

Spring 2022 Funded Projects

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Project successes to inspire those aged 4-11

We Can Engineer It

South Eastern Regional College, Northern Ireland

In November 2021, South Eastern Regional College (SERC) Co. Down and Confirms, the Science Foundation Ireland funded research centre for Smart Manufacturing based at the University of Limerick secured a grant to work on a unique project which aims to identify the barriers to entering engineering careers and study paths experienced by women and girls across the island of Ireland. Supported by the Community Foundation for Ireland "All-Island" Fund, an online engagement tool to gather views from women and girls about engineering and barriers to the profession, has been designed and implemented. To date, the engagement work has been successful with statistically accurate responses with common trends identified. Key findings include a lack of encouragement from school and parents, a lack of female role models, and negative treatment descriptions in the engineering workplace. In response to the engagement work findings, SERC will be implementing a Women in Engineering Leadership course to help create strong positive female role models in the industry for our region. Also, through our funding application with the Engineering Education Grant Scheme, SERC intends to run three family workshops promoting engineering. The events will be geographically spread to make them accessible to the whole region. The events will use the strapline 'consider the possibilities' to open people's minds to the exciting engineering world. The workshops will introduce families to the fun and excitement of engineering and technology through unique and creative engineering workshop exercises.

Who Wants To Be An Engineer?

St Brendan's Primary School and Nursery, Scotland

The 'Who Wants To Be An Engineer?' seeks to develop primary-aged children's skills for engineering literacy, promote awareness of engineering as a career path and inspire students to pursue STEM based learning in future through the delivery of short but impactful cycles of engineering learning experiences. As a collaborative project, 'Who Wants To Be An Engineer?' will see the students and families of St Brendan's and Muirhouse Primaries brought together for joint learning sessions over three different four-week cycles. Through involvement with the project, children will have the opportunity to learn more about careers in civil, software or mechanical and electronic engineering and develop skills for engineering literacy in a fun and accessible way. Each cycle of activities will feature input from a working engineer, who will through face-to-face or remote visits tell children more about their role, how their discipline contributes to society and the path they took to become an engineer. Children and their families will explore and develop relevant engineering skills through practical activities in class and 'Stay and Play' sessions after the school day. Each cycle will conclude with a creative engineering challenge, where children will have the opportunity to independently apply their new skills and learning. All materials and resources generated will be made widely available for use within the local authority through the North Lanarkshire Digital School, an established network and resource for the production and sharing of quality learning materials across the authority.

Project successes to inspire those aged 4-16

Giving Voice: Stories from STEAM through the technology of radio

Chelmsford Science and Engineering Society, East Anglia

This project celebrates Essex's local history of radio and BBC's 100-year anniversary. Ten Essex schools will be involved. Within each school, students will work in teams to create a germanium crystal radio set and an FM radio. Students will then research a female or other minority technology leader / entrepreneur and create a 5-minute podcast introducing their chosen role model. Students will then use a short-range transmitter to broadcast the podcasts within their

classroom and share their podcasts with other schools via internet streaming. All schools will listen to each other's podcasts to learn more about important leaders within technology. After completing this project, students will have gained valuable hands-on, practical electronics skills and learned more about their local history and technology leaders. Learning about female and other minority technologists has a dual purpose of encouraging girls/minority students to consider (or continue considering) STEAM as a potential career – by highlighting successful female and minority technologists who have come before them. This project specifically targets primary and secondary school children (aged 7-14 years) as this is the age range in which students, especially girls, begin to believe that STEAM is not for them. We want to encourage students to enjoy STEAM and show them that STEAM is fun and open for them before they reach this age.

Project successes to inspire those aged 7-11

Children Challenging Industry

Centre for Industry Education Collaboration, The University of York, Yorkshire and Humber

This project will deliver the "Children Challenging Industry" programme to teachers and children in seven primary schools in the Humber region between September 2022 and July 2025. This highly regarded, effective and robustly evaluated programme is unique in its combination of continuing professional development (CPD) for teachers and STEM professionals, direct classroom activities for children, and tailored site visits to industry, all with an emphasis on career-related learning intended to bridge the gap between industry and education. CIEC's specialist advisory teachers deliver all CPD and coordinate all elements of the programme to broker arrangements and ensure smooth running and effectiveness. In addition to working with the children and teachers, this proposal provides training and ongoing support to apprentices, the CATCH training team and invited IMechE/IET members, in order to support outreach objectives and communication with primary school children. At the conclusion of each year:

- The children will have an increased knowledge and literacy of engineering, a better understanding of the role of the engineer, that it could be a career for "people like me", and the contribution engineering makes to society.
- The teachers will be empowered to teach children about engineering and to talk confidently about the industry.
- The apprentices and CATCH staff will develop their communication skills and confidence to express their key messages to this age range, have the opportunity to participate and gain experience of delivering outreach with primary school children, as well as gaining experience and skills in working with children in an industry setting.

