

Autumn 2017 Funded Projects

Dismantle and Discover

Loughborough University
Loughborough
Secondary School Activity

Led by student role models from Women's Engineering Society, Dismantle and Discover will be an engaging after school club which aims to challenge the idea that 'engineering is not for people like me' by giving children the skills, enthusiasm and confidence to take up STEM subjects and improve their futures. This initiative will embrace the concept of 'enquiry based learning' through a group project where children will be challenged to explore the inner workings of an Anglepoise Lamp by taking it apart to discover how it works and re-engineering the components to design, manufacture and test a floor mounted catapult. Children will have the opportunity to work in groups and test their catapult in a competition where prizes will be awarded to the teams who launch a ball the furthest distance, hit a target and produce the cheapest catapult.

Through Dismantle and Discover, pupils will gain an insight into university life with the opportunity to tour our new state-of-the-art STEMLab facility where they will see their catapult being joined by a trained welding technician according to their manufacturing plan. Pupils will also gain an insight into 3D printing, laser cutting and water jet cutting during their visit and come away with practical understanding of fundamental mechanics and an new perspective on engineering as an exciting and innovative career.

Make IT happen

Dover Grammar School for Girls
Dover and East Kent
Primary and Secondary School Activity

This is an ambitious project designed to change the image of STEM pathways and especially Engineering within the student community and wider population of East Kent. In this outreach project, students who are traditionally disengaged from STEM will jointly create, not consume, engineering solutions to society's problems. It will involve Dover Grammar School for Girls and Kent and Medway STEM, then 3 secondary schools as part of the Dover, Deal and Sandwich consortium and at least 4 primary schools in Phase 2.

The project will raise the profile of STEM pathways amongst female student, change the aspirational views of boys and girls of all abilities through a range of outreach activities and STEM professional lead events. The focus will be;

1. Change cultural views of STEM pathways
2. Encourage more females into STEM career pathways.
3. Excite and challenge students in KS2 and 3
4. Inform and inspire students in KS4 and 5.

Both phases will make full use of all IET and Tomorrows Engineers support, educational material and create a series of exemplar teaching and learning resources to enable the project to have a longer term impact.

Year of Engineering Roadshow: Meet the Parents

Towards Vision
Across the UK
Public activity

The Year of Engineering: Meet the Parents Roadshow is designed to take future engineering careers information on the road to meet parents face to face, to tell them more about the fantastic opportunities that there are in engineering for their children, and what some of these future careers will look like. Evidence from the IET 'Inspiring the Next Generation of Engineers' Report* has shown

that by giving parents even a small amount of positive information, they can be convinced about the appeal of engineering careers. This roadshow, supported by the engineering industry and the inspiring individuals that work in it, will visit at least ten public shows across the UK during 2018 and aims to build on the Year of Engineering publicity to bring engineering careers to life.

A careers stand staffed with a diverse range of volunteer engineers from local companies, Professional Institutions and education establishments will engage with visitors of the shows as they pass the stand, signing them up where appropriate for further details to be sent.

Parents are often the gatekeepers of their children's careers, but they are notoriously difficult to reach. This activity aims to fill a gap in our coverage of the provision of careers information to parents.

Kids Invent Stuff - Invention Challenges

Kids Invent Stuff Ltd

Online

Public activity

Kids Invent Stuff is a YouTube channel aimed at directly engaging primary school children with STEM subjects. Young people are encouraged to submit their own ideas for inventions to solve novel and entertaining technical challenges.

The most creative and entertaining inventions are then showcased as part of weekly Kids Invent Stuff YouTube episodes (www.youtube.com/KidsInventStuff). One chosen idea is then built and demonstrated on film, with often hilarious consequences. In short we build and test kids' inventions on camera. Each month we set a different themed invention challenge and 5-11 year olds are encouraged to submit their invention ideas as drawings or videos uploaded to our website (www.kidsinventstuff.com). We then showcase some of the best ideas on our channel and pick one invention to build and test. We've built everything from a custard-firing superhero suit to a fire and water shooting piano. We release a video every Saturday with a challenge setting episode, an ideas showcase video and separate build and test episodes for each challenge.

For this grant we're seeking support for 3 separate invention challenges, with 12 videos released across a 23 week period, including one larger, high profile challenge in April 2018 to celebrate the Year of Engineering.

Primary 5 - Science of Flight Challenge 2018

Our Lady and St Patrick's College Knock (OLSPCK)

Belfast

Primary School Activity

Since 2015, our school has been working in partnership with P5 teachers from St. Ita's Primary School and St. Joseph's Primary School to develop a STEM project linked to supporting the P5 curriculum, culminating in a skills activity day in our College during the latter stages of summer term. The aim of the project is to use this unique STEM activity to further strengthen curricular links between OLSPCK and our contributory primary schools.

