EESW STEM Cymru

talent

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The Llangefni school team, with team members Elin Pierce, 16, Owen Hughes, 16, Iwan Jones, 16, Owain Roberts, 18, Siwan Iorwerth, 16, and Elen Iorwerth, 18, had taken on the challenge of designing, manufacturing and engineering an F1 in Schools car, a miniature version of an F1 car that races on a 20-metre track, in a time of just over a second

Winners represent Wales in Singapore

Gwenno Williams
Ysgol Gyfun Llangefni

Drive, a team of six pupils from Ysgol Gyfun Llangefni, is embarking on a trip to Singapore as the Welsh champions of the F1 in Schools Competition.

The competition revolves around a model F1 car that the teams must design using computer-aided design (CAD) software to produce drawings to make the car at an EESW manufacturing centre.

As well as designing, testing and producing drawings for manufacturing their race car, the team had to design its pit display and put together a portfolio of its design process and gather sponsorship, which was generously given by a number of local companies.

The team began its journey in March this year in the regional round of the competition organised by EESW and held in Denbigh. After winning several awards and a place at the national finals at the Silverstone circuit, the pupils made their way to the British home of Formula 1 racing that was also a stage to display their many months of hard work.

Here, they were crowned the Welsh champions, won an award for their 'Team Identity' as well as being one of three teams nominated for two other awards.

This is a huge achievement for the team as it is the first school from Anglesey to reach this part of the competition and it is eager to do well in the name of its country. The team has had an overwhelming amount of support from the community in raising the £30,000 needed to travel and compete – which was no easy task.

In Singapore, Drive will be proudly flying the Welsh flag as it is the nation's representative team competing against 51 other countries.

It has further developed its car, hoping to have similar success as it did at the regional and national finals.

Each member of the team has an allocated role that takes advantage of their individual strengths; this means that the workload is shared, making things run more smoothly. This is crucial as there is a lot of development work and modifications to meet the high standard of the World final, and very little time to do so as the competition takes place early in September this year.

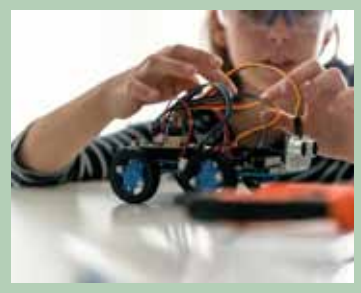
One of the team members said: "The F1 in Schools competition has allowed us to see engineering in a completely different light and given us so many life changing and unforgettable memories.

"It has definitely had an impact on career choices for many of us as we have had first hand experience of applying scientific knowledge that we already had in an exciting context to solve real problems.

"We also feel very humbled to have the opportunity to represent our country on such a world-wide stage."

See more F1 in Schools news on Pages 6&7

INSIDE



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On behalf of the Engineering Education Scheme Wales (EESW) I would like to thank all those who have contributed to Talent. Any suggestions or comments that will help to improve the quality and content of this magazine will be gratefully received.

We are also grateful to all the companies, colleges and universities that work with us to provide pupils with a greater understanding of the importance of STEM subjects to the prosperity of Wales and for helping to develop better employability skills.

The Engineering Education Scheme Wales (EESW) has once again received funding from the European Social Fund through the Welsh Government for the STEMCymru II Project until June 2021. This will enable us to continue our work in the west, north Wales and valleys area. EESW also receives funding from the Welsh Government through the National Science Academy to ensure it can offer activities for the benefit of students in schools in other areas of Wales.

Bob Cater, Editor

Cronfa Gymdeithasol Ewrop
European Social Fund

Ysgol Glan Clwyd reach First Lego League World Final

Team Egni crowned north Wales champions at the EESW Llandudno tournament

Alice Murray
EESW activity deliverer

A team of pupils from Ysgol Glan Clwyd travelled to Detroit in the USA recently to compete in the World Final of the FIRST LEGO League (FLL) competition.

The 2017-18 competition revolved around the theme of hydrodynamics, and pupils were required to build and programme an EV3 robot to carry out missions based on the journey of water. They also completed a research project into how humans interact with water by identifying a problem and finding a solution.

The students gain vital STEM skills such as programming and use principles of engineering, computer science and numeracy to be successful.

Team Egni was the champion at EESW's north Wales FLL regional tournament, held in Llandudno, where it competed against 13 other north Wales schools to come out on top. From there, it went on to compete at the UK and Ireland final in Bristol, where it was crowned Wales champion and invited to the World final in Detroit.

Sion Jones, design and technology teacher at Ysgol Glan Clwyd and Team Egni's coach, commented on how the competition has affected his pupils. "It was a life changing experience for them," he said. "Not only have they gained an insight into the amazing places that STEM can take them, but the chance to meet so many diverse new people from around the world has given them much more confidence and social skills – it's an amazing change!'

The First Lego League is a global STEM competition championed by figures such as Barack Obama and Will.i.am.

More than 35,000 teams in 88 countries competed this year, with EESW providing support to Welsh teams and hosting the regional tournaments in Wales.

Team Egni represents Wales at the World Final in Detroit

Fully-viable 'bolt' solution for Ford from Bridgend College's team

Alison Blaydon
HR officer, Ford Bridgend Engine Plant

The Ford Bridgend Engine Plant (BEP) continues to work closely with EESW to enhance pupils' knowledge of engineering and manufacturing to encourage them to consider it as a career.

Some of the ideas that students have provided over the years have saved the engine plant substantial amounts of money and improved other aspects such as safety and recycling.

One of the EESW sixth-form project activities this year involved Bridgend Engine Plant working closely with students from Bridgend College to design a production tool to securely locate bolts during an engine manufacturing process.

Working with Bridgend plant engineer Mark Bamford, the students worked as a team to provide a solution for the identified issues. Ellie-May Buffet who was the team leader for this project along with Ben Norris, Dafydd Hill, Callum Jenkins, Josh Midlane, Thomas Rosser and Matt Llewellyn were invited to the engine plant to gain a better insight of what Mark was asking of them and then went away to put together their ideas and present their proposal.

Fundamentally, the tool they created is a carbon-fibre shield which temporarily locates and protects the bolts in a flywheel as it is fitted and removed during the assembly process. It prevents damage and loss of parts during the handling and assembly process through two stations.

Ellie-May, who has also been involved in the Ford Saturday Club, and has secured an electrical apprenticeship at a specialist engineering company since starting the project, said: "We had lots of potential ideas to resolve and improve the issue that Mark presented us with, but we found that the carbon-fibre shield was the most reliable and offered the greatest benefits."

Some of the advantages of the carbon-fibre shield were that it could be reusable and it is lightweight and durable. At the end of its life, it can be ground down and the epoxy resin used can be turned into another plastic product.

Ellie-May Buffey

The tool the team created was also entered into this year's Big Bang event which took place in Parc y Scarlets. Engineers from Bridgend Engine Plant attended along with students from other schools. The engineers spent the day talking to the students, helping them better understand engineering and manufacturing and answering any questions that they had while demonstrating a modern robot at work.

Mark Bamford said: "The students have really worked hard on the project and came up with a fully-viable solution and product to meet the requirements set out in the design brief. It offers the possibility of very substantial savings in manufacturing if adopted around the world. I am very proud of them."

John Lewis, a teacher at the college, added: "This working project with Ford Bridgend Engine Plant has been absolutely tremendous for the students and college and I hope we will get the opportunity to work with them again."

Overall, this has been, and continues to be, a great opportunity for students. They tackle real engineering challenges to give them an insight into what the engineering and manufacturing sector has to offer.

The team from Bridgend College

EESW activity deliverers in action

Wales on world stage at FIRST Lego League in hydro dynamics

Vince Keating, Thomas Lloyd and Alice Murray
EESW activity deliverers

The FIRST LEGO League (FLL) competition has wrapped up for the 2017-18 season. The FLL is a global science, technology, engineering and maths competition focussing around a different theme each year. More than 35,000 teams in 88 countries competed this year, with EESW providing support to Welsh teams and hosting the regional tournaments in north and south Wales.

The 2017-18 theme was hydro dynamics, which challenged teams to consider the human water cycle – the many different ways people interact with water. This could be anything from the journey of clean water to our homes and industries, to the safe disposal of waste water or flood defences in vulnerable parts of the world.

Teams are assessed on a variety of criteria as part of the competition, meaning every member has an opportunity to contribute positively and effectively to the team's entry. Pupils complete a research project on the theme of water by identifying a problem and researching a workable solution.

The most engaging aspect of the competition challenges pupils to design, build and programme a robot using Lego Mindstorms EV3 kits to complete missions based on the journey of water and earn as many points as possible. Think 'Robot Wars' meets 'Crufts' for a reliable mental image. Success in the FLL competition relies on vital STEM skills such as programming and uses principles of engineering, computer science and numeracy, as well as effective research, presentation and teamworking skills.

EESW supports Welsh schools competing in the FLL from the first day of term in September, up to the south and north regional finals in December, with the winning teams heading to the UK national final in February. Fourteen schools competed in the South Wales Regional Final with Morriston Comprehensive's Hydro Heroes taking first place and a trip to the UK national final in Bristol in February 2018.

Following their voyage along the M4, Hydro Heroes team coach Emma Dabrowska said: "We had the most amazing experience at the FLL UK and Ireland finals! The team is absolutely buzzing from the experience and is already talking about next year – so excited to compete again. Thanks to EESW for all your help!"

Ysgol Glan Clwyd's Team Egni came out on top against 13 other north Wales schools at EESW's North Wales Regional Final in Llandudno, which also earned it a chance to compete at the UK and Ireland final in Bristol.

Team Egni's journey didn't stop at Bristol however – the pupils' skills and teamwork meant they were crowned Wales Champions, earning them a place at the FLL World Final in Detroit.

Sion Jones, design and technology teacher at Ysgol Glan Clwyd and Team Egni's coach, commented on how the competition has affected his pupils: "It was a life-changing experience for them. Not only have they gained an insight into the amazing places that STEM can take them, but the chance to meet so many diverse new people from around the world has given them much more confidence and developed their social skills – it's an amazing change!"

South Wales' FIRST LEGO League Final

How pupils as young as six make a big splash at EESW in Bridgend

This summer also saw EESW host a FIRST LEGO League (FLL) Junior Expo at our centre in Bridgend. Following the same theme as its older sibling, the FLL Jr is a fantastic opportunity for pupils as young as six years old to develop their STEM skills.

'Aqua Adventure' was the theme to inspire the budding engineers and programmers at the Bridgend FLL Jr expo. Teams again needed to identify and research a real-world challenge relating to the human water cycle – this time creating elaborate posters, collages and displays to show off their research.

Teams were also challenged to design and build a LEGO model demonstrating a topic they'd researched, with one extra crucial component; each model needed to include a moving part using programmable LEGO WeDo motors. The models were fantastic displays of programming and using simple mechanisms to complete tasks, proving it's never too soon to learn valuable engineering skills.

Adding an extra dose of real-world relevance to proceedings, several engineers and other staff from Welsh Water kindly volunteered their time to help review teams' work at the FLL Jr event. Welsh Water's head of architecture Nial Grimes said: "It was a pleasure and a privilege to be involved in FFL once again and the teams really impressed us with their level of research on a topic that is very close to our hearts".

Bryn Celynnog pupils full of bright ideas

A STEM activity week at Bryn Celynnog Comprehensive School gave everyone in Year 8 a chance to get thoroughly hands-on with EESW's Energy Quest, Jaguar 2D and Wind Turbine challenges.

While half of Year 8 worked with EESW's activity deliverer team, the rest of the pupils were with teachers racking their brains for innovative solutions to global energy demands as part of 'The Bright Ideas Challenge' – a nationwide KS3 competition which challenges pupils to think outside the box and consider how the world's energy might be generated in cities of the future. Pupils would then swap over, meaning nobody missed out on any of the activities.

STEM week culminated in a 'Big Bang @ Bryn Celynnog' – a huge show-and-tell style exhibition in the school gym giving pupils the opportunity to explain the week's activities and display their work to visiting parents, governors and industry professionals.

Laura Glennon, head of skills at Bryn Celynnog Comprehensive School said: "The sessions delivered by EESW staff during the week were engaging, inspiring and enjoyable for the pupils, who were then able to apply these experiences when formulating their own energy solutions for the Bright Ideas Challenge. The fantastic standard of work pupils produced, as well as the confidence and understanding with which they explained them was testament to the quality of the week's activities.

"Following the huge success of our first STEM week, we are planning on making it an annual event and we hope to continue our work with EESW in future years."

Plenty of ideas flowing for Year 8 pupils at Bryn Celynnog

Robots with pupils at the South Wales assessment and presentation day

Celebrating the sixth-form industry strand

Bob Cater
CEO EESW

The two annual assessment and presentation days (APDs) this year were again very successful with the south Wales event having the largest number of sixth-form teams we have ever had. The north Wales event was held in Venue Cymru Llandudno and the south Wales event was in Parc Y Scarlets, Llanelli. This was our first time at Parc y Scarlets. The two events are combined with our Big Bang Near Me programme and, in addition to the sixth-form teams displaying their solutions to engineering challenges set by companies, local schools are invited to visit. Both days comprised STEM work carried out by sixth-form teams, exhibitor displays and educational activities and shows.

In south Wales there were 76 sixth-form teams displaying their work and in north Wales, 25 teams. The total number of attendees in south Wales was 1,612 and in the north 982.

This event celebrates the sixth-form industry strand, but EESW offers five strands which are:

■ **Girls into STEM**
This strand is especially adapted to encourage female pupils to consider engineering pathways and to make technology easily accessible, interesting and relevant to them. It also enhances their understanding of STEM subjects. Groups of girls visit companies, colleges and universities to sample STEM related courses and careers.

■ **F1 in Schools**
F1 in Schools is a national project that engages pupils of all ages and abilities in designing model F1 cars. The activity involves the use of industry-standard, computer-aided design (CAD) software. The design drawings are converted into actual models on Computer numerical control (CNC) machines, giving pupils a thorough understanding of modern digital manufacturing.

■ **Introduction to Engineering (i2E)**
i2E develops young people's interests and skills in STEM through engagement with a range of practical engineering activities. The importance of science and maths in careers in engineering is emphasised and support materials are used to highlight the opportunities to apply knowledge from these subjects.

■ **Sixth-form Industry-linked Project**
This strand links teams of sixth-form students or their equivalent in further education (FE)colleges to develop STEM skills through industry-linked practical projects. By working with professional engineers on real industry problems they will develop a better understanding of engineering as a career. The strand begins with setting up links between schools and companies between July and September, welcome days in October and company visits and school-based work (solving the problem) between October and March/April. Workshops are held just before Christmas so that projects can be developed with the assistance of college/university staff and company engineers. The APDs are held just before Easter to display and assess final solutions.

■ **Headstart Cymru**
This strand provides an opportunity for those in Year 12 to spend three residential days at university prior to making their Ucas application. The three days will consist of:
■ Sampling various strands of engineering;
■ Campus tours;
■ Experiencing university life, both academic and social.

The students will spend the days in laboratory/lecture situations. The evenings will involve a mixture of on and off-site social activities.

Tim Williams, Chair of Trustees, assisted by robots from Bridgend College at the south Wales APD

Celebrating our winners – Student of the Year 2017

The EESW Student of the Year award was introduced by Bob Cater CEO of EESW in 2012. He felt we needed to celebrate the success of the talented young people we have in Wales. We also needed to promote them and help them reach their aspirations. He felt there was too much negativity about our young people and it was an opportunity to tell a wide audience that we have the talent and enthusiasm in Wales to grow our economy.

Following the submission of written applications, a shortlist was prepared for interview. The winners were invited to attend the Welsh Automotive Forum annual dinner to receive their awards. The winner and runners up receive cash awards and a trophy.

We are grateful to Raj Jones who has given financial support to the initiative in honour of her late husband Dr Tom Parry Jones.

From left: Kieran Dalton, Loren Molyneux, William Hughes, First Minister Carwyn Jones, Huw Smith, Raj Jones and Oliver Barbaresi

Bethan Wilkinson
Receiving the EESW Student of the Year Award in 2016 was a huge boost of confidence for me, and the experiences I gained through EESW have been a topic of conversation at every interview since.
In my Student of the Year application about STEM in Wales, I mentioned ARUP as a company that I would be interested in working for in the future.

Having finished my first year studying civil engineering at the University of Edinburgh, I am currently enjoying doing a summer placement with ARUP in Cardiff and learning a great deal. This year I was also fortunate enough to be awarded the exceptional pupil achievement award from the Design and Technology Association for my enthusiasm for the subject throughout high school and sixth form. I am increasingly excited about my career choice and thoroughly appreciate the support I have been given by organisations such as EESW pursue it.

Kieran Dalton
Beyond school life, it is often difficult to separate career ambitions from the systematic pursuit of school qualifications. Perhaps the major benefit of EESW is the opportunity to have an exciting, uniquely personal project, where we can carry out real engineering work alongside a team of like-minded individuals, akin to a research group. The feeling of accomplishment after successfully applying independently-learned knowledge to solve practical problems is unmatchable, as is the experience of team leadership not provided by the individualistic world of A-levels.

Attending the Welsh Automotive Forum dinner was an incredible experience, and it was an honour to be awarded the EESW Runner-up Student of the Year. Subsequently, we have had the opportunity to exhibit our project at the Big Bang Fair, allowing us to present to a huge audience and witness the incredible potential and ability of like-minded students, kindled by schemes such as EESW.

The extensive knowledge gained from planning, assembling, and testing circuitry has been invaluable during university interviews, and I look forward to building on this knowledge at the University of Cambridge, where I hope to study physical natural sciences. I hope to eventually pursue a career in research, contributing to the development of practical quantum computers.

After many weeks of work, I distinctly remember the immense feeling of pride when, late one afternoon in a quiet laboratory, I added a final wire to a voltage comparator circuit, causing the LEDs to illuminate and the motor to whirr. This pride, compounded by weeks of solving hundreds of problems of various difficulty, will stay with me forever.

William Hughes
Throughout secondary education my interest in STEM subjects grew, resulting in me choosing to study A-levels in maths, further maths, physics and chemistry and as a consequence engineering fast became an obvious route to pursue.

Over the course of my two years of A-level studies, the Engineering Education Scheme Wales has enabled me to participate in a number of engineering projects. One such project, Headstart Cymru, was a course that allowed me to explore the academic side of engineering at the new Swansea University Bay Campus and reinforce my interest in engineering.

The EESW also gave me the opportunity to lead an engineering team comprised of my fellow A-level students from Gower College Swansea. We were given sixth months to complete our project, the aim of which was to increase the maximum distance an electric wheelchair user could travel by modifying a chair so that it could be powered by a hydrogen fuel cell. This gave me a fantastic insight into how rewarding the design process can be, providing me with not only a significant technical challenge, but also the chance to lead my five colleagues, which has proven to be invaluable as it taught me that one of the most significant challenges of any engineering project is not only down to managing tricky physics, but also down to managing tricky people! At the end of the project I achieved the Gold Crest Award. My team then attended the EESW Big Bang Fair at the Liberty Stadium in Swansea, to display our project with other teams from around Wales.

I was also very fortunate to gain a place on a summer work placement at Tata Steel, during which I was assigned an analysis project and won the scheme award for the 'value added' impact of my project.

These experiences have taught me that although you require strong academic abilities to succeed in engineering, it is just one of the qualities an engineer must have to work effectively. My experience as team leader, developed my interpersonal skills which were utilised during the placement when liaising closely with colleagues at all levels in the organisation.

I was privileged to attend the Welsh Automotive Forum members dinner in December and was very proud to be a runner-up for the EESW Tom Parry Jones Award.

The opportunities I have experienced with EESW have been an instrumental part in helping me decide what to do in the future. My interest in engineering was reinforced and my focus on civil engineering was firmly established.

Looking forward to how I might contribute to the economy of Wales later in my career, I find myself thinking about what matters to me as a young person growing up in a world where the future can at times seem bleak. The growing threats of climate change and global warming dominate the headlines and being part of the industries trying to combat this really appeals to me.

Loren Molyneux
I cannot thank the EESW enough for the opportunity to be a part of such an inspiring scheme. It has been an amazing opportunity to think creatively, apply scientific concepts, and challenge myself.

Looking back to the first term of sixth form, when our project was merely an idea on a piece of paper, I can see how far my team and I have come. We set out to achieve the aim of building a self-levelling device using photonics concepts. Considering we had little knowledge of the field, reflecting on the research we carried out, the design process that followed, the building of the prototype, and finally the finished project, I can really appreciate what we have achieved.

Together we learnt to think creatively, take on responsibility, and consider the inputs of others. Ultimately, it was the recognition of each team member's different area of expertise, and awareness of how vital excellent communication is, that led to our success in securing a place at the UK Big Bang Science Finals.

I would also like to thank the EESW for the kind invitation to the Welsh Automotive Forum dinner, and for the award of Student of the Year. I couldn't believe it and honestly didn't expect it, and am very grateful for the honour. It is definitely an evening that I will remember, even if I can't remember my speech, being pre-occupied with trying not to show how nervous I was!

Speaking with experts in their field, meeting talented students from across Wales, and hearing about the EESW and its exciting projects, all made this a very special event. However, ultimately, it is the invaluable skills gained and experience of working in a team, and the influence that working on the project has had on the way that I tackle problems, which I know will be invaluable in future.

For me, it has been a busy few months since, filled with university applications, interviews, and studying for my A-level exams. In March, I attended the Big Bang Fair finals held in Birmingham, where it was great to work together in a team on our LEVEL project once again, representing the Photonics Academy of Bangor and Ysgol Friars. It truly was a unique experience.

As I walked around the huge arena filled with stalls about everything from biotechnology to renewable energies, genetics to electrical engineering, and spoke with students from across the UK, creative thinkers who were so enthusiastic about their projects and eager to discuss their innovation, I couldn't help but feel a part of something special.

I intend to study medicine at university, and am excited to begin my first term later this year. However, the EESW scheme has impacted me in ways that I did not expect, making me consider my own career plans. I feel that through this project I have realised the importance of engineering in the field of medicine. The use of technology to diagnose, treat, and manage disease is going to be fundamental to the future of healthcare. The development of innovative ways to aid doctors and to improve the efficiency of the healthcare system is vital, and I am very excited for a future where I can be a part of this.

I am very grateful for the time and effort that the EESW dedicate in order to give opportunities such as this to students like myself across Wales, and hope that pupils can continue to benefit in future. I think that the scheme is an excellent way to introduce engineering to school pupils, and an exciting way to spark an interest in innovation and creative thinking.

Past student **Owain Roberts**

My interest in STEM subjects, particularly mathematics and physics, has developed throughout my time at school.

Understanding the world around me, looking at different devices and objects and studying how they function is a great interest of mine.

Studying cars, computers and other electronic devices has given me great insight into the way all sorts of different disciplines of engineering, physics and mathematics are combined to create individual apparatus.

My interest in engineering sparked during my time in primary school where I was introduced into F1 in Schools. While at Ysgol Gynradd y Talwrn, I competed in the competition twice.

The first year we earned 3rd place in the regional finals, while the second year saw us go on to earn 1st place in the regional finals and then win the UK national finals.

I believe that learning engineering principles from a young age has helped me throughout secondary school. It has enabled me to understand more complex work and to then use this new knowledge and apply it into the real-life world.

Furthermore, I believe that F1 in Schools is an excellent addition to put on a CV and university application form. It shows that I have had an interest in engineering from a young age and have been driven to be successful in this sector.

Fortunately, I was able to apply for a place in some of the top universities in the UK, such as Cambridge and Durham, in order to study general engineering and therefore to further my knowledge in all engineering aspects and I am hoping to go to Durham this autumn to study general engineering over a period of four years.

In addition, this year I have been fortunate enough to be a part of Ysgol Gyfun Llangefni's F1 team, Team Drive.

Our journey started at the regional finals held at Denbigh. We had a successful stage to the competition as we came 3rd in the professional class and therefore we qualified for the next stage of the competition – the national finals. Also, we were awarded best research and development, best engineered car and best sponsorship and marketing.

Following our success at Denbigh, we headed to Silverstone to compete in the national finals where we competed over a two-day period.

We were once again successful. We were Welsh champions which means we are going to Singapore to represent Wales.

In addition, we were also top 3 in the UK for best pit display and sponsorship and marketing, and also won the award for best team identity throughout the whole UK.

I would like to thank EESW for giving me the opportunity to be able to apply engineering concepts into real life situations.

It's nice to see that Wales is trying to promote STEM by giving schools the opportunity to compete in competitions such as F1 in Schools.

THE JOURNAL OF THE ENGINEERING EDUCATION SCHEME WALES

The great F1 in Schools Challenge 2017-18

Stephen Lane
EESW activity manager

As in the world of Formula 1, this year F1 in Schools had a stable set of rules, regulations and class categories for the 2018 F1 in Schools STEM challenge. New competitors choose from entry, development or professional classes, depending upon age and experience.

Returning teams, if not already competing in the higher professional class, were encouraged to make a class step up.

Team members are assigned roles where they have to master skills including computer-aided design (CAD), aerodynamics, maths, physics, literacy and numeracy matching rolls and skills used in the real world of digital manufacture.

For teams new to the competition, work starts early in the academic year with planning, software training, designing and testing while returning teams will have been working hard since competing in last year's regional and national finals. Welsh teams have the option of attending one of two regional finals organised by EESW in Wales.

At the finals, the teams not only compete for the coveted fastest car but are also assessed on a portfolio of their work, team verbal presentation, an engineering interview and their pit display.

Teams were competing for a range of awards with the top spots being offered with the additional incentive of a trip to compete at the UK national finals being held in the amazing Silverstone wing above the pit straight at the Silverstone F1 circuit.

The north Wales finals suffered from The Beast of the East meeting storm Emma. Heavy snow caused mild panic with the need to reschedule and find another venue.

Denbigh High School kindly offered the use of its sports hall to all the teams still able to attend. We arrived at the venue early and found a procession of Denbigh High pupils carrying tables and chairs across the school carpark readying the venue for the event.

The enthusiasm from the host school pupils must have been contagious with all teams eager to demonstrate their work in their allotted pit area.

At the track the competitiveness of teams shone through with any pleasantries between competing schools being shelved for the intense head-to-head racing.

The south Wales finals also had a change of venue. To cater for the increased number of teams we used the superb facilities at the Cardiff City Stadium. With 30 teams attending the event, along with additional supporting activities arrange by colleagues from the EESW team the day had a full schedule. Competition classes were split evenly between new-entry class teams eager to taste the excitement while development/professional class teams were looking for a taste of Silverstone.

As with the north Wales event the enthusiasm from pupils was inspiring, each team having a unique approach to meet the strict rules and regulations set out for the competition.

Winning teams went on to the two-day F1 in Schools UK National Finals where Team Drive from Ysgol Gyfun Llangefni was crowned winning Welsh team and now look forward to competing at the F1 in Schools World Finals in Singapore.

Congratulations must be passed on to all teams competing – the standard of competition across all classes was very high and all pupils deserve acknowledgment for their efforts.

For the 2018/19 competition, EESW will be continuing its support for teams across Wales. Aerodynamic experiments will be offered, along with new Autodesk Fusion 360 CAD sessions for all levels and abilities. In-school competitions will also be offered which is a great opportunity for large groups of pupils to participate ahead of the regional finals.

F1 IN SCHOOLS WINNERS

Entry class	School and team
NORTH WALES	
Fastest car	Prestatyn High School – Team Hamerhead
Portfolio award	St David's College – 6x7 Racing
Presentation award	Ysgol Gyfun Llangefni – Hard Chargers
Best verbal presentation award	Ysgol Gyfun Llangefni – Hard Chargers
Future stars award	St David's College – 6x7 Racing
Entry class regional champions	Ysgol Gyfun Llangefni – Hard Chargers
Development and professional classes	
Development class – Fastest car	Ruthin School – KA-Chow
Professional class – Fastest car	Denbigh High School – Quantum
Team sponsorship and marketing award	Ysgol Gyfun Llangefni – Drive
Team identity award	Denbigh High School – Quantum
Innovative thinking award	Denbigh High School – Quantum
Research and development award	Ysgol Gyfun Llangefni – Drive
Best engineered development class car award	Ruthin School – KA-Chow
Judges recommendation award	St David's College – SDC Racing
Development class – 3rd place	St David's College – SDC Racing
Development class – 2nd place	Ruthin School – Ballistix
Development class – Winners 2018	Ruthin School – KA-Chow
Best engineered professional class car award	Ysgol Gyfun Llangefni – Drive
Professional class – 3rd place	Ysgol Gyfun Llangefni – Drive
Professional class – 2nd place	Connah's Quay High School – Pursuit Racing
Professional class regional champions 2018	Denbigh High School - Quantum

Entry class	School and team
SOUTH WALES	
Fastest car	Brynteg School – Firefish
Portfolio award	Ysgol Gyfun Gymraeg Bro Myrddin – Vulcan
Presentation award	Brynteg School - Firefish
Best verbal presentation award	Ysgol Gyfun Rhydywaun – Mellten Rhydywaun
Future stars award	Y Pant School – Speed
Entry class regional champions	Ysgol Gyfun Gymraeg Bro Myrddin – Vulcan
Development and professional classes	
Development class – Fastest car	Brynteg School – Swordfish
Professional class – Fastest car	Afon Taf – Kalopsia
Team sponsorship and marketing award	St John's College – Exception
Team identity award	Pencoed School – Nemesis Inferno
Innovative thinking award	Brynteg School – F1 Fireflys
Research and development award	Ysgol Gyfun Gymraeg Bro Edern – Apex-Bro Edern
Best engineered development class car award	Brynteg School – Swordfish
Judges recommendation award	St John's College – Stormbreakers
Development class – 3rd place	Pencoed School – Nemesis Inferno
Development class – 2nd place	Ysgol Gyfyn Ystalyfera – Nemesis
Development class – Winners 2018	Brynteg School – F1 Fireflys
Best engineered professional class car award	St John's College – Exception
Professional class – 3rd place	Cyfarthfa High School – In a Jiffy
Professional class – 2nd place	Afon Taf – Kalopsia
Professional class regional champions 2108	St John's College – Exception

Denbigh High School student and the Williams Randstad Engineering Academy

Graham Nutt
EESW north Wales manager

A Denbigh High School student who won one of just nine places worldwide to join a prestigious engineering academy has secured a second year on the programme. Amy Martin, a Year 12 student, first gained a place in the Williams Randstad Engineering Academy after her success as manager of Team Tachyon (in two consecutive years) – the school's all-girl F1 in Schools competitors.

Last year the team scooped three awards at the F1 in Schools World Finals 2016 awards celebration in Texas: the team sponsorship and marketing award, the women in motorsport award and the best verbal presentation award. It raised an incredible £23,000 to cover the competition entry fees, travel, accommodation, as well as funding research and making refinements to the car and pit display. In 2015, the team won the sponsorship and marketing award at the world finals in Singapore. Amy was selected for the academy while in Texas.

The programme requires students to complete a series of motorsport-themed e-learning modules, working with a Williams mentor to help guide them through the process. In her first year, Amy has learned about how aerodynamics, acceleration, braking and cornering affect the performance of F1 cars. Her mentor, Michelle Davis, designs radiator ducts and is responsible for the cooling of the engine inside the Williams F1 car. Each year, after a series of essays and interviews, Williams whittles down the group. Amy was thrilled to hear that she had successfully got through to year two of the six-year programme. Her second-year mentor is Laurence Griffiths who is a senior CFD methodology engineer. He will be taking her through the safety, mass, transmission and braking units throughout the year.

Amy Martin with Team Tachyon second from right

As well as managing the demands of the engineering programme. Amy is studying for her AS qualifications in physics, maths, further maths, government and politics, and English literature. She said: "The whole experience with Randstad and Williams has been completely amazing, and it's very different from normal learning. They test us and challenge us, and I believe this has really helped me to develop my knowledge of particular topics.

"As I'm one of the youngest in the academy, I haven't covered a lot of the topics in physics or technology classes. My technology and physics teachers, Mr Gareth Jones, Mr Alex Price and Mr John Breese, assist me with the academy workload and they have all been very supportive of all my endeavours outside of school. The support I have received from them, and my family, is making me a lot more driven to succeed within the RWEA.

"In the future, I would love to go to a top university like Oxford or Imperial College, London to study mechanical or aeronautical engineering. "If I'm successful through the six-year programme with Williams, I may be offered a job with them – this is something I definitely want to pursue. I aspire to be an engineer within motorsport and I am so appreciative of this whole experience and the incredible support I have received to help me get closer to realising my ambition."