Miss Molecule & Friends

Studio Wallop, South West

Miss Molecule & Friends is a series of inspirational digital resources to be used independently by teachers, parents and the general public to educate and inform children aged between 9-11 years on a variety of subjects and industries related to renewable energy, critical minerals, sustainability, biodiversity and wellbeing. The series will be formatted as a 'chat show', with a character called Miss Molecule (a H₂O molecule) as the host. Each episode will focus on a specific industry and will have their own character. However, as in a real chat show, more than one guest can be brought in to discuss interactions between industries and incorporate the circular economy approach. The chat show vehicle would be an effective way of keeping consistency throughout the different episodes but would also allow specific topics and cross-cutting themes to be discussed. The first in the series will focus on Cornish Lithium's sustainable lithium extraction project, with the character Lithium. There will be a related lesson plan and inclusive resources to accompany the animation. All resources will be hosted on a simple to use website. The project also includes outreach delivered by local engineers who will present the animation as part of an assembly for 10 schools in Cornwall. The schools targeted will be in areas where there are high numbers of disadvantaged groups, but also extensive engineering history – for example Camborne and Redruth have a huge mining legacy, but also suffer from some of the highest poverty figures in the whole of England.

Project successes to inspire those aged 7-14

Schools Air Race Challenge 2022

Aero Space Scientific Educational Trust, Scotland

The Schools Air Race Challenge was devised by Professor Andrew Rae in 2017. The goal was an engineering challenge for schools based on the Greenpower F24 competition; but a cheaper and more accessible format for schools in remote areas where accessing STEM outreach can be difficult. The pupils took part and completed challenges using remote controlled aircraft and smart phone-controlled paper airplanes which were all supplied. Our ASSET Science Educator, and Teacher, is now further developing the challenge in line with recommendations in the Final Outcome Report for

IET. We seek to provide an exciting engineering challenge for pupils from P6 to S3. We will reach out to over 2,000 schools in our email database with an initial entry competition. From here we will select schools to take part in the main competition and receive kit. We will take Hannah's experience in teaching and utilise Professor Rae's expertise in aeronautics engineering to develop a challenge that supports educators in delivering STEM CfE outcomes and engages pupils remotely as we emerge from the pandemic. Winning schools will be chosen based on assessment of criteria set in partnership with the SSERC Young STEM Leader Programme. Prizes include the chance to keep the kit and share with their whole school, a visit from our science educators for a session in school and a potential grand prize of an invitation to their local airport to see our light aircraft up close, which was itself built by local school pupils.

Project successes to inspire those aged 7-19

Coventry Robotics Hub

Earlsdon Primary School, West Midlands

Our exciting and unique project is to develop a city-wide robotics hub that can be used by over 100 schools over the next five years and beyond. This will ensure that all pupils in Coventry have free access to current robotics technology. There will be a wide range of structured activities including teacher CPD, pupil lessons, family taster sessions and school tournaments. Many of these will be led by trained Young STEM Ambassadors aged 16 – 18. In addition, there will be an open-access policy meaning that schools can use the hub for their own lessons and enrichment clubs. This project is innovative as it provides a long-term vision for systematically developing robotics education across a whole city. The project capitalises on existing excellent collaborative networks across Coventry schools, and it comes at a time when schools are eager to develop their robotics curriculum but need further support to do this. It offers excellent value for money due project partner contributions, including the permanent use of a suite of rooms. This project is sustainable as we have budgeted for a five-year project, reporting on impact at end of Year 1. The project will be sustainable well beyond the five-year plan. This project will ensure that we are developing engineers and roboticists of the future by removing barriers to participation and creating sustainable routeways for young people to engage with robotics. We would like this to be a flagship model that could be replicated in other cities across the UK.

Project successes to inspire those aged 14-19

Virtual escape room for showcasing engineering careers to GCSE physics students

Dr Daniel Cooper, All UK regions

I will develop a virtual escape room game for higher tier Key Stage 4 physics, and the physics part of combined science, which showcases careers and opportunities in engineering while also being an engaging revision resources for GCSE exams. The aim of the project is to build on a previously successful project which used the engaging virtual escape room format to showcase the work of chemists in a variety of settings. This previous project was funded by the Royal Society of Chemistry Outreach fund and since its' launch on January 5th has been played in excess of 10,000 times. Feedback from students and teachers was overwhelmingly positive in both its use as a revision aid and the way it highlights careers which are open to chemists that young people often do not think of. The escape room resource developed with the RSC can be found here: <https://view.genial.ly/617a6f0bfe862e0de5621ce3>

I would like to build a similar game which is aimed at GCSE physics students, the game will highlight some of the wide range of careers open in the field of engineering. The resources have the added benefit of being based on past exam questions, so they are useful exam practice and are therefore more likely to be used by teachers. Through the STEM Ambassador Network, I have been in touch with an electronic engineer and IET member who works for RAL Space. He is keen to assist in helping me find a range of engineers within RAL Space who will be happy to showcase their job and career profile. His and his colleague's kind involvement will be limited to providing photographs of their lab/place of work and a short description of their job, plus a biography. These will be used to create a game which will inspire KS4 physics students into considering the wide range of careers in engineering.

The money would be used in 3 areas:

1. Development of a complete set of escape rooms for GCSE chemistry and double award science (higher tier).
2. Upgrade the subscription of software used to enable access to usage data and therefore help advise improvements to the resources.
3. Increase the reach of the escape rooms by promoting on social media.

The previous project was successful in reaching areas of the country of high deprivation and I would aim to replicate the reach with this project. My previous project reached over 10,000 students in a space of 3 months. It is a reasonable assumption that any subsequent projects will reach even more students in a similar time frame.

Other projects I have created can be found on my website <https://testtuberevise.com/>