In 2015 when the project was being developed meetings took place between staff from all three partner schools. Teachers developed a shared understanding of the KS2 and KS3 curriculum and selected 'Flight' as a topic.

It was agreed that the collaboration would involve a P5 lesson on the 'Science of Flight' delivered by a OLSPCK Science teacher in the primary school followed by an action packed STEM activity day in the College.

Like many other schools we continue to face cuts in education spending that ultimately impacts on our ability to continue to run such innovative and engaging activities that are crucial in assisting young people identify the importance and relevance of STEM subjects in their future academic and working careers.

Mission to Mars

The Petchey Academy

London

Primary and Secondary School Activity

The Petchey Academy will be launching a "Mission to Mars" 2 day whole school challenge which will bring STEM subjects to life in a fun and engaging manner. This will develop important life skills including teamwork, confidence, leadership and strategic thinking, also providing them with an insight into practical examples where Science and Engineering comes to life.

530 children across 5 schools will be informed that an asteroid is going to hit the earth and they have 48 hours to get off the planet to stay safe. They will then work together to complete a series of tasks and challenges over the 2 days. The project will culminate in a large assembly celebrating their achievements.

We will be working in partnership with Strata, an online digital media company which is part of the Comcast Corporation. They will be working with us during the Mission to Mars project, and we will be taking a group of selected students on a visit to their office, to complete a technology & engineering workshop with their staff members, as part of their #StrataWomen initiative which seeks to get more women into the industry.

Engineering Talent Boost (targeting dyslexic young people)

EDT (The Engineering Development Trust)

England

Secondary School Activity

With the growing demand for engineers, it is critical to identify strengths across a diverse talent pool. In the same way that autism is a strength in some Cyber Security roles, we believe that the engineering industry is missing out on talented young people with dyslexia/dyslexic characteristics, who do not realise their potential, so have no aspirations to become engineers. Therefore, we wish to explore the correlation between the skills required for engineers and the natural cognitive strengths and attributes of neuro-diverse young people e.g: dyslexic learners or those with dyslexic characteristics.

We will run two 'engineering skills camps' in different parts of the country, to compare perceived regional differences, which offer young people a chance to work on an exciting week-long, real life engineering challenge, partnered alongside mentors from leading engineering companies. This programme is designed to replicate working in a commercial engineering project team, so with a structured project timetable and engineering mentors, the participants will be introduced to the skills needed to complete the project.

Our intention is to test our assumptions of the correlation between engineering skills and dyslexic characteristics, and to measure their strengths and distance travelled whilst learning in a kinesthetic, engineering focused environment.

Logic and Arithmetic Teaching Tool for KS5/A-Level Computer Science

UK Electronics Skills Foundation

Secondary Schools and Sixth Form Colleges

Secondary School Activity

This project will provide A-level Computer Science students with a practical, hands-on, tool to enhance their learning. Teachers can use these classroom sets to deliver a series of engaging and stimulating activities to teach the core Electronics concepts of KS5/A-Level Computing curriculum, which are usually taught using simulators or theoretically. The tool covers aspects of Boolean operations, logic gates and binary number systems. The tool is split into 2 sections: one to explore Boolean operations and logic gates, the other an 8-bit two's complement adder/subtractor.

The circuit has already been designed and a prototype produced and tested. This prototype has been evaluated by Computer Science teachers (15) as part of a residential CPD course at Southampton. Feedback was excellent; the teachers are keen to use the boards in their lessons.

The funding will enable this collaborative project between the UKESF and the University of Southampton to run a pilot, producing and deploying classroom sets to engage ~750 computing students and providing CPD training for teachers to be delivered in Summer 2018.

Engineered Fairytales

STEMFirst Ltd.
Lancashire
Primary School Activity

The Engineered Fairytales programme will raise awareness of the engineering industry and show that engineering is all around us. It will allow young people, particularly girls and their teachers to meet a diverse range of professional engineers, challenge stereotypes surrounding the role of an engineer, and allow the audience to learn what a day in the life of an engineer is really like.

A bespoke sustainable classroom resource will be developed for Key Stage 1 and 2 which includes engineering challenges taken from 4 popular fairytales. The activities will cover different engineering sectors.

The model of the programme consists of activity design, 3 train the trainer workshops followed by 6 pilot sessions to support volunteer engineers and teachers delivering the resource to a wide network of schools. Underrepresented groups will provide inspirational, relatable role models. Following on from the pilot sessions, the programme will be rolled out by teachers with STEM Ambassador support, STEMFirst will help teachers to link with STEM Ambassadors. CPD will be provided to all the volunteer engineers and teachers allowing them to deliver the classroom based activity with confidence and make the programme sustainable.