Amy recently went with her dad and sister to watch the Abu Dhabi Grand Prix, the Formula 1 finale. While there, she went into the Williams garage and met Felipe Massa and was being invited into the pits for the last race of the season which, she said, was a "huge honour".

All members of Team Tachyon have stayed on at Denbigh High School to join the sixth form. Holly Roberts, the team's design engineer, and Jessica Briody Hughes, manufacturing engineer, are both looking to go into engineering or mathematics careers, and Katie Rowlands, resources manager, wants to pursue a career in law.

The school held a special assembly in January in honour of the students' outstanding achievements and contribution to the school. The team's success over the last two years has also been acknowledged by Ann Jones AM. She met the girls on a visit to the school and subsequently spoke about their achievements in the Senedd, Cardiff.

UK F1 in Schools champions 2018 celebrate winning place at Singapore world finals

Alison Hill
F1 in Schools Press Officer

Unity, a team of 16 and 17 year-old students from Emmanuel College, Gateshead, celebrated winning the F1 in Schools UK National Finals 2018, proving that determination and perseverance is rewarded – taking the UK champions title at their fourth attempt. Its success wins the team a place at the F1 in Schools World Finals 2018 in Singapore in September, alongside the Formula 1 Singapore Grand Prix.

Tickets to the Formula 1 British Grand Prix courtesy of Silverstone circuit, exclusive paddock access at the event from Formula 1, a Formula 1 team factory tour, two £5,000 scholarships for University College London's (UCL) mechanical engineering degree and Denford equipment worth £10,000 for its school were also prizes for the victors.

Unity also won the best engineered car award on its way to the UK crown with the judges commending the team on the design, manufacturing and engineering of its F1 in Schools car.

Amid tears of joy on the top step of the podium, Unity team leader, Lucy Brooks, said: "I'm speechless. It's unbelievable; we've all worked so hard for this, so I think we deserved it. It's been a long road, but so worth it. We've been together a long time now, so our teamwork is certainly a factor in our success. We have a huge amount of work now to prepare for Singapore, making sure our car is as good as it can be. We know that competing at the world finals can open doors to careers in engineering so that is a great opportunity for us. We're very excited to be heading there."

Joining Unity on the podium after two days of fierce competition were Origin, a team from Robert May's School, Odiham, which will represent England at the World finals and Hawk Racing from Colyton Grammar School, Devon, which has the opportunity to collaborate with an overseas podium-winning F1 in Schools team at the World finals. Also heading to Singapore will be Drive from Ysgol Gyfun Llangefni, representing Wales and Velocity Racing from Inveralmond Community High School, Livingston flying the flag for Scotland.

Team AcceleRace powered by Inoapps, an F1 in Schools Development Class team from Linlithgow Academy, Scotland, also won a place at the world finals, after taking the F1 in Schools Development Class champions title earlier this week.

Team Unity, from Emmanuel College, Gateshead, celebrate winning F1 in Schools UK National Finals 2018

What is the F1 in Schools?

F1 in Schools challenges students to create their own Formula 1 team which is commissioned to design, construct and race the fastest miniature Formula 1 car of the Future; a 21cm-long scale model built from a modelling block and powered by a compressed air cylinder.

Each team of between three and six students creates a 'pit' display and showcases its work in developing its race car. At the national finals each team brings along a pit display, its cars and portfolio, as well as having prepared a verbal presentation for the judges.

The cars race on a 20-metre track, with the cars covering the distance in around one second. The world finals brings together the best students to compete for the coveted world champions trophy and valuable university scholarships and bursaries.

Andrew Denford, founder and chairman, F1 in Schools said of this year's UK National Finals: "I'm blown away by the standard we've seen this year. The students have put in an amazing amount of work, displaying an exceptional level of engineering, design, and business skills and being excellent ambassadors for their schools and for STEM learning. I'm delighted to see Unity finally take the crown, it's shown such perseverance and has never given up on its dream of representing the UK at the world finals.

"The skills developed by the students is almost unnoticed as their passion and motivation to design the best car possible takes over. It is only at the conclusion of this event when they reflect on their work that they realise how far they have come and how much their skills have developed – whether that is confidence, CAD/CAM expertise, leadership, time management, or engineering. I'm very proud of every student, team and teacher involved in the programme, they demonstrate just how STEM in action can be invaluable in education."

The F1 in Schools UK National Finals, held at the home of British motorsport, Silverstone circuit, brought together the top 42 teams from around the UK, which had won through from 10 regional-final events held earlier this year. The teams had taken up the challenge to design, build, test and race a miniature F1 car, with the last two days being spent having their entries judged in a number of categories including scrutineering, engineering, verbal presentation, pit display and enterprise portfolio as well as the car's speed being tested on the official F1 in Schools track – a 20-metre long drag strip, which the F1 in Schools F1 cars cover in just over a second.

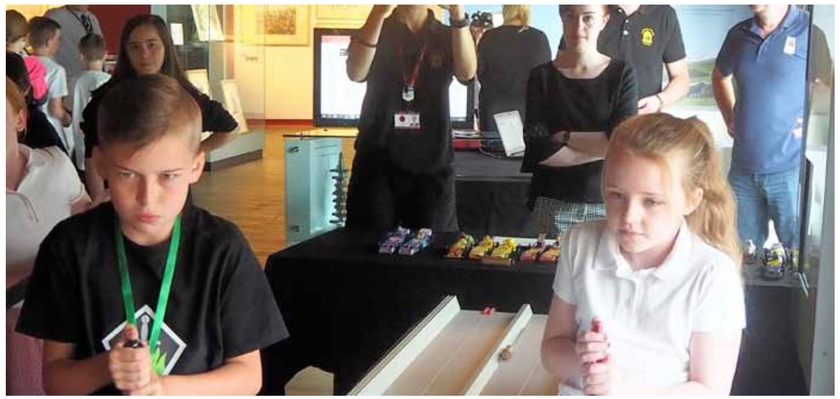
The F1 in Schools National Finals 2018 took place with the assistance of a host of sponsors and supporters. Among these are the IET, Autodesk, Denford Ltd, Airbus, City, University of London and UCL Engineering.

Jaguar Primary School challenge 2018

Chris Harris
EESW Jaguar Primary School Challenge coordinator

The Jaguar Primary School Challenge is a STEM competition, open to pupils aged six to 11 years old. It involves designing and manufacturing the fastest car possible within a set of rules, following the design and engineering processes employed by real engineering companies like Jaguar Land Rover.

Pupils form a team of three to six pupils to design a race car out of 160g/m² card complete with wheels, body and even a mini driver. They design and manufacture a body shell to fit a standard chassis using software before printing and cutting their designs onto card using a plotter cutter and then making their car ready to race. The cars are powered by a 4gm recycled CO2 cartridge and are raced on the standard 20-metre F1 in School's track and timing system.



EESW is committed to encouraging more young people to consider careers in STEM disciplines, particularly engineering

North Wales regional final
The F1 in Schools Jaguar Primary School challenge concluded in north Wales at Venue Cymru, Llandudno. Seven schools took part and, as usual in the north Wales hub, the competition was fierce with a record four places available in the UK final. Competing teams must compile a portfolio and organise a pit display to illustrate their learning. Prizes were shared among Lightning Strikes from Ysgol Bodafon, Eyri Eagles from Ysgol Bro Gwdyr and Plasma from Ysgol Esgob Morgan.

In addition to the pit and portfolio category teams are also required to give a verbal presentation to judging panels and their cars are also marked for engineering quality. The verbal presentation was won this year by Jungle Racers from Nercwys with the best engineered car prize going to Eyri Eagles from Ysgol Bro Gwydyr.

The racing was again very competitive, and no team managed to beat the incredible reaction time of 0.009 set by Ysgol Bro Gwydyr last year. However, Spycon from Ysgol Esgob Morgan achieved the best reaction time on the day of 0.162 of a second. The fastest car was designed and made by the team from Llanidloes called Jaguar X. A judges discretionary award was given to Cosmic Raycers from Ysgol Bodafon.

Overall champions of the north Wales hub though were Lightning Strikes from Ysgol Bodafon with Light Speed from Nercwys, Eryi Eagles from Ysgol Bro Gwydyr and Jungle Racers from Nercwys receiving invitations to take part in the UK national final.

South Wales regional final
The south Wales hub final was held at the National Waterfront Museum, Swansea and was attended by 22 schools with five places allocated for the UK final. Such was the high standard this year that the judges decided to give seven discretionary awards. These were awarded to: Electric Roadsters from Clytha Primary; Electric Wheels from Albert Road, Penarth; Supersonic from Coity Primary; Dragon Fury from Garntег; Lightning Bolts from Castle Park Primary and Team Spitfire from Llanbedr School.

The pit and portfolio award was given to the team from Caedraw in Merthyr called End Game. The verbal presentation was jointly awarded to End Game from Caedraw and Dragon Racing from Gwaunfarren. The driver from Deri View Primary and the team Lightning Bolts, achieved the fastest reaction time of 0.014 of a second. However, the fastest car was designed and made by End Game from Caedraw – its car took just 0.958 of a second to travel down the 20-metre track, which means that it was travelling over 46 miles per hour!

End Game from Caedraw were awarded a richly deserved overall champions trophy. In addition, the following schools/teams were given invitations to take part in the UK national final: Deri View Primary School – Lighting Bolts; Llangynydir Primary – Team Bolt; Gwaunfarren Primary – Dragon Racing and Mynydd Cynffig Primary – Turbo Titans.

UK national championships
Unsurprisingly, given the standard they had displayed throughout the regional and national finals, End Game from Caedraw was crowned UK champions on June 20, 2018 at the National Motor Museum, Gaydon. This a great accolade for the school and Wales and is the culmination of several years hard work by the school and its teachers, Miss J Stokes and Mr S Beale. Mention also must be made of Gwaunfarren Primary which achieved the sponsorship award, this is most notable as this is its first year taking part in the Jaguar Primary School Challenge.

The fourth industrial revolution – Industry 4.0

Bob Cater
CEO Engineering Education Scheme Wales

In the last edition I explained that we stand on the brink of a technological revolution that will fundamentally alter the way we live, work, and relate to one another. In its scale, scope, and complexity, the transformation will be unlike anything humankind has experienced before. This is being called the fourth industrial revolution or Industry 4.0.

In the last 150 years the UK has lived through three industrial revolutions. The first industrial revolution, which started around 1760, revolutionised a way of life that had remained largely unchanged since medieval times. The second industrial revolution ran from the mid-19th century to the start of World War I and involved the widespread use of steel to the UK, and the introduction of mass production. The third revolution, or the digital revolution, took place towards the latter half of the 20th century, and saw industry make the switch from mechanical and analogue electronic technology, to digital.

The digital revolution marked the beginning of the information age in which we now live – the internet and the Internet of Things era given a suitably digital sounding name – Industry 4.0.

Industry 4.0, or the fourth industrial revolution, effectively creates what has been called a 'smart factory', which utilises up-to-the-minute technology, including cyber-physical systems, the Internet of Things and cloud computing to monitor the processes in a factory and make informed, remote decisions.

Industry 4.0
The fourth industrial revolution has been termed as such, due to the revolutionary impact new technologies will have on all parts of manufacturing. The growing interaction between devices, or Internet of Things, additive manufacturing (3D-printing), big data and the increase of robotics will significantly increase productivity, innovation, and mass customisation. The key drivers behind these developments are the increasingly available technology, coupled with the growing global middle class, which is resulting in a rising demand for high quality, individualised products.

The increased use of robotics will probably result in a significant decline of manufacturing jobs, as automated processes will replace the role of humans on the factory floor. Losses are however, likely to be displaced as human input in the form of creativity becomes more highly valued.

However, there is, and will continue to be, a shortage of young people taking STEM subjects in our country and we particularly need more engineers. But most engineers who come up with a new innovative idea will need a broader range of skills than those found in maths, engineering, and technology. They will also use design-thinking, creativity, communication, and artistic skills to bring those innovations to fruition.

The antiquated idea that engineers and scientists are isolated workers is no longer relevant. There is a growing body of supporters who wish to introduce A for art into the STEM acronym to give STEAM.

EESW is committed to encouraging more young people to consider careers in STEM disciplines, particularly engineering

What does Industry 4.0 mean for Wales
Miller Research and Consulting, in a report prepared for Industry Wales, concluded that the Welsh economy has traditionally relied on heavy industry, from mass production of steel and slate alongside a strong maritime industry. Despite the presence of pockets of aerospace engineering and semi-conductor manufacturing in Wales, this is by no means representative of the broader Welsh manufacturing sector, which is starting to fall behind global advancements in manufacturing processes.

The existing literature highlights, to maintain or increase the number of jobs in Welsh manufacturing the industry needs to expand its markets to emerging global demand and significantly invest in efforts to increase the science, technology, engineering, and mathematics abilities of the Welsh labour force.

This has big implications for what we do with the young people in our schools and colleges. EESW is committed to encouraging more young people to consider careers in STEM disciplines, particularly engineering. The Welsh Government via the NSA and the Welsh European Funding Office (WEFO) are playing their part by supporting EESW and other STEM projects to address the shortage of young people who currently consider careers in STEM disciplines.

The new Donaldson-inspired curriculum with its six areas of learning and experience will, hopefully, provide a better basis for developing the attitudes and skills to improve interest in and take up of STEM subjects at higher levels.

Headstart Cymru summer school

Swansea University works hand in hand with EESW

Tamsyn Protheroe
Digital marketing and communications officer
College of Engineering
Swansea University

Our relationship with EESW began more than 20 years ago and, ever since, we have been proud to support the work that the organisation does.

Many of our current students, and even staff, have benefited directly from EESW schemes, including aerospace engineering associate-professor Dr Ben Evans who participated in a Headstart Cymru summer school while a student at Bishopston Comprehensive School, Swansea.

Each year, we host a Headstart Cymru summer school, sponsored by EESW, at Swansea University. It is an opportunity for 30 Year 12 students from Welsh schools to participate and engage in engineering topics and projects centred on aerospace, chemical, civil, electronic and electrical, materials, mechanical and medical engineering. These sessions provide a taste of specific areas within the respective programmes in a hands-on, practical and engaging way, highlighting what a degree in these programme areas involve, and providing an insight into future careers and research in these fields.

Organised evening social activities also provides a platform for students to make friends and have fun, and the residential element of the summer school provides an insight to a typical university experience.

Each year Swansea University sponsors EESW sixth-form project teams which participate in a project over six months in collaboration with academic and industrial partners.

We provide expert guidance from our academic staff, such as Dr Ian Mabbett who has been leading this effort for the university, and from current engineering undergraduate and doctorate students.

The school teams are able to utilise our world-leading research equipment and facilities, such as our design software and programmes and technical workshops, to aid their projects.

EESW sixth-form projects are showcased each year at the Big Bang fairs, and we were proud to host the 2016 South Wales Big Bang Fair at our Swansea University Bay Campus. More than 70 school teams from across south Wales attended fun-filled shows, hands-on exhibits and interactive workshops.

We look forward to continuing our relationship and providing as much support as we possibly can to EESW and the fantastic work it does to provide and enhance opportunities for young people in Wales to engage with engineering study and careers.

Summer school was held at Swansea University's Bay Campus

Looking to the future with energy-positive office

Garbo Lim
Marketing officer
College of Engineering
Swansea University

Need picture energy positive office

Here at the College of Engineering at Swansea University, we are always looking towards the future, whether it be through inspiring budding scientists, creating the next set of engineers or through our forward-thinking research.

This year within the Engineering Quarter at the Bay Campus, we have opened the UK's first energy-positive office, which generates more solar energy than it consumes. Opened by Secretary of State for Wales Alun Cairns, the office was designed by SPECIFIC, a UK Innovation and Knowledge Centre led by academics within the College of Engineering.

The Active Office combines a range of innovative technologies that will enable it to generate, store and release solar energy in one integrated system, including:

- A curved roof with integrated solar cells – showing the flexible nature of the laminated photovoltaic panel
- A photovoltaic thermal system on the south-facing wall – which is capable of generating both heat and electricity from the sun in one system
- Lithium ion batteries to store the electricity generated and a 2,000-litre water tank to store solar heat

Next to the Active Office is the Active Classroom, the UK's first energy-positive classroom.

Cap

Also built by SPECIFIC, this was recently named Project of the Year by the RICS Wales. In its first year of operation, the Active Classroom generated more than one and a half times the energy it consumed.

Renewable energy is a huge part of our research here at the college and we use our expertise to inspire the next generation by taking our research out on the road. At this year's Swansea University Science Festival, being held between November 3 and 8, SPECIFIC will be hosting an interactive table-top activity which involves children making solar panels using blueberries.

Also cycling around national science fairs is The Hydrogen Bike which demonstrates our research for working towards using hydrogen as a universal energy carrier. During these events, you can get on the bike and watch, in real time, as your energy is stored as hydrogen gas. If you have made enough hydrogen, you can watch as it is burned in our micro-burner to return your energy.

Not only is a huge effort being made to take our research into the community, but we also encourage visitors to come and experience STEM here on campus. This year we've welcomed more than 300 school children on to campus to tour our facilities, listen to inspiring talks by our world-leading researchers and take part in various practical sessions.

If you would like to come and visit, please contact us by email at engineering@swansea.ac.uk or telephone 01792 295514.

STEM team support Engineering Education Scheme Wales – north Wales

Laurence Baron, Engineering Broughton, attended the Welsh Big Bang STEM Fair in Llandudno and took part in the EESW finals, judging entries from schools and colleges as well as supporting Hawarden High School with the design project he gave them, titled 'an Aircraft iTable'.

Although Hawarden High didn't win an award, it was nominated for two (best commercial potential and best overall report), and its score of 82% put it eighth overall, so a very good effort indeed.

The 'iTable' concept was to design a stowable (fold out/up/down) table for an aircraft installation that carries all the connectivity someone would need for an 'office in a table'.

After a visit to Broughton to view a Sentinel RMk1 the team was able to establish a specification following some basic elements of the process we use to develop products. The team demonstrated a logical and thorough approach to the task and produced a detailed final report that received a well-earned nomination.

Raytheon UK's STEM initiative is well-established, demonstrating investment and support to local communities and schools. The initiative proactively supports the UK Government's challenge on national technological skills shortages and provides engagement around all Raytheon sites, helping to raise the profile of Raytheon. Our STEM initiative also supports our employees, allowing them to inspire the next generation.

We now have more than 170 registered STEM ambassadors, with representation across all our main sites.

The Big Bang Fair – South Wales – EESW award winners and nominees

Sponsor Noddwyr	**Award** Gwobr	**Nominees** Enwebeion	**Winner and link company** Enillydd ac eu Cwmni
AIRBUS	**Most Innovative or Adapted Design** Y Cynllun Arloesol neu Addasedig Gorau	65 Ysgol Maesydderwen 66 Cardinal Newman RC School	65 Ysgol Maesydderwen Working with University of Wales Trinity Saint David
Continental	**Project with the Most Commercial Potential** Y Prosiect â'r Potensial Masnachol Mwyaf	15 Cardiff High School 37 Ysgol Gyfun Emlyn 1 45 Ysgol Uwchradd Aberteifi 51 Bassaleg School 60 Pembrokeshire College 2	60 Pembrokeshire College 2 Working with Valero
Ford	**Best Engineering Design** Y Cynllun Peirianneg Gorau	19 Llanishen High School 2 27 Whitchurch High School 4	19 Llanishen High School 2 Working with GE Aviation
GENERAL DYNAMICS United Kingdom Limited	**Best Overall Team Performance** Y Perfformiad Tîm Cyffredinol Gorau	6 Cynffig Comprehensive School 53 Caerleon Comprehensive School 2 54 Rougemont School 1 64 Ysgol Y Preseli 82 St Alban's RC High School 2	6 Cynffig Comprehensive School Working with Sony UK Tec
IChemE Advancing Chemical Engineering Worldwide	**Best Chemical/Process Engineering Design** Y Cynllun Peirianneg Gemegol / Broses Gorau	4 Brynteg School 2 74 Gower College Swansea, Tycoch 2	4 Brynteg School 2 Working with SAS International
IET The Institution of Engineering and Technology	**Best Application of Engineering and Technology** Y Defnydd Gorau o Beirianneg a Thechnoleg	16 Howell's School 1 19 Llanishen High School 2 47 Monmouth School for Boys 60 Pembrokeshire College 2	47 Monmouth School for Boys Working with Renishaw
Institution of MECHANICAL ENGINEERS	**Best Appreciation of Safety Issues** Y Gwerthfawrogiad Gorau o Faterion Diogelwch	40 Ysgol Maes y Gwendraeth 1 50 St Joseph's School and Sixth Form Centre 2 59 Pembrokeshire College 1 68 Treorchy Comprehensive School 2	40 Ysgol Maes y Gwendraeth 1 Working with National Botanic Garden of Wales
INDUSTRY WALES Growing Welsh Technology and Manufacturing Business Globally	**Most Effective Presentation of the Chosen Solution** Y Cyflwyniad Mwyaf Effeithiol o'r Ateb	17 Howell's School 2 15 Cardiff High School 37 Ysgol Gyfun Emlyn 1 47 Monmouth School for Boys	37 Ysgol Gyfun Emlyn 1 Working with Aberystwyth University
Power & Water	**Best Application of Science** Y Defnydd Gorau o Wyddoniaeth	17 Howell's School 2 21 St John's College 1 39 Ysgol Gyfun Gymraeg Bro Myrddin 77 Ysgol Gyfun Gymraeg Bryn Tawe	77 Ysgol Gyfun Gymraeg Bryn Tawe Working with Power and Water
Swansea University Prifysgol Abertawe	**Best Energy Appreciation** Y Gwerthfawrogiad Gorau o Ynni	34 Queen Elizabeth High School 50 St Joseph's School and Sixth Form Centre 2	50 St Joseph's School and Sixth Form Centre 2 Working with Weartech
	Best Working Model or Prototype Y Model Gweithio neu'r Prototeip Gorau	16 Howell's School 1 17 Howell's School 2 47 Monmouth School for Boys 59 Pembrokeshire College 1 60 Pembrokeshire College 2	16 Howell's School 1 Working with Renishaw
TATA STEEL	**Best Application of Maths** Y Defynydd Goran o Fathemateg	21 St John's College 1 22 St John's College 2	21 St John's College 1 Working with the University of South Wales
VALERO	**Best Appreciation of Environmental Issues** Y Gwerthfawrogiad Gorau o Faterion Amgylcheddol	49 St Joseph's School and Sixth Form Centre 1 50 St Joseph's School and Sixth Form Centre 2 70 Bishop Gore School 83 Cowbridge Comprehensive School	70 Bishop Gore School Working with the University of Wales Trinity Saint David
Llywodraeth Cymru Welsh Government	**Most Innovative Solution to the Project Set** Yr Ateb Mwyaf Arloesol i'r Prosiect	3 Brynteg School 1 37 Ysgol Gyfun Emlyn 1 66 Cardinal Newman RC School 76 Ysgol Gyfun Gwyr 81 St Alban's RC High School 1	66 Cardinal Newman RC School Working with Capita
wjec cbac	**Best Overall Written Report** Yr Adroddiad Ysgrifenedig Cyffredinol Gorau	2 Bridgend College 16 Howell's School 1 23 St Teilo's CIW High School 27 Whitchurch High School 4 45 Ysgol Uwchradd Aberteifi 82 St Alban's RC High School 2	27 Whitchurch High School 4 Working with GE Aviation
ZODIAC AEROSPACE	**Most Innovative Application of an Existing Technology** Y Defnydd Mwyaf Arloesol o Dechnoleg Gyfredol	3 Brynteg School 1 35 Ysgol Dyffryn Taf 1 42 Penglais School 81 St Alban's RC High School 1	81 St Alban's School 1 Working with Meritor
The Big Bang Fair	**Big Bang nominations – three projects selected to go forward to the Big Bang National Fair in March 2019**	60 Pembrokeshire College 2 16 Howell's School 1 81 St Alban's RC High School 1	

New season launches new challenge

Alison Hill
Land Rover 4x4 in Schools press Officer

The Land Rover 4x4 in Schools Technology Challenge, one of the world's best project-based STEM challenges, is now open to all UK secondary schools, colleges and youth groups to register their participation for the 2018/19 season.

Students work in small teams to design and build a Land Rover of the future, showcasing their engineering talents. Students are assigned different roles in each team, which operates as a mini-business, and students strengthen their project management, marketing, engineering and communications skills.

Successful teams will compete in regional, national and world champion competitions. Teams can now sign up online and start work on their vehicle.

Teams design their cars using a combination of design-and-make skills and computer-aided design/computer-aided manufacturing (CAD/CAM) software.

Students build a radio controlled 4x4 vehicle to specifications set by real Jaguar Land Rover engineers. The vehicle must successfully navigate and complete obstacles on an off-road test track that is just as demanding as the real thing, emulating the capabilities of a full-size 4x4 vehicle. Each team can enter the vehicle into a regional final to compete for a place at the UK national final.

Jaguar Land Rover mentors and STEM ambassadors are assigned to teams to advise and guide students, providing a valuable resource with industry knowledge.

The challenge is mapped against the National Curriculum by OCR and project approach materials for the Cambridge Nationals in engineering for four qualifications, with OCR providing project documentation to support in-classroom teaching.

Students taking part in Land Rover 4x4 in Schools can also gain Industrial Cadets awards, Arkwright Engineering scholarships, Duke of Edinburgh Scheme skills section and Crest Award skills section credits. The Land Rover 4x4 in Schools Technology Challenge UK Champions are offered a £1,000 scholarship to attend any of the engineering courses on offer at Harper Adams University.

New for this season is the ACES (Automated, Connected, Electric and Shared) Innovation Challenge, which will challenge young engineers to develop new creative concepts for a future feature or system. The challenge reflects the changing landscape of the automotive industry. From 2020, all new Jaguar Land Rover vehicles will be electrified, as part of the company's investment in ACES vehicles and technologies.

Nelson Vale, international project manager, Land Rover 4x4 in Schools said: "This popular student engineering competition is a great opportunity for students to put their classroom learning into practice, work with engineers from industry and gain valuable accreditations and awards. The competition embraces the future challenges of the automotive industry with the increasing importance of software engineering, and autonomous, connected, vehicles, keeping it relevant for careers opportunities."

Victoria Perry, global social impact manager, Jaguar Land Rover, said: "We want to inspire more talented young people to become engineers to help us develop the next generation of automated, connected, electrified and shared vehicles and technologies. The Land Rover 4x4 in Schools Technology Challenge demonstrates the importance and relevance of STEM subjects to the workplace and also gives students the chance to learn about real-life design and engineering processes.

"Former participants have joined us as apprentices, undergraduates and graduates and we hope to inspire even more bright students to join us in the future."

Students and teachers can find out more about the Land Rover 4x4 in Schools Technology Challenge at www.4x4inschools.co.uk and follow on social media.

EDGE 4X4 offroad track challenge Land Rover 4x4 in Schools UK Final 2018

The Big Bang Fair – North Wales – EESW award winners and nominees

Sponsor Noddwyr	**Award** Gwobr	**Nominees** Enwebeion	**Winner and link company** Enillydd ac eu Cwmni
AIRBUS	**Best Application of Engineering and Technology** Y Defnydd Gorau o Beirianneg a Thechnoleg	7 Ysgol Uwchradd Glan Clwyd Team 2 8 Alun School Team 1 19 Ysgol Friars Team 1 20 Ysgol Friars Team 2 25 Coleg Cambria, Yale	8 - Alun School Team 1 Working with Toyota
POWER NUCLEAR HORIZON NUCLEAR POWER	**Best Energy Appreciation** Y Gwerthfawrogiad Gorau o Ynni	1 Ysgol Aberconwy 5 Prestatyn High School	1 Ysgol Aberconwy Working with Dŵr Cymru Welsh Water
IET The Institution of Engineering and Technology	**Most Innovative Solution to the Project Set** Yr Ateb Mwyaf Arloesol i Brosiect	5 Prestatyn High School 17 Coleg Meirion-Dwyfor, Pwllheli Team 2 19 Ysgol Friars Team 1 20 Ysgol Friars Team 2	19 Ysgol Friars Team 1 Working with Photonics Academy of Wales at Bangor
Institution of MECHANICAL ENGINEERS	**Best Use of Mechanical Engineering Principles** Y Defnydd Gorau o Egwyddorion Peirianneg Fecanyddol	6 Ysgol Uwchradd Glan Clwyd Team 1 7 Ysgol Uwchradd Glan Clwyd Team 2 18 Coleg Meirion-Dwyfor, Pwllheli 3 24 Welshpool High School 25 Coleg Cambria, Yale	18 Coleg Meirion-Dwyfor, Pwllheli 3 Working with EESW
TATA STEEL	**Best Overall Team Performance** Y Perfformiad Tîm Cyffredinol Gorau	6 Ysgol Uwchradd Glan Clwyd Team 1 12 Hawarden High School 21 Ysgol Uwchradd Bodedern 22 Ysgol Uwchradd Caergybi Team 1 25 Coleg Cambria, Yale	6 Ysgol Uwchradd Glan Clwyd Team 1 Working with Knitmesh
Llywodraeth Cymru Welsh Government	**Project with the Most Commercial Potential** Y Prosiect â'r Potensial Masnachol Mwyaf	12 Hawarden High School 21 Ysgol Uwchradd Bodedern 22 Ysgol Uwchradd Caergybi Team 1 23 Ysgol Uwchradd Caergybi Team 2	22 Ysgol Uwchradd Caergybi Team 1 Working with BAE Systems and Babcock
	Best Application of Science Y Defnydd Gorau o Wyddoniaeth	2 Ysgol Bryn Elian Team 1 7 Ysgol Uwchradd Glan Clwyd Team 2 19 Ysgol Friars Team 1	7 Ysgol Uwchradd Glan Clwyd Team 2 Working with Mott Macdonald Bentley
wjec cbac	**Best Overall Written Report** Yr Adroddiad Ysgrifenedig Cyffredinol Gorau	15 Coleg Meirion-Dwyfor, Dolgellau Team 2 20 Ysgol Friars Team 2 21 Ysgol Uwchradd Bodedern 23 Ysgol Uwchradd Caergybi Team 2	20 Ysgol Friars Team 2 Working with Photonics Academy of Wales at Bangor
The Big Bang Fair	**Big Bang Nominations – Two projects selected to go forward to the Big Bang National Fair in March 2019** Welsh		8 Alun School Team 1 Working with Toyota 19 Ysgol Friars Team 1 Working with Photonics Academy of Wales at Bangor

Royal Air Force training engineering excellence in Wales for 80 years

SR Rowley
Wg Cdr / Stn Cdr MOD St Athan and CO No 4 School of Technical Training MOD St Athan

An RAF trainee maintaining a Ground Power Unit

Since 1938, the Royal Air Force has proudly delivered high quality engineering training in the heart of the Vale of Glamorgan, south Wales. Established on September 1, 1938, in the build up to World War II, Royal Air Force St Athan's first role was the home of Number 4 School of Technical Training, instructing air engineers to conduct in-flight technical tasks on bomber aircraft. The school has the prestigious honour of having trained 15 of the 19 air engineers who flew in the aircraft on the Dambuster's Raid by 617 Squadron on May 17, 1943.

Today, Number 4 School of Technical Training still operates at Ministry of Defence St Athan (re-named to MOD St Athan in 2006). However, its role has evolved from training engineers for on-board aircraft to highly skilled ground-based technicians, specifically the Royal Air Force's General Technician Trade, known as Trade Group 5.

This wonderfully diverse trade group maintains a wide variety of equipment to enable and sustain aircraft operations in the UK and around the world. From airfield fire engines to ground power generators, aircraft loading equipment to dental tools and Land Rovers to armoured vehicles, the engineering capabilities of Royal Air Force general technicians are awe-inspiring. The workshops trade can even fabricate aircraft components from raw materials in deployed locations, such as Afghanistan.

With approximately 200 trainees at any one time at MOD St Athan, the school is always busy and striving to deliver the best experience to the trainees and output to the front line of the Royal Air Force. In addition to pushing technical boundaries, the school also prides itself on its duty-of-care provision, looking after the welfare of trainees as they undertake their learning. Subject to Ofsted inspections, just like any civilian school or college, Number 4 School must ensure that standards are maintained all times, which is particularly important for trainees under 18 years of age or those from vulnerable backgrounds.

The training delivered by the school is also aligned to a Level 3 apprenticeship award – the initial step of many career progression opportunities offered by the Royal Air Force. This commitment to professionalism and investment in talent was recently recognised by the National Apprenticeship Service, with the Royal Air Force named as the winner of the Macro Employer category (5,000+ employees) and included in the prestigious Top 100 Apprenticeship Employers list.

