a certain threshold the facility qualifies for various financial benefits, primarily exemption from Climate Change Levy (CCL). GFT made it a requirement of the CHP scheme to achieve CHPQA certification so effective uses of the available waste heat had to be found as well as use of the generated electricity.

The Project: After a competitive tender process based on a performance specification On-Site Energy Projects were chosen to design, build and operate the CHP facility including required grid connections for gas and electricity and supporting infrastructure to make effective use of the waste heat. After initial award, there followed a detailed review period during which the original design assumptions were verified and, in some cases, required modifying. The final project consisted of 2 CHP units (1.5 and 2.0 MW),

33 kV grid connection, on site electrical infrastructure of DNO 33 kV switchroom, IDNO 2x33/11 kV transformers and 11 kV switchroom, replacement incoming 11 kV switchboard in main incoming plant switchroom, new 4 km gas main and hot water (LTHW) distribution system to plant heating system and process washes to make use of the available heat. Total capital cost of around £10 million was fully funded by OEP and the energy supply contract is over an 8-year term with options of 4 year extension periods.



Operation: The CHP meets 95% of the plant's electricity needs, with a small make up from the grid during peak load periods and some export when plant is operating on reduced shifts and at weekends. Despite the significant volatility in gas and energy prices the electricity cost from CHP is not significantly greater than from grid supply, and the extra cost is partially offset by the LTHW supply saving around 75% of heating gas usage.



Zero Carbon Challenge: In 2021 the transmission plant returned to 100% Ford ownership and was awarded significant investment in September that year to manufacture E-Drives for Fords Battery Electric Vehicles in Europe from mid-2024. As part of the plant's electric future, it now has the target to achieve Zero carbon for energy supply. The CHP contract commits the plant to gas in the medium term, however purchase of biomethane certificates achieves true zero carbon and the CHP units can be converted to operate on 100% hydrogen when this becomes commercially viable.

Simon Smith

Updates from Further Education Partners

The Engineering College

Report on The Engineering College



The Engineering College, could never be accused of naval or indeed navel gazing. Being based next door to the UK's leading commercial shipyard, Cammell Laird in Birkenhead, it would be tempting to perceive the quite unique industrial training company as focusing on maritime engineering, gazing longingly out to sea wondering where in the world our apprentices are now? Not at all. With a vision to 'inspire a new generation of young engineers', The Engineering College delivers technical training and assessment to a healthy mixture of young aspiring technicians as well as mature and ambitious engineers working in a broad range of other industrial sectors as well as shipbuilding and repair, and is well known and widely respected within the engineering construction, infrastructure maintenance, rail industry, energy and power generation, medical engineering, and composites manufacture sectors. Indeed, The Engineering College is one of the leading providers of engineering, manufacturing, construction and technical apprenticeships in the North West of England.

The training and assessment services are underpinned by formal, nationally recognised qualifications and apprenticeship Standards with over 320 apprentices 'in training' at any-one time following one of the twelve Standards offered by the Engineering College. The pre-apprenticeship programs running at the college include a vocational schools programme, an industrial Scholarship, and a pre-apprenticeship Traineeship programme, all of which are receiving national qualifications from the engineering construction and engineering manufacturing sectors leading Awarding Organisations including City and Guilds, EAL, Pearson or ECITB. The curriculum at the Engineering College also holds multiple endorsements with the key Professional Engineering Institutions including IET, IMechE and IMarEst. Mature technicians and engineers are following industrially recognised competence assessment

schemes and internationally recognised codings and certifications.

It is The Engineering Colleges' unique origins as a Group Training Association (GTA) which sets it apart from the many competitor organisations in the market which are generally the large FE Colleges. Having risen as a charitable organisation through the investment of the community of engineering businesses in its region, The Engineering College is constitutionally employer engaged and employer driven. The service offer is driven by the 'subscribing' businesses who as employers, shape the curriculum and sustain The Engineering College by investing time, support, materials and funding, equipping the charity with assets and resources with which it provides the community with aggregated, timely and cost-effective training solutions.

In maintaining a first class business engagement relationship with over 100 local engineering businesses the Engineering College has established a sustainable real-time conduit to industry and long term high value employment opportunities for local people, fulfilling its charitable objectives in a meaningful and mutually beneficial process for business and the community residents.