Benefits of Low Friction - A modern take

Omega Dot Ltd
Surrey and SW London
Secondary School Activity

We are a small research and engineering company providing consultancy services in the field of air bearings, tribology and sensors.

Children will learn the importance of low friction materials, lubricants and coatings. The practical exercises will teach them to design a test rig, construct it, test different material combinations and find methods of measuring the friction. Their creativity will be in how to design bearing that runs with very low friction.

Students will learn what a bearing is and construct a small scale test rig to experiment on materials and measure their friction with increasing load. This will involve assembling a motor, material specimens, sensors and data logging equipment. The students will need to apply mathematics to work out how to control the motor and how to convert signals from sensors to engineering units.

Impactful support for an established coding club

Coderdojo Ham (based at Kingston University)

Kingston University

Primary and Secondary School Activity

The proposal is for financial support to expand and improve the experience delivered by CoderDojo Ham. This includes the provision of engineering focused (e.g. Robotics) activities which involve hardware that must be purchased, but can be re-used. We envisage this will also allow 5 more monthly places to be opened in the CoderDojo (to 70 places) increasing our reach to 770 participants per year. This will also allow us to enter robotics competitions such as piwars (piwars.org).

Coderdojo Ham is one of the UK's largest regular Coderdojos (free coding clubs) with a track record of success in educating young people between 7 and 17 in the areas of computer science, technology and engineering. Coderdojo also has a track record of success with inclusion; returning girls number 42% of participants in October 2017.

Moving Engineering

FLUX

Warwickshire

Primary and Secondary School Activity

Designed in response to the language and learning barriers students face when engaging with STEM, Moving Engineering is a sophisticated and creative solution, utilising movement and kinesthetic teaching methods. The grant will enable us to design two new Moving Engineering workshops in collaboration with engineers. The workshops will combine dance and movement activities with coding, programming and communication technologies. We will co-ordinate delivery of the workshops within schools, engaging children from diverse backgrounds within Coventry and Warwickshire, targeting elements of the key stage curriculum, while providing inclusive learning regardless of age, gender or ethnicity.

We will target young female students identified as 'Social Artists' and students identified as 'Less Engaged' in the IMechE [Five Tribes](#) report as these students are typically more engaged with creative subjects however have the potential to contribute to the future STEM workforce. By utilising the students' affinity to performing arts subjects, infusing creativity into their learning process, we will foster their interest and engagement with engineering, and break down barriers fundamental to learning.

Moving Engineering will:

- Use the Arts as a platform to engage students who have relatively little affinity to STEM
- Encourage teachers to continue cross-curricular learning as a pathway to STEM
- Strengthen students' communication, creative thinking and social skills

We plan to involve a minimum of 1140 students and 48 teachers. Each student within the school delivery having a minimum of two hours of exposure.

Northern Ireland Raspberry Jam Astro Pi Project and Expansion

Northern Ireland Raspberry Jam

School of Maths and Physics Teaching Centre, Belfast

Public Activity

Building on 3-4 years delivering monthly "Raspberry Jam" events in Belfast, NI, with numbers growing from 10 to 110 per event we wish to put in place a new series of Astro Pi related activities reaching typically 40 attendees per month. With support from Queens University including professional subject specific expert advice on Astrophysics.

We would like to purchase equipment to allow us to expand the Raspberry Jam numbers by 40 young people, alongside delivering our new Astro Pi programme, bringing the total attendee number of 150. Alongside this, the grant will cover the ongoing expenses of 6 Raspberry Jam events in the first half of 2018.

The Internet of Curious Things

Foundation for Digital Creativity C.I.C.
Greater Manchester, Lancashire and West Yorkshire
Primary, Secondary and Public activity

The Internet of Curious Things empowers young people to invent with smart sensors and become positive changemakers in their own communities. We're challenging young people to develop their engineering skills to make a smarter, more connected world and view problems and solutions in a new light.

The emphasis on engineered solutions within the context of the environment will give purpose and real world relevance to participants' learning. Alongside school workshops for 7-14 yr olds, we will also deliver intergenerational community learning events and a hands-on teacher development session to extend, develop and excite audiences engaged through STEM innovations.

Children will explore engineering trade offs to invent a creative solution relevant to them. They will select and program sensors onto the Codebug wearable device to collect environmental data in a fun way to support problem solving. Along their coding journey, participants will explore the live data they collect through an interactive, imaginative and colourful lighting display.

Funding will facilitate the participation of over 300 children, teachers and family members in this series of innovative digital making workshops. Teachers will be supported to organise visits to local manufacturing companies and STEM Ambassadors will inspire students as capable role models to share knowledge and experiences to the future engineers and technicians of the industry.