The school is not solely focused on its Royal Air Force function, it also plays an active role in the local community, such as supporting charitable endeavours and promoting STEM. So far, in '2018: The Year of Engineering', the school has undertaken 11 major STEM events, reaching out to more than 30,000 people and raising their awareness of engineering – many of whom have been young adults or children. The school also welcomes its recent collaboration with the Engineering Education Scheme Wales.

The Royal Air Force actively encourages diversity in its workforce, recruiting from all ethnic and gender groups and has won numerous awards for its efforts. From school-leavers to anyone looking for a new challenge, Royal Air Force Engineering offers exciting opportunities to people wishing to learn a trade and to have something different to an ordinary job (#NoOrdinaryJob).

Number 4 School of Technical Training personnel on parade receiving the Freedom of the County Borough of Rhondda Cynon Taf (June 2, 2018)

Newport Wafer Fab, the CHIP fab of CS Cluster

Wales and the fourth industrial revolution

Joanne Daniels
Learning and Development Business Partner
Newport Wafer Fab Ltd

Welsh coal helped fuel the first industrial revolution with the ironworks of Merthyr Tydfil – Cyfarthfa and Dowlais giving rise to Wales's first industrial town.

By 1830 Monmouthshire and East Glamorgan were producing half the iron exported by Britain. Now compound semiconductor technology developed in Wales can act as the foundation for many of the new emerging technologies of the fourth revolution.

Semiconductor processing on silicon has been used for 50 plus years, but with the final applications for these products, such as mobile phones, computer technology and data centres, becoming ever more demanding it is difficult to keep pace with the increasing global need for ever faster applications. Combinations of new materials from the periodic table have been developed such as gallium nitride, improving silicon performance by 50x. With higher speeds and lower power losses they can be used for applications such as light sensing and emitting across a large spectrum (photonics), RF applications, sensors, and medical applications where battery life is critical.

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Compound semiconductors are driving future technologies: from the connected world, the Internet of Things to robotics, autonomous vehicles, 5G and healthcare technologies. Compound semiconductors are and will continue to impact the way we live, work and spend our leisure time. Compound semiconductors created here in Wales are the enabling technology for 21st-century life.

CS Connected represents Wales-based academic and business partners engaged in the research, development, innovation and/or manufacture of compound semiconductor related and enabled products.

The organisations involved are: Cardiff University, Swansea University, Compound Semiconductor Centre, the CSA Catapult, IQE PLC, Newport Wafer Fab, SPTS and Microsemi.

This unique inter-company collaboration is already launching technologies which will be at the heart of the fourth industrial revolution. The CS Cluster can potentially create more than 2,000 additional high-tech careers, playing significant role in transforming the economy of Wales

Dr Paul James, managing director for Newport Wafer Fab, said: "This is an exciting challenge as the CS Cluster will produce many high technology jobs right here in Wales.

"We are going to need many new engineers and technologists to take advantage of this opportunity.

"The cluster will provide a huge variety of engineering and scientific career opportunities for the next generation, especially for those who have a passion for technology and engineering and are energised by the prospect of working at the cutting edge of technology."

Newport Wafer Fab is the world's first integrated silicon, and compound on silicon, wafer fab, providing manufacturing services for the Wales Compound Semiconductor Cluster (CS Connected) and the wider global foundry market.

As part of the CS Cluster we have ambitious growth plans to extend the manufacturing footprint of the site.

We look forward to working with EESW to get more young people interested in our industry and to consider careers with us.

2018 Rally – enthusing the next generation

Jonathan Gill
National press officer
MPA Creative

This year's eagerly-awaited Dayinsure Wales Rally GB (October 4-7) will again be the focal point for a number of far-reaching initiatives aimed at inspiring future generations of ambitious young talent.

The presence in the region of the high-tech and exciting FIA World Rally Championship will once again be maximised via the presence of a 'Big Bang' Industry Awareness STEM exhibition in the Rally Village. This is the event's dynamic hub, located in the largely industrial conurbation of Deeside, where all the WRC teams are based throughout the high-profile motorsport event.

More than 1,500 students studying key STEM subjects at local educational establishments will visit the Big Bang fair which will host a raft of engaging, interactive activities provided by a number of proactive exhibitors. What's more, the showcase will be open to all those visiting the Rally Village – one of a number of free-to-view opportunities available to the public.

"Engaging with education is just one of the many ways that the rally makes a positive contribution to life within Wales," explained Ben Taylor, managing director of Dayinsure Wales Rally GB.

Ben continued:"The location of the Rally Village, right next to Toyota's engine plant, and the presence of the world's top WRC rally teams provides us with a fantastic opportunity to enthuse the next generation. The interactive Big Bang scheme is an exciting way to illustrate the attractions of a career within motorsport or the wider automotive industry."

Adding to Toyota involvement, its GB arm has also supported an exciting car livery design competition for young students, with the winning entry being applied to a GT86 rally car.

Once liveried, the GT86 will be displayed within the Big Bang showcase located right at the heart of the dynamic Rally Village.

Jointly coordinated by the rally organisers and the Engineering Education Scheme Wales (EESW) on behalf of the Welsh Government, the inspirational contest was open to all primary schools, secondary schools and colleges throughout the UK with individual entry categories for Key Stages 2, 3, 4 and 5.

Winners of all four categories are being invited to the Rally Village where they will be presented with rally goody-bag prizes courtesy of Performance Clothing and enjoy a special behind-the-scenes insight into one of the world's most exciting and technologically-advanced sports.

Last year's winning design – drawn by 12-year-old Rheinallt Jones from Ysgol Gyfun Llangefni comprehensive school in Anglesey – was officially revealed by Ken Skates, the Welsh Government Cabinet Secretary for Economy & Infrastructure and Toyota GAZOO Racing WRC star Jari-Matti Latvala.

Rheinallt not only saw his prize-winning design adorning the GT86 but was also presented with a scale model of his liveried car, plus an artist's impression of his design. Both were signed by WRC racing drivers Latvala, Juho Hänninen and Esapekka Lappi as well as team principal and four-time WRC Champion Tommi Mäkinen.

The World Championship rally – won last year by local hero Elfyn Evans – also offers free admission to all accompanied children aged 15 and under.

Ken Skates AM with last years winner Rheinallt Jones and Jari-Matti Latvala

Challenging young engineers to think outside the box

Digitisation – opening young minds to old industrial challenges

Gash Bhullar
Control 2K

Words like gamification or virtual factories are bandied around these days but not many people know what they really mean or what they imply. We know the future is digital, or so we are told, and it will be down to the imagination of future generations to decide how it shapes up.

Control 2K, as an innovation company, has considered the future too. It's putting its own interpretation on these new words and what they mean to the manufacturing sector.

We all rely on manufacturing industries to produce our cars, planes and boats, make our mobiles, package our food just as we have done over the last few hundred years. We come up with novel ways to make things and to use whatever technology is present to make things faster, cheaper and ideally more reliable, but reliability can be subject to marketing strategy as it is questionable if sellers really want you to hold on to things for many years.

Today's technology push is all about gathering information (data) so that we can make more informed decisions and connect more processes together making it easier to see the whole picture when things go wrong.

Different industries move at different speeds so if you can steal ideas from areas like the computer games industry and apply them to manufacturing, you could be on to a winner!

We are challenging young engineers to think outside the box and see how they can incorporate newer sensors or Internet of Things devices as they are referred to, to link up different systems with Industreweb software (www.industreweb.com). These technologies are showcased at Waterton – the Digital Manufacturing Innovation Hub for Wales. Come see what we are up to.

Growing science for future generations

Professor Peter Halligan
Chief scientific adviser for Wales

The Welsh Government has always been keen, given its support of science as a way of growing Wales' prosperity and well-being, to encourage activities which provide young people with a positive and memorable experience of science and engineering.

Consequently, I am pleased to see that the 'Endgame' team from Merthyr's Caedraw Primary School made spectacular progress through the Jaguar Primary Schools Challenge, to emerge as overall UK champions, as well as capturing three class wins, for fastest car, best verbal presentation and best designed car.

In addition to offering my own congratulations to all four pupils concerned, their teachers and supporters, I hope they will capitalise on their success and remain interested and engaged with science and engineering as they progress through their careers. It was particularly pleasing to see a second Merthyr primary school, Gwaunfarren, winning the sponsorship and marketing trophy.

It is important for all of us in Wales to have a better appreciation and general understanding of what and how science and technologies bring for societal, as well as economic benefit. It is difficult to make informed choices without having such an understanding. They impact on so many aspects of our lives today, from personalised medicine to our ubiquitous and difficult-to-live-without smartphones.

The Welsh Government, as with many other countries, has a very clear and real reason for wanting more children and young people to get interested in science, technology, engineering and maths.

Put simply, Wales needs future generations of scientifically-literate and qualified people to run the technology businesses and industries of tomorrow. To deliver this will demand more young people with experience of STEM subjects – and hopefully choosing to continue studying them to a higher level, now and in the coming years, for the benefit of Wales.

We know that there has been a problem for some years in the take-up of some science subjects by girls – physics and computer science being the most problematic. As a small smart country we cannot, however, afford to miss out or side-line this generational talent, so we have been supporting a number of programmes, operated by Learned Societies, private companies and by schools and universities to help bring about this change.

As part of my new role of Chief Scientific Adviser for Wales, I oversee the team that runs the National Science Academy (NSA). This has been operating since 2010 and has delivered several impressive outputs, despite the relatively small amount of funding at its disposal – broadly about £1m per year. More than £4.4m has been invested since 2012 involving nearly 70 projects and over 1,000 STEM enrichment activities provided to over 132,000 students/participants.

Some 1,300 teachers have also benefitted from STEM professional development events. Professional learning in communicating research training has been given to more than 57 researchers, 41 of these were female, so they can act as more effective role models to the next generation.

Caedraw team at our regional final

NSA is also proud to have subsidised more than 4,500 British Science Association CREST Awards made to Welsh pupils and overall some 11,500 CREST Awards have been made in Wales – a very encouraging situation.

The latest ambitious enrichment programme that is closely aligned to formal STEM education, aims to raise the percentage of students studying triple science GCSEs (biology, chemistry, physics). Without these GCSEs it is harder to progress onto A-level sciences and subsequent university study.

With a total budget of £7.2m comprising Welsh Government and European Structural Funds via WEFO, the programme will be delivered across Wales to increase uptake and attainment levels in STEM subjects by 11-19-year-olds – specifically by encouraging taking of GCSE triple science.

This new programme will provide targeted STEM enrichment activities for pupils aged 11 to 13 from 20-30 schools located in the west Wales and valleys area. There will be three academic years of these activities.

Unique to this programme is the opportunity to demonstrate how effective these STEM engagement activities are, beyond anecdotal information from surveys. It will be running an internationally ground-breaking longitudinal research study, tracking pupils aged 11 to 13 that will show the impact of this investment in Wales's future in providing' STEM engagement and enrichment activities.

Designing for the future

Lucinda Dargavel
PDR

Encouraging and harvesting talent is so important and PDR (International Centre for Design and Research located at Cardiff Metropolitan University) is proud to be a partner with EESW which does just that. This scheme was designed with the aim of encouraging sixth-form students to study engineering courses in further or higher education.

EESW operates by tasking local companies to set research and development briefs for teams of Year 12 students which are related to real industrial problems. Over a period of six months, the students set about solving these problems in co-operation with engineers and scientists from the link companies.

By giving students a positive experience of working closely with professional engineers and scientists in an industrial setting, the programme demonstrates to them that STEM areas are both diverse and stimulating to work in, for they can provide them with intellectually challenging careers where they can really make a difference.

With more than 30 international design awards to its name, PDR is considered world-leading in respect of the services it can provide relating to design, development and research.

In a recent EESW partnership with Howell's School, PDR's Emily Bilbie, workshop manager and the lead engineer on this project, set a brief for sixth-form students to design a lower arm prosthesis which could then be 3D-printed using Stereo Lithography (SLA). This printing technique gradually builds up a 3D-structure by using layers of polymer which are then set using UV light. This method enables the 'painting' of layers of polymer to create a final model.


Howells Girls' School team with Emily Bilbie PDR engineer

Eight students from Howell's School, along with their teacher Andrew Ford, came to PDR for the initial industrial partner site visit and enjoyed a guided tour of the facilities, which included the prototype and manufacture department and the surgical and prosthetic department. During this visit, the students were also able to test Freeform for themselves – the haptic feedback CAD system used by the designers.

The rationale behind the brief itself was to design a relatively cheap product that would be suitable, in the first instance, for use in the developing world. The newly-designed prosthesis needed not only to be functional, but also aesthetically pleasing and would comprise of multiple parts in a variety of colours which could be assembled together easily.

The palm, fingers and attachment cuff of the prototype were all created using SLA. The team of students was ably led with a clear idea of division of roles and responsibility and independent sub-teams were also allocated to the task – resulting in the attachment mechanism and finger control being separately developed.

The design of the prosthesis itself needed to take into account the results of extensive research revolving around ergonomic and anthropometric data and it also had to provide an adequate method of attaching the prosthesis to the amputee.

Before considering the design element of the challenge, the students needed to highlight the key considerations that a user would require from such a prosthesis. To do this they met with, and interviewed, an amputee in order to gain ideas about the desirable features and the potential problems with prosthetics from the perspective of users.

Over the course of the project, the project management skills of the students were certainly seen to develop and the students were not only introduced to the fundamentals of 3D-printing and design, but they also learnt about sustainability, commercial applications, viability and cost effectiveness.

The completed prototype was taken, together with the final written report, to the EESW awards day where the judges were impressed with the originality of the solution and could see its potential for the future. The students were then delighted to be awarded the Welsh Assembly Government award for most innovative solution to a problem.

A definite success story for EESW as most of the team involved in this project now have engineering aspirations for the future and their enthusiasm has had them talking about enhancements to the prototype long after its completion.

"It is a great opportunity to educate the engineers of the future," said Emily Bilbie, prototype and manufacture engineer.

"Being part of this scheme means that PDR can play its part in showing that careers in STEM are both intellectually challenging and rewarding. The team is looking forward to setting a challenge for the next set of students," said Jarred Evans, director.

If you want to talk to PDR about a product design or prototyping project contact Anthony on amcallister@pdronline.co.uk

Endgame – the team from Caedraw Primary School

Endgame – journey to national champions

Jodie Stokes
Teacher, Caedraw Primary

We had worked hard to get this far, now was the time to show what we could do! After months of work the time was finally here, time to pack up all of our equipment and merchandise and make the journey to the South Wales F1 in Schools Regional Finals in Swansea. The work and commitment had been tough, working in three after-school clubs a week, and every lunch time and break time, but we were determined to produce the fastest 2D Formula 1 car that the UK had ever seen.

It would be the first time any of us had been in a competition like this, and as we arrived in Swansea we were very nervous and excited. Setting up our pit area we noticed how good some of the other teams looked, we had to compete against 25 other teams and we quickly realised that it was going to be a difficult event.

Throughout the day we didn't stop working as we spoke to four sets of judges and raced our car.

When we met the engineering judges we couldn't wait to explain all of the science and engineering behind our car. One of the most difficult parts was our verbal presentation because we had to explain our whole project in a very short time, then we had to explain all of the STEM skills that we had used to the pit and portfolio judges – we had so much to tell them all! Our driver, Rio, was a little nervous before we had to race our car, but he did amazingly well, and had consistently the fastest reaction times of the day.

We waited for the results with all of the other teams, it was nerve wracking. We were thrilled to be awarded prizes for the fastest car, best engineered car, best pit and portfolio, best verbal presentation and overall regional champions! The best results our school had ever achieved and we had qualified to represent south Wales at the UK national finals!

We didn't have long to get ready for the UK national finals. Despite having the fastest car in south Wales, we were not happy with how it performed on the day and knew that our car could go faster. After analysing the car, we identified some issues, carried out tests and worked to improve it.

The UK national final took place at the Jaguar factory near Stratford, it was an amazing location. There were teams from all over the UK competing. Our verbal presentation and speaking to the pit judges went very well. The engineering judges were great and had lots of questions about the work we had done and how we had made the different parts of our car.

Our car was 32nd out of 36 to race, and the nerves had been building all day. We were unsure if our car was good enough, because some fantastically fast times had already been achieved throughout the day – cars that were faster than our car had ever been.

Despite being very nervous, Rio, our driver, performed magnificently, again producing consistently the fastest reaction times. After all the hard work the time had finally come, to see if we had achieved our goal – to design and build the fastest 2D F1 in Schools car ever seen in the UK. As our race results came in, we were ecstatic! Our car was consistently fast, the fastest of the day, the fastest car ever seen! We had done it!

After completing all of the challenges of the day we then had to wait nervously for the results. It seemed to take forever for the presenter to announce the results. The first prize announced was for the fastest car, we were still smiling from the race results and were delighted to accept our prize. The prize for the best engineered car was announced next, and we had won it! We were so pleased to win this award because we had worked very hard to design and make all of the components of our car. We were also thrilled to receive the prize for the best verbal presentation.

It then came to the overall podium results, and we were on the edge of our seats. Third and second places were called and then team Endgame was announced as champions! We had done it! All the hard work and effort had paid off. Standing on the podium with our trophies and the confetti falling around us was amazing – we will always remember it.

Despite all the hard work, taking part in the F1 in Schools project was a fantastic experience, we learnt so much and developed so many skills – it is certainly one we will never forget. We would like to thank the companies that sponsored us and helped us to compete, EESW for its help and our teachers for making it possible.

Team Endgame – Rio Northey (team manager), Alex Lawrence (design engineer), Sam Pike (manufacturing engineer) and Lia Sims (graphic designer) – UK F1 in Schools Champions 2018.

Sixth-form product designers go interstellar at Bangor University

Alice Murray
EESW activity deliverer

In July, EESW ran the Headstart Cymru programme at the product design department in Bangor University. It was a residential course which gave sixth-form students an insight into university life. Year 12 students from Ysgol David Hughes, Ysgol Friars, Ysgol Glan Clwyd, Denbigh High School and The Alun School participated in the Autodesk Design Now Challenge with the help of Autodesk trainer, Mark Chester.

Over the three-day course the students received Autodesk Fusion 360 training before putting their skills to the test in the Design for Space Travel competition. The brief was to design a spaceship for commuting between the earth and the moon. Mark was very impressed with the students' work, and EESW's efforts to encourage girls to take up careers in engineering.

Mark said: "We had such a positive response to the challenge. Hopefully we have some winners in there. It was amazing to see so many young women wanting to pursue a career in design and engineering. There should be more events like this."

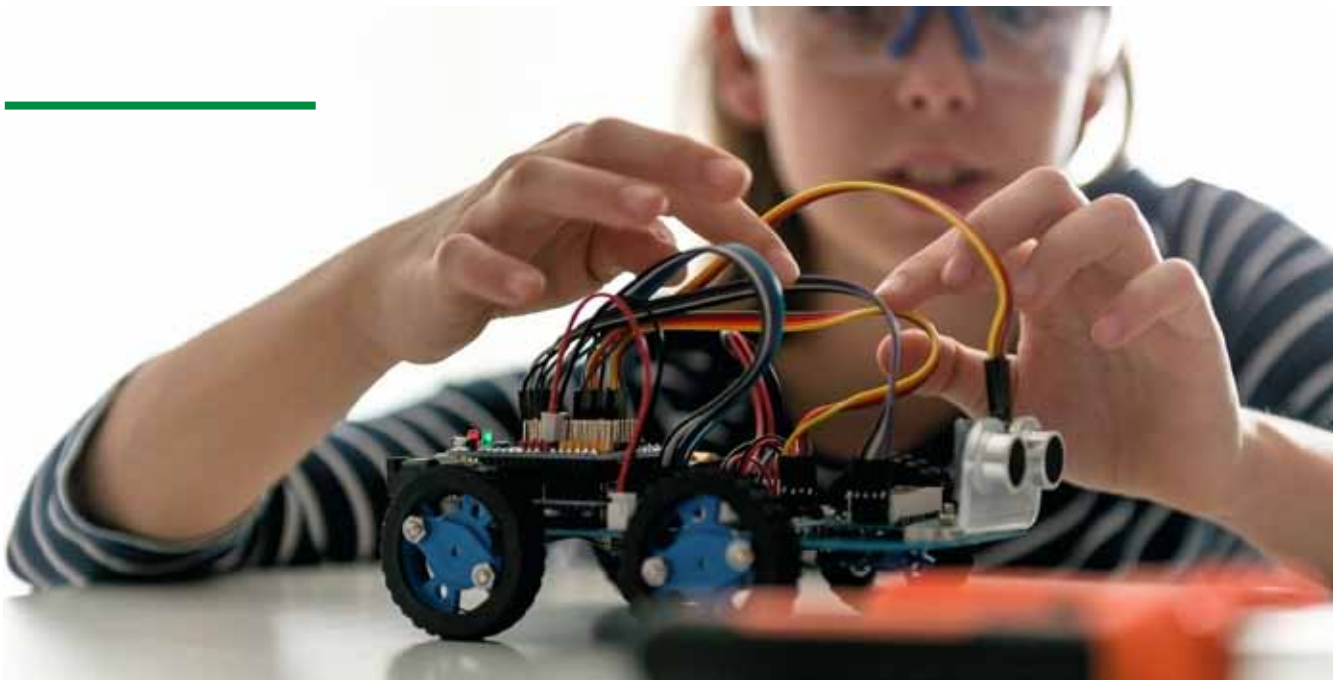
As well as learning new skills, the students also had a taste of university life. They stayed in Bangor University's halls of residence, enjoyed a quiz and using the sports facilities in the evenings. The students commented that the experience has made them more confident about selecting the right course and transitioning into life at university.

EESW would like to thank Autodesk and the product design department at Bangor University for making this course possible and for their continued support. Additionally, we would like to especially thank Mark Chester for delivering the course and the Bangor University product design student ambassadors for making the course such a success.


Students with Mark Chester in the Product Design Centre at Bangor University

Successful Futures – for a more fluid and agile approach to educational provision

Richard Lawson
Director of learning – physics,
Cardinal Newman School



Our young people are being prepared for the future in a new and exciting way

Science and technology provision within schools has struggled in recent years in light of huge advancements being made in the field. The pace of change means that the education system has been unable, in its current form, to keep up and so a disparity emerges.

In order to become active and versatile citizens of Wales and the world, a more fluid and agile approach to educational provision is required. Enter Successful Futures – the result of a wide-ranging review by Professor Graham Donaldson. Following the recommendations of this report, a new educational framework is being created.

Central to the new framework currently under development is a new philosophy of how learners will become more fully engaged in their learning.

A child's school career is being divided into six new areas of learning and experience (AoLEs), such as expressive arts, health and wellbeing and science and technology.

Each AoLE will be centred around four purposes for education that aim for all young people in Wales to become: ambitious capable learners; healthy confident individuals; enterprising, creative contributors and ethically-informed citizens.

Interdependencies are being highlighted and will serve to blur the lines between each AoLE, thus enabling a more fluid approach to learning and avoiding the compartmentalisation of knowledge.

Within each AoLE, mandatory requirements for knowledge and skills are being stripped back to the essentials that all young people leaving school should know or have experience of.

To this end, traditional labels are being removed and along with the connotations that come with biology, chemistry, physics, DT and computer science.

New, slimmed down content (reduced in volume to the fundamental essentials, not watered down) will be delivered under new headings. From 2022, learners in Wales may well find themselves studying design thinking, scientific thinking, life, matter, forces and energy and computation in a more holistic way, each with their own cross-curricular links, content and experiences attached.

This process is being rigorously applied by curriculum pioneers who, charged with the design of the new framework for science and technology, have engaged with professional bodies, academics and representatives from industry.

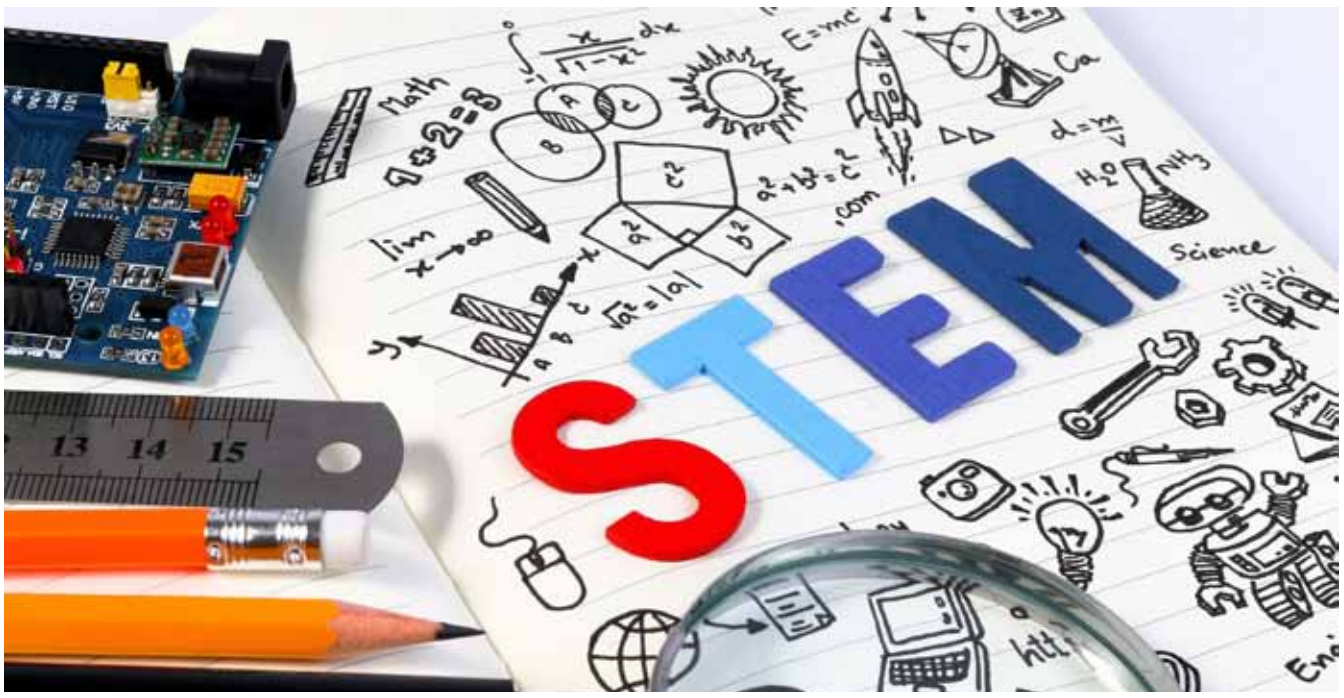
The framework is designed to incorporate literacy, numeracy and digital competency which are being addressed as cross-curricular responsibilities by teachers throughout Wales already.

The time to test and ratify the structure and content of our new framework for Wales is fast approaching. The prospect of the radical transformation this unique approach to curriculum reform could have on the education system in Wales is eagerly anticipated. The eyes of the world are on Wales – particularly in the field of science and technology, as our young people are prepared for the future in a new and exciting way.

2018. THE YEAR OF ENGINEERING

So what is the Year of Engineering

Bob Cater
CEO EESW



It's time to shake up people's ideas about engineering, inspiring the next generation of innovators, inventors and problem solvers

The UK has a proud engineering heritage. We lead the world in sectors like aerospace and automotive. The industry continues to thrive today, delivering huge economic benefits to our country.

However, there is a shortfall in qualified engineering graduates and skilled technicians. What's more, there is a lack of diversity in the workforce. Through the Year of Engineering, it is hoped to change that. The Year of Engineering 2018 is an opportunity to celebrate UK engineering. The government and industry will work with schools and families to offer young people a positive experience of the profession. A career in engineering offers young people the opportunity to shape the future of the world they live in.

We need to alter perceptions of what it is to be an engineer today and inspire a new generation of brilliant engineers by highlighting the breadth of creative jobs on offer.

HM Government want to work with partners and organisations that span the length and breadth of the engineering sector as a whole, drawing on their expertise to inspire and motivate everyone from primary school children up to graduates, putting engineering centre stage. There has never been a better time to become an engineer.

The Year of Engineering is a government campaign, which celebrates the world and wonder of engineering. It also forms an important part of our industrial strategy which is committed to boosting engineering across the UK, ensuring everyone has the skills needed to thrive in a modern economy.

From spaceships to ice skates, the bubbles in chocolate bars to life saving cancer treatment, engineering touches every part of our lives. However, not enough young people – especially young girls – think it's a world for them. As a result, the industry is struggling to recruit future talent. What's more, young people are missing out on the chance to make a positive difference to both their futures, that of the planet and everything that calls it home.

A career in engineering is exciting, rewarding and creative. Yet there is a big shortage of young people that think it could be a job for them. Over the course of 2018, we want to shake-up people's ideas about engineering, inspiring the next generation of innovators, inventors and problem solvers by showing them what engineers actually do.

Engineering is one of the most productive sectors in the UK economy, contributing at least 20% of the UK's gross value added and half of our exports. Yet there is a marked shortfall in qualified engineering professionals, and a lack of diversity in the profession – the engineering workforce is 94% white and 91% male.

The Year of Engineering is an opportunity for us to work together in 2018 to catalyse greater public awareness of engineering, using aligned messages about engineering's appeal and impact.

This is Engineering will then continue beyond 2018, building on the Year of Engineering with a sustained effort to encourage more young people to pursue engineering.

EESW STEM Cymru

talent

Rhifyn 22 | WELSH ENGINEERING TALENT FOR THE FUTURE | Medi 2018

Remove date for glossy version

Tîm Ysgol Llangefni, gydag aelodau'r tîm Elin Pierce, 16, Owen Hughes, 16, Iwan Jones, 16, Owain Roberts, 18, Siwan Iorwerth, 16, ac Elen Iorwerth, 18, sydd wedi mynd i'r afael â'r her o ddylunio, gweithgynhyrchu a pheiriannu car F1 mewn Ysgolion, sef fersiwn bychan o gar F1 sy'n rasio ar drac 20 metr, mewn ychydig dros eiliad

Enillwyr yn cynrychioli Cymru yn Singapore

Gwenno Williams
Ysgol Gyfun Llangefni

Meddyliwch am sut byddwch yn YSBRYDOLI eich myfyrwyr ac ystyriwch beth yr hoffech iddyn nhw ei gael o gynllun gwers heddiw.

Mae Drive, sef tîm o chwech o ddisgyblion o Ysgol Gyfun Llangefni, yn mentro ar daith i Singapore fel pencampwyr Cymru yn y gystadleuaeth F1 mewn Ysgolion.

Canolbwynt y gystadleuaeth yw model o gar F1 y mae'n rhaid i'r timau ei ddylunio gan ddefnyddio meddalwedd dylunio â chymorth cyfrifiadur (CAD) i gynhyrchu darluniau er mwyn creu'r car mewn canolfan weithgynhyrchu EESW.

Yn ogystal â dylunio, profi a chynhyrchu darluniau ar gyfer gweithgynhyrchu ei gar rasio, roedd angen i'r tîm ddylunio arddangosfa pit, a chreu portffolio o'i broses ddylunio a chasglu nawdd, a roddwyd yn hael gan nifer o gwmnïau lleol.

Dechreuodd y tîm ei daith ym mis Mawrth eleni yn rownd ranbarthol y gystadleuaeth a drefnwyd gan EESW ac a gynhaliwyd yn Ninbych. Ar ôl ennill sawl gwobr a lle yn y rownd derfynol genedlaethol yn Silverstone, teithiodd y tîm i gartref rasio Formula 1 ym Mhrydain, a oedd hefyd yn llwyfan i'w misoedd lawer o waith caled.

Yma, cawsant eu coroni'n bencampwyr Cymru, ennill gwobr am 'Hunaniaeth Tîm' yn ogystal â bod yn un o dri thîm a enwebwyd am ddwy wobr arall.

Dyma gamp anferth i'r tîm, gan mai dyma'r ysgol gyntaf o Ynys Môn i gyrraedd y rhan hon o'r gystadleuaeth, ac mae'n awyddus i lwyddo dros ei wlad. Mae'r tîm wedi cael cymorth aruthrol gan y gymuned wrth godi'r £30,000 oedd ei angen er mwyn teithio a chystadlu – ac nid oedd yn dasg hawdd o bell ffordd.

Yn Singapore, bydd Drive yn chwifio'r ddraig goch yn falch, gan mai nhw fydd cynrychiolwyr y genedl a fydd yn cystadlu yn erbyn 51 o wledydd eraill.

Maen nhw wedi datblygu eu car ymhellach, gan obeithio cael cymaint o lwyddiant ag y cawsant yn y rowndiau terfynol rhanbarthol a chenedlaethol.