Are we navel-gazing? As an employer engaged and employer driven 'group training association' The Engineering College can never rest. As CEO Terry Weston says, "It is our duty to our founding and new stakeholders to be ahead of the game in regards to the training solutions we are able to deliver to them as their markets change and evolve". By invitation The Engineering College has inserted itself into many of the employer forums (Trailblazers) developing the next generation of apprenticeship training Standards, ensuring that they offer a good and fit for purpose model for SMEs and supply chain businesses. The on-board expertise and knowledge at the Engineering College makes it a trusted partner to many engineering and manufacturing businesses and sees members of its team travelling to far flung corners of the UK and overseas, offering consultancy and advice on unique skills solutions for UK based businesses and international clients.

Supported by organisations like the Institute of Engineering and Technology (IET), the Engineering College has delivered over 1000 young engineering apprentices and more than 2000 certificated or coded adult engineers into industry and we continue to attract many new business clients each year along with over 500 applications from young people seeking to train as apprentices for our industry. Long may it continue.

Terry Weston



Faculty of Science and Engineering

Today's scientists and engineers, in line with the fourth industrial revolution, are challenging the traditional notions of pure and applied science with a focus on student centred experiences.

Our exciting courses offer the scope to carve a future career that challenges, innovates and creates change within our industrial society.

- Chemical Engineering
- Chemistry
- Computer Science
- Cyber Security
- Games Development
- MSc Electronic and Electrical Engineering
- Mathematics
- MSc Mechanical Engineering
- Physics
- Software Engineering

To find out
more, please visit:
[www.chester.ac.uk/
science-engineering](http://www.chester.ac.uk/science-engineering)



Report on the IET Manufacturing Technical Network

The IET Manufacturing TN continues to promote and raise awareness of developments in manufacturing and technology. [IET EngX \(theiet.org\)](http://www.theiet.org)

Our next meeting is planned for 14th September entitled The Future Role of Manufacturing. The event will provide attendees with various insights and examples into how leading industry players are approaching the challenges of digitisation and sustainability in terms of developing the future role of Manufacturing Engineering. The event looks at all aspects from process, technology, and people, and addresses how the skills that are needed are being defined and developed to support the expectations being placed on the current and future Manufacturing Engineering population.

Other planned events and/or activities for later in 2022 include:

- The Future of Manufacturing Automation – This event is planned for November 1st and will be in workshop format. It will include 3–4 case studies that highlight how emerging automation technologies can be used. The case studies will be a mix of current implementations in Manufacturing operations and “pilot” examples that demonstrate proof of concept. The intention is to give practical but challenging insights into how emerging automation technologies can bring significant value to Manufacturing and Sustainability. The workshop will allow attendees to discuss the implications of what they have seen and heard. We will have 3 breakout sessions covering Opportunities and

Benefits, Skill Requirements, and Implications for Business Strategies.

- Digital Manufacturing – Comprising a series of three seminars to be held in November on the subject of Digital Manufacturing. We will feature talks by experts from both industry and academia. The first seminar is to be held in person, in combination with a networking event, at the University of Sheffield Advanced Manufacturing Research Centre (AMRC) on the outskirts of Sheffield, with the subsequent seminars being held online. The topics that will be covered include what is meant by Digital Manufacturing, how the Smart Factory can be enabled, and what we can do with the data that is collected.
- Future Manufacturing Challenges – This event is in the process of being developed and will be held in December. We plan to identify current challenges for manufacturing from both a socio/economic and technology perspectives.

The TN is always willing to hear ideas and suggestions on topics to cover. We have openings for volunteers to join the TN and help reshape and expand the Executive. These opportunities range from simply attending a committee meeting, to bring new ideas to the table, through to organising, running, and promoting events. For more details, please contact the TN Chair, Dr Chris Proudfoot christopher.proudfoot@ietvolunteer.org.

Dr Christopher Proudfoot

Mersey and Western Cheshire Network

Continuing Professional Development (CPD)

On the centre pages of this Newsletter you will see in the right hand column headed CPD and for each event a number of hours that this event qualifies for if you attend the full event. A few years ago the CPD hours for our events were not considered, but times change.

I have taken the paragraph from the Engineering Council's website: “CPD has several purposes, which will vary in relation to your circumstances, needs and career progression. It can also take a variety of forms. At its heart is informal learning through the challenges and opportunities of working life, and interaction with others such as colleagues, customers and suppliers, including professionals from other disciplines. This may be supplemented by structured activities such as courses, distance learning programmes, private study, preparation of papers and presentations, mentoring, involvement in professional body activities, or relevant voluntary work.”

