Autumn 2021 Funded Projects

Project successes to inspire those aged 7-14

iDesign: Immersive learning

De Montfort University, East Midlands

iDesign programme is an innovative STEM engagement project targeting students and young people to learn about 3D scanning as well as 3D printing with the fundamentals of product design and development. These engineering-based outreach sessions will walk the participant through the process of learning 3D scanning and CAD, using free software, in a comprehensive manner and produce their own designs which can then be 3D printed to take home. Participants will also learn the skills to turn their ideas into reality using freeware CAD software and everyday gaming sensor as a 3D scanner. These novel and interactive workshop sessions will not only highlight the value of engineering for children of all ages but give pupils a hands-on experience and understanding on engineers bring an idea to life. Furthermore, the pupils will be also engaged with an educational tour of the Mechanical Engineering department at De Montfort University, thus providing an opportunity for the young pupils to witness daily life of engineers and experience core-engineering equipment / facilities. We seek funding from EEGS to procure the material/equipment required to create an Immersive virtual environment enabling innovation to carry out pupil-led experiments/activities. Pupils will be able to take home their 3D printed models. The goal of our EEGS project is aligned with our long-term mission to reach out to our young generation, especially girls, who are under-represented in Engineering especially in Mechanical Engineering.

STEM Outreach through Marine Engineering

The Marine Society and Sea Cadets (MSSC), All UK Regions

The project sets out to use concepts and problems connected with marine engineering, plus the appeal of practical problem-solving, to engage young people with the excitement and potential of engineering and STEM, and the range of possible careers. Thereby: increase the number of young people developing an interest in STEM and choosing to pursue further study and ultimately careers. The main activity will be a series of interactive workshops (virtual and/or in person) using engaging, creative activity to bring engineering concepts linked to the National Curriculum to life, leading to a CREST certificate. The workshops will target school children at Key Stage 2 and 3 (9-14), aiming to awaken their interest in engineering/STEM early enough for them to develop a base of knowledge and enthusiasm, and choose the GCSE subjects they will need if they decide to pursue this interest further. Workshops will be delivered by a team of inspiring educators, including three qualified and experienced engineers, who will not only explain the concepts but share their own passion and act as role models. We will deliver in both schools and community settings across the UK, with a particular focus on attracting young people who are harder to reach and/or from under-represented groups. Outcomes will see 15,000 young people gain awareness of STEM/engineering through taster workshops. 7,500 young people gain deeper understanding and a recognised qualification through the CREST-accredited programme. As well, more hard-to-reach young people are engaged through workshops delivered in settings not linked to formal schooling.

Project successes to inspire those aged 7-16

Accessible engineering for home educator groups

Bloodhound Education Ltd, South West

We wish to support home educator groups in the south west and inspire them to become engineers, through providing access to a programme of practical STEM learning activities showcasing innovative technologies and making the link between the classroom and future career opportunities. These hands-on sessions will provide 7–16-year-olds the opportunity to explore engineering, meet engineers whilst having fun and building skills confidence in a safe and supportive learning environment. We have been approached by a number of home school groups in the area who would like their children to develop STEM skills but do not have access to STEM experiences, resources or STEM specialists and engineers. Following 3 successful taster sessions during the summer term, we would like to offer a funded programme to the home school network especially those from under-represented groups, disadvantaged

backgrounds and with complex health or special educational needs. The sessions will be held at our STEM centre and aim to create an interest in and awareness of STEM career pathways and opportunities through exploring real innovative applications of renewable technology and broaden the students' knowledge of sustainable engineering. They will be designed for flexible delivery to respond to diverse ranges of prior attainment and learning style, with optional home study extension activities. We recognise the importance of parental involvement and parents will be offered CPD to develop their own knowledge and skills and confident to access further free resources to promote continued engagement beyond the sessions.

Transport REVOlutions

Engineering: Volunteering and Outreach Society (EVO), North West

A collection of engineering workshops based around the themes of sustainable transport, designed to help teach basic science and engineering principles to primary and secondary school students, while inspiring them to get involved in STEM in the future. These workshops will be delivered by volunteers from the University of Manchester, liaising with teachers from schools around Manchester and the North West. The workshops have been designed to be easily adaptable for the learning styles and academic abilities of the students, making them accessible to students across a wide range of backgrounds. All materials and tools needed for the workshops are easily obtained, meaning the projects can be distributed to other schools and organisations around the country for widespread use. As well as being educational, our workshops are also designed to be fun, helping encourage students who may be from underrepresented backgrounds to pursue qualifications or further education in science and engineering.