Mae gan bob aelod o'r tîm rôl benodol sy'n manteisio ar eu cryfderau unigol; mae hyn yn golygu bod y llwyth gwaith yn cael ei rannu, gan wneud i bethau redeg yn hwylus. Mae hyn yn hanfodol, gan fod angen llawer o waith datblygu ac addasu i gyrraedd safon uchel y rownd derfynol ryngwladol, a heb lawer o amser i wneud hynny, gan y cynhelir y gystadleuaeth ar ddechrau mis Medi eleni.

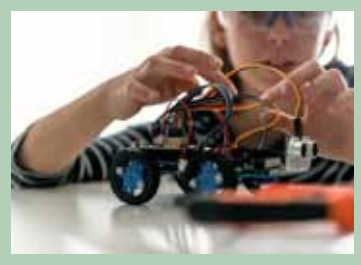
Dywedodd un aelod o'r tîm: "Mae'r gystadleuaeth F1 mewn Ysgolion wedi caniatáu i ni weld peirianneg mewn goleuni newydd, ac mae wedi rhoi cymaint o atgofion bythgofiadwy a fydd yn newid ein bywydau.

"Yn sicr, mae wedi dylanwadu ar ddewisiadau gyrfa llawer ohonom ni, gan ein bod ni wedi cael profiad uniongyrchol o ddefnyddio gwybodaeth wyddonol a oedd gennym ni eisoes mewn cyd-destun cyffrous er mwyn datrys problemau go iawn.

"Rydym ni hefyd yn teimlo'n falch iawn o gael cyfle i gynrychioli ein gwlad ar lwyfan fyd-eang."

Mae rhagor o newyddion am F1 mewn Ysgolion ar dudalennau 6 a 7.

TU MEWN



CYLCHGRAWN CYNLLUN ADDYSG PEIRIANNEG YNG NGHYMRU

CYSYLLTU

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Ar ran Cynllun Addysg Beirianneg Cymru (EESW), hoffwn ddiolch i bawb sydd wedi cyfrannu at Talent. Byddem yn ddiolchgar am unrhyw awgrymiadau neu sylwadau a fydd yn helpu i wella ansawdd a chynnwys y cylchgrawn hwn.

Rydym hefyd yn ddiolchgar i'r holl gwmnïau, colegau a phrifysgolion sy'n gweithio gyda ni i roi gwell dealltwriaeth i ddisgyblion o bwysigrwydd pynciau STEM i ffyniant Cymru, a helpu i ddatblygu sgiliau cyflogadwyedd gwell.

Unwaith eto, mae Cynllun Addysg Beirianneg Cymru (EESW) wedi derbyn cyllid gan Gronfa Gymdeithasol Ewrop trwy Lywodraeth Cymru ar gyfer Prosiect STEM Cymru II tan Fehefin 2021. Bydd hyn yn ein galluogi i barhau â'n gwaith yn ardal y gorllewin, gogledd Cymru a'r cymoedd. Mae EESW hefyd yn derbyn cyllid gan Lywodraeth Cymru trwy'r Academi Wyddoniaeth Genedlaethol i sicrhau y gall gynnig gweithgareddau er budd myfyrwyr mewn ysgolion mewn ardaloedd eraill yng Nghymru.

Bob Cater, Golygydd

Undeb Ewropeaidd / European Union
Llywodraeth Cymru / Welsh Government
Cronfa Gymdeithasol Ewrop
European Social Fund

Ysgol Glan Clwyd yn rownd derfynol y byd First Lego League

Alice Murray
Darparwr gweithgareddau EESW

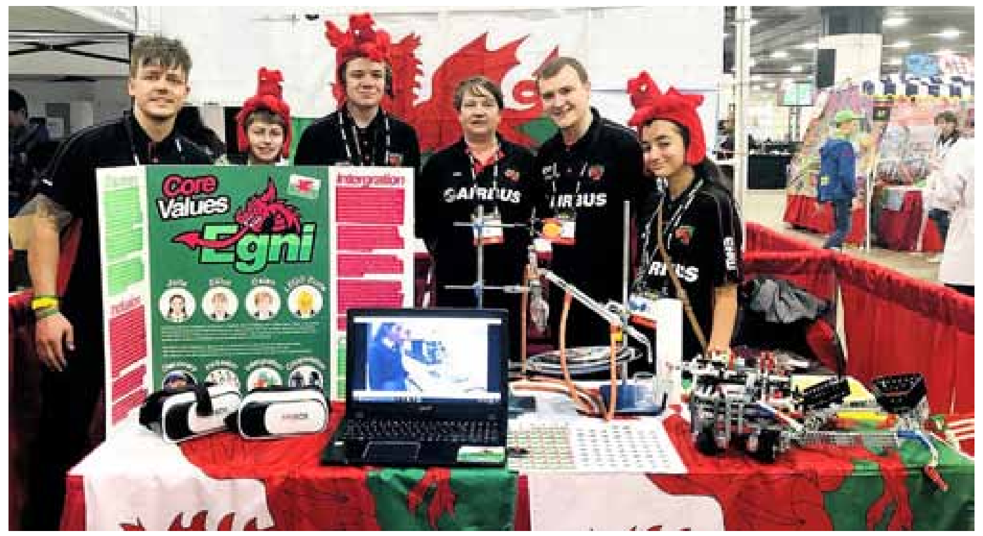
Tîm Egni'n cael eu coroni'n bencampwyr gogledd Cymru yn nhwrnamaint EESW Llandudno

Teithiodd tîm o ddisgyblion Ysgol Glan Clwyd i Detroit yn UDA yn ddiweddar i gystadlu yn Rownd Derfynol y Byd y gystadleuaeth FIRST LEGO League (FLL).

Thema cystadleuaeth 2017-18 oedd hydrodynameg, ac roedd angen i ddisgyblion adeiladu a rhaglennu robot EV3 i gyflawni tasgau yn seiliedig ar daith dŵr. Hefyd, fe wnaethant gwblhau prosiect ymchwil i sut mae pobl yn rhyngweithio â dŵr trwy amlygu problem a chanfod ateb.

Mae'r myfyrwyr yn ennill sgiliau STEM hanfodol, fel rhaglennu, ac yn defnyddio egwyddorion peirianneg, cyfrifiadureg a rhifedd i fod yn llwyddiannus.

Tîm Egni oedd enillydd twrnamaint rhanbarthol FLL gogledd Cymru EESW, a gynhaliwyd yn Llandudno, lle bu'n cystadlu yn erbyn 13 ysgol arall o ogledd Cymru i gyrraedd y brig. O'r fan honno, aeth ymlaen i gystadlu yn rownd derfynol y DU ac Iwerddon ym Mryste, lle cafodd ei enwi'n bencampwr Cymru, a chael ei wahodd i rownd derfynol y byd yn Detroit.



Tîm Egni'n cynrychioli Cymru yn Rownd Derfynol y Byd yn Detroit

Dywedodd Sion Jones, athro dylunio a thechnoleg yn Ysgol Glan Clwyd a hyfforddwr Tîm Egni, sut mae'r gystadleuaeth wedi effeithio ar ei ddisgyblion. "Roedd yn brofiad a newidiodd eu bywydau," dywedodd. "Yn ogystal â chael cipolwg ar y cyfeiriadau anhygoel y gall STEM fynd â nhw, mae'r cyfle i gwrdd â chymaint o bobl newydd amrywiol o bedwar ban byd wedi rhoi cymaint mwy o hyder iddynt a datblygu eu sgiliau cymdeithasol– mae'n newid anhygoel!"

Mae'r First Lego League yn gystadleuaeth STEM fyd-eang sy'n cael ei chefnogi gan unigolion fel Barack Obama a Will.i.am.

Cystadlodd dros 35,000 o dimau o 88 o wledydd eleni, gydag EESW yn darparu cymorth i dimau Cymru ac yn cynnal y twrnameintiau rhanbarthol yng Nghymru.

Ateb 'bollt' cwbl ymarferol ar gyfer Ford gan dîm Coleg Pen-y-bont

Alison Blaydon
Swyddog Adnoddau Dynol, Safle Peiriannau Ford Bridgend

Mae Safle Peiriannau Ford Bridgend yn parhau i gydweithio'n agos gydag EESW i wella gwybodaeth y disgyblion am beirianneg a gweithgynhyrchu i'w hannog i'w hystyried fel gyrfa.

Mae rhai o'r syniadau y mae'r myfyrwyr wedi'u darparu ar hyd y blynyddoedd wedi arbed llawer o arian i'r safle, ac wedi gwella agweddau eraill fel diogelwch ac ailgylchu.

Roedd un o weithgareddau prosiect chweched dosbarth EESW eleni'n cynnwys safle peiriannau Pen-y-bont yn cydweithio'n agos gyda myfyrwyr Coleg Pen-y-bont i ddylunio offeryn cynhyrchu i leoli bolltau yn ddiogel yn ystod proses weithgynhyrchu peiriant.

Gan weithio gyda pheiriannydd peiriannau Pen-y-bont, Mark Bamford, gweithiodd y myfyrwyr fel tîm i ddarparu ateb ar gyfer y problemau a amlygwyd. Cafodd Ellie-May Buffet, a oedd yn arweinydd tîm ar gyfer y prosiect hwn, ynghyd â Ben Norris, Dafydd Hill, Callum Jenkins, Josh Midlane, Thomas Rosser a Matt Llewellyn, eu gwahodd i'r safle peiriannau i gael gwell dealltwriaeth o'r hyn yr oedd Mark yn gofyn iddyn nhw ei wneud, cyn mynd ati i roi syniadau at ei gilydd a chyflwyno eu cynnig.

Yn y bôn, mae'r teclyn a grëwyd ganddynt yn darian ffibr carbon sy'n lleoli ac yn diogelu'r bolltau mewn chwylolwyn wrth iddo gael ei osod a'i dynnu yn ystod y broses gydosod. Mae'n atal difrod a cholli rhannau yn ystod y broses drin a chydosod trwy ddwy orsaf.

Dywedodd Ellie-May, sydd hefyd wedi cymryd rhan yng nghlwb dydd Sadwrn Ford, ac sydd wedi sicrhau prentisiaeth drydanol mewn cwmni peirianneg arbenigol ers dechrau'r prosiect: "Roedd gennym ni lawer o syniadau posibl i ddatrys a gwella'r broblem y cyflwynodd Mark i ni, ond gwelsom mai'r darian ffibr carbon oedd y dull mwyaf dibynadwy, a oedd yn cynnig y mwyaf o fuddion."

Rhai o fanteision y darian ffibr carbon oedd y gellir ei hailddefnyddio, ac mae'n ysgafn ac yn gadarn. Ar ddiwedd ei hoes, gellir ei malu, a gellir troi'r epocsi-resin a ddefnyddir yn gynnyrch plastig arall.

Ellie-May Buffey

Cafodd y teclyn a grëwyd gan y tîm ei gyflwyno yn nigwyddiad Big Bang eleni, a gynhaliwyd ym Mharc y Scarlets. Roedd peirianwyr o safle peiriannau Pen-y-bont yn bresennol, ynghyd â myfyrwyr o ysgolion eraill. Treuliodd y peirianwyr y diwrnod yn siarad â'r myfyrwyr i'w helpu i ddeall peirianneg a gweithgynhyrchu yn well ac ateb unrhyw gwestiynau, gan arddangos robot modern ar waith.

Y tîm o Goleg Pen-y-bont

Dywedodd Mark Bamford: "Mae'r myfyrwyr wedi gweithio'n galed iawn ar y prosiect, ac wedi meddwl am gynnyrch ac ateb cwbl ymarferol i fodloni'r gofynion yn y briff dylunio. Mae'n cynnig y posibilrwydd o arbedion sylweddol iawn wrth weithgynhyrchu os caiff ei fabwysiadu ledled y byd. Rwy'n hynod falch drostyn nhw."

Ychwanegodd John Lewis, sy'n athro yn y coleg: "Mae'r prosiect gwaith hwn gyda safle peiriannau Ford Pen-y-bont wedi bod yn gwbl anhygoel i'r myfyrwyr a'r coleg, ac rwy'n gobeithio y cawn gyfle i weithio gyda nhw eto."

Ar y cyfan, mae hyn wedi bod yn gyfle gwych i fyfyrwyr, ac mae'n parhau i fod. Maen nhw'n mynd i'r afael â gwir heriau peirianneg er mwyn rhoi cipolwg iddynt ar yr hyn sydd gan y sector peirianneg a gweithgynhyrchu i'w gynnig.

Darparwyr gweithgareddau EESW ar waith

Cymru ar lwyfan fyd-eang yn FIRST Lego League mewn hydrodynameg

Vince Keating, Thomas Lloyd ac Alice Murray
Darparwyr gweithgareddau EESW

Mae cystadleuaeth FIRST LEGO League (FLL) wedi dod i ben ar gyfer tymor 2017-18. Mae'r FLL yn gystadleuaeth wyddoniaeth, technoleg, peirianneg a mathemateg fyd-eang sy'n canolbwyntio ar thema wahanol bob blwyddyn. Cystadlodd dros 35,000 o dimau mewn 88 o wledydd eleni, gydag EESW yn darparu cymorth i dimau yng Nghymru ac yn cynnal y twrnameintiau rhanbarthol yng ngogledd a de Cymru.

Thema 2017-18 oedd hydrodynameg, a heriodd dimau i ystyried y cylch dŵr dynol – sef y gwahanol ffyrdd y mae pobl yn rhyngweithio â dŵr. Gallai hyn fod yn unrhyw beth o daith dŵr glân i'n cartrefi a'n diwydiannau, i waredu dŵr gwastraff yn ddiogel, neu amddiffynfeydd rhag llifogydd mewn rhannau o'r byd sydd mewn perygl.

Caiff timau eu hasesu ar sail meini prawf amrywiol fel rhan o'r gystadleuaeth, sy'n golygu bod pob aelod yn cael cyfle i gyfrannu at gynnig y tîm mewn ffordd effeithiol a chadarnhaol. Mae'r disgyblion yn cwblhau prosiect ymchwil ar thema dŵr trwy amlygu problem ac ymchwilio i ateb ymarferol.

Mae elfen fwyaf cyffrous y gystadleuaeth yn herio'r disgyblion i ddylunio, adeiladu a rhaglennu robot gan ddefnyddio pecynnau Lego Mindstorms EV3 er mwyn cwblhau tasgau yn seiliedig ar daith dŵr ac ennill cymaint o bwyntiau â phosibl. Os ydych chi am greu delwedd ddibynadwy ohono yn eich pen, meddyliwch am gymysgedd o 'Robot Wars' a 'Crufts'. Mae llwyddo yng nghystadleuaeth FLL yn dibynnu ar sgiliau STEM hanfodol fel rhaglennu, ac mae'n defnyddio egwyddorion peirianneg, cyfrifiadureg a rhifedd, yn ogystal â sgiliau ymchwilio, cyflwyno a chydweithio effeithiol.

Mae EESW yn cynorthwyo ysgolion yng Nghymru sy'n cystadlu yn y FLL o ddiwrnod cyntaf y tymor ym mis Medi hyd at rowndiau terfynol rhanbarthol y de a'r gogledd ym mis Rhagfyr, gyda'r timau buddugol yn mynd i rownd derfynol genedlaethol y DU ym mis Chwefror. Cystadlodd pedair ysgol ar ddeg yn Rownd Derfynol Ranbarthol De Cymru, gyda thîm 'Hydro Heroes' o Ysgol Gyfun Treforys yn cipio'r wobr gyntaf a thaith i rownd derfynol genedlaethol y DU ym Mryste ym mis Chwefror 2018.

Yn dilyn eu taith ar hyd yr M4, dywedodd hyfforddwr tîm Hydro Heroes, Emma Dabrowska: "Cawsom ni brofiad cwbl anhygoel yn rownd derfynol FLL y DU ac Iwerddon! Mae'r tîm ar ben eu digon ar ôl y profiad ac maen nhw wedi dechrau siarad am y flwyddyn nesaf yn barod – maen nhw'n edrych ymlaen yn arw at gystadlu eto. Diolch i EESW am eich holl help!"

Daeth Tîm Egni Ysgol Glan Clwyd i'r brig yn erbyn 13 ysgol arall yng ngogledd Cymru yn Rownd Derfynol Ranbarthol Gogledd Cymru EESW yn Llandudno, a roddodd gyfle iddyn nhw hefyd gystadlu yn rownd derfynol y DU ac Iwerddon ym Mryste.

Fodd bynnag, ni ddaeth taith Tîm Egni i ben ym Mryste – arweiniodd eu sgiliau a'u gwaith tîm at gael eu coroni'n Bencampwyr Cymru, a enillodd le iddyn nhw gystadlu yn Rownd Derfynol FLL y Byd yn Detroit.

Dywedodd Sion Jones, sef athro dylunio a thechnoleg yn Ysgol Glan Clwyd a hyfforddwr Tîm Egni, sut mae'r gystadleuaeth wedi effeithio ar ei ddisgyblion: "Roedd yn brofiad a newidiodd eu bywydau. Yn ogystal â chael cipolwg ar y cyfeiriadau anhygoel y gall STEM fynd â nhw, mae'r cyfle i gwrdd â chymaint o bobl newydd amrywiol o bedwar ban byd wedi rhoi cymaint mwy o hyder iddynt a datblygu sgiliau cymdeithasol – mae'n newid anhygoel!"

Rownd Derfynol FIRST LEGO League De Cymru

Disgyblion mor ifanc â chwech oed yn creu argraff ym Mhen-y-bont

Yr haf hwn, cynhaliodd EESW FIRST LEGO League (FLL) Junior Expo yn ein canolfan ym Mhen-y-bont ar Ogwr. Gan ddilyn yr un thema â'r digwyddiad i ddisgyblion hŷn, mae'r FLL Jr yn gyfle gwych i ddisgyblion mor ifanc â chwech oed ddatblygu eu sgiliau STEM.

'Aqua Adventure' oedd y thema i ysbrydoli'r cyw beirianwyr a rhaglennwyr yn expo FLL Jr ym Mhen-y-bont ar Ogwr. Roedd angen i dimau amlygu her yn y byd go iawn yn ymwneud â'r cylch dŵr dynol ac ymchwilio iddo – ond y tro hwn, roedd angen iddyn nhw greu posteri, collage ac arddangosfeydd trwyadl i ddangos eu gwaith ymchwil.

Hefyd, cafodd y timau eu herio i ddylunio ac adeiladu model LEGO sy'n arddangos pwnc y maen nhw wedi ymchwilio iddo, gydag un elfen ychwanegol hanfodol: roedd angen i bob model gynnwys rhan symudol gan ddefnyddio moduron rhaglenadwy LEGO WeDo. Roedd y modelau'n arddangosfeydd gwych o waith rhaglennu a defnyddio mecanweithiau syml i gwblhau tasgau, sy'n profi ei bod hi byth yn rhy gynnar i ddysgu sgiliau peirianneg gwerthfawr.

Gan ychwanegu ychydig o berthnasedd byd go iawn i bethau, rhoddodd sawl peiriannydd a sawl aelod staff arall o Ddŵr Cymru eu hamser i helpu adolygu gwaith y timau yn y digwyddiad FLL Jr. Dywedodd pennaeth pensaernïaeth Dŵr Cymru, Nial Grimes: "Roedd yn fraint ac yn anrhydedd bod ynghlwm â FLL unwaith eto, a chawsom ein plesio'n fawr gan lefel ymchwil y timau i bwnc sy'n agos iawn at ein calonnau".

Disgyblion Bryn Celynnog yn llawn syniadau llachar

Rhoddodd wythnos weithgareddau STEM yn Ysgol Gyfun Bryn Celynnog gyfle i bawb ym mlwyddyn 8 roi cynnig ar heriau Energy Quest, Jaguar 2D a thyrbinau gwynt EESW.

Tra'r oedd hanner blwyddyn 8 yn gweithio gyda thîm darparwyr gweithgareddau EESW, roedd gweddill y disgyblion gyda'r athrawon yn pendroni dros atebion arloesol i ofynion ynni byd-eang fel rhan o her 'Bright Ideas' – sef cystadleuaeth genedlaethol i CA3 sy'n herio disgyblion i feddwl mewn ffordd wahanol ac ystyried sut gellir cynhyrchu ynni'r byd mewn dinasoedd yn y dyfodol. Yna byddai'r disgyblion yn cyfnewid sesiynau, sy'n golygu nad oedd y disgyblion yn colli unrhyw weithgaredd.

Daeth yr wythnos STEM i ben gyda 'Big Bang @ Bryn Celynnog' – sef arddangosfa anferth dangos-a-dweud yng nghampfa'r ysgol, a roddodd gyfle i'r disgyblion esbonio gweithgareddau'r wythnos ac arddangos eu gwaith i rieni, llywodraethwyr a gweithwyr proffesiynol y diwydiant.

Dywedodd Laura Glennon, pennaeth sgiliau yn Ysgol Gyfun Bryn Celynnog: "Roedd y sesiynau a ddarparwyd gan staff EESW yn ystod yr wythnos yn ddiddorol, yn ysbrydoledig ac yn hwyliog i'r disgyblion, oedd yn gallu defnyddio'r profiadau hyn i greu eu hatebion ynni eu hunain ar gyfer her Bright Ideas.

Roedd safon anhygoel gwaith y disgyblion, yn ogystal â'u hyder a'u dealltwriaeth wrth ei gyflwyno, yn dyst i ansawdd uchel gweithgareddau'r wythnos.

"Yn dilyn llwyddiant anferth ein hwythnos STEM gyntaf, rydym yn bwriadu ei gwneud yn ddigwyddiad blynyddol, ac rydym yn gobeithio parhau â'n gwaith gydag EESW yn y dyfodol."

Syniadau'n llifo rhwng disgyblion Blwyddyn 8 ym Mryn Celynnog

CYLCHGRAWN CYNLLUN ADDYSG PEIRIANNEG YNG NGHYMRU

Robotiaid gyda disgyblion yn y diwrnod asesu a chyflwyno yn ne Cymru

Dathlu maes diwydiant y chweched dosbarth

Tim Williams, Cadeirydd yr Ymddiriedolwyr, yn cael ei gynorthwyo gan robotiaid o Goleg Pen-y-bont yn niwrnod asesu a chyflwyno de Cymru

Bob Cater
Prif Weithredwr EESW

Roedd y ddau ddiwrnod asesu a chyflwyno blynyddol yn llwyddiannus unwaith eto eleni, gyda digwyddiad de Cymru'n denu'r nifer uchaf o dimau chweched dosbarth erioed. Cynhaliwyd digwyddiad gogledd Cymru yn Venue Cymru Llandudno, ac roedd digwyddiad de Cymru ym Mharc y Scarlets, Llanelli. Dyma oedd ein tro cyntaf ym Mharc y Scarlets. Mae'r ddau ddigwyddiad yn cael eu cyfuno â'n rhaglen Big Bang Near Me ac, yn ogystal â thimau chweched dosbarth yn arddangos eu hatebion i heriau peirianneg a osodwyd gan gwmnïau, caiff ysgolion lleol eu gwahodd i ymweld â'r digwyddiad. Roedd y ddau ddiwrnod yn cynnwys gwaith STEM a wnaed gan dimau chweched dosbarth, arddangosfeydd gan stondinwyr a gweithgareddau a sioeau addysgol.

Yn ne Cymru, roedd 76 o dimau chweched dosbarth yn arddangos eu gwaith, a 25 tîm yng ngogledd Cymru. Cyfanswm y mynychwyr yn ne Cymru oedd 1,612, a'r nifer yn y gogledd oedd 982.

Mae'r digwyddiad hwn yn dathlu maes diwydiant y chweched dosbarth, ond mae EESW yn cynnig pum maes, sef:

■ **Denu merched i faes STEM**
Mae'r maes hwn wedi'i addasu'n benodol i annog disgyblion benywaidd i ystyried llwybrau peirianneg a gwneud technoleg yn hygyrch, yn ddiddorol ac yn berthnasol iddyn nhw. Hefyd, mae'n ehangu eu dealltwriaeth o bynciau STEM. Mae grwpiau o ferched yn ymweld â chwmnïau, colegau a phrifysgolion i roi cynnig ar gyrsiau a gyrfaoedd yn ymwneud â STEM.

■ **F1 mewn Ysgolion**
Mae F1 mewn Ysgolion yn brosiect cenedlaethol sy'n cynnwys disgyblion o bob oedran a gallu i mewn dylunio modelau o geir F1. Mae'r gweithgaredd yn cynnwys defnyddio meddalwedd dylunio â chymorth cyfrifiaduron (CAD), safon y diwydiant. Mae'r darluniadau a ddyluniwyd yn cael eu troi yn fodelau go iawn ar beiriannau rheoli rhifyddol cyfrifiadurol (CNC), sy'n rhoi deallltwriaeth drylwyr i ddisgyblion o weithgynhyrchu digidol modern.

■ **Cyflwyniad i Beirianneg (i2E)**
Mae i2E yn datblygu diddordebau a sgiliau pobl ifanc ym maes STEM trwy gymryd rhan mewn amrywiaeth o weithgareddau peirianneg ymarferol. Caiff pwysigrwydd gwyddoniaeth a mathemateg mewn gyrfaoedd peirianneg ei bwysleisio a defnyddir deunyddiau ategol i amlygu'r cyfleoedd i ddefnyddio gwybodaeth o'r pynciau hyn.

■ **Prosiect cyswllt diwydiant i'r chweched dosbarth**
Mae'r maes hwn yn cysylltu timau o fyfyrwyr y chweched dosbarth neu eu cyfoedion mewn colegau addysg bellach i ddatblygu sgiliau STEM trwy brosiectau ymarferol sy'n gysylltiedig â diwydiant. Trwy weithio gyda pheirianwyr proffesiynol ar broblemau gwirioneddol yn y diwydiant, byddant yn datblygu dealltwriaeth well o beirianneg fel gyrfa. Mae'r maes yn dechrau trwy greu cysylltiadau rhwng ysgolion a chwmnïau rhwng mis Gorffennaf a mis Medi, diwrnodau croesawu ym mis Hydref ac ymweliadau â chwmnïau a gwaith mewn ysgolion (datrys y broblem) rhwng mis Hydref a mis Mawrth/Ebrill. Cynhelir gweithdai cyn y Nadolig fel bod modd datblygu prosiectau â chymorth staff colegau/prifysgolion a pheirianwyr y cwmni. Cynhelir y diwrnodau asesu a chyflwyno cyn y Pasg i arddangos ac asesu'r atebion terfynol.

■ **Headstart Cymru**
Mae'r maes hwn yn rhoi cyfle i ddisgyblion ym Mlwyddyn 12 dreulio tri diwrnod preswyl mewn prifysgol cyn gwneud eu cais UCAS. Bydd y tri diwrnod yn cynnwys:
■ Rhoi cynnig ar wahanol feysydd peirianneg;;
■ Teithiau o'r campws;
■ Profi bywyd prifysgol, yn academaidd ac yn gymdeithasol.

Bydd y myfyrwyr yn treulio'r diwrnodau mewn sefyllfaoedd labordy/darlithoedd. Bydd y nosweithiau'n cynnwys cymysgedd o weithgareddau cymdeithasol ar y safle ac oddi arno.

Dathlu ein henillwyr – Myfyriwr y Flwyddyn 2017

Cafodd gwobr Myfyriwr y Flwyddyn EESW ei chyflwyno gan Brif Weithredwr EESW, Bob Cater, yn 2012. Roedd yn teimlo bod angen i ni ddathlu llwyddiannau'r bobl ifanc dawnus sydd gennym ni yng Nghymru. Hefyd, roedd angen i ni eu hyrwyddo a'u helpu i gyflawni eu dyheadau. Roedd yn teimlo bod pobl yn rhy negyddol am ein pobl ifanc, ac roedd yn gyfle i ddweud wrth gynulleidfa eang bod gennym y doniau a'r brwdfrydedd yng Nghymru i dyfu ein heconomi.

Yn dilyn cyflwyno ceisiadau ysgrifenedig, paratowyd rhestr fer i'w cyfweld. Cafodd yr enillwyr eu gwahodd i swper blynyddol Fforwm Modurol Cymru i dderbyn eu gwobrau. Mae'r enillydd a'r rhai a ddaeth yn agos yn derbyn gwobrau ariannol a thlws.

Rydym yn ddiolchgar i Raj Jones, sydd wedi rhoi cymorth ariannol i gefnogi'r fenter er cof am ei diweddar ŵr, Dr Tom Parry Jones.

O'r chwith: Kieran Dalton, Loren Molyneux, William Hughes, Y Prif Weinidog Carwyn Jones, Huw Smith, Raj Jones ac Oliver Barbaresi

Bethan Wilkinson

Roedd derbyn gwobr Myfyriwr y Flwyddyn EESW yn 2016 yn hwb mawr i'm hyder, ac mae'r profiadau a enillais trwy EESW wedi bod yn destun trafod ym mhob cyfweliad ers hynny. Yn fy nghais Myfyriwr y Flwyddyn ar gyfer STEM yng Nghymru, soniais am ARUP fel cwmni yr hoffwn weithio iddyn nhw yn y dyfodol.

A minnau wedi gorffen fy mlwyddyn gyntaf yn astudio peirianneg sifil ym Mhrifysgol Caeredin, ar hyn o bryd, rwy'n mwynhau fy lleoliad gwaith dros yr haf gydag ARUP yng Nghaerdydd ac rwy'n dysgu llawer. Eleni, roeddwn i hefyd yn ddigon ffodus i dderbyn gwobr cyflawniad myfyriwr rhagorol gan y Gymdeithas Ddylunio a Thechnoleg am fy mrwdfrydedd am y pwnc trwy gydol yr ysgol uwchradd a'r chweched dosbarth. Rwy'n llawn cyffro am fy newis gyrfa ac rwyf wir yn gwerthfawrogi'r cymorth yr wyf wedi'i dderbyn gan sefydliadau fel EESW i'w dilyn.

Kieran Dalton

Y tu hwnt i fywyd ysgol, mae'n aml yn anodd gwahanu uchelgeisiau gyrfaol rhag astudio ar gyfer cymwysterau ysgol. Efallai mai prif fantais EESW yw'r cyfle i wneud prosiect personol unigryw a chyffrous, lle gallwn wneud gwaith peirianneg go iawn ynghyd â thîm o unigolion â'r un meddylfryd, yn debyg i grŵp ymchwil. Mae'r ymdeimlad o gyflawni ar ôl defnyddio gwybodaeth a ddysgwyd yn annibynnol i ddatrys problemau ymarferol yn ddihafal, fel y mae'r profiad o arweinyddiaeth tîm nad yw'n cael ei ddarparu gan fyd unigolyddol Safon Uwch.

Roedd mynychu swper Fforwm Modurol Cymru yn brofiad anhygoel, a braint oedd dod yn agos at y brig yng ngwobr Myfyriwr y Flwyddyn EESW. Yna, cawsom gyfle i arddangos ein prosiect yn ffair Big Bang, oedd yn caniatáu i ni gyflwyno i gynulleidfa anferth a gweld potensial a gallu anhygoel myfyrwyr o'r un meddylfryd, wedi'u sbarduno gan gynlluniau fel EESW.

Mae'r wybodaeth eang a enillwyd o gynllunio, cydosod a phrofi cylchedwaith wedi bod yn amhrisiadwy yn ystod cyfweliadau prifysgol, ac rwyf yn edrych ymlaen at adeiladu ar y wybodaeth hon ym Mhrifysgol Caergrawnt, lle rwyf yn gobeithio astudio'r gwyddorau naturiol ffisegol. Yn y pen draw, rwyf yn gobeithio dilyn gyrfa mewn ymchwil, gan gyfrannu at ddatblygiad cyfrifiaduron cwantwm ymarferol.

Ar ôl sawl wythnos o waith, rwy'n cofio fy malchder anferth, yn hwyr un prynhawn mewn labordy tawel, pan ychwanegais y wifren olaf at gylched cymharydd foltedd, gan achosi'r LEDs i oleuo a'r modur i suo. Bydd y balchder hwn, ynghyd ag wythnosau o ddatrys cannoedd o broblemau o amrywiol lefelau anhawster, yn aros gyda fi am byth.

William Hughes

Tyfodd fy niddordeb mewn pynciau STEM trwy gydol fy addysg uwchradd, gan arwain at ddewis astudio Safon Uwch mewn mathemateg, mathemateg bellach, ffiseg a chemeg, ac felly daeth peirianneg yn llwybr amlwg i'w ddilyn.