Recording your informal learning helps individuals progress through the different levels of registration, Engineering Technician, Incorporated or Chartered Engineer.

The IET provides Members an online tool called “Career Manager” for recording individual's CPD. The regular use of Career Manager helps individuals to:

- apply for professional registration;
- set goals and plan the steps you need to achieve them;
- record your career progress in detail;
- identify areas where you need extra help;
- record your CPD;
- export and share development reports with peers;
- call on expert advice;
- build an impressive master CV.

If you wish you can sign up to receive hints and tips on CPD and the use of Career Manager.. To sign up for hints and tips just email your name and membership number to cpd@theiet.org using “CPD hints and tips” as the subject line. For engineers and technicians starting out in their careers, CPD will be a fundamental part of your professional life.

Rob McDonald

DEVELOP YOUR ENGINEERING AND TECHNOLOGY BUSINESS WITH LIVERPOOL JOHN MOORES UNIVERSITY

The School of Engineering at Liverpool John Moores University are ideal partners in developing your engineering and technology business.

The school covers:

Marine Engineering,
Mechanical Engineering,
Electrical and Electronic
Engineering disciplines.



POST-GRADUATE ENGINEERING TAUGHT DEGREES

The School of Engineering offers a wide range of M.Sc. courses that can develop knowledge and industry-relevant skills to progress you within your chosen career.

Example courses:

Audio and Video Forensics, Electrical Power and Control Engineering, Marine and Offshore Engineering, Sensors and Data and Management.

- World Class teaching
- State-of-the-Art facilities
- Strategic and practical support at every stage

www.ljmu.ac.uk/about-us/faculties/faculty-of-engineering-and-technology/school-of-engineering/courses

BUSINESS INNOVATION SUPPORT PROGRAMS

LCR 4.0 HOLISTIC is a unique service offering that brings together world class assets in the Liverpool City Region (LCR) to connect complex supply chains through digital technology.

The project provides collaborative support to SMEs and is a partnership between LJMU, University of Liverpool and LCR Growth Platform, and is part-funded by the European Regional Development Fund.

CW 4.0 is a knowledge transfer programme working drive innovation in SMEs in Cheshire & Warrington through the adoption of Industry 4.0 concepts. Using technical expertise and best practice from the automotive, aerospace and energy sectors. Delivered by LJMU, the Virtual Engineering Centre (University of Liverpool), the Science and Technology Facilities Council and the Northern Automotive Alliance.

Subject to state aid, support for SMEs is free of charge

More information: lcr4.uk: candw4.uk or email: E.Money@ljmu.ac.uk

Celebration of Engineering: Research and Knowledge Exchange with Industry at Liverpool John Moores University (LJMU) School of Engineering

The recent UK Research Excellence Framework (REF 2021), the national audit of university quality, has highlighted the international relevance of research at Liverpool John Moores University. Research in Engineering was judged to be 92% 'world leading' or 'internationally excellent'.

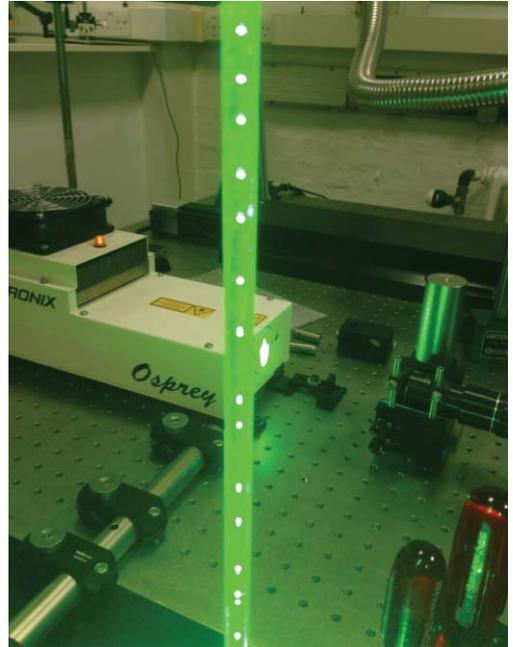
This event, to be held jointly with the IET's Merseyside & Western Cheshire Manufacturing and Management Group on the 9th of November 2022, showcases the current research landscape in the School of Engineering. It will provide an opportunity for Ph.D. students to showcase their work to their peers within LJMU, and to industry.