STEAM Scout - What if Disney had STEAM science shows by students for students

Accord Mat trust, Yorkshire and the Humber

A STEAM project that allows students from disadvantaged backgrounds to take on the role as presenter and STEAM mentor. Currently STEAM scouts incorporates a yearly theme. Last year the theme was STEAM through the ages, where students were able to look at different inventions over time and design and make a better version by understanding the key concepts around that invention. This year the theme is “What if Disney had STEAM”. We are looking at a range of different Disney films and completing different engineering tasks based on the synopsis of the film. The project incorporates the delivering of STEAM shows to other schools to their disadvantaged students. Students will learn the engineering and science skills required, practice STEAM in an engaging way and then go on to teach this to other students at other academies in the trust, in the first year starting with primary year 5 and year 6 students, which will support transition in STEAM related topics and then leading to secondary schools. The shows for the receiving school will include 1 STEAM scheme of work designed by myself, and 1 STEAM pack that will have the resources to complete the first activity on the scheme of work, as well as the show run by the students for the students. It is intended the shows and provided scheme of work will branch out to other schools in the district.

STEM into Tayside

RaspiKidd, Scotland

STEM into Tayside is a project that will deliver educational STEM resources to young people from the local community. Featured activities will include e.g. programming robots and cardboard circuits, and perhaps building a “micro:bit city”, thus providing students with an introduction to engineering, electronics, and basic programming skills. These resources will be based on open-source design and hardware and will be influenced by the latest trends in the Maker movement. The project will put at heart young peoples' interests such as mobile apps and gaming, while promoting problem-solving and critical thinking skills, and support their creativity. The project will primarily benefit the local community as workshops will be running in Dundee Central Library, Morgan Academy and other local community centres/schools over Tayside but will also benefit the wider community as online resources will be created and available to all. There will be a strong focus on communication through documentation, online media, and peer education, as resources will be tested and improved upon with the involvement of workshop participants at all stages of the engineering process, from initial ideas to design and manufacture. This project will be supported by a monthly professional meetup organised for educators to discuss feedback and experiences from the STEM activities, exchange and share knowledge, with guests invited from the industry. This project is based on some activities being run in collaboration with partner organisations. Funding will enable an increased outreach to the local community and grow the cultural and social diversity potential.

Project successes to inspire those aged 11-16

Engineering a Sustainable Life on Earth (EASLE)

4wardfutures, North West

The EASLE project addresses the growing global challenges humanity faces due to climate change, CO^2 emissions, plastic pollution, decreasing biodiversity, extreme weather patterns and poor air quality. Delivered as a metaphor, it introduces learners to the exciting work that engineers are doing to address these challenges, and the engineering career and progression pathways into mechanical, chemical, electrical, electronics, green energy, and sustainable development. Through taking part in live workshops and webinars with engineers, apprentices, and academics, EASLE gives learners the opportunity to find out about the work engineers are doing, their career journeys and the technology they are using or developing to address these environmental challenges, such as additive manufacturing, generative design, sustainable construction systems, robotics, artificial intelligence, and the application of smart connected sensors. The learners are then given the challenge to work together in teams to produce and present a presentation showcasing the work engineers are doing to address one specific environmental challenge. The EASLE project will also involve developing a virtual Sustainable Engineering Expo. This will be based on the Virtual Space Futures Expo 4wardFutures has recently developed. Through this virtual Expo and an associated webinar programme, engineers, engineering companies, university faculties and organisations will be able to share with young people the work they are doing to combat the impacts of climate change. This virtual Expo will also provide resources that organisations across the UK can utilise to enhance the work they are doing with young people.

Virtual Lab: Formula 1

Lightyear Foundation, South East

Lightyear Foundation established the Virtual Lab during the first lockdown. Its aim is to provide high quality practical STEM activities for disabled children and those with special educational needs; with a view to encouraging students to consider a STEM career. In this project we will employ mainly existing resources from Engineering in Motion: F1 in Schools and work with their engineers to create an inspirational hands-on engineering project for delivery via Zoom (and hopefully in-person) to SEND schools. We want our students to experience the thrill of building and launching a model F1 car in school! The students will first learn a little about F1 cars and their design and then each student will build their own car from a pre-cut body design with a choice of different wing shapes specially made for our students. Working with an engineer, they will test their models in the smoke trace tunnel and adapt their designs to reduce drag. The students will then all come together for a celebratory Grand Prix Race Day. Lightyear Foundation will train the engineers in suitable communication methods in order to optimise their interaction with the students. The sessions which we develop can then be used by Engineering in Motion to deliver the F1 in Schools activities to a wider audience.

Project successes to inspire those aged 11-19

Hyperloop Outreach Programme

HYPED, Scotland

Hyperloop technology is a valuable tool that can be used to get students interested in STEM.

School workshops, ages 11-14: Focussing on low science capital schools, we will utilise the variety of components on a hyperloop pod to introduce students to principles in levitation, propulsion, aerodynamics, renewable energy, and simulations. Students will get hands-on experience with engineering with a VR pod experience, a chance to build a component, and adapting simulations to design a working hyperloop pod and network.