Yn ystod fy nwy flynedd yn astudio Safon Uwch, mae Cynllun Addysg Beirianneg Cymru wedi fy ngalluogi i gymryd rhan mewn nifer o brosiectau peirianneg. Roedd un prosiect, Headstart Cymru, yn gwrs a wnaeth fy ngalluogi i archwilio ochr academaidd peirianneg yng Nghampws y Bae newydd Prifysgol Abertawe, ac atgyfnerthodd fy niddordeb mewn peirianneg.

Hefyd, rhoddodd EESW gyfle i fi arwain tîm peirianneg oedd yn cynnwys fy nghyd-fyfyrwyr Safon Uwch o Goleg Gŵyr, Abertawe. Rhoddwyd chwe mis i ni gwblhau ein prosiect, a'i nod oedd cynyddu'r uchafswm pellter y gall defnyddiwr cadair olwyn drydanol ei deithio trwy addasu cadair fel bod modd ei phweru gan gell danwydd hydrogen. Rhoddodd hyn fewnweledigaeth gwych i mi i ba mor werthfawr yw'r broses ddylunio, gan ddarparu nid yn unig her dechnegol sylweddol, ond cyfle i arwain fy mhum cyd-fyfyriwr hefyd, sydd wedi bod yn amhrisiadwy, gan ei fod wedi dangos i fi mai un o heriau mwyaf sylweddol unrhyw brosiect peirianneg, yn ogystal â mynd i'r afael â ffiseg anodd, yw mynd i'r afael â phobl anodd hefyd! Ar ddiwedd y prosiect, cyflawnais y Wobr Aur CREST. Yna, aeth fy nhîm i Ffair Big Bang EESW yn Stadiwm Liberty yn Abertawe i ddangos ein prosiect gyda thimau eraill o rannau eraill o Gymru.

Roeddwn i hefyd yn ffodus iawn i ennill lle ar leoliad gwaith dros yr haf gyda Tata Steel, lle cefais brosiect dadansoddi i'w wneud, ac enillais wobr y cynllun am effaith 'ychwanegu gwerth' fy mhrosiect.

Mae'r profiadau hyn wedi dangos i fi, er bod angen gallu academaidd cryf i lwyddo ym maes peirianneg, rhaid i beiriannydd feddu ar lawer o rinweddau eraill er mwyn gweithio mewn ffordd effeithlon. Mae fy mhrofiad fel arweinydd tîm wedi datblygu fy sgiliau rhyngbersonol a ddefnyddiwyd yn ystod y lleoliad gwaith wrth gysylltu'n agos gyda chydweithwyr ar bob lefel yn y sefydliad.

Cefais y fraint o fynychu swper aelodau Fforwm Modurol Cymru ym mis Rhagfyr, ac roeddwn yn falch iawn o ddod yn agos at y brig ar gyfer gwobr Tom Parry Jones EESW.

Mae'r cyfleoedd yr wyf i wedi profi gydag EESW wedi bod yn hollbwysig wrth fy helpu i benderfynu beth i'w wneud yn y dyfodol. Cafodd fy niddordeb mewn peirianneg ei atgyfnerthu, a chafodd fy ffocws ar beirianneg sifil ei gadarnhau.

Gan edrych ymlaen at sut gallaf gyfrannu at economi Cymru yn ddiweddarach yn fy ngyrfa, rwy'n dueddol o feddwl am yr hyn sy'n bwysig i fi fel person ifanc mewn byd lle mae'r dyfodol yn gallu edrych yn llwm ar adegau. Mae bygythiadau cynyddol y newid yn yr hinsawdd a chynhesu byd-eang yn meddiannu'r penawdau, ac mae bod yn rhan o'r diwydiannau sy'n ceisio mynd i'r afael â hyn yn apelio'n fawr ataf.

Loren Molyneux

Alla' i ddim mynegi pa mor ddiolchgar ydw i i EESW am y cyfle i fod yn rhan o gynllun mor ysbrydoledig. Mae wedi bod yn gyfle gwych i feddwl mewn ffordd greadigol, defnyddio cysyniadau gwyddonol a herio fy hun.

Gan edrych yn ôl ar fy nhymor cyntaf yn y chweched dosbarth, pan oedd ein prosiect yn ddim mwy na syniad ar ddarn o bapur, gallaf weld pa mor bell rydw i a fy nhîm wedi dod. Ein nod oedd adeiladu dyfais hunan lefelu gan ddefnyddio cysyniadau ffotoneg. O ystyried cyn lleied o wybodaeth oedd gennym ni am y maes, wrth edrych yn ôl ar ein gwaith ymchwil, y broses ddylunio a ddilynodd, adeiladu'r prototeip a gweld y cynnyrch terfynol o'r diwedd, gallaf werthfawrogi'r hyn yr ydym wedi'i gyflawni.

Gyda'n gilydd, dysgom sut i feddwl yn greadigol, cymryd cyfrifoldeb ac ystyried mewnbwn pobl erail. Yn y pen draw, yr hyn a arweiniodd at ein llwyddiant oedd cydnabod gwahanol feysydd arbenigedd pob aelod o'r tîm, ac ymwybyddiaeth o ba mor hanfodol yw cyfathrebu rhagorol, i sicrhau lle yn Rownd Derfynol Big Bang Science y DU.

Hefyd, hoffwn ddiolch i EESW am y gwahoddiad caredig i swper Fforwm Modurol Cymru, ac am wobr Myfyriwr y Flwyddyn. Doeddwn i methu credu'r peth, ac nid oeddwn yn ei ddisgwyl o gwbl, ac rwy'n wirioneddol ddiolchgar am yr anrhydedd. Roedd yn noson fythgofiadwy, hyd yn oed os nad ydw i'n gallu cofio fy araith, gan fy mod i mor brysur yn ceisio cuddio pa mor nerfus oeddwn i!

Roedd siarad gydag arbenigwyr yn eu meysydd, cwrdd â myfyrwyr dawnus o bob cwr o Gymru, a chlywed am EESW a'i brosiectau cyffrous, wedi gwneud y digwyddiad yn un arbennig iawn. Fodd bynnag, yr hyn fydd yn amhrisiadwy i fi yn y dyfodol fydd y sgiliau amhrisiadwy a'r profiad o weithio mewn tîm, a'r dylanwad y mae gweithio ar y prosiect wedi'i gael ar y ffordd yr wyf yn mynd i'r afael â phroblemau.

I fi, mae'r ychydig fisoedd diwethaf wedi bod yn brysur, yn llawn ceisiadau prifysgol, cyfweliadau ac astudio ar gyfer fy arholiadau Safon Uwch. Ym mis Mawrth, mynychais rownd derfynol y Big Bang Fair yn Birmingham, lle cawsom gyfle gwych i weithio gyda'n gilydd mewn tîm ar ein prosiect LEVEL unwaith eto, yn cynrychioli Academi Ffotoneg Bangor ac Ysgol Friars. Roedd yn brofiad gwirioneddol unigryw.

Wrth i fi gerdded trwy'r arena anferth yn llawn stondinau am bob dim o fiotechnoleg i ynni adnewyddadwy, geneteg i beirianneg trydanol, a siarad â myfyrwyr o bob cwr o'r DU, meddylwyr creadigol oedd yn frwdrydig am eu prosiectau ac yn awyddus i drafod eu harloesedd, roeddwn i'n teimlo'n rhan o rywbeth arbennig.

Rwy'n bwriadu astudio meddygaeth yn y brifysgol ac rwy'n edrych ymlaen at ddechrau fy nhymor cyntaf yn ddiweddarach eleni. Fodd bynnag, mae cynllun EESW wedi effeithio arnaf mewn ffyrdd nad oeddwn i'n eu disgwyl ac wedi gwneud i fi ystyried fy nghynlluniau gyrfa. Trwy gydol y prosiect hwn, rwyf wedi sylweddoli pa mor bwysig yw peirianneg ym maes meddygaeth. Bydd defnyddio technoleg i roi diagnosis a thriniaeth i afiechydon, a'u rheoli, yn hanfodol i ddyfodol gofal iechyd. Mae datblygu ffyrdd arloesol o helpu meddygon a gwella effeithlonrwydd y system gofal iechyd yn hanfodol, ac rwy'n teimlo'n gyffrous iawn am ddyfodol lle gallaf fod yn rhan o hyn.

Rwy'n ddiolchgar iawn am yr amser a'r ymdrech y mae EESW yn ei roi i ddarparu cyfleoedd fel hyn i fyfyrwyr ledled Cymru, ac rwy'n gobeithio y gall disgyblion barhau i elwa ohonynt yn y dyfodol. Yn fy marn i, mae'r cynllun yn ffordd wych o gyflwyno peirianneg i ddisgyblion ysgol ac yn ffordd gyffrous o ysgogi diddordeb mewn arloesedd a meddwl yn greadigol.

Cyn-fyfyriwr **Owain Roberts**

Mae fy niddordeb mewn pynciau STEM, yn enwedig mathemateg a ffiseg, wedi datblygu trwy gydol fy amser yn yr ysgol.

Mae deall y byd o'm cwmpas, gan edrych ar wahanol ddyfeisiau a gwrthrychau ac astudio sut maen nhw'n gweithio, o ddiddordeb mawr i fi.

Mae astudio ceir, cyfrifiaduron a dyfeisiau electronig erailll wedi rhoi mewnweledigaeth da i fi i'r ffordd y mae pob math o wahanol ddisgyblaethau ym meysydd peirianneg, ffiseg a mathemateg yn cyfuno i greu cyfarpar unigol. Cafodd fy niddordeb mewn peirianneg ei sbarduno yn ystod fy nghyfnod yn yr ysgol gynradd, lle cefais fy nghyflwyno i F1 mewn Ysgolion. Fel disgybl yn Ysgol Gynradd y Talwrn, cymerais ran yn y gystadleuaeth ddwywaith.

Yn y flwyddyn gyntaf, cyrhaeddom y trydydd safle yn y rownd derfynol ranbarthol, ac yn yr ail flwyddyn, aethom ymlaen i gyrraedd y safle cyntaf yn y rownd derfynol ranbarthol ac yna ennill rownd derfynol genedlaethol y DU.

Rwy'n credu bod dysgu egwyddorion peirianneg o oedran ifanc wedi fy helpu trwy gydol yr ysgol uwchradd. Mae wedi fy ngalluogi i ddeall gwaith mwy cymhleth ac yna defnyddio'r wybodaeth newydd hon a'i chymhwyso yn y byd go iawn.

Yn ogystal, rwy'n credu bod F1 mewn Ysgolion yn ychwanegiad gwych i'r CV a ffurflenni cais prifysgolion. Mae'n dangos fy mod wedi ymddiddori mewn peirianneg ers fy mod i'n ifanc ac wedi cael fy ysgogi i lwyddo yn y sector hwn.

Yn ffodus, roedd modd i fi wneud cais am le yn rhai o brifysgolion gorau'r DU, fel Caergrawnt a Durham, er mwyn astudio peirianneg gyffredinol ac, felly, datblygu fy ngwybodaeth am holl agweddau peirianneg, ac rwyf yn gobeithio mynd i Durham yn yr hydref i astudio peirianneg gyffredinol dros gyfnod o bedair blynedd. Hefyd, eleni, rwyf wedi bod yn ddigon ffodus i fod yn rhan o dîm F1 Ysgol Llangefni, Tîm Drive.

Dechreuodd ein taith yn y rownd derfynol ranbarthol yn Ninbych. Cawsom rownd lwyddiannus yn y gystadleuaeth, gan i ni ddod yn drydydd yn y dosbarth proffesiynol ac, felly, roedden ni'n gymwys i fynd i rownd nesaf y gystadleuaeth – y rownd derfynol genedlaethol. Hefyd, cawsom wobrau am y gwaith ymchwil a datblygu gorau, y car wedi'i beiriannu orau a'r nawdd a marchnata gorau.

Yn dilyn ein llwyddiant yn Ninbych, aethom ni i Silverstone i gystadlu yn y rownd derfynol genedlaethol, lle cystadlom dros gyfnod o ddeuddydd.

Roedden ni'n llwyddiannus un waith eto. Roedden ni'n bencampwyr Cymru, sy'n golygu ein bod ni'n mynd i Singapore i gynrychioli Cymru.

Hefyd, roedden ni yn y 3 uchaf yn y DU am yr arddangosfa pit gorau a'r nawdd a marchnata gorau, ac enillom y wobr am yr hunaniaeth tîm orau yn y DU. Hoffwn ddiolch i EESW am roi cyfle i fi allu defnyddio cysyniadau peirianneg mewn sefyllfaoedd bywyd go iawn.

Mae'n braf gweld bod Cymru'n ceisio hyrwyddo STEM trwy roi cyfle i ysgolion gystadlu mewn cystadlaethau fel F1 mewn Ysgolion.

Her Fawr F1 mewn Ysgolion 2017-18

Stephen Lane
Rheolwr gweithgareddau EESW

Yn yr un modd â Formula 1, eleni, roedd gan F1 mewn Ysgolion set benodol o reolau, rheoliadau a dosbarthiadau ar gyfer her STEM F1 mewn Ysgolion 2018. Roedd y cystadleuwyr newydd yn dewis o blith dosbarthiadau mynediad, datblygu neu broffesiynol, gan ddibynnu ar oedran a phrofiad.

Roedd timau a oedd yn dychwelyd, os nad oedden nhw eisoes yn cystadlu yn y dosbarth proffesiynol uwch, yn cael eu hannog i gamu ymlaen i ddosbarth uwch.

Mae aelodau'r tîm yn cael rolau penodol lle mae angen iddyn nhw feistroli sgiliau fel dylunio â chymorth cyfrifiadur, erodynameg, mathemateg, ffiseg, llythrennedd a rhifedd, gan baru rolau a sgiliau a ddefnyddir yn y byd gweithgynhyrchu digidol go iawn.

I dimau sy'n newydd i'r gystadleuaeth, mae'r gwaith yn dechrau'n gynnar yn y flwyddyn academaidd gyda chynllunio, hyfforddiant meddalwedd, dylunio a phrofi, tra y bydd timau sy'n dychwelyd wedi bod yn gweithio'n galed ers cystadlu yn rowndiau terfynol rhanbarthol a chenedlaethol y llynedd. Mae gan dimau Cymru'r opsiwn o fynychu un o ddwy rownd derfynol ranbarthol a drefnir gan EESW yng Nghymru.

Yn y rowndiau terfynol, nid yn unig y mae'r timau'n cystadlu i greu'r car cyflymaf, maen nhw hefyd yn cael eu hasesu ar bortffolio o'u gwaith, cyflwyniad llafar mewn tîm, cyfweliad peirianneg a'u harddangosfa pit.

Roedd y timau'n cystadlu am wobrau amrywiol, a chynigir ysgogiad ychwanegol i'r rhai sy'n cyrraedd y brig, sef taith i gystadlu yn rownd derfynol genedlaethol y DU, a gynhelir yn y Silverstone Wing anhygoel uwchlaw'r 'pit straight' ar drac rasio F1 Silverstone.

Cafodd rownd derfynol gogledd Cymru drafferthion wrth i'r Ddihiryn o'r Dwyrain gwrdd â storm Emma. Achosodd eira trwm rywfaint o banig, ac roedd angen aildrefnu a dod o hyd i leoliad arall.

Cynigiodd Ysgol Uwchradd Dinbych ei neuadd chwaraeon i'r holl dimau oedd yn gallu cyrraedd. Cyrhaeddom yr adeilad yn gynnar a gwelsom orymdaith o ddisgyblion Ysgol Uwchradd Dinbych yn cario byrddau a chadeiriau ar draws maes parcio'r ysgol, yn paratoi'r neuadd ar gyfer y digwyddiad.

Mae'n rhaid bod brwdfrydedd disgyblion yr ysgol yn heintus, gyda'r holl dimau'n awyddus i arddangos eu gwaith yn eu hardaloedd pit penodedig.

Ar y trac, roedd cystadleurwydd y timau'n disgleirio, gydag unrhyw gyfeillgarwch rhwng yr ysgolion yn cael ei roi i'r neilltu ar gyfer y rasio brwd.

Newidiodd rownd derfynol de Cymru ei leoliad hefyd. I fodloni'r nifer uwch o dimau, defnyddiom gyfleusterau gwych Stadiwm Dinas Caerdydd. Gyda 30 o dimau'n mynychu'r digwyddiad, ynghyd â gweithgareddau ategol ychwanegol a drefnwyd gan gydweithwyr o dîm EESW, roedd amserlen y diwrnod yn llawn dop. Cafodd dosbarthiadau'r gystadleuaeth eu rhannu'n gyfartal rhwng timau dosbarth newydd oedd yn awyddus i gael blas o'r cyffro, tra bod y timau dosbarth datblygu/proffesiynol yn awchu am flas o Silverstone.

Yn yr un modd â digwyddiad gogledd Cymru, roedd brwdfrydedd y disgyblion yn ysbrydoledig, gyda phob tîm yn meddu ar ddull unigryw o fodloni'r rheolau a'r rheoliadau llym a amlinellwyd ar gyfer y gystadleuaeth.

Aeth y timau buddugol ymlaen i Rownd Derfynol Genedlaethol F1 mewn Ysgolion y DU, lle daeth Tîm Drive o Ysgol Gyfun Llangefni i'r brig fel tîm buddugol Cymru, ac maen nhw'n edrych ymlaen at gystadlu yn Rownd Derfynol y Byd F1 mewn Ysgolion yn Singapore. Rhaid llongyfarch yr holl dimau a gystadlodd – roedd safon y cystadlu ym mhob dosbarth yn uchel iawn ac mae pob disgybl yn haeddu cydnabyddiaeth am eu hymdrechion.

Ar gyfer cystadleuaeth 2018/19, bydd EESW yn parhau i gefnogi timau ledled Cymru. Bydd arbrofion erodynameg yn cael eu cynnig, ynghyd â sesiynau dylunio â chymorth cyfrifiadur Autodesk Fusion 360 newydd i bob lefel a gallu. Bydd cystadlaethau o fewn ysgolion hefyd yn cael eu cynnig, sy'n gyfle gwych i grwpiau mawr o ddisgyblion gymryd rhan cyn y rownd derfynol ranbarthol.

ENILLWYR F1 MEWN YSGOLION

Dosbarth mynediad	Ysgol a thîm
GOGLEDD CYMRU	
Car cyflymaf	Ysgol Uwchradd Prestatyn – Tîm Hamerhead
Gwobr portffolio	Coleg Dewi Sant – 6x7 Racing
Gwobr cyflwyno	Ysgol Gyfun Llangefni – Hard Chargers
Gwobr am y cyflwyniad llafar gorau	Ysgol Gyfun Llangefni – Hard Chargers
Gwobr sêr y dyfodol	Coleg Dewi Sant – 6x7 Racing
Pencampwyr rhanbarthol y dosbarth mynediad	Ysgol Gyfun Llangefni – Hard Chargers
Dosbarthiadau datblygu a phroffesiynol	
Dosbarth datblygu – car cyflymaf	Ysgol Rhuthun – KA-Chow
Dosbarth proffesiynol – car cyflymaf	Ysgol Uwchradd Dinbych – Quantum
Gwobr nawdd a marchnata tîm	Ysgol Gyfun Llangefni – Drive
Gwobr hunaniaeth tîm	Ysgol Uwchradd Dinbych – Quantum
Gwobr meddwl arloesol	Ysgol Uwchradd Dinbych – Quantum
Gwobr ymchwil a datblygu	Ysgol Gyfun Llangefni – Drive
Gwobr car a beiriannwyd orau, dosbarth datblygu	Ysgol Rhuthun – KA-Chow
Gwobr argymhelliad y beirniaid	Coleg Dewi Sant – SDC Racing
Dosbarth datblygu – 3ydd safle	Coleg Dewi Sant – SDC Racing
Dosbarth datblygu – 2il safle	Ysgol Rhuthun – Ballistix
Dosbarth datblygu – Enillwyr 2018	Ysgol Rhuthun – KA-Chow
Gwobr car a beiriannwyd orau, dosbarth proffesiynol	Ysgol Gyfun Llangefni – Drive
Dosbarth proffesiynol – 3ydd safle	Ysgol Gyfun Llangefni – Drive
Dosbarth proffesiynol – 2il safle	Ysgol Uwchradd Cei Connah – Pursuit Racing
Pencampwyr rhanbarthol, dosbarth proffesiynol 2018	Ysgol Uwchradd Dinbych - Quantum

Dosbarth mynediad	Ysgol a thîm
DE CYMRU	
Car cyflymaf	Ysgol Brynteg – Firefish
Gwobr portffolio	Ysgol Gyfun Gymraeg Bro Myrddin – Vulcan
Gwobr cyflwyno	Ysgol Brynteg – Firefish
Gwobr cyflwyniad llafar gorau	Ysgol Gyfun Rhydywaun – Mellten Rhydywaun
Gwobr sêr y dyfodol	Ysgol Y Pant – Speed
Pencampwyr rhanbarthol, dosbarth mynediad	Ysgol Gyfun Gymraeg Bro Myrddin – Vulcan
Dosbarthiadau datblygu a phroffesiynol	
Dosbarth datblygu – car cyflymaf	Ysgol Brynteg – Swordfish
Dosbarth proffesiynol – car cyflymaf	Afon Taf – Kalopsia
Gwobr nawdd a marchnata tîm	Coleg St John – Exception
Gwobr hunaniaeth tîm	Ysgol Pencoed – Nemesis Inferno
Gwobr meddwl arloesol	Ysgol Brynteg – F1 Fireflys
Gwobr ymchwil a datblygu	Ysgol Gyfun Gymraeg Bro Edern – Apex-Bro Edern
Gwobr car a beiriannwyd orau, dosbarth datblygu	Ysgol Brynteg – Swordfish
Gwobr argymhelliad y beirniaid	Coleg St John – Stormbreakers
Dosbarth datblygu – 3ydd safle	Ysgol Pencoed – Nemesis Inferno
Dosbarth datblygu – 2il safle	Ysgol Gyfun Ystalyfera – Nemesis
Dosbarth datblygu – Enillwyr 2018	Ysgol Brynteg – F1 Fireflys
Gwobr car a beiriannwyd orau, dosbarth proffesiynol	Coleg St John – Exception
Dosbarth proffesiynol – 3ydd safle	Ysgol Uwchradd Cyfarthfa – In a Jiffy
Dosbarth proffesiynol – 2il safle	Afon Taf – Kalopsia
Pencampwyr rhanbarthol dosbarth proffesiynol 2018	Coleg St John – Exception

Myfyriwr Ysgol Uwchradd Dinbych ac Academi Beirianneg Williams Randstad

Graham Nutt
Rheolwr Gogledd Cymru EESW

Mae myfyriwr yn Ysgol Uwchradd Dinbych a enillodd un o naw o leoedd yn fyd-eang i ymuno ag academi beirianneg uchel ei pharch wedi sicrhau ail flwyddyn ar y rhaglen. Enillodd Amy Martin, sy'n fyfyriwr ym Mlwyddyn 12, ei lle yn Academi Beirianneg Williams Randstad am y tro cyntaf ar ôl ei llwyddiant fel rheolwr Tîm Tachyon (ddwy flynedd yn olynol) – sef cystadleuwyr merched yn unig yr ysgol yn F1 mewn Ysgolion.

Y llynedd, enillodd y tîm dair gwobr yn nathliad gwobrau Rownd Derfynol y Byd F1 mewn Ysgolion yn Texas: y wobr nawdd a marchnata tîm, y wobr menywod mewn chwaraeon moduro, a'r wobr am y cyflwyniad llafar gorau. Cododd swm anhygoel o £23,000 i dalu am ffi'r gystadleuaeth a chostau teithio a llety, yn ogystal ag ariannu gwaith ymchwil a gwneud gwelliannau i'r car a'r arddangosfa pit. Yn 2015, enillodd y tîm y wobr nawdd a marchnata yn rownd derfynol y byd yn Singapore. Cafodd Amy ei dewis ar gyfer yr academi pan oedd yn Texas.

Mae'r rhaglen yn gofyn i fyfyrwyr gwblhau cyfres o fodiwlau e-ddysgu ar thema chwaraeon moduro, gan weithio gyda mentor Williams i'w harwain drwy'r broses. Yn ei blwyddyn gyntaf, mae Amy wedi dysgu am sut mae erodynameg, cyflymu, brecio a gyrru rownd corneli yn effeithio ar berfformiad ceir F1. Mae ei mentor, Michelle Davis, yn dylunio pibelli rheiddiaduron ac mae'n gyfrifol am oeri'r injan y tu mewn i gar F1 Williams. Bob blwyddyn, ar ôl cyfres o draethodau a chyfweliadau, mae Williams yn torri'r grŵp i lawr. Roedd Amy wrth ei bodd i glywed ei bod hi wedi llwyddo i gyrraedd ail flwyddyn y rhaglen chwe blynedd. Ei mentor yn yr ail flwyddyn yw Laurence

Amy Martin gyda thîm Tachyon, ail o'r dde

Griffiths, sy'n uwch-beiriannydd methodoleg CFD. Bydd yn ei thywys trwy'r unedau diogelwch, màs, trawsyriant a brecio trwy gydol y flwyddyn.

Yn ogystal â rheoli gofynion y rhaglen beirianneg, mae Amy yn astudio ar gyfer ei chymwysterau AS mewn ffiseg, mathemateg, mathemateg bellach, llywodraeth a gwleidyddiaeth, a llenyddiaeth Saesneg. Dywedodd: "Mae'r holl brofiad gyda Randstad a Williams wedi bod yn gwbl anhygoel, ac mae'n wahanol iawn i ddysgu arferol. Maen nhw'n ein profi a'n herio, ac rwy'n credu ei fod wedi fy helpu i ddatblygu fy ngwybodaeth am bynciau penodol.

"Gan mai fi yw un o'r ifancaf yn yr academi, nid ydym ni wedi trafod llawer o'r pynciau yn y dosbarth ffiseg neu dechnoleg. Mae fy athrawon technoleg a ffiseg, Mr Gareth Jones, Mr Alex Price a Mr John Breese, yn fy helpu gyda llwyth gwaith yr academi, ac maen nhw wedi bod yn gefnogol iawn o'm holl ymdrechion y tu allan i'r ysgol. Mae'r cymorth rwyf yn ei dderbyn ganddyn nhw, a gan fy nheulu, yn fy ysgogi i lwyddo yn yr Academi.

"Yn y dyfodol, byddwn i wrth fy modd yn mynd i brifysgol dda fel Rhydychen neu Goleg Imperial, Llundain i astudio peirianneg fecanyddol neu awyrennol. Os byddaf yn llwyddiannus trwy gydol y rhaglen chwe blynedd gyda Williams, efallai y caf gynnig swydd gyda nhw – mae hyn yn rhywbeth yr hoffwn ei wneud yn bendant. Fy uchelgais yw bod yn beiriannydd ym maes chwaraeon modurol, ac rwy'n werthfawrogol iawn o'r holl brofiad a'r cymorth anhygoel yr wyf wedi'i dderbyn i fy helpu i nesáu at gyflawni fy uchelgais."

Yn ddiweddar, aeth Amy gyda'i thad a'i chwaer i wylio Grand Prix Abu Dhabi, sef rownd olaf Formula 1. Tra roedd hi yno, aeth i garej Williams i gwrdd â Felipe Massa, a chafodd ei gwahodd i'r pit ar gyfer ras olaf y tymor, oedd yn "anrhydedd anferth" yn ei geiriau hi.

Mae pob aelod o Dîm Tachyon wedi aros ymlaen yn Ysgol Uwchradd Dinbych i ymuno â'r chweched dosbarth. Mae Holly Roberts, peiriannydd dylunio'r tîm, a Jessica Briody Hughes, y peiriannydd gweithgynhyrchu, yn ystyried gyrfaoedd mewn peirianneg neu fathemateg, ac mae Katie Rowlands, y rheolwr adnoddau, eisiau dilyn gyrfa yn y gyfraith.

Cynhaliodd yr ysgol wasanaeth arbennig ym mis Ionawr i anrhydeddu cyflawniadau rhagorol y myfyrwyr a'u cyfraniad i'r ysgol. Mae llwyddiant y tîm dros y ddwy flynedd ddiwethaf hefyd wedi cael ei gydnabod gan Ann Jones AC. Cyfarfu â'r merched ar ymweliad â'r ysgol ac yna siaradodd am eu cyflawniadau yn y Senedd, Caerdydd.

TALENT PEIRIANNEG I'R DYFODOL YNG NGHYMRU 7

Pencampwyr F1 mewn Ysgolion y DU 2018 yn dathlu eu buddugoliaeth yn rownd derfynol y byd yn Singapore

Alison Hill
Swyddog y Wasg F1 mewn Ysgolion

Team Unity, from Emmanuel College, Gateshead, celebrate winning F1 in Schools UK National Finals 2018

Dathlodd Unity, tîm o fyfyrwyr 16 a 17 oed o Goleg Emmanuel, Gateshead, eu buddugoliaeth yn Rownd Derfynol Genedlaethol F1 mewn Ysgolion y DU 2018, gan brofi bod dyfalbarhad a phenderfyniad yn cael eu gwobrwyo – dyma oedd eu pedwerydd cynnig cyn ennill teitl pencampwyr y DU. Mae'r llwyddiant yn sicrhau lle'r tîm yn Rownd Derfynol y Byd F1 mewn Ysgolion 2018 yn Singapore ym mis Medi, ochr yn ochr â Grand Prix Formula 1 Singapore.

Y gwobrau i'r pencampwyr oedd tocynnau i Grand Prix Formula 1 Prydain, trwy garedigrwydd trac rasio Silverstone, mynediad arbennig i'r 'Paddock' yn y digwyddiad gan Formula 1, taith o ffatri tîm Formula 1, dwy ysgoloriaeth £5,000 ar gyfer gradd peirianneg fecanyddol yng Ngholeg Prifysgol Llundain (UCL) a chyfarpar Denford gwerth £10,000 ar gyfer eu hysgol.

Hefyd, enillodd Unity y wobr am y car a beiriannwyd orau ar ei ffordd i ennill coron y DU, gyda'r beirniaid yn canmol y tîm am ddyluniad, gweithgynhyrchu a pheirianneg y car F1 mewn Ysgolion.

Ymysg dagrau o lawenydd ar frig y podiwm, dywedodd Lucy Brooks, arweinydd tîm Unity: "Does gen i ddim geiriau. Mae'n anhygoel; rydyn ni i gyd wedi gweithio mor galed, felly dw i'n meddwl ein bod ni'n haeddu hyn. Mae hi wedi bod yn daith hir, ond yn werth chweil. Rydyn ni wedi bod gyda'n gilydd ers amser hir bellach, felly mae ein gwaith tîm yn sicr yn rhan bwysig o'n llwyddiant. Mae llawer o waith i'w wneud i baratoi ar gyfer Singapore, i sicrhau bod ein car cystal ag y gall fod. Rydyn ni'n gwybod y gall cystadlu yn rowndiau terfynol y byd agor drysau i yrfaoedd mewn peirianneg, felly mae'n gyfle gwych i ni. Rydyn ni'n edrych ymlaen at fod yno."

Yn ymuno ag Unity ar y podiwm ar ôl deuddydd o gystadlu brwd oedd Origin, tîm o Ysgol Robert May, Odiham, a fydd yn cynrychioli Lloegr yn rownd derfynol y byd, a Hawk Racing o Ysgol Ramadeg Colyton, Dyfnaint, sy'n cael cyfle i gydweithio gyda thîm buddugol F1 mewn Ysgolion tramor yn rownd derfynol y byd. Hefyd, bydd tîm Drive o Ysgol Gyfun Llangefni yn cynrychioli Cymru yn Singapore, a bydd Velocity Racing o Ysgol Uwchradd Gymunedol Inveralmond, Livingston, yn cystadlu dros yr Alban.

Hefyd, enillodd Tîm AcceleRace wedi'i bweru gan Inoapps, sef tîm F1 mewn Ysgolion yn y Dosbarth Datblygu o, Academi Linlithgow, yr Alban, eu lle yn rownd derfynol y byd, ar ôl ennill teitl pencampwyr Dosbarth Datblygu F1 mewn Ysgolion yn gynt yn yr wythnos.

Dywedodd Andrew Denford, sefydlydd a chadeirydd F1 mewn Ysgolion, am Rownd Derfynol y DU eleni: "Mae'r safon eleni wedi bod yn syfrdanol. Mae'r myfyrwyr wedi gweithio'n rhyfeddol o galed, gan ddangos lefel aruthrol o sgiliau peirianneg, dylunio a busnes, a bod yn llysgenhadon gwych dros eu hysgolion a dysgu STEM. Rwyf wrth fy modd i weld Unity'n fuddugol o'r diwedd, maen nhw wedi dangos dyfalbarhad, heb ildio eu breuddwyd o gynrychioli'r DU yn rownd derfynol y byd.