Professor Jin Wang, Associate Dean for Research at the Faculty of Engineering and Technology, said: "LJMU has an exciting future as we build on our vision to be globally recognised as the UK's applied research powerhouse in areas such as marine engineering and technology, general engineering, electrical engineering and electronics". Key areas of impact assessed in REF 2021 include: risk-based design and operation of large marine engineering systems, knowledge-based service and design for reliable and secure microelectronic products, innovation in abrasive machining and a decision-support system for transportation and logistics.

For the IET members and industrialists, this would be an opportunity to understand these key areas of research, and others, conducted in engineering at LJMU. Additionally, the intention is to cultivate a strong sense of inclusivity by providing a platform for the School's Post Graduate Research Students (PGRS) to demonstrate their research, irrespective of their stage in the Ph.D. degree. Additionally, undergraduate students will be encouraged to talk to the Ph.D. students about their work, and also seek advice on their own final year studies, particularly their own projects. It will also be an opportunity for all students to talk to IET members about the benefits of achieving Chartered Engineer (CE) status.

An important aspect of the REF assessment is how university research has a real impact on the economy, health, and governance of the UK and also internationally. This impact largely arises from "knowledge exchange", the delivery of knowledge and experience arising from research to industry, enterprise, health services and the government, etc.

A key aspect for knowledge exchange in the School of Engineering is its participation in two regional SME support projects, LCR 4.0 HOLISTIC and CW 4.0.



LCR 4.0 HOLISTIC is a project that brings together world class assets in the Liverpool City Region (LCR) to connect complex supply chains through digital technology. It is a partnership between the University of Liverpool and LJMU together with the LCR Growth Platform and is part funded by the European Regional Development Fund (ERDF).

CW4.0 is a knowledge transfer programme that works to drive innovation in SMEs in Cheshire & Warrington through the adoption of Industry 4.0 technologies. Part funded by the ERDF, CW 4.0 brings together the combined expertise and capabilities of LJMU, the Virtual Engineering Centre (University of Liverpool), the Science and Technology Facilities Council and the Northern Automotive Alliance. Members of the two projects' teams will present more information of these projects, and be available for discussions.

Martin Sharp, Andy Burgess, Andre Batako



Virtual Sustainable Futures Careers Expo

As part of the development of their Engineering a Sustainable Life on Earth (EASLOE) project, 4wardFutures are hosting a Virtual Sustainable Futures Careers Expo. The first phase of the Expo is now live.

<https://www.4wardfutures.org.uk/sustainable-careers-expo>



Through exhibiting at the Expo: companies, individuals, and organisations from all sectors will be able to share with young people, both the work they are doing to combat the climate and ecological challenges humanity faces, to reduce the carbon footprint and environmental impact of their own organisation and give an insight in the progression and career opportunities that you may offer young people.

There are currently 16 companies, organisations and universities exhibiting in Phase 1 of the Expo. Phase 2 of the Expo will go live on 22nd July. Companies, organisations, training providers and universities who wish to exhibit are welcome to get in touch media@4wardfutures.org.uk



There is no charge to exhibit at the Expo.

The 4wardFutures team can if required work with you to help create an exhibition stand.



The Virtual Sustainable Futures Careers Expo builds on the success of the Virtual Space Futures Expo 4wardFutures launched in October 2021

<https://www.4wardfutures.org.uk/space-careers-expo>

Engineering a Sustainable Life on Earth (EASLOE)

EASLOE (<https://www.4wardfutures.org.uk/engineering-a-sustainable-life-on-earth>) is an engineering sectors careers education project that taps into the passions and values that many young people have in addressing the climate and ecological challenges that humanity faces. To introduce them to the wide ranging and exciting work that engineers are doing to address these huge challenges, and the engineering careers and progression pathways that will allow them to work on addressing these challenges themselves through their future careers and be part of the solution.



The EASLOE project will involve over 260 young people from five schools taking part in interactive live workshops and webinars with engineering professionals, graduates, apprentices, and academics.

EASLOE gives these young people the opportunity to find out about the work engineers are doing, their career journeys and the technology they are using or developing to address these environmental challenges, such as zero emissions technology, carbon capture, recycling and reuse technologies, hydrogen technologies, sustainable construction and manufacturing systems, robotics, artificial intelligence and the application of smart systems and digital twins.