Site visits, ages 11-20: HYPED-hosted events will provide an opportunity to illustrate applications of STEM in the hyperloop pod to a wide range of people. Firstly, we will host a conference-style event in February, showcasing the work of HYPED as well as interaction with industry sponsors, university technicians, and other university teams. Secondly, we will conduct workshop visits and live demonstrations at our test track, we are hoping to build.

Fife College Collaboration, ages 17-20: People from more impoverished backgrounds who are less inclined to go to university for accredited degrees, may benefit from being given the opportunity to pursue a path at the University of Edinburgh, to decide on the right career for them. Working in this environment with a Student Innovation Group like HYPED could inspire college students to pursue an accredited degree in engineering and their work so far would qualify them for direct entry into second year in many universities across Scotland.

BIGKID Engineering Club

BIGKID Foundation, Greater London

The BIGKID Engineering Project provides our young people the opportunity to get involved, learn, and develop new knowledge and skills, in an environment outside of school/college. A number of our young people have shown an affinity for the subject and are inspired by others working in the field but have tended to move away from engineering as they either cannot find anything that continues to engage them, lack the finances to access or continue projects or

do not have the skills to pursue their interests. Our young people represent an ethnically diverse community. Many have unstable home lives due to issues such as low income/unemployment, domestic violence, unsuitable housing, alcohol/substance misuse. Most do not have family members that have gone to tertiary education. Those that do well academically, can find it difficult to navigate the university system, access finance; or lack confidence or financial means to move far from home; or fear the risk of taking on debt. This project provides 10 young people with a new engineering project to do every month for a year. They will be challenged to explore new areas, develop key skills, knowledge, and technical experience. Guided by our Outreach Officer (who holds an Aeronautical Technology degree), the sessions will be delivered in our youth club setting, in a fun, engaging and inclusive way that encourages young people to get and stay involved. They will also produce an end product, which they can take home as a badge of pride, showcasing their talents.

Project successes to inspire those aged 14-19

Find Your Future in Engineering

Speakers for Schools, Northern Ireland

Work experience has always had a crucial role in helping young people make informed decisions about their post-school destination and become 'workplace ready'. It is an important aspect for getting into any career and can make participants stand out from the crowd on applications for university courses, further training and employment opportunities. Whilst the last 18 months have hit businesses hard, they have also been particularly tough on young people across Northern Ireland. They have missed these crucial opportunities to gain vital insights into Engineering careers and the workplace. This project will secure support from 10 Engineering firms in NI to host a series of virtual work experience opportunities varying from insight days to five-day experiences for male and female students. The project will assist them explore the qualifications, entry routes and diverse careers paths available within the STEM Sector. Participating students will have the opportunity to 'meet the team' at the host company, explore career paths, participate in group tasks/challenges, research activities, quizzes, skills development sessions and careers advice sessions including panel Q&A to inspire them to pursue a career in Engineering. The project will have an impact report for each student before and after each intervention.

Summer Sustainability Camp

Bradford College, Yorkshire and Humber

Our project will raise awareness of pollution as a result of unrecycled plastics and the role engineers can play in improving our planets future. Plastic pollution, in particular non-recyclables, have become one of our most significant environmental issues, as rapidly increasing production of disposable plastic products overwhelms our ability to process or repurpose them responsibly. Engineers, in particular Environmental Engineers, play a crucial role in improving recycling, waste disposal, public health, and water and air pollution control. By making young people aware of these two facts, we hope this project will encourage more young people to consider engineering roles and how these can have a positive impact on the environment when considering future careers. The young people participating in this project will design, build, and programme a 3D printed robot, able to differentiate between plastics and non-plastics. After designing their robot with their industry mentor, they will work in teams to collect waste plastics from the River Aire. They will then 3D print their robots, program them to differentiate between plastic and non-plastic waste – helping them learning about modelling, programming, and manufacture. The waste collected from the river will be processed by an employer partner to offset the activities carbon footprint and composite manufacture. The volume of recycled materials will then contribute towards the next annual summer school in 2023 – a cyclic sustainability model.

Replacement and upgrade of robotics kit

Student Robotics, All UK Regions

This project will enable Student Robotics to run a robotics competition to engage young people between the ages of 16 and 19. Students of this age have been disproportionately impacted by the pandemic, with severe disruptions to their education and significant impact on their mental health and general well-being. The degree of disruption to formal education that has been encountered is unprecedented and, for the last 18 months, schools and sixth form colleges have been unable to maintain extra-curricular or enrichment activities for students. For many STEM students this has meant no social interaction outside of the classroom. Our project, led by volunteers who are a mix of undergraduate and graduate engineering and computer science students, will mentor young people to design, build and program a small autonomous robot for a national competition. This will provide schools and colleges a focus for STEM enrichment activities and will ignite interest in students with an aptitude and interest in engineering. Our project will provide a core electronics kit to form the base of each robot and then the youth teams will have six months to complete their project before competing against each other in the two-day long competition finals. With a strong track record of delivering robotics competitions, we are in an excellent position to deliver on our objectives.