"Bron nad ydych yn sylwi ar y sgiliau a ddatblygwyd gan y myfyrwyr, gan fod eu hangerdd a'u hysgogiad i ddylunio'r car gorau posibl yn eu meddiannu. Ar ddiwedd y digwyddiad yn unig, pan fyddan nhw'n myfyrio ar eu gwaith, y byddan nhw'n sylweddoli pa mor bell maen nhw wedi dod a faint mae eu sgiliau wedi datblygu – p'un a yw'n hyder, arbenigedd CAD/CAM, arweinyddiaeth, rheoli amser, neu beirianneg. Rwy'n falch iawn o bob myfyriwr, tîm ac athro sydd ynghlwm â'r rhaglen; maen nhw'n dangos sut gall rhoi STEM ar waith fod yn amhrisiadwy mewn addysg."

Roedd Rownd Derfynol Genedlaethol F1 mewn Ysgolion y DU, a gynhaliwyd yng nghartref chwaraeon modurol Prydain, trac rasio Silverstone, yn dod â'r 42 tîm gorau o bob cwr o'r DU ynghyd, sef enillwyr y 10 rownd derfynol ranbarthol a gynhaliwyd yn gynharach eleni. Aeth y timau ati i fynd i'r afael â'r her o ddylunio, adeiladu, profi a rasio car F1 bychan, a threulio'r ddau ddiwrnod olaf yn cael eu cynigion wedi'u beirniadu mewn nifer o gategorïau, gan gynnwys archwilio, peirianneg, cyflwyniad llafar, arddangosfa pit a phortffolio menter, yn ogystal â phrofi cyflymder y car ar drac swyddogol F1 mewn Ysgolion – sef strip ceir 20 metr o hyd, y mae'r ceir F1 mewn Ysgolion yn ei wneud mewn ychydig dros eiliad.

Cynhaliwyd Rownd Derfynol Genedlaethol F1 mewn Ysgolion gyda chymorth llu o noddwyr a chefnogwyr. Ymhlith y rhain y mae IET, Autodesk, Denford Ltd, Airbus, City, University of London ac UCL Engineering.

Beth yw F1 mewn Ysgolion?

Mae F1 mewn Ysgolion yn herio myfyrwyr i greu eu tîm Formula 1 eu hunain, sy'n cael ei gomisiynu i ddylunio, adeiladu a rasio car Formula 1 bach cyflymaf y dyfodol; sef model 21cm o hyd wrth raddfa wedi'i greu o floc modelu ac wedi'i bweru gan silindr aer cywasgedig.

Mae pob tîm o rhwng tri a chwech o fyfyrwyr yn creu arddangosfa 'pit' ac yn arddangos ei waith o ddatblygu ei gar rasio. Yn y rownd derfynol genedlaethol, mae pob tîm yn dod ag arddangosfa pit, ei geir a'i bortffolio, yn ogystal â pharatoi cyflwyniad llafar i'r beirniaid.

Mae'r ceir yn rasio ar drac 20 metr, gyda'r ceir yn teithio'r pellter hwnnw mewn tua un eiliad. Mae rowndiau terfynol y byd yn dod â'r myfyrwyr gorau ynghyd i gystadlu am dlws uchel ei barch pencampwyr y byd, ac ysgoloriaethau a bwrsariaethau prifysgol gwerthfawr.

CYLCHGRAWN CYNLLUN ADDYSG PEIRIANNEG YNG NGHYMRU

Her Ysgolion Cynradd Jaguar 2018

Chris Harris
Cydlynydd Her Ysgolion Cynradd Jaguar EESW

Mae Her Ysgolion Cynradd Jaguar yn gystadleuaeth STEM sydd ar agor i ddisgyblion rhwng 6 ac 11 oed. Mae'n cynnwys dylunio a gweithgynhyrchu'r car cyflymaf posibl o fewn set o reolau, gan ddilyn y prosesau dylunio a gweithgynhyrchu sy'n cael eu defnyddio gan gwmnïau peirianneg go iawn fel Jaguar Land Rover.

Mae disgyblion yn ffurfio tîm o dri i chwe disgybl i ddylunio car rasio o gerdyn 160g/m² gydag olwynion, corff a hyd yn oed gyrrwr bach. Maen nhw'n dylunio ac yn gweithgynhyrchu cragen corff i'w osod mewn ffrâm sylfaenol gan ddefnyddio meddalwedd cyn argraffu a thorri eu dyluniadau ar gerdyn gan ddefnyddio torrwr plotiwr ac yna paratoi eu car i'w rasio. Caiff y ceir eu pweru gan getrisen 4gm CO2 wedi'i hailgylchu ac maen nhw'n cael eu rasio ar system amseru a thrac 20 metr sylfaenol F1 mewn Ysgolion.

Rownd derfynol ranbarthol gogledd Cymru

Daeth her Ysgolion Cynradd Jaguar F1 mewn Ysgolion i ben yng ngogledd Cymru yn Venue Cymru, Llandudno. Cymerodd saith o ysgolion ran, ac yn ôl yr arfer yng ngogledd Cymru, bu cystadlu brwd, gyda phedwar o leoedd ar gael yn rownd derfynol y DU – y mwyaf erioed. Rhaid i'r timau greu portffolio a threfnu arddangosfa pit i ddangos yr hyn maen nhw wedi'i ddysgu. Rhannwyd y gwobrau rhwng Lightning Strikes o Ysgol Bodafon, Eryrod Eryri o Ysgol Bro Gwydir a Plasma o Ysgol Esgob Morgan.

Yn ogystal â'r categori pit a phortffolio, mae'n rhaid i'r timau roi cyflwyniad llafar i baneli o feirniaid ac mae eu ceir yn cael eu marcio ar sail ansawdd peirianneg. Enillwyd y wobr cyflwyniad llafar eleni gan Jungle Racers o Nercwys, ac Eryrod Eryri o Ysgol Bro Gwydir enillodd y wobr am y car a beiriannwyd orau.

Roedd y rasio'n gystadleuol iawn unwaith eto, ac ni lwyddodd unrhyw dîm i guro amser ymateb anhygoel 0.009 a osodwyd gan Ysgol Bro Gwydir y llynedd. Fodd bynnag, Spycon o Ysgol Esgob Morgan a gyflawnodd amser ymateb gorau'r diwrnod, sef 0.162 o eiliad. Dyluniwyd a chrëwyd y car cyflymaf gan y tîm o Lanidloes, Jaguar X. Rhoddwyd gwobr ddewisol y beirniaid i'r Cosmic Raycers o Ysgol Bodafon.

Y pencampwyr cyffredinol yng ngogledd Cymru oedd Lightning Strikes o Ysgol Bodafon, gyda Light Speed o Nercwys, Eryrod Eryri o Ysgol Bro Gwydir a'r Jungle Racers o Nercwys yn cael eu gwahodd i gymryd rhan yn rownd derfynol y DU.


Mae EESW wedi ymrwymo i annog mwy o bobl ifanc i ystyried gyrfaoedd mewn disgyblaethau STEM, yn enwedig peirianneg

Rownd derfynol ranbarthol de Cymru

Cynhaliwyd rownd derfynol rhanbarth de Cymru yn Amgueddfa Genedlaethol y Glannau, Abertawe, a daeth 22 o ysgolion i gystadlu am bum lle yn rownd derfynol y DU. Roedd y safon mor uchel eleni, penderfynodd y beirniaid roi saith o wobrau dewisol. Dyfarnwyd y rhain i: Electric Roadsters o Ysgol Gynradd Clytha; Electric Wheels o Albert Road, Penarth; Supersonic o Ysgol Gynradd Coity; Dragon Fury o Garnteg; Lightning Bolts o Ysgol Gynradd Parc y Castell a thîm Spitfire o Ysgol Llanbedr.

Rhoddwyd y wobr pit a phortffolio i'r tîm o Gaedraw ym Merthyr o'r enw End Game. Cafodd y wobr cyflwyniad llafar ei roi ar y cyd i End Game o Gaedraw a Dragon Racing o Ysgol Gwaunfarren. Gyrrwr Ysgol Gynradd Deri View a'r tîm Lightning Bolts a gyflawnodd yr amser ymateb cyflymaf, sef 0.014 eiliad. Fodd bynnag, cafodd y car cyflymaf ei ddylunio a'i greu gan End Game o Ysgol Caedraw – cymerodd y car 0.958 eiliad i deithio ar hyd y trac 20 metr, sy'n golygu ei fod yn teithio'n gynt na 46 milltir yr awr!

Enillodd End Game o Ysgol Caedraw dlws yr enillwyr cyffredinol, yn gwbl haeddiannol. Yn ogystal, cafodd yr ysgolion/timau canlynol eu gwahodd i gymryd rhan yn rownd derfynol genedlaethol y DU: Ysgol Gynradd Deri View – Lightning Bolts; Ysgol Gynradd Llangynidr – Tîm Bolt; Ysgol Gynradd Gwaunfarren – Dragon Racing ac Ysgol Gynradd Mynydd Cynffig – Turbo Titans.

Pencampwriaeth genedlaethol y DU

Nid yw'n syndod, ar ôl gweld y safon a ddangoswyd ganddynt drwy gydol y rowndiau terfynol rhanbarthol a chenedlaethol, y cafodd End Game o Ysgol Caedraw eu coroni'n bencampwyr y DU ar 20 Mehefin 2018 yn yr Amgueddfa Fodurol Genedlaethol yn Gaydon. Dyma anrhydedd fawr i'r ysgol ac i Gymru, ac mae'n benllanw sawl blwyddyn o waith caled gan yr ysgol a'i hathrawon, Miss J Stokes a Mr S Beale. Rhaid cydnabod Ysgol Gynradd Gwaunfarren hefyd, a enillodd y wobr nawdd, ac mae hyn yn nodedig gan mai dyma ei blwyddyn gyntaf yn cymryd rhan yn Her Ysgol Gynradd Jaguar.

Y pedwerydd chwyldro diwydiannol – Diwydiant 4.0

Bob Cater
Prif Weithredwr Cynllun Addysg Beirianneg Cymru

Yn y rhifyn diwethaf, esboniais ein bod ni ar drothwy chwyldro diwydiannol a fydd yn newid y ffordd rydym yn byw, yn gweithio ac yn ymwneud â'n gilydd yn sylfaenol. O ran ei raddfa, ei gwmpas a'i gymhlethdod, bydd y trawsnewidiad yn annhebyg i unrhyw beth y mae'r ddynoliaeth wedi ei brofi cyn hyn. Mae'n cael ei alw'n bedwerydd chwyldro diwydiannol, neu Ddiwydiant 4.0.

Yn ystod y 150 mlynedd ddiwethaf, mae'r DU wedi byw trwy dri chwyldro diwydiannol. Roedd y chwyldro diwydiannol cyntaf, a ddechreuodd oddeutu 1760, wedi trawsnewid ffordd o fyw nad oedd wedi newid rhyw lawer ers yr Oesoedd Canol. Parhaodd yr ail chwyldro diwydiannol o ganol y 19eg ganrif hyd at ddechrau'r Rhyfel Byd Cyntaf, ac roedd yn cynnwys defnyddio dur ar raddfa eang yn y DU, a chyflwyno masgynhyrchu. Digwyddodd y trydydd chwyldro, neu'r chwyldro digidol, yn ail hanner yr ugeinfed ganrif, a gwelodd ddiwydiant yn newid o ddefnyddio technoleg electronig fecanyddol ac analog, i ddigidol.

Sbardunodd y chwyldro digidol ddechrau'r oes wybodaeth yr ydym yn byw ynddi heddiw – rhoddir enw digidol addas i oes y rhyngrwyd a Rhyngrwyd Pethau, sef Diwydiant 4.0.

Mae Diwydiant 4.0, neu'r pedwerydd chwyldro diwydiannol, yn creu, i bob pwrpas, yr hyn a elwir yn 'ffatri ddeallus', sy'n defnyddio'r dechnoleg ddiweddaraf, gan gynnwys systemau seibr-ffisegol, Rhyngrwyd Pethau a chyfrifiadura cwmwl, i fonitro'r prosesau mewn ffatri a gwneud penderfyniadau gwybodus o bell.

Diwydiant 4.0

Bathwyd y term pedwerydd chwyldro diwydiannol o ganlyniad i'r effaith chwyldroadol y bydd technolegau newydd yn ei chael ar bob rhan o weithgynhyrchu. Bydd y rhyngweithio cynyddol rhwng dyfeisiau, neu Ryngrwyd Pethau, gweithgynhyrchu ychwanegol (argraffu 3D), data mawr a chynnydd roboteg yn cynyddu cynhyrchiant, arloesedd ac addasu torfol yn sylweddol. Yr ysgogwyr allweddol y tu ôl i'r datblygiadau hyn yw'r dechnoleg sydd ar gael yn fwy cyffredin, ar y cyd â'r dosbarth canol sy'n tyfu'n fyd-eang, sy'n arwain at alw cynyddol am gynnyrch unigoledig o ansawdd uchel.

Mae'n debygol y bydd y defnydd cynyddol o roboteg yn arwain at leihad sylweddol mewn swyddi gweithgynhyrchu, gan y bydd prosesau wedi'u hawtomeiddio'n disodli rôl pobl ar lawr y ffatri. Fodd bynnag, mae'n debygol y bydd colledion yn cael eu gwrthbwyso wrth i fewnbwn dynol ar ffurf creadigrwydd gael ei werthfawrogi'n fwy.

Fodd bynnag, mae prinder parhaus o bobl ifanc sy'n dewis pynciau STEM yn ein gwlad, ac mae angen mwy o beirianwyr arnom yn enwedig. Ond bydd angen ystod ehangach o sgiliau ar y mwyafrif o beirianwyr sy'n meddwl am syniad arloesol newydd na'r rhai a enillir ym maes mathemateg, peirianneg a thechnoleg. Byddan nhw hefyd yn defnyddio meddwl dylunio, creadigrwydd, cyfathrebu a sgiliau artistig er mwyn gwireddu'r arloesiadau hyn.


Mae EESW wedi ymrwymo i annog mwy o bobl ifanc i ystyried gyrfaoedd mewn disgyblaethau STEM, yn enwedig peirianneg

Nid yw'r syniad hen-ffasiwn fod peirianwyr a gwyddonwyr yn weithwyr ynysig yn berthnasol bellach. Mae yna gorff cynyddol o gefnogwyr sy'n dymuno ychwanegu A am 'art' at STEM, er mwyn creu STEAM.

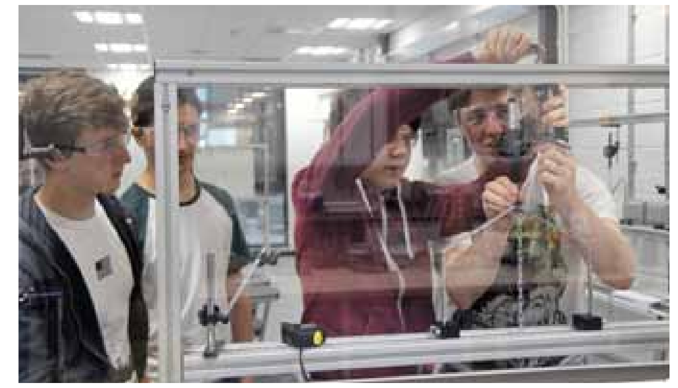
Beth mae Diwydiant 4.0 yn ei olygu i Gymru

Daeth Miller Research and Consulting i'r casgliad mewn adroddiad a baratowyd ar gyfer Diwydiant Cymru, bod economi Cymru wedi dibynnu ar ddiwydiannau trwm yn draddodiadol, o fasgynhyrchu dur a llechi ochr yn ochr â diwydiant morol cryf. Er gwaethaf presenoldeb pocedi o weithgynhyrchu peirianneg awyrofod a lled-ddargludyddion yng Nghymru, nid yw hyn yn cynrychioli'r sector gweithgynhyrchu ehangach yng Nghymru o bell ffordd, sy'n dechrau cael ei adael ar ôl o ran datblygiadau byd-eang mewn prosesau gweithgynhyrchu.

Mae'r llenyddiaeth bresennol yn dangos bod angen i Gymru ehangu ei marchnadoedd i fodloni galw byd-eang a buddsoddi'n sylweddol mewn ymdrechion i gynyddu galluoedd gwyddoniaeth, technoleg, peirianneg a mathemateg gweithlu Cymru er mwyn cynnal neu gynyddu nifer y swyddi ym maes gweithgynhyrchu Cymru.

Mae gan hyn oblygiadau mawr i'r hyn rydym yn ei wneud gyda'r bobl ifanc yn ein hysgolion a'n colegau. Mae EESW wedi ymrwymo i annog mwy o bobl ifanc i ystyried gyrfaoedd mewn disgyblaethau STEM, yn enwedig peirianneg. Mae Llywodraeth Cymru, trwy'r Academi Wyddoniaeth Genedlaethol a Swyddfa Cyllid Ewropeaidd Cymru, yn gweithredu trwy gefnogi EESW a phrosiectau STEM eraill i fynd i'r afael â'r prinder pobl ifanc sy'n ystyried gyrfaoedd mewn disgyblaethau STEM ar hyn o bryd.

Gobeithio y bydd y cwricwlwm newydd, a ysbrydolwyd gan Donaldson, gyda'i chwe maes o ddysgu a phrofiad, yn darparu gwell sail ar gyfer datblygu agweddau a sgiliau i annog mwy o ddiddordeb ac astudio pynciau STEM ar lefelau uwch.


Ysgol haf Headstart Cymru

Prifysgol Abertawe'n gweithio law yn llaw gydag EESW

Tamsyn Protheroe
Swyddog cyfathrebu a marchnata digidol
Coleg Peirianneg
Prifysgol Abertawe

Dechreuodd ein perthynas gydag EESW dros 20 mlynedd yn ôl, ac ers hynny, rydym wedi bod yn falch o gefnogi gwaith y sefydliad.

Mae llawer o'n myfyrwyr presennol, a hyd yn oed ein staff, wedi elwa'n uniongyrchol ar gynlluniau EESW, gan gynnwys yr athro cyswllt peirianneg awyrofod, Dr Ben Evans, a gymerodd ran yn ysgol haf Headstart Cymru pan oedd yn ddisgybl yn Ysgol Gyfun Llandeilo Ferwallt, Abertawe.

Bob blwyddyn, rydym yn cynnal ysgol haf Headstart Cymru, wedi'i noddi gan EESW, ym Mhrifysgol Abertawe. Mae'n rhoi cyfle i 30 o fyfyrwyr Blwyddyn 12 o ysgolion yng Nghymru gymryd rhan ac ymgysylltu â phynciau a phrosiectau peirianneg sy'n canolbwyntio ar beirianneg awyrofod, cemegol, sifil, electronig a thrydanol, deunyddiau, mecanyddol a meddygol. Mae'r sesiynau hyn yn rhoi blas ar feysydd penodol o fewn y rhaglenni unigol mewn ffordd ymarferol, ryngweithiol a diddorol, gan amlygu beth mae gradd yn y meysydd hyn yn ei olygu, a thaflu goleuni ar yrfaoedd yn y dyfodol a gwaith ymchwil yn y meysydd hyn.

Mae gweithgareddau cymdeithasol gyda'r nos hefyd yn rhoi cyfle i fyfyrwyr wneud ffrindiau a mwynhau, ac mae elfen breswyl yr ysgol haf yn rhoi syniad iddynt o brofiad prifysgol arferol.

Bob blwyddyn, mae Prifysgol Abertawe yn noddi timau prosiect chweched dosbarth EESW sy'n cymryd rhan mewn prosiect dros chwe mis mewn cydweithrediad â phartneriaid yn y byd academaidd a diwydiannol.

Rydym yn darparu arweiniad arbenigol gan ein staff academaidd, fel Dr Ian Mabbett sydd wedi bod yn arwain yr ymdrech hon yn y brifysgol, a chan fyfyrwyr peirianneg israddedig a doethuriaeth presennol.

Hefyd, gall y timau ysgol ddefnyddio ein cyfleusterau a'n cyfarpar ymchwil byd-arweiniol, fel ein rhaglenni a'n meddalwedd dylunio a'n gweithdai technegol, i helpu eu prosiectau.

Caiff prosiectau chweched dosbarth EESW eu harddangos bob blwyddyn yn y ffeiriau Big Bang, ac roeddem yn falch o gynnal Ffair Big Bang De Cymru 2016 yng Nghampws y Bae Prifysgol Abertawe. Daeth dros 70 o dimau ysgol o bob cwr o dde Cymru i sioeau hwyliog, arddangosfeydd ymarferol a gweithdai rhyngweithiol.

Edrychwn ymlaen at barhau â'n perthynas a darparu cymaint o gymorth â phosibl i EESW a'r gwaith gwych mae'n ei wneud i ddarparu ac ehangu'r cyfleoedd i bobl ifanc yng Nghymru ymgysylltu ag astudiaethau a gyrfaoedd peirianneg.


Cynhaliwyd yr ysgol haf yng Nghampws y Bae, Prifysgol Abertawe

Edrych at y dyfodol gyda swyddfa ynni positif

Garbo Lim
Swyddog Marchnata
Coleg Peirianneg
Prifysgol Abertawe

Yma yn y Coleg Peirianneg ym Mhrifysgol Abertawe, rydym yn edrych at y dyfodol o hyd, p'un a yw hynny trwy ysbrydoli darpar-wyddonwyr, creu'r set newydd o beirianwyr neu drwy ein gwaith ymchwil blaengar.

Eleni, yn yr Ardal Beirianneg yng Nghampws y Bae, rydym ni wedi agor swyddfa ynni positif gyntaf y DU, sy'n cynhyrchu mwy o ynni solar nag y mae'n ei defnyddio. Fe'i hagorwyd gan Ysgrifennydd Gwladol Cymru, Alun Cairns, a dyluniwyd y swyddfa gan SPECIFIC, sef Canolfan Arloesi a Gwybodaeth y DU a arweinir gan ysgolheigion yn y Coleg Peirianneg.

Mae'r Swyddfa Weithredol yn cyfuno ystod o dechnolegau arloesol a fydd yn ei galluogi i greu, storio a rhyddhau ynni solar mewn un system integredig, gan gynnwys:

- To crwm gyda chelloedd solar integredig – gan ddangos natur hyblyg y panel ffotofoltäig laminedig
- System thermol ffotofoltäig ar y wal sy'n wynebu'r de - sy'n gallu creu gwres a thrydan o'r haul mewn un system
- Batris lithiwm-ion i storio'r trydan a gynhyrchir a thanc dŵr 2,000 litr i storio gwres solar

Mae'r Ystafell Ddosbarth Weithredol ger y Swyddfa Weithredol, sef ystafell ddosbarth ynni positif gyntaf y DU. Fe'i hadeiladwyd gan SPECIFIC hefyd, ac yn ddiweddar enwodd RICS Cymru y prosiect hwn yn Brosiect y Flwyddyn. Yn ei blwyddyn gyntaf, llwyddodd yr Ystafell Ddosbarth Weithredol i gynhyrchu dros 1.5 gwaith yn fwy o ynni nag y'i defnyddiodd.


Swansea University's energy-positive office

Mae ynni adnewyddadwy yn rhan fawr o'n gwaith ymchwil yma yn y coleg, ac rydym yn defnyddio ein harbenigedd i ysbrydoli'r genhedlaeth nesaf trwy fynd â'n gwaith ymchwil ar daith. Yng Ngŵyl Wyddoniaeth Prifysgol Abertawe eleni, rhwng 3 a 8 Tachwedd, bydd SPECIFIC yn cynnal gweithgaredd bwrdd rhyngweithiol a fydd yn cynnwys plant yn creu paneli solar gan ddefnyddio llus.

Mae'r Beic Hydrogen hefyd yn gwibio o amgylch ffeiriau gwyddoniaeth cenedlaethol, sy'n dangos ein gwaith ymchwil sy'n gweithio tuag at ddefnyddio hydrogen fel cludydd ynni cyffredinol. Yn ystod y digwyddiadau hyn, gallwch fynd ar y beic a gwylio, mewn amser real, wrth i'ch ynni gael ei storio fel nwy hydrogen. Os byddwch chi wedi creu digon o hydrogen, gallwch wylio wrth iddo gael ei losgi yn ein llosgwr micro i ddychwelyd eich ynni.

Gwneir ymdrech fawr i fynd â'n gwaith ymchwil at y gymuned, ond rydym hefyd yn annog ymwelwyr i ddod i brofi STEM yma ar ein campws. Eleni, rydym ni wedi croesawu dros 300 o blant ysgol i'n campws i fynd ar daith o'n cyfleusterau, gwrando ar sgyrsiau ysbrydoledig gan ymchwilwyr byd-arweiniol a chymryd rhan mewn sesiynau ymarferol amrywiol.

Os hoffech ddod i ymweld â ni, cysylltwch â ni drwy anfon neges e-bost at engineering@swansea.ac.uk neu ffonio 01792 295514.

Tîm STEM yn cefnogi Cynllun Addysg Beirianneg Cymru – gogledd Cymru

Aeth Laurence Baron, Engineering Broughton, i Ffair STEM Big Bang Cymru yn Llandudno a chymerodd ran yn rowndiau terfynol EESW, yn beirniadu'r cynigion gan ysgolion a cholegau yn ogystal â chynorthwyo Ysgol Uwchradd Penarlâg gyda'r prosiect dylunio a roddodd iddyn nhw, sef 'Aircraft iTable'.

Er na enillodd Ysgol Uwchradd Penarlâg wobr, cafodd ei henwebu am ddwy (potensial masnachol gorau a'r adroddiad cyffredinol gorau), a chafodd sgôr o 82% i gyrraedd yr wythfed safle ar y cyfan, sy'n ymdrech dda iawn.

Cysyniad yr 'iTable' oedd dylunio bwrdd yr oedd modd ei blygu allan/i fyny/i lawr i'w osod mewn awyren sydd â'r holl gysylltedd angenrheidiol ar gyfer 'swyddfa mewn bwrdd'.

Ar ôl ymweliad â Broughton i weld Sentinel RMk1, roedd modd i'r tîm sefydlu manyleb gan ddilyn elfennau sylfaenol y broses rydym yn ei defnyddio i ddatblygu cynnyrch. Dangosodd y tîm ddull rhesymegol a thrylwyr o gyflawni'r dasg, a chynhyrchwyd adroddiad terfynol manwl a dderbyniodd enwebiad haeddiannol.

Mae menter STEM Raytheon UK wedi'i hen sefydlu, ac mae'n dangos buddsoddiad a chymorth i gymunedau ac ysgolion lleol. Mae'r fenter yn cefnogi her Llywodraeth y DU i fynd i'r afael â'r prinder sgiliau technolegol cenedlaethol yn rhagweithiol ac mae'n darparu gwaith ymgysylltu yn holl safleoedd Raytheon. Mae ein menter STEM hefyd yn cefnogi ein gweithwyr, sy'n eu galluogi i ysbrydoli'r genhedlaeth nesaf. Bellach, mae gennym dros 170 o lysgenhadon STEM cofrestredig, gyda chynrychiolaeth ar draws ein holl brif safleoedd.

Ffair Big Bang – De Cymru – enillwyr ac enwebeion gwobrau EESW

Sponsor Noddwyr	**Award** Gwobr	**Nominees** Enwebeion	**Winner and link company** Enillydd ac eu Cwmni
AIRBUS	**Most Innovative or Adapted Design** Y Cynllun Arloesol neu Addasedig Gorau	65 Ysgol Maesydderwen 66 Cardinal Newman RC School	65 Ysgol Maesydderwen Working with University of Wales Trinity Saint David
Continental	**Project with the Most Commercial Potential** Y Prosiect â'r Potensial Masnachol Mwyaf	15 Cardiff High School 37 Ysgol Gyfun Emlyn 1 45 Ysgol Uwchradd Aberteifi 51 Bassaleg School 60 Pembrokeshire College 2	60 Pembrokeshire College 2 Working with Valero
Ford	**Best Engineering Design** Y Cynllun Peirianneg Gorau	19 Llanishen High School 2 27 Whitchurch High School 4	19 Llanishen High School 2 Working with GE Aviation
GENERAL DYNAMICS United Kingdom Limited	**Best Overall Team Performance** Y Perfformiad Tîm Cyffredinol Gorau	6 Cynffig Comprehensive School 53 Caerleon Comprehensive School 2 54 Rougemont School 1 64 Ysgol Y Preseli 82 St Alban's RC High School 2	6 Cynffig Comprehensive School Working with Sony UK Tec
IChemE Advancing Chemical Engineers Worldwide	**Best Chemical/Process Engineering Design** Y Cynllun Peirianneg Gemegol / Broses Gorau	4 Brynteg School 2 74 Gower College Swansea, Tycoch 2	4 Brynteg School 2 Working with SAS International
IET The Institution of Engineering and Technology	**Best Application of Engineering and Technology** Y Defnydd Gorau o Beirianneg a Thechnoleg	16 Howell's School 1 19 Llanishen High School 2 47 Monmouth School for Boys 60 Pembrokeshire College 2	47 Monmouth School for Boys Working with Renishaw
Institution of Mechanical Engineers	**Best Appreciation of Safety Issues** Y Gwerthfawrogiad Gorau o Faterion Diogelwch	40 Ysgol Maes y Gwendraeth 1 50 St Joseph's School and Sixth Form Centre 2 59 Pembrokeshire College 1 68 Treorchy Comprehensive School 2	40 Ysgol Maes y Gwendraeth 1 Working with National Botanic Garden of Wales
INDUSTRY WALES Growing Welsh Technology and Manufacturing Business Globally	**Most Effective Presentation of the Chosen Solution** Y Cyflwyniad Mwyaf Effeithiol o'r Ateb	17 Howell's School 2 15 Cardiff High School 37 Ysgol Gyfun Emlyn 1 47 Monmouth School for Boys	37 Ysgol Gyfun Emlyn 1 Working with Aberystwyth University
Power & Water	**Best Application of Science** Y Defnydd Gorau o Wyddoniaeth	17 Howell's School 2 21 St John's College 1 39 Ysgol Gyfun Gymraeg Bro Myrddin 77 Ysgol Gyfun Gymraeg Bryn Tawe	77 Ysgol Gyfun Gymraeg Bryn Tawe Working with Power and Water
Swansea University Prifysgol Abertawe	**Best Energy Appreciation** Y Gwerthfawrogiad Gorau o Ynni	34 Queen Elizabeth High School 50 St Joseph's School and Sixth Form Centre 2	50 St Joseph's School and Sixth Form Centre 2 Working with Weartech
	Best Working Model or Prototype Y Model Gweithio neu'r Prototeip Gorau	16 Howell's School 1 17 Howell's School 2 47 Monmouth School for Boys 59 Pembrokeshire College 1 60 Pembrokeshire College 2	16 Howell's School 1 Working with Renishaw
TATA STEEL	**Best Application of Maths** Y Defnyddd Goran o Fathemateg	21 St John's College 1 22 St John's College 2	21 St John's College 1 Working with the University of South Wales
VALERO	**Best Appreciation of Environmental Issues** Y Gwerthfawrogiad Gorau o Faterion Amgylcheddol	49 St Joseph's School and Sixth Form Centre 1 50 St Joseph's School and Sixth Form Centre 2 70 Bishop Gore School 83 Cowbridge Comprehensive School	70 Bishop Gore School Working with the University of Wales Trinity Saint David
Llywodraeth Cymru Welsh Government	**Most Innovative Solution to the Project Set** Yr Ateb Mwyaf Arloesol i'r Prosiect	3 Brynteg School 1 37 Ysgol Gyfun Emlyn 1 66 Cardinal Newman RC School 76 Ysgol Gyfun Gwyr 81 St Alban's RC High School 1	66 Cardinal Newman RC School Working with Capita
wjec cbac	**Best Overall Written Report** Yr Adroddiad Ysgrifenedig Cyffredinol Gorau	2 Bridgend College 16 Howell's School 1 23 St Teilo's CIW High School 27 Whitchurch High School 4 45 Ysgol Uwchradd Aberteifi 82 St Alban's RC High School 2	27 Whitchurch High School 4 Working with GE Aviation
ZODIAC AEROSPACE	**Most Innovative Application of an Existing Technology** Y Defnydd Mwyaf Arloesol o Dechnoleg Gyfredol	3 Brynteg School 1 35 Ysgol Dyffryn Taf 1 42 Penglais School 81 St Alban's RC High School 1	81 St Alban's School 1 Working with Meritor
The Big Bang Fair	**Big Bang nominations – three projects selected to go forward to the Big Bang National Fair in March 2019**	60 Pembrokeshire College 2 16 Howell's School 1 81 St Alban's RC High School 1	

Tymor newydd yn lansio her newydd

Mae Her Dechnoleg Land Rover 4x4 mewn Ysgolion, sef un o heriau prosiect STEM gorau'r byd, bellach ar agor i holl ysgolion uwchradd, colegau a grwpiau ieuenctid y DU i gofrestru ar gyfer tymor 2018/19.