The young people are then given the challenge to work together in teams to produce and then present their work, showcasing the work engineers are doing to address a specific environmental challenge area they are interested in.

The EASLOE project is supported through an EEGS grant from the Institution of Engineering and Technology (theiet.org) and the Institution of Mechanical Engineers (IMechE.org).

Mark Waters, Phil Atkinson



Chester's New Hydro Hub

Readers of our past newsletters will recall that our Retired Professionals Group had, for many years, scheduled a visit to the currently abandoned Chester Hydroelectric station.

Chester Corporation built a coal fired power station in 1896 and Chester Electrical Undertaking's pioneering Electrical Engineer Sidney Britton planned a hydroelectric station on the site of the old flour mill to expand capacity.

It was the first hydro electric station in the UK to use both run of the river and tidal flow to generate energy. Situated on Chester Weir, where water powered mills and factories had existed for over 850 years, construction commenced in 1911 and when completed 3 turbines of 500 kW, operated from 1914 until 1949 when the government decided to focus on coal.

The plant generated clean carbon-free electricity for almost half of the city's needs from the hydroelectric building on Castle Drive between 1914 and 1949. In 1952 the building became a water pumping station, until 2015, helping to pump clean drinking water from the River Dee to half a million people. Next to the Old Dee Bridge and opposite the University of Chester's Riverside site, the building is currently unused and redundant.

A plan to recreate a 500 kW hydro-electric station was developed by Cheshire West & Chester Council and the University of Chester between 2005 and 2015, but Government funding was withdrawn for this type of project. However it is now proposed to turn the site into a 'Hydro Hub' acting as a focal point for residents, schools and visitors to learn about what a low carbon world will look like and how all aspects of our lives will change as new technologies remove emissions from our industry, commerce, agriculture, homes, transport and food.

A new Community Interest Company called Cheshire Heritage and Sustainability Enterprises CIC, or 'CHASE', has been set up to create and manage the Hydro Hub, partnering with local businesses and the council. CHASE believe that the site is perfect for explaining the history of Chester's power and educating people about water management, fish management, the Site of Special Scientific Interest (SSSI) flora and fauna management and how clean energy destroyed the port of Chester. It will also be used to demonstrate the future of clean, renewable energy – water, wind, solar, hydrogen.

Keith Done
LNC member and former Chair
of the Retired Professionals Group



The Old Dee Bridge site of the Chester Hydroelectric Station, soon to become part of the Hydro Hub

Focus on Biomedical Engineering

Biomedical Engineers apply technology and engineering analysis, tools and knowledge of material and structural behaviour to solve healthcare problems.

The IET Mersey and Western Cheshire Network, Biomedical Engineering Group, is made up of volunteer members from these industrial sectors, healthcare organisations and academia. The aim of the group is to raise awareness and further knowledge in this multidisciplinary field and support the industry to advance through networking opportunities, connecting individuals, giving voice to active individuals and sharing knowledge.

The group is focused on topics that rely on the application of engineering or technology to address healthcare and clinical problems. This includes design, development, manufacture, maintenance and commercialisation of medical technologies, equipment and devices, such as artificial internal organs, replacements for body parts, and machines or methods for diagnosing, managing or treating medical problems.

The group was founded by Dr Ashkan Eliasy and Dr Andrew Kaldos in January 2021. The group has organised two events in areas of 3D testing using optical metrology and the internet of

things, both focused in healthcare applications. Until the end of 2022, the group will be organising a total of nine events in areas ranging from 3D printing and wearables to additive manufacturing for the medical industry. It intends to provide plenty of growth and networking opportunities.

The group attracted three additional enthusiastic volunteers in the steering committee, Mike McKean to provide strategic advice, Co-Chairs Shruti Turner and Jack Hayes to support public relationships and Joshua Moore to support the operation. The members of committee are focused on growing the group and bringing more volunteers onboard to support its activities and ensure meeting the group objectives. If readers of this article are interested to take part in the Biomedical Engineering Group's activities, please do not hesitate to contact us for more information and register for our events.

We would like to welcome proposals for new events/webinars in this very wide multidisciplinary area, and if you feel you would be happy to contribute to the work of the group, please contact Ashkan on email address

ashkan.eliasy@ietvolunteer.org.

Ashkan Eliasy



Mersey and Western Cheshire Network

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Can't find the contact you need?

You will find contact details for each event in the event synopsis on pages 20–21.



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