Mae'r myfyrwyr yn gweithio mewn timau bach i ddylunio ac adeiladu Land Rover y dyfodol, gan arddangos eu doniau peirianneg. Rhoddir rolau gwahanol i aelodau pob tîm, sy'n gweithredu fel busnes bach, ac mae myfyrwyr yn cryfhau eu sgiliau rheoli prosiect, marchnata, peirianneg a chyfathrebu.

Bydd y timau llwyddiannus yn cystadlu mewn cystadlaethau rhanbarthol, cenedlaethol a rhyngwladol. Gall timau gofrestru ar-lein yn awr a dechrau gweithio ar eu cerbyd.

Mae'r timau'n dylunio eu ceir gan ddefnyddio cyfuniad o sgiliau dylunio-a-chreu a meddalwedd dylunio â chymorth cyfrifiadur/gweithgynhyrchu â chymorth cyfrifiadur (CAD/CAM).

Mae'r myfyrwyr yn adeiladu cerbyd 4x4 radio-reoledig yn ôl manylebau a osodwyd gan beirianwyr Jaguar Land Rover go iawn. Rhaid i'r cerbyd lywio a goresgyn rhwystrau yn llwyddiannus ar drac prawf oddi ar y ffordd sydd yn un mor anodd â'r peth go iawn, gan efelychu galluoedd cerbyd 4x4 maint llawn. Gall pob tîm arddangos y cerbyd mewn rownd derfynol ranbarthol i gystadlu am le yn rownd derfynol genedlaethol y DU.

Alison Hill
Swyddog y wasg Land Rover 4x4 mewn Ysgolion

Caiff mentoriaid Jaguar Land Rover a llysgenhadon STEM eu neilltuo i dimau i roi cyngor ac arweiniad i fyfyrwyr, gan ddarparu adnodd gwerthfawr gyda gwybodaeth am y diwydiant.

Caiff yr her ei fapio yn erbyn y Cwricwlwm Cenedlaethol gan OCR, a'r deunyddiau dull prosiect ar gyfer arholiadau cenedlaethol Caergrawnt mewn peirianneg ar gyfer pedwar cymhwyster, gydag OCR yn darparu dogfennau'r prosiect er mwyn cynorthwyo addysgu yn yr ystafell ddosbarth.

Gall myfyrwyr sy'n cymryd rhan yn Land Rover 4x4 mewn Ysgolion hefyd ennill dyfarniadau Cadet Diwydiannol, ysgoloriaethau peirianneg Arkwright, adran sgiliau Cynllun Dug Caeredin a chredydau adran sgiliau Dyfarniad Crest.

Cynigir ysgoloriaeth £1,000 i bencampwyr y DU Her Dechnoleg Land Rover 4x4 mewn Ysgolion i ddilyn unrhyw un o'r cyrsiau peirianneg a gynigir ym Mhrifysgol Harper Adams.

Eleni, mae yna her arloesi ACES newydd (mae'r byrfodd ACES yn sefyll am awtomatig, cysylltiedig, trydanol ac wedi'i rannu), a fydd yn herio peirianwyr ifanc i ddatblygu cysyniadau creadigol newydd ar gyfer nodwedd neu system yn y dyfodol. Mae'r her yn adlewyrchu sefyllfa gyfnewidiol y diwydiant modurol. O 2020 ymlaen, bydd pob cerbyd newydd Jaguar Land Rover wedi'i drydaneiddio, fel rhan o fuddsoddiad y cwmni mewn cerbydau a thechnolegau ACES.

Dywedodd Nelson Vale, rheolwr prosiect rhyngwladol, Land Rover 4x4 mewn Ysgolion: "Mae'r gystadleuaeth beirianneg boblogaidd hon i fyfyrwyr yn gyfle gwych i fyfyrwyr roi'r hyn maen nhw wedi'i ddysgu yn yr ystafell ddosbarth ar waith, gweithio gyda pheirianwyr yn y diwydiant ac ennill achrediadau a dyfarniadau gwerthfawr. Mae'r gystadleuaeth yn croesawu heriau'r diwydiant modurol yn y dyfodol, gyda phwysigrwydd cynyddol peirianneg meddalwedd, a cherbydau hunanreolus, cysylltiedig, gan sicrhau ei fod yn berthnasol i gyfleoedd gyrfaol."


Her trac oddi ar y ffordd EDGE 4X4 yn Rownd Derfynol y DU 2018 Land Rover 4x4 mewn Ysgolion

Dywedodd Victoria Perry, rheolwr effaith gymdeithasol fyd-eang Jaguar Land Rover: "Rydym ni eisiau ysbrydoli mwy o bobl ifanc ddawnus i fod yn beirianwyr i'n helpu i ddatblygu'r genhedlaeth nesaf o gerbydau a thechnolegau awtomatig, cysylltiedig, trydanol ac wedi'u rhannu. Mae Her Dechnoleg Land Rover 4x4 mewn Ysgolion yn dangos pwysigrwydd a pherthnasedd pynciau STEM yn y gweithle, ac mae hefyd yn rhoi cyfle i fyfyrwyr ddysgu am brosesau dylunio a pheirianneg bywyd go iawn.

"Mae cyfranogwyr blaenorol wedi ymuno â ni fel prentisiaid, israddedigion a graddedigion, a gobeithiwn ysbrydoli hyd yn oed mwy o fyfyrwyr disglair i ymuno â ni yn y dyfodol."

Gall myfyrwyr ac athrawon ddarganfod mwy am Her Dechnoleg Land Rover 4x4 mewn Ysgolion ar www.4x4inschools.co.uk a'i dilyn ar y cyfryngau cymdeithasol.

Ffair Big Bang – Gogledd Cymru – Enillwyr ac enwebeion gwobrau EESW

Sponsor Noddwyr	**Award** Gwobr	**Nominees** Enwebeion	**Winner and link company** Enillydd ac eu Cwmni
AIRBUS	**Best Application of Engineering and Technology** Y Defnydd Gorau o Beirianneg a Thechnoleg	7 Ysgol Uwchradd Glan Clwyd Team 2 8 Alun School Team 1 19 Ysgol Friars Team 1 20 Ysgol Friars Team 2 25 Coleg Cambria, Yale	8 - Alun School Team 1 Working with Toyota
Power Nuclear Horizon Nuclear Power	**Best Energy Appreciation** Y Gwerthfawrogiad Gorau o Ynni	1 Ysgol Aberconwy 5 Prestatyn High School	1 Ysgol Aberconwy Working with Dŵr Cymru Welsh Water
IET The Institution of Engineering and Technology	**Most Innovative Solution to the Project Set** Yr Ateb Mwyaf Arloesol i Brosiect	5 Prestatyn High School 17 Coleg Meirion-Dwyfor, Pwllheli Team 2 19 Ysgol Friars Team 1 20 Ysgol Friars Team 2	19 Ysgol Friars Team 1 Working with Photonics Academy of Wales at Bangor
Institution of Mechanical Engineers	**Best Use of Mechanical Engineering Principles** Y Defnydd Gorau o Egwyddorion Peirianneg Fecanyddol	6 Ysgol Uwchradd Glan Clwyd Team 1 7 Ysgol Uwchradd Glan Clwyd Team 2 18 Coleg Meirion-Dwyfor, Pwllheli 3 24 Welshpool High School 25 Coleg Cambria, Yale	18 Coleg Meirion-Dwyfor, Pwllheli 3 Working with EESW
TATA STEEL	**Best Overall Team Performance** Y Perfformiad Tîm Cyffredinol Gorau	6 Ysgol Uwchradd Glan Clwyd Team 1 12 Hawarden High School 21 Ysgol Uwchradd Bodedern 22 Ysgol Uwchradd Caergybi Team 1 25 Coleg Cambria, Yale	6 Ysgol Uwchradd Glan Clwyd Team 1 Working with Knitmesh
Llywodraeth Cymru Welsh Government	**Project with the Most Commercial Potential** Y Prosiect â'r Potensial Masnachol Mwyaf	12 Hawarden High School 21 Ysgol Uwchradd Bodedern 22 Ysgol Uwchradd Caergybi Team 1 23 Ysgol Uwchradd Caergybi Team 2	22 Ysgol Uwchradd Caergybi Team 1 Working with BAE Systems and Babcock
Llywodraeth Cymru Welsh Government	**Best Application of Science** Y Defnydd Gorau o Wyddoniaeth	2 Ysgol Bryn Elian Team 1 7 Ysgol Uwchradd Glan Clwyd Team 2 19 Ysgol Friars Team 1	7 Ysgol Uwchradd Glan Clwyd Team 2 Working with Mott Macdonald Bentley
wjec cbac	**Best Overall Written Report** Yr Adroddiad Ysgrifenedig Cyffredinol Gorau	15 Coleg Meirion-Dwyfor, Dolgellau Team 2 20 Ysgol Friars Team 2 21 Ysgol Uwchradd Bodedern 23 Ysgol Uwchradd Caergybi Team 2	20 Ysgol Friars Team 2 Working with Photonics Academy of Wales at Bangor
The Big Bang Fair	**Big Bang Nominations – Two projects selected to go forward to the Big Bang National Fair in March 2019** Welsh		8 Alun School Team 1 Working with Toyota 19 Ysgol Friars Team 1 Working with Photonics Academy of Wales at Bangor

Rhagoriaeth hyfforddiant peirianneg y Llu Awyr Brenhinol yng Nghymru ers 80 mlynedd

SR Rowley
Wg Cdr / Stn Cdr MOD Sain Tathan a CO Rhif 4 Ysgol Hyfforddiant Technegol MOD Sain Tathan

Un o hyfforddeion y Llu Awyr Brenhinol yn cynnal Uned Pŵer ar y Tir

Ers 1938, mae'r Llu Awyr Brenhinol wedi bod yn darparu hyfforddiant peirianneg o ansawdd uchel yng nghalon Bro Morgannwg, de Cymru.

Fe'i sefydlwyd ar 1 Medi 1938 yn y cyfnod yn arwain at yr Ail Ryfel Byd, a rôl gyntaf Llu Awyr Brenhinol Sain Tathan oedd cynnal Ysgol Hyfforddiant Technegol Rhif 4, i addysgu peirianwyr awyr i ymgymryd â thasgau technegol wrth hedfan ar awyrennau bomio. Mae gan yr ysgol yr anrhydedd o fod wedi hyfforddi 15 o'r 19 peiriannydd awyr a hedfanodd yn yr awyrennau yng Nghyrch Chwalwyr yr Argae gan Sgwadron 617 ar 17 Mai 1943.

Heddiw, mae Ysgol Hyfforddiant Technegol Rhif 4 yn parhau i weithredu yn y Weinyddiaeth Amddiffyn Sain Tathan (a ail-enwyd yn MOD Sain Tathan yn 2006). Fodd bynnag, mae ei rôl wedi datblygu o hyfforddi peirianwyr ar awyrennau i dechnegwyr tra medrus ar y tir, yn benodol Crefft Technegydd Cyffredinol y Llu Awyr Brenhinol, sy'n cael ei adnabod fel Grŵp Crefft 5.

Mae'r grŵp crefft hynod amrywiol hwn yn cynnal amrywiaeth eang o gyfarpar i alluogi a chynnal gweithrediadau awyrennau yn y DU ac o amgylch y byd. O beiriannau tân maes awyrennau i eneraduron pŵer ar y tir, cyfarpar llwytho awyrennau i offer deintiol a Land Rovers i gerbydau arfog, mae galluoedd peirianneg technegwyr cyffredinol y Llu Awyr Brenhinol yn rhyfeddol.

Gall crefftwyr y gweithdy hyd yn oed greu cydrannau awyrennau o ddeunyddiau crai mewn lleoliadau byddin fel Affganistan.

Mae thua 200 o hyfforddeion ym MOD Sain Tathan ar un adeg, felly mae'r ysgol yn brysur o hyd, ac yn ymdrechu i ddarparu'r profiad gorau i'r hyfforddeion ac allbwn i reng flaen y Llu Awyr Brenhinol. Yn ogystal â gwthio ffiniau technegol, mae'r ysgol hefyd yn ymfalchïo yn ei darpariaeth dyletswydd gofal, gan ofalu am les yr hyfforddeion wrth iddynt nhw ddysgu. Mae Ysgol Rhif 4 yn destun archwiliadau Ofsted, yn yr un modd ag unrhyw ysgol neu goleg arall, felly rhaid iddi sicrhau y cynhelir y safonau bob amser, sy'n arbennig o bwysig i hyfforddeion dan 18 oed, neu rai o gefndiroedd bregus.

Mae'r hyfforddiant a gyflwynir gan yr ysgol hefyd yn cyd-fynd â dyfarniad prentisiaeth Lefel 3 – sef cam cyntaf llawer o gyfleoedd datblygu gyrfa a gynigir gan y Llu Awyr Brenhinol. Cafodd yr ymroddiad hwn i broffesiynoldeb a buddsoddi mewn talent ei gydnabod yn ddiweddar gan y Gwasanaeth Prentisiaethau Cenedlaethol, wrth i'r Llu Awyr Brenhinol gael ei enwi'n enillydd y categori Cyflogwr Macro (dros 5,000 o weithwyr) a'i gynnwys ar restr uchel ei pharch y 100 Cyflogwr Prentisiaethau gorau.

Nid yw'r ysgol yn canolbwyntio ar ei swyddogaeth Llu Awyr Brenhinol yn unig; mae hefyd yn chwarae rôl weithredol yn y gymuned leol, fel cefnogi mentrau elusennol a hyrwyddo STEM. Hyd yma yn '2018: Blwyddyn Peirianneg', mae'r ysgol wedi cynnal 11 o ddigwyddiadau STEM mawr, gan gyrraedd dros 30,000 o bobl a chodi eu hymwybyddiaeth o beirianneg – ac roedd llawer o'r rhain yn bobl ifanc neu'n blant. Mae'r ysgol hefyd yn croesawu ei chydweithrediad diweddar â Chynllun Addysg Beirianneg Cymru.

Mae'r Llu Awyr Brenhinol yn annog amrywiaeth yn ei weithlu, gan recriwtio pobl o bob grŵp ethnig a rhywedd, ac mae wedi ennill nifer o wobrau am ei ymdrechion. O rai sy'n gadael yr ysgol i unrhyw un sy'n chwilio am her newydd, mae Peirianneg y Llu Awyr Brenhinol yn cynnig cyfleoedd cyffrous i bobl sy'n dymuno dysgu crefft a rhoi cynnig ar rywbeth sy'n wahanol i swydd arferol (#NoOrdinaryJob).

Personél Ysgol Hyfforddiant Technegol Rhif 4 ar orymdaith yn derbyn Rhyddid Bwrdeistref Sirol Rhondda Cynon Taf (2 Mehefin, 2018)

Newport Wafer Fab, gwneuthurwr CHIP y Clwstwr CS

Cymru a'r pedwerydd chwyldro diwydiannol

Joanne Daniels
Partner Busnes Dysgu a Datblygu
Newport Wafer Fab Ltd

Helpodd glo Cymru i danio'r chwyldro diwydiannol cyntaf, gyda gweithfeydd dur Merthyr Tudful – Cyfarthfa a Dowlais – yn arwain at sefydlu tref ddiwydiannol gyntaf Cymru.

Erbyn 1830, roedd Sir Fynwy a Dwyrain Morgannwg yn cynhyrchu hanner y dur oedd yn cael ei allforio gan Brydain. Bellach, gall y dechnoleg lled-ddargludyddion cyfansawdd a ddatblygir yng Nghymru weithredu fel sail i nifer o'r technolegau sy'n dod i'r amlwg yn y pedwerydd chwyldro.

Mae prosesu lled-ddargludyddion ar silicon wedi bod yn cael ei ddefnyddio ers dros 50 mlynedd, ond oherwydd y galw cynyddol am ddefnyddiau terfynol y cynnyrch hwn, fel ffonau symudol, technoleg gyfrifiadurol a chanolfannau data, mae'n anodd bodloni'r galw byd-eang cynyddol am raglenni cyflymach fyth. Datblygwyd cyfuniadau o ddeunyddiau newydd o'r tabl cyfnodol, fel galiwm nitrid, sy'n gweithio perfformiad silicon 50 gwaith yn well. Gyda chyflymder uwch a cholledion pŵer is, gellir eu defnyddio ar gyfer synhwyro golau ac allyrru dros sbectrwm eang (ffotoneg), rhaglenni RF, synwyryddion, ac yn y byd meddygol lle mae bywyd batri'n hollbwysig.

I fodloni'r galw byd-eang cynyddol am raglenni cyflymach fyth, datblygwyd cyfuniadau o ddeunyddiau newydd o'r tabl cyfnodol fel galiwm nitrid, sy'n gweithio perfformiad silicon 50 gwaith yn well.

Gyda chyflymder uwch a cholledion pŵer is, gellir eu defnyddio ar gyfer synhwyro golau ac allyrru dros sbectrwm eang (ffotoneg), cymwysiadau RF, synwyryddion ac yn y byd meddygol lle mae bywyd batri'n hollbwysig.

Mae lled-ddargludyddion cyfansawdd yn ysgogi technolegau'r dyfodol: o'r byd cysylltiedig, Rhyngrwyd Pethau i roboteg, cerbydau hunan-yrru, 5G a thechnolegau gofal iechyd. Mae lled-ddargludyddion cyfansawdd yn effeithio ar y ffordd rydym yn byw, yn gweithio ac yn treulio ein hamser hamdden, a byddant yn parhau i wneud hynny. Y lled-ddargludyddion cyfansawdd sy'n cael eu creu yma yng Nghymru yw'r dechnoleg sy'n galluogi bywyd yn yr 21ain ganrif.

Mae CS Connected yn cynrychioli partneriaid busnes ac academaidd yng Nghymru sy'n ymwneud ag ymchwilio, datblygu, arloesi a/neu weithgynhyrchu cynnyrch sy'n ymwneud â lled-ddargludyddion cyfansawdd ac sy'n cael eu galluogi ganddynt.

Y sefydliadau sydd ynghlwm â hyn yw: Prifysgol Caerdydd, Prifysgol Abertawe, y Ganolfan Lled-ddargludyddion Cyfansawdd, y Catapwlt Lled-ddargludyddion, IQE PLC, Newport Wafer Fab, SPTS a Microsemi.

Mae'r cydweithrediad unigryw hwn rhwng cwmnïau eisoes yn lansio technolegau a fydd wrth wraidd y pedwerydd chwyldro diwydiannol. Mae gan y Clwstwr botensial i greu dros 2,000 o yrfaoedd uwch-dechnoleg ychwanegol, a fydd yn cyfrannu'n sylweddol at drawsnewid economi Cymru.

Dywedodd Dr Paul James, rheolwr gyfarwyddwr Newport Wafer Fab: "Mae hon yn her gyffrous, gan y bydd y Clwstwr yn creu llawer o swyddi uwch-dechnoleg yma yng Nghymru.

"Bydd angen llawer o beirianwyr a thechnolegwyr newydd arnom i fanteisio ar y cyfle hwn.

"Bydd y clwstwr yn darparu amrywiaeth eang iawn o gyfleoedd gyrfa peirianneg a gwyddonol ar gyfer y genhedlaeth nesaf, yn enwedig i'r rhai sy'n frwd ynghylch technoleg a pheirianneg, ac sy'n cael eu hysgogi gan y syniad o weithio ar flaen y gad ym maes technoleg."

Newport Wafer Fab yw gwneuthurwr haenell silicon integredig a chyfansawdd ar silicon, cynnau y byd, ac mae'n darparu gwasanaethau gweithgynhyrchu i Glwstwr Lled-ddargludyddion Cyfansawdd Cymru (CS Connected) a'r farchnad ffowndri fyd-eang ehangach.

Fel rhan o glwstwr CS, mae gennym gynlluniau twf uchelgeisiol i ehangu ôl troed gweithgynhyrchu'r safle.

Edrychwn ymlaen at weithio gydag EESW i annog mwy o bobl ifanc i ymddiddori yn ein diwydiant ac i ystyried gyrfaoedd gyda ni.

Rali 2018 – ennyn diddordeb y genhedlaeth nesaf

Jonathan Gill
Swyddog cenedlaethol y wasg MPA Creative

Bydd Rali GB Cymru Dayinsure hir-ddisgwyliedig eleni ar 4-7 Hydref unwaith eto'n ganolbwynt i nifer o fentrau pellgyrhaeddol sy'n ceisio ysbrydoli'r cenedlaethau nesaf o dalent ifanc uchelgeisiol.

Bydd presenoldeb Pencampwriaeth Rali'r Byd FIA gyffrous a thechnolegol yn y rhanbarth yn cael ei ehangu unwaith eto gan bresenoldeb arddangosfa STEM 'Big Bang' Ymwybyddiaeth o'r Diwydiant ym Mhentref y Rali. Dyma ganolbwynt dynamig y digwyddiad, sydd wedi'i leoli yn ardal ddiwydiannol Glannau Dyfrdwy, lle bydd yr holl dimau WRC wedi'u lleoli drwy gydol y digwyddiad chwaraeon modurol proffil uchel.

Bydd dros 1,500 o fyfyrwyr sy'n astudio pynciau STEM allweddol mewn sefydliadau addysg lleol yn ymweld â ffair Big Bang, a fydd yn cynnal llu o weithgareddau rhyngweithiol diddorol, wedi'u darparu gan nifer o arddangoswyr rhagweithiol. Ar ben hynny, bydd yr arddangosfa ar agor i bawb sy'n ymweld â Phentref y Rali – un o nifer o gyfleoedd rhad ac am ddim fydd ar gael i'r cyhoedd.

"Mae ymgysylltu ag addysg yn un o sawl ffordd y mae'r rali'n gwneud cyfraniad cadarnhaol i fywyd yng Nghymru," esboniodd Ben Taylor, sef rheolwr gyfarwyddwr Rali GB Cymru Dayinsure.

Parhaodd Ben: "Mae lleoliad Pentref y Rali, drws nesaf i safle peiriannau Toyota, a phresenoldeb timau rali WRC gorau'r byd, yn rhoi cyfle gwych i ni ennyn diddordeb y genhedlaeth nesaf. Mae'r cynllun Big Bang rhyngweithiol yn ffordd gyffrous o ddangos yr hyn sy'n ddeniadol am yrfa mewn chwaraeon modurol neu'r diwydiant modurol ehangach."

Gan ychwanegu at gyfraniad Toyota, mae ei gangen Brydeinig hefyd wedi cefnogi cystadleuaeth gyffrous i fyfyrwyr ifanc ddylunio corff car, gyda'r cynnig buddugol yn cael ei ychwanegu at gar rali GT86.

Pan fydd y GT86 wedi'i gwblhau, bydd yn cael ei arddangos yn yr arddangosfa Big Bang sy'n ganolbwynt i Bentref dynamig y Rali.

Wedi'i gydlynu ar y cyd rhwng trefnwyr y rali a Chynllun Addysg Beirianneg Cymru (EESW) ar ran Llywodraeth Cymru, roedd yr ornest ysbrydoledig ar agor i bob ysgol gynradd ac uwchradd a choleg trwy gydol y DU, gyda dosbarthiadau mynediad unigol ar gyfer Cyfnodau Allweddol 2, 3, 4 a 5.

Mae enillwyr y pedwar dosbarth yn cael eu gwahodd i Bentref y Rali, lle byddant yn derbyn bag yn llawn gwobrau rali, trwy garedigrwydd Performance Clothing, ac yn mwynhau cipolwg y tu ôl i'r llenni yn un o'r campau mwyaf cyffrous a thechnolegol yn y byd.

Cafodd dyluniad buddugol y llynedd – a grëwyd gan Rheinallt Jones, 12 oed, o Ysgol Gyfun Llangefni, Ynys Môn – ei ddatgelu'n swyddogol gan Ken Skates, Ysgrifennydd y Cabinet dros yr Economi a Seilwaith Llywodraeth Cymru a'r seren rasio WRC Toyota GAZOO, Jari-Matti Latvala.

Ken Skates AC gydag enillydd y llynedd, Rheinallt Jones, a Jari-Matti Latvala

Cafodd Rheinallt gyfle i weld ei ddyluniad buddugol yn addurno'r GT86, yn ogystal â derbyn model wrth raddfa o'i gar buddugol ac argraff arlunydd o'i ddyluniad. Cafodd y ddau eu llofnodi gan yrwyr rasio WRC Latvala, Juho Hänninen ac Esapekka Lappi, yn ogystal ag arweinydd y tîm a phencampwr WRC bedair gwaith, Tommi Mäkinen.

Mae'r rali Pencampwriaeth y Byd – a enillwyd y llynedd gan yr arwr lleol Elfyn Evans – hefyd yn cynnig mynediad am ddim i bob plentyn dan 15 oed, gyda gwarcheidwad.

Herio peirianwyr ifanc i feddwl mewn ffordd wahanol

Digideiddio – agor meddyliau ifanc i hen heriau diwydiannol

Gash Bhullar
Control 2K

Mae geiriau fel gemeiddio neu rith-ffatrïoedd yn cael defnyddio fwyfwy yn ddiweddar, ond nid oes llawer o bobl yn gwybod eu hunion ystyr neu oblygiadau. Rydym ni'n gwybod bod y dyfodol yn ddigidol, neu dyna beth mae pobl yn ei ddweud, beth bynnag, a dychymyg cenedlaethau'r dyfodol fydd yn penderfynu sut fydd yn cael ei lywio.

Mae Control 2K, fel cwmni arloesi, wedi ystyried y dyfodol hefyd. Mae'n dehongli'r geiriau hyn yn ei ffordd ei hun, a'r hyn maen nhw'n ei olygu i'r sector gweithgynhyrchu.

Mae pob un ohonom yn dibynnu ar ddiwydiannau gweithgynhyrchu i gynhyrchu ein ceir, awyrennau a chychod, creu ein ffonau symudol a phecynnu ein bwyd, yn yr un modd â'r ychydig gannoedd o flynyddoedd diwethaf. Rydym yn meddwl am ffyrdd newydd o greu pethau a defnyddio'r dechnoleg sydd ar gael i wneud pethau'n gynt, yn rhatach ac yn fwy dibynadwy, yn ddelfrydol, ond mae dibynadwyedd yn gallu bod yn destun strategaeth farchnata gan fod dadleuon ynghylch a yw'r gwerthwyr eisiau i chi gadw gafael ar bethau am flynyddoedd lawer.

Mae technoleg heddiw yn ymwneud â chasglu gwybodaeth (data) fel bod modd i ni wneud penderfyniadau mwy gwybodus a chysylltu mwy o brosesau gyda'i gilydd i'w gwneud yn haws i weld y darlun llawn pan fydd pethau'n mynd o'i le.

Mae diwydiannau gwahanol yn symud ar gyflymdra gwahanol, felly os gallwch ddwyn syniadau o feysydd fel y diwydiant gemau cyfrifiadurol a'u cymhwyso i weithgynhyrchu, gallech fod ar eich ennill!

Rydym yn herio peirianwyr ifanc i feddwl mewn ffordd wahanol a gweld sut gallant ymgorffori synwyryddion mwy newydd neu'r hyn a elwir yn ddyfeisiau Rhyngrwyd Pethau, i gysylltu gwahanol systemau â meddalwedd Industreweb. (www.industreweb.com). Caiff y technolegau hyn eu harddangos yn Waterton – sef Canolfan Arloesi Cymru ar gyfer Gweithgynhyrchu Digidol. Dewch i'n gweld ni ar waith.

Tyfu gwyddoniaeth ar gyfer cenedlaethau'r dyfodol

Yr Athro Peter Halligan
Prif Gynghorydd Gwyddonol Cymru

Mae Llywodraeth Cymru bob amser wedi bod yn awyddus i annog gweithgareddau sy'n darparu profiad cadarnhaol a chofiadwy o wyddoniaeth a pheirianneg i bobl ifanc, gan ei bod yn cefnogi gwyddoniaeth fel ffordd o gynyddu ffyniant a lles Cymru.

Yn sgil hyn, rwy'n falch o weld bod tîm 'Endgame' o Ysgol Gynradd Caedraw Merthyr wedi gwneud cynnydd anhygoel trwy Her Ysgolion Cynradd Jaguar, i fod yn bencampwyr y DU gyfan, yn ogystal ag ennill tair gwobr yn eu dosbarth, am y car cyflymaf, y cyflwyniad llafar gorau a'r car a ddyluniwyd orau.

Yn ogystal â chynnig fy llongyfarchiadau fy hun i'r pedwar disgybl yn y tîm, eu hathrawon a'u cefnogwyr, rwy'n gobeithio y byddan nhw'n manteisio ar eu llwyddiant ac yn parhau i ymddiddori ac ymgysylltu â gwyddoniaeth a pheirianneg trwy gydol eu gyrfaoedd.

Roeddwn i'n arbennig o falch o weld ysgol gynradd arall ym Merthyr, Gwaunfarren, yn ennill y tlws nawdd a marchnata.

Mae'n bwysig bod pob un ohonom yng Nghymru'n cael gwell gwerthfawrogiad a dealltwriaeth gyffredinol o beth a sut mae gwyddoniaeth a thechnoleg yn ei gyfrannu at fudd cymdeithasol ac economaidd. Mae'n anodd gwneud penderfyniadau gwybodus heb ddealltwriaeth o'r fath. Maen nhw'n effeithio ar gymaint o agweddau o'n bywydau ni heddiw, o feddyginiaeth bersonoledig i'n ffonau clyfar hollbresennol y mae'n anodd byw hebddynt bellach.

Mae gan Lywodraeth Cymru, fel llawer o wledydd eraill, reswm clir a gwirioneddol dros fod yn awyddus i weld mwy o blant a phobl ifanc yn ymddiddori mewn technoleg, peirianneg a mathemateg.

Yn syml, mae angen cenedlaethau o bobl gymwys a llythrennog mewn gwyddoniaeth yng Nghymru yn y dyfodol er mwyn cynnal busnesau a diwydiannau technoleg yfory. Bydd angen mwy o bobl ifanc sydd â phrofiad o bynciau STEM er mwyn gwneud hyn ar lefel uwch, yn awr ac yn y blynyddoedd sydd i ddod, er budd Cymru.

Ers sawl blwyddyn, mae problemau wedi bod wrth annog merched i astudio rhai pynciau gwyddoniaeth – a ffiseg a chyfrifiadura yw'r pynciau sy'n peri'r broblem fwyaf. Fel gwlad fach, glyfar, fodd bynnag, ni allwn fforddio colli talent y genhedlaeth hon, na'i hanwybyddu, felly rydym ni wedi bod yn cefnogi sawl rhaglen, a gynhelir gan Gymdeithasau Dysgedig, cwmnïau preifat a chan ysgolion a phrifysgolion i helpu i ysgogi'r newid hwn.

Fel rhan o fy rôl newydd fel Prif Gynghorydd Gwyddonol Cymru, rwy'n goruchwylio'r tîm sy'n cynnal yr Academi Wyddoniaeth Genedlaethol. Mae'r academi wedi bod yn gweithredu ers 2010, ac mae wedi cyflwyno sawl allbwn trawiadol, er gwaetha'r cyllid cymharol isel sydd ganddo – sef tua £1m y flwyddyn. Mae dros £4.4m wedi cael ei fuddsoddi ers 2012, gan gynnwys bron i 70 prosiect a dros 1,000 o weithgareddau cyfoethogi STEM wedi'u darparu i dros 132,000 o fyfyrwyr/cyfranogwyr.

Mae tua 1,300 o athrawon hefyd wedi elwa ar ddigwyddiadau datblygu proffesiynol STEM. Rhoddwyd addysg broffesiynol mewn hyfforddiant cyfathrebu ymchwil i dros 57 o ymchwilwyr, yr oedd 41 ohonynt yn fenywaidd, fel bod modd iddynt ddangos esiampl fwy effeithiol i'r genhedlaeth nesaf.

Mae'r Academi hefyd yn falch o fod wedi noddi dros 4,500 o Ddyfarniadau CREST Cymdeithas Wyddoniaeth Prydain i ddisgyblion yng Nghymru, ac ar y cyfan, mae tua 11,500 o Ddyfarniadau CREST wedi cael eu rhoi yng Nghymru – sy'n sefyllfa galonogol iawn.

Mae'r rhaglen gyfoethogi addysg STEM ffurfiol, yn ceisio cynyddu canran y myfyrwyr sy'n astudio TGAU gwyddoniaeth driphlyg (bioleg, cemeg a ffiseg). Heb y cymwysterau TGAU hyn, mae'n fwy anodd symud ymlaen i wyddoniaeth Safon Uwch ac astudio yn y brifysgol ar ôl hynny.

Gyda chyfanswm cyllideb o £7.2m sy'n cynnwys arian gan Lywodraeth Cymru a Chronfeydd Strwythurol Ewropeaidd trwy WEFO, bydd y rhaglen yn cael ei chyflwyno ledled Cymru i gynyddu lefelau astudio a chyflawni mewn pynciau STEM ymysg myfyrwyr 11-19 oed – yn benodol trwy eu hannog i astudio gwyddoniaeth yn darparu gweithgareddau cyfoethogi STEM wedi'u targedu i ddisgyblion 11 i 13 oed mewn 20-30 o ysgolion yng ngorllewin Cymru ac ardal y cymoedd. Bydd tair blwyddyn academaidd o'r gweithgareddau hyn.

Elfen unigryw o'r rhaglen hon yw'r cyfle i ddangos pa mor effeithiol yw'r gweithgareddau ymgysylltu STEM hyn, y tu hwnt i wybodaeth anecdotaidd o arolygon.

Bydd yn cynnal astudiaeth ymchwil hydredol sy'n torri tir newydd yn rhyngwladol, yn dilyn trywydd disgyblion 11-13 oed a fydd yn dangos effaith y buddsoddiad hwn yn nyfodol Cymru trwy ddarparu gweithgareddau ymgysylltu a chyfoethogi STEM.

Tim Caedraw yn ein rownd derfynol ranbarthol

Dylunio ar gyfer y dyfodol

Lucinda Dargavel
PDR

Mae annog a harneisio talent yn bwysig dros ben, ac mae PDR (y Ganolfan Ryngwladol ar gyfer Dylunio ac Ymchwil, wedi'i lleoli ym Mhrifysgol Metropolitan Caerdydd) yn falch o weithio mewn partneriaeth ag EESW, sy'n gwneud hynny yn union. Dyluniwyd y cynllun hwn i annog myfyrwyr y chweched dosbarth i astudio cyrsiau peirianneg mewn addysg bellach neu uwch.

Mae EESW yn gweithredu trwy annog cwmnïau lleol i osod briffiau ymchwil a datblygu i fyfyrwyr Blwyddyn 12 sy'n berthnasol i broblemau go iawn yn y diwydiant. Dros gyfnod o chwe mis, mae'r myfyrwyr yn mynd ati i ddatrys y problemau hyn mewn cydweithrediad â pheirianwyr a gwyddonwyr o'r cwmnïau cysylltiedig.

Trwy roi profiad cadarnhaol i'r myfyrwyr o gydweithio'n agos gyda pheirianwyr a gwyddonwyr proffesiynol mewn sefyllfa ddiwydiannol, mae'r rhaglen yn dangos iddyn nhw bod meysydd STEM yn rhai amrywiol ac ysgogol i weithio ynddynt, gan eu bod yn gallu darparu gyrfaoedd deallusol heriol iddyn nhw lle gallan nhw wneud gwahaniaeth mawr.

Gyda dros 30 o wobrau dylunio rhyngwladol, mae PDR yn cael ei ystyried ar flaen y gad yn rhyngwladol o ran y gwasanaethau y gall eu darparu yn ymwneud â dylunio, datblygu ac ymchwil.

Mewn partneriaeth ddiweddar rhwng EESW ac Ysgol Howell, gosododd Emily Bilbie o PDR, sef rheolwr gweithdy a'r prif beiriannydd ar y prosiect hwn, dasg i fyfyrwyr chweched dosbarth i ddylunio prosthesis braich a allai gael ei argraffu'n 3D gan ddefnyddio 'Lithograffeg Stereo' (SLA). Mae'r dechneg argraffu hon yn adeiladu strwythur 3D yn raddol trwy ddefnyddio haenau o bolymer sy'n cael eu gosod gan ddefnyddio golau uwchfioled. Mae'r dull hwn yn eich galluogi i 'baentio' haenau o bolymer i greu model terfynol.

Daeth wyth myfyriwr o Ysgol Howell, ynghyd â'u hathro Andrew Ford, i PDR ar gyfer yr ymweliad safle cychwynnol â phartner diwydiannol, lle cawsant daith dywys o'r cyfleusterau, a oedd yn cynnwys yr adran brototeip a gweithgynhyrchu a'r adran lawfeddygol a phrostheteg. Yn ystod yr ymweliad, cafodd y myfyrwyr gyfle i brofi Freeform yn uniongyrchol – sef y system CAD adborth cyffyrddiadol a ddefnyddir gan y dylunwyr.

Y rhesymeg y tu ôl i'r briff oedd dylunio cynnyrch cymharol rad a fyddai'n addas i'w ddefnyddio yn y byd datblygol yn y lle cyntaf. Roedd angen i'r prosthesis newydd fod yn ymarferol yn ogystal â deniadol, a byddai'n cynnwys rhannau amrywiol mewn amrywiaeth o liwiau y byddai modd eu gosod at ei gilydd yn hawdd.

Cafodd cledr, bysedd a rhan gysyllt u'r prototeip eu creu gan ddefnyddio SLA. Cafodd y tîm o fyfyrwyr arweiniad gwybodus, gyda syniad clir o sut i rannu'r rolau a'r cyfrifoldebau, a neilltuwyd is-dimau annibynnol i'r dasg hefyd – gan arwain at ddatblygu'r mecanwaith cysylltu a rheolyddion y bysedd ar wahân.

Roedd angen i ddyluniad y prosthesis ei hun ystyried canlyniadau gwaith ymchwil helaeth yn ymwneud â data ergonomig ac anthropometrig ac roedd angen iddo hefyd ddarparu dull digonol o gysylltu'r prosthesis â'r unigolyn.

Cyn ystyried elfen ddylunio'r her, roedd angen i'r myfyrwyr amlygu'r ystyriaethau allweddol y byddai eu hangen ar ddefnyddwyr prosthesis o'r fath. Er mwyn gwneud hyn, trefnwyd cyfarfod a chyfweliad gyda rhywun oedd wedi colli un o'i aelodau er mwyn cael syniadau am y nodweddion dymunol a'r problemau posibl gyda phrosthetegau o safbwynt defnyddwyr.

Dros gyfnod y prosiect, gwelwyd sgiliau rheoli prosiect y myfyrwyr yn gwella yn sicr, a chafodd y myfyrwyr eu cyflwyno i hanfodion argraffu 3D a dylunio, yn ogystal â dysgu am gynaliadwyedd, defnyddiau masnachol, hyfywedd a chost-effeithiolrwydd.

Aethpwyd â'r prototeip cyflawn, ynghyd â'r adroddiad ysgrifenedig terfynol, i ddiwrnod gwobrwyo EESW lle cafodd y beirniaid eu plesio gan wreiddioldeb y cynnyrch, a gallent weld ei botensial ar gyfer y dyfodol. Yna, roedd y myfyrwyr wrth eu boddau i ennill gwobr Llywodraeth Cynulliad Cymru am yr ateb mwyaf arloesol i broblem.

Dyma stori lwyddiannus i EESW, gan fod mwyafrif y tîm oedd ynghlwm â'r prosiect yn gobeithio dilyn gyrfa mewn peirianneg yn y dyfodol erbyn hyn, ac mae eu brwdfrydedd wedi eu hysgogi i drafod gwelliannau i'r prototeip ymhell ar ôl iddo gael ei gwblhau.

"Mae'n gyfle gwych i addysgu peirianwyr y dyfodol," dywedodd Emily Bilbie, y peiriannydd gweithgynhyrchu a phrototeip.

"Mae bod yn rhan o'r cynllun yn golygu y gall PDR gyfrannu at ddangos bod gyrfaoedd ym maes STEM yn heriol yn ddeallusol ac yn werth chweil. Mae'r tîm yn edrych ymlaen at osod her i'r set nesaf o fyfyrwyr," dywedodd Jarred Evans, cyfarwyddwr.

Os hoffech siarad â PDR am brosiect dylunio cynnyrch neu greu prototeip, cysylltwch ag Anthony ar amcallister@pdronline.co.uk


Tîm Ysgol Ferched Howell gydag Emily Bilbie, peiriannydd PDR

Endgame – y tîm o Ysgol Gynradd Caedraw

Endgame – taith y pencampwyr cenedlaethol

Jodie Stokes
Athrawes, Ysgol Gynradd Caedraw

Roedden ni wedi gweithio'n galed i gyrraedd y cam hwn, a dyma oedd ein cyfle i ddangos beth allwn ni ei wneud! Ar ôl misoedd o waith, roedd yr amser wedi cyrraedd o'r diwedd, ac roedd hi'n bryd pacio ein holl gyfarpar a theithio i Rownd Derfynol Ranbarthol F1 mewn Ysgolion De Cymru yn Abertawe. Roedd y gwaith a'r ymroddiad wedi bod yn anodd, gan weithio mewn tri chlwb ar ôl ysgol bob wythnos a phob amser cinio ac egwyl, ond roedden ni'n benderfynol o gynhyrchu'r car Formula 1 2D cyflymaf a welodd y DU erioed.

Dyma oedd y tro cyntaf i'r un ohonom ni fod mewn cystadleuaeth o'r fath, ac wrth i ni gyraedd Abertawe, roedden ni'n teimlo'n nerfus ac yn llawn cyffro. Wrth osod ein hardal pit, sylwon ni ba mor dda oedd rhai o'r timau eraill yn edrych, ac roedd angen i ni gystadlu yn erbyn 25 o dimau eraill, a sylweddolon ni'n sydyn nad oedd yn mynd i fod yn ddigwyddiad hawdd. Dyma ni'n gweithio'n ddi-stop drwy gydol y dydd wrth i ni siarad â phedair set o feirniaid a rasio ein car.

Wrth gwrdd â'r beirniaid peirianneg, roedden ni'n edrych ymlaen at esbonio'r holl wyddoniaeth a pheirianneg y tu ôl i'n car. Un o'r rhannau anoddaf oedd ein cyflwyniad llafar, oherwydd roedd angen i ni esbonio ein prosiect cyfan mewn amser byr iawn, ac yna esbonio'r holl sgiliau STEM a ddefnyddiom i'r beirniaid pit a phortffolio – roedd gennym ni gymaint i'w ddweud! Roedd ein gyrrwr, Rio, braidd yn nerfus cyn i ni rasio'r car, ond gwnaeth yn rhyfeddol o dda, gan ddangos yr amseroedd ymateb cyflymaf yn gyson yn ystod y dydd.

Arhosom am y canlyniadau gyda'r timau eraill, ac roedden ni'n nerfus iawn. Roedden ni wrth ein boddau i ennill y gwobrau am y car cyflymaf, y car a beiriannwyd orau, pit a phortffolio gorau, cyflwyniad llafar gorau a phencampwyr rhanbarthol! Dyma oedd canlyniadau gorau'r ysgol erioed, ac roedden ni wedi llwyddo i fynd ymlaen i gynrychioli de Cymru yn rownd derfynol genedlaethol y DU!

Roedd amser yn brin i baratoi ar gyfer rownd derfynol genedlaethol y DU. Er mai ein car ni oedd y cyflymaf yn ne Cymru, nid oedden ni'n hapus gyda'i berfformiad ar y dydd, ac roedden ni'n gwybod y gallai ein car fynd yn gynt. Ar ôl dadansoddi'r car, amlygwyd rhai problemau, ac aethom ati i gynnal profion a gweithio i'w wella.

Cynhaliwyd rownd derfynol y DU yn ffatri Jaguar ger Stratford. Roedd yn lleoliad gwych ac roedd timau o bob cwr o'r DU yn cystadlu. Aeth ein cyflwyniad llafar a'n sgyrsiau gyda'r beirniaid pit yn dda iawn. Roedd y beirniaid peirianneg yn wych, ac roedd llawer o gwestiynau ganddyn nhw am ein gwaith a sut gwnaethon ni wahanol rannau'r car.

Ein car ni oedd y 32ain o 36 car i rasio, ac roedd y nerfau wedi bod yn cynyddu drwy'r dydd. Roedden ni'n ansicr a fyddai ein car yn ddigon da, oherwydd y cyflawnwyd amseroedd cyflym dros ben drwy gydol y dydd – ceir ag amseroedd cynt nag unrhyw un o'n hamseroedd ni yn y gorffennol.

Er ei fod e'n nerfus iawn, roedd Rio, ein gyrrwr, wedi perfformio'n anhygoel, gan gyflawni'r amseroedd ymateb cyflymaf yn gyson unwaith eto. Ar ôl yr holl waith caled, roedd hi'n amser gweld a oedden ni wedi cyrraedd y nod – sef dylunio ac adeiladu'r car 2D F1 mewn Ysgolion cyflymaf a welodd y DU erioed. Wrth i ganlyniadau ein ras gyrraedd, roedden ni wrth ein boddau! Roedd ein car yn gyson gyflym, y cyflymaf ar y dydd, a'r cyflymaf a welwyd erioed! Roedden ni wedi llwyddo!

Ar ôl cwblhau holl heriau'r dydd, roedd angen i ni aros yn eiddgar am y canlyniadau. Roedd y cyflwynydd fel petai'n cymryd oriau maith i gyhoeddi'r canlyniadau. Y wobr gyntaf a gyhoeddwyd oedd y car cyflymaf, ac roedden ni'n dal i wenu ers canlyniadau'r ras, ac wrth ein boddau i dderbyn ein gwobr. Cyhoeddwyd y wobr am y car a beiriannwyd orau nesaf, ac enillon ni honno! Roedden ni'n falch o ennill y wobr hon, gan ein bod ni wedi gweithio'n galed iawn i ddylunio a chreu holl elfennau ein car. Roedden ni hefyd wrth ein boddau i dderbyn y wobr am y cyflwyniad llafar gorau.

Yna roedd hi'n amser am ganlyniadau'r tri uchaf, ac roedden ni ar bigau'r drain. Cyhoeddwyd yr ail a'r trydydd safle, ac yna cyhoeddwyd mai Endgame oedd y pencampwyr! Roedden ni wedi ennill! Roedd yr holl waith caled a'r ymdrech wedi bod yn werth chweil. Roedd sefyll ar y podiwm gyda'r tlysau a'r conffeti'n syrthio o'n cwmpas yn anhygoel – byddwn yn ei drysori am byth.

Er gwaethaf yr holl waith caled, roedd cymryd rhan yn y prosiect F1 mewn Ysgolion yn brofiad gwych, ac roedden ni wedi dysgu cymaint a datblygu cymaint o sgiliau – yn sicr, wnawn ni fyth ei anghofio. Hoffem ddiolch i'r cwmnïau a noddodd ac a'n helpodd ni i gystadlu, EESW am ei help a'n hathrawon am wneud y cyfan yn bosibl.

Tîm Endgame - Rio Northey (rheolwr y tîm), Alex Lawrence (peiriannydd dylunio), Sam Pike (peiriannydd gweithgynhyrchu) a Lia Sims (dylunydd graffeg) - Pencampwyr F1 mewn Ysgolion y DU 2018.

Dylunwyr cynnyrch chweched dosbarth yn cyrraedd y sêr ym Mhrifysgol Bangor

Alice Murray
Darparwr gweithgareddau EESW

Ym mis Mehefin, cynhaliodd EESW raglen Headstart Cymru yn yr adran dylunio cynnyrch ym Mhrifysgol Bangor. Cwrs preswyl ydoedd a roddodd gipolwg ar fywyd prifysgol i fyfyrwyr chweched dosbarth. Bu myfyrwyr Blwyddyn 12 o Ysgol David Hughes, Ysgol Friars, Ysgol Glan Clwyd, Ysgol Uwchradd Dinbych ac Ysgol Alun yn cymryd rhan yn her Autodesk Design Now, gyda chymorth yr hyfforddwr Autodesk, Mark Chester.

Yn ystod y cwrs tri diwrnod, derbyniodd y myfyrwyr hyfforddiant Autodesk Fusion 360 cyn profi eu sgiliau yn y gystadleuaeth Dylunio Teithio Gofod. Y dasg oedd dylunio llong ofod ar gyfer teithio rhwng y ddaear a'r gofod. Cafodd Mark ei blesio'n fawr gan waith y myfyrwyr, ac ymdrechion EESW i annog merched i ddilyn gyrfaoedd mewn peirianneg.

Dywedodd Mark: "Cawsom ni ymateb mor gadarnhaol i'r her. Gobeithio y bydd rhai ohonyn nhw'n enillwyr. Roedd hi'n braf gweld cynifer o fenywod ifanc yn awyddus i ddilyn gyrfa mewn dylunio a pheirianneg. Dylid cynnal mwy o ddigwyddiadau o'r fath."

Yn ogystal â dysgu sgiliau newydd, cafodd y myfyrwyr flas ar fywyd yn y brifysgol. Arhoson nhw yn neuaddau preswyl Prifysgol Bangor, yn ogystal â mwynhau cwis a gefnddio'r cyfleusterau chwaraeon gyda'r nos.

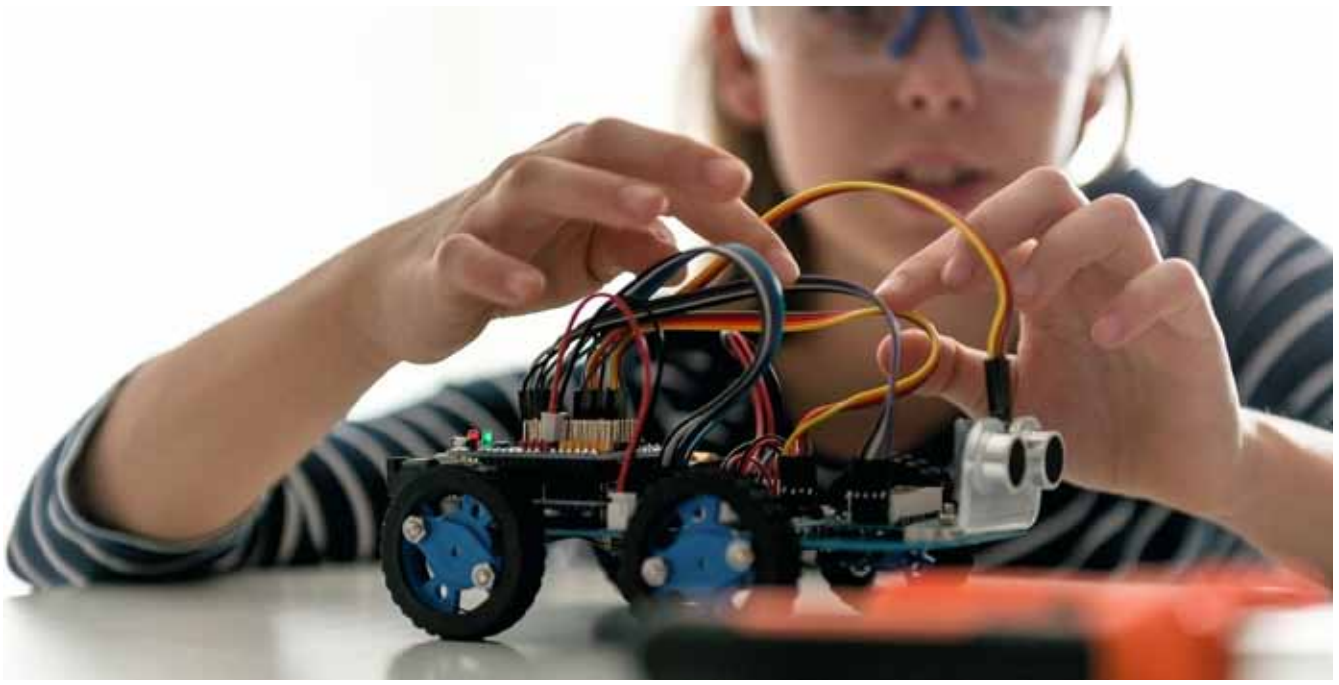
Dywedodd y myfyrwyr fod y profiad wedi'u gwneud nhw'n fwy hyderus ynglŷn â dewis y cwrs cywir ac addasu i fywyd yn y brifysgol.

Hoffai EESW ddiolch i Autodesk a'r adran dylunio cynnyrch ym Mhrifysgol Bangor am alluogi'r cwrs hwn ac am eu cymorth parhaus. Yn ogystal, hoffem ddiolch yn benodol i Mark Chester am gyflwyno'r cwrs a llysgenhadon myfyrwyr dylunio cynnyrch Prifysgol Bangor am sicrhau bod y cwrs yn llwyddiannus.


Myfyrwyr gyda Mark Chester yn y Ganolfan Dylunio Cynnyrch ym Mhrifysgol Bangor

Dyfodol Llwyddiannus – dull mwy hyblyg ac ymatebol o ddarparu addysg

Richard Lawson
Cyfarwyddwr dysgu – ffiseg, Ysgol Cardinal Newman



Mae ein pobl ifanc yn cael eu paratoi ar gyfer y dyfodol mewn ffordd newydd a chyffrous

Mae darpariaeth gwyddoniaeth a thechnoleg mewn ysgolion wedi profi trafferthion yn y blynyddoedd diweddar yn sgil datblygiadau anferth yn y maes. Nid yw'r system addysg yn gallu addasu mor gyflym â'r newidiadau ar ei ffurf bresennol, ac felly mae bwlch yn ymddangos.

Er mwyn bod yn ddinasyddion gweithredol ac amryddawn yng Nghymru a'r byd, mae angen dull mwy hyblyg ac ymatebol o ddarparu addysg. Felly dyma greu Dyfodol Llwyddiannus – canlyniad adolygiad eang gan yr Athro Graham Donaldson. Yn sgil argymhellion yr adroddiad, mae fframwaith addysg newydd yn cael ei greu.

Bydd athroniaeth newydd o sut y bydd dysgwyr yn ymgysylltu'n llawn â'u haddysg yn rhan ganolog o'r fframwaith sydd wrthi'n cael ei ddatblygu.

Bydd gyrfa ysgol plentyn yn cael ei rhannu'n chwe maes dysgu a phrofiad (MDPh), fel y celfyddydau mynegiannol, iechyd a lles a gwyddoniaeth a thechnoleg.

Bydd pob MDPh yn canolbwyntio ar bedwar pwrpas ar gyfer addysg sy'n ceisio gwneud yr holl bobl ifanc yng Nghymru yn: ddysgwyr uchelgeisiol, galluog; unigolion iach, hyderus; cyfranwyr mentrus, creadigol ac yn ddinasyddion egwyddorol, gwybodus.

Mae rhyngddibyniaethau'n cael eu hamlygu a byddant yn dileu'r ffiniau rhwng pob MDPh, gan alluogi dull mwy hyblyg o ddysgu, ac osgoi cyfyngu gwybodaeth i flychau.

O fewn pob MDPh, mae'r anghenion gorfodol ar gyfer gwybodaeth a sgiliau'n cael eu tynnu yn ôl i'r hanfodion y dylai pob person ifanc sy'n gadael yr ysgol eu gwybod neu feddu ar brofiad ohonynt.

I'r perwyl hwn, mae labeli traddodiadol yn cael eu dileu, ynghyd â'r goblygiadau sy'n cael eu cysylltu â bioleg, cemeg, ffiseg, dylunio a thechnoleg a chyfrifiadureg.

Bydd cynnwys newydd, symlach (wedi'i leihau o ran maint i'r hanfodion angenrheidiol, nid haws) yn cael ei gyflwyno dan benawdau newydd.

O 2022 ymlaen, efallai y bydd dysgwyr yng Nghymru'n astudio meddwl dylunio, meddwl gwyddonol, bywyd, sylwedd, grymoedd ac ynni a chyfrifiadura mewn ffordd fwy holistaidd, a phob un â'i gysylltiadau trawsgwricwlaidd, cynnwys a phrofiadau cysylltiedig.

Mae'r broses hon yn cael ei chymhwyso'n drylwyr gan arloeswyr cwricwlwm sydd â'r dasg o ddylunio fframwaith newydd gwyddoniaeth a thechnoleg, ac maen nhw wedi ymgysylltu â chyrff proffesiynol, ysgolheigion a chynrychiolwyr o'r diwydiant.

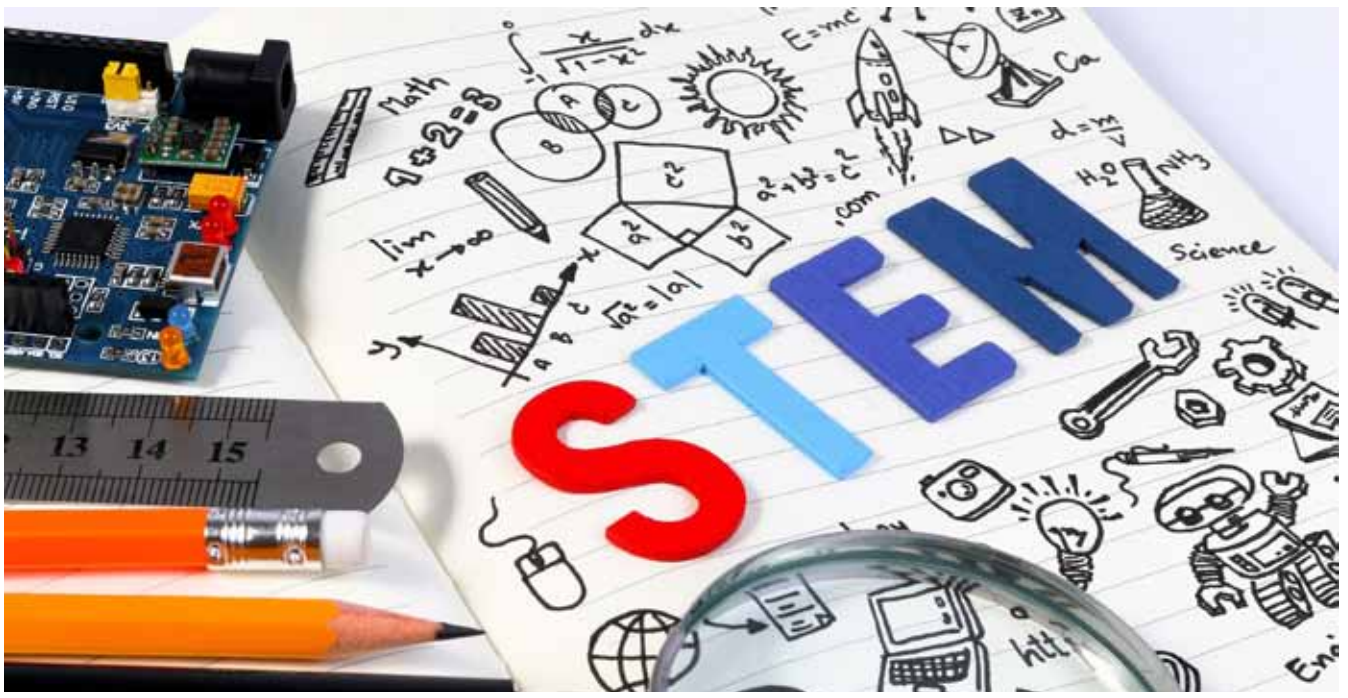
Dyluniwyd y fframwaith i ymgorffori llythrennedd, rhifedd, a chymhwysedd digidol, sy'n cael eu trin fel cyfrifoldebau trawsgwricwlaidd gan athrawon ledled Cymru eisoes.

Mae'r amser i brofi a chadarnhau strwythur a chynnwys ein fframwaith newydd ar gyfer Cymru yn brysur agosáu. Mae disgwyl mawr am y trawsnewid radical posibl y gallai'r dull unigryw hwn o ddiwygio'r cwricwlwm ei gael ar y system addysg yng Nghymru. Mae llygaid y byd ar Gymru - yn enwedig ym maes gwyddoniaeth a thechnoleg, wrth i'n pobl ifanc gael eu paratoi ar gyfer y dyfodol mewn ffordd newydd a chyffrous.

2018. THE YEAR OF ENGINEERING

Felly beth yw'r Flwyddyn Beirianneg?

Bob Cater
Prif Weithredwr EESW



Mae'n bryd trawsnewid syniadau pobl am beirianneg, gan ysbrydoli'r genhedlaeth nesaf o arloeswyr, dyfeiswyr a datryswyr problemau

Mae gan y DU dreftadaeth beirianneg falch. Rydym yn arwain y byd mewn sectorau fel awyrofod a moduro. Mae'r diwydiant yn parhau i ffynnu heddiw, gan ddarparu buddion economaidd anferth i'n gwlad.

Fodd bynnag, mae yna ddiffyg graddedigion peirianneg cymwys a thechnegwyr medrus. Yn fwy na hynny, mae yna ddiffyg amrywiaeth yn y gweithlu. Mae'r Flwyddyn Beirianneg yn gobeithio newid hynny. Mae Blwyddyn Beirianneg 2018 yn gyfle i ddathlu peirianneg yn y DU. Bydd y llywodraeth a diwydiant yn gweithio gydag ysgolion a theuluoedd i gynnig profiad cadarnhaol o'r diwydiant i bobl ifanc. Mae gyrfa mewn peirianneg yn rhoi cyfle i bobl ifanc lywio dyfodol y byd maen nhw'n byw ynddo.

Mae angen i ni newid canfyddiadau pobl am rôl peirianwyr heddiw, ac ysbrydoli cenhedlaeth newydd o beirianwyr gwych trwy amlygu'r amrediad o swyddi creadigol sydd ar gael.

Mae Llywodraeth EM eisiau gweithio gyda phartneriaid a sefydliadau sy'n cwmpasu hyd a lled y sector peirianneg yn ei gyfanrwydd, gan ddefnyddio eu harbenigedd i ysbrydoli a chymell pawb o blant ysgol gynradd i raddedigion, gyda pheirianneg yng nghanol y cyfan. Dyma'r amser gorau i ddechrau gyrfa fel peiriannydd.

Mae'r Flwyddyn Beirianneg yn ymgyrch gan y llywodraeth sy'n dathlu rhyfeddodau'r byd peirianneg. Mae hefyd yn rhan bwysig o'n strategaeth ddiwydiannol sy'n ymrwymo i roi hwb i beirianneg ledled y DU, i sicrhau bod gan bawb y sgiliau angenrheidiol er mwyn ffynnu mewn economi fodern.

O longau gofod i esgidiau sglefrio, swigod mewn bariau siocled i driniaethau canser sy'n achub bywydau, mae peirianneg yn cyffwrdd â phob rhan o'n bywydau. Fodd bynnag, nid yw digon o bobl ifanc – yn enwedig merched ifanc – yn credu mai dyma'r byd iddyn nhw. Yn sgil hyn, mae'r diwydiant yn cael trafferth recriwtio doniau'r dyfodol. Ar ben hynny, mae pobl ifanc yn colli'r cyfle i wneud gwahaniaeth cadarnhaol i'w dyfodol nhw, dyfodol eu planed a phopeth sy'n byw ynddi.

Mae gyrfa mewn peirianneg yn gyffrous, yn werth chweil ac yn greadigol. Ond mae prinder mawr o bobl ifanc sy'n credu y gallai fod yn swydd iddyn nhw. Yn ystod 2018, rydym ni eisiau trawsnewid syniadau pobl am beirianneg, gan ysbrydoli'r genhedlaeth nesaf o arloeswyr, dyfeiswyr a datryswyr problemau, trwy ddangos iddyn nhw beth mae peirianwyr yn ei wneud mewn gwirionedd.

Peirianneg yw un o'r sectorau mwyaf cynhyrchiol yn economi'r DU, ac mae'n cyfrannu o leiaf 20% o werth ychwanegol gros y DU a hanner ein hallforion. Ac eto, ceir prinder sylweddol mewn gweithwyr peirianneg proffesiynol cymwys, a diffyg amrywiaeth yn y proffesiwn – mae 94% o'r gweithlu peirianneg yn wyn, a 91% yn wrywaidd.

Mae'r Flwyddyn Beirianneg yn gyfle i ni weithio gyda'n gilydd yn 2018 i godi ymwybyddiaeth y cyhoedd o beirianneg, gan ddefnyddio negeseuon cyson am apêl ac effaith peirianneg.

Yna, bydd Dyma Beirianneg yn parhau y tu hwnt i 2018, gan adeiladu ar y Flwyddyn Beirianneg gydag ymdrech barhaus i annog mwy o bobl ifanc i ddilyn gyrfa mewn peirianneg.