

Round 2 (2008): *Ingenious* Final project summaries

JACK BRADLEY, University of Bradford

We turn your Fat to Fuel

The “We Turn Your Fat to Fuel” project dealt with issues around engineering, the environment, and alternative technologies. It aimed to provide clear demonstrations of how engineering has in the past affected the environment, causing climate change, and how engineering is a possible solution to that very same problem. Hands-on workshops on renewable energy production, biofuels and climate change were conducted in schools around Yorkshire and the Humber, hosted both at the schools, and at the University of Bradford. 4 open air demonstrations of renewable technology and local, engineering-based solutions to global environmental problems were conducted in towns around Yorkshire, The University of Bradford’s School of Engineering, Design and Technology teamed up with the Alternative Technology Centre in Hebden Bridge to provide both academic and practical knowledge of renewable technologies for the demonstration events.

PROFESSOR TREVOR COX, University of Salford

Digital Stories for Engineers

This project was about developing engineers’ communication skills through workshops based around digital story telling. Each participant makes a film with a theme based on their personal experience of engineering. During the course of the workshop, they learnt about narrative structure, script reading and picture and video editing.

Originally 4 workshops were planned each four days long. But upon review of the pilot evaluation, it was decided to condense each workshop to three days, with two activities in parallel and the project manager helping. 6 workshops were completed in total, held at the NRM in York, the NMM in Bradford, and Southampton, Birmingham and Salford Universities.

Various films were shown at the York Science festival (March 2008) and on the Newcastle Science festival website (Spring 2008). Seven films were shown at the British Science Festival (Guildford , September 2009) and were the inspiration for a schools workshop for ks3 pupils.

Two films were shown at a STEM ambassadors event, Girls in Science (September 2009) to year 11 pupils. Three films were shown at the Engineering Your Future event (Bolton, October 2009), to promote careers in broadcast engineering and acoustics. The films are also broadcast on YouTube.

DR PATRICIA ERSKINE, University of Edinburgh

Developing Engineering Expertise for Public Engagement and Rapport (DEEPER)

Academic engineers are engaged in some of the most exciting research in the UK today. Topics are diverse and sometimes unexpected – from production of clean energy from coal to completely new areas such as synthetic biology. Universities and Funding Councils actively encourage researchers to engage the public with their work, but it remains a challenge for many mid-career and senior academics to participate. It takes time to develop and practise the skills required to present technical knowledge to non-specialist audiences. It also takes both time and money to design a demonstrator which would illustrate their work practically. Ineffective presentations frequently result in disappointment for both the speakers and their audiences, especially if important research findings are not delivered with the necessary impact.

The DEEPER project piloted a programme of public engagement support for engineers at this critical stage in their careers. Participants practised and developed their presentation skills in two linked coaching sessions one month apart in February / March 2009 and May/June 2009. They received guidance on developing a good Science Festival talk and on producing interactive demonstrators, with an opportunity to bid for demonstrator funding. The sessions also gave participants a range of contacts in public facing organizations.

DR STEFFI FRIEDRICHS, Nanotechnology Industries Association

Advanced Workshop Course in Public Communication and Applied Ethics for Nanotechnologists

A 6-day advanced workshop course was held at St Edmund Hall, University of Oxford since facilities were not available at St Edmund's College, University of Cambridge during the Easter vacation 2009 for both UK-based and international research and company nanotechnologists to:

- increase their awareness of the associated public communication and applied ethical issues,
- encourage, support and train them in communicating confidently with the public, the media and politicians about such topics in their own fields of nanotechnology, and
- enable them to carry out such activities in their own organisational settings.

This course built on the experience from a number of similar successful, highly interactive courses in biotechnology and nanotechnology consisting of lectures, discussion sessions and group work led by experienced tutors. During the course participants developed plans for novel public communication activities to be carried out at the science festivals thus gaining practical experience and greatly amplifying the course's impact.

SUE HORDIJENKO, British Association for the Advancement of Science

A series of Engineering events at the BA Festival of Science 2008

The project comprised 12 events in the BA Festival of Science programme. These included talks, debates, hands on exhibitions, workshops for schools and science shows. As the events were so diverse and developed with different audiences in mind, the strand provided many opportunities for both engineers and the public

to be engaged at many different levels. 'Ingenious' allowed us to expand the reach of engineering in the Festival programme by also running the BA Isambard Kingdom Brunel Award Lecture during Manchester Science Festival. This worked particularly well as we ran the lecture as part of a family programme of events at Manchester Museum.

JOHN JONES, The Engineering Education Scheme-Wales (EESW)
EESW Ambassadors of Engineering

Six teams of year 11 and 12 EESW students will visit schools and companies to demonstrate their successful award-winning EESW engineering projects. The teams showed how they are able to communicate their findings verbally and in writing to engineers and peers and the general public alike.

DR VINAY KATHOTIA, Royal Institute of Great Britain
Engineering Masterclasses

The project worked with engineers and helped them to develop and deliver in-depth, discussion- and demonstration-rich masterclasses which gave 13-15 year olds an intense hands-on experience of engineering. During the subsequent series of masterclasses on Saturdays, students had the chance to work in groups to:

- (1) learn about the latest developments in engineering;
- (2) do hands-on engineering activities;
- (3) discuss the wider setting of these, including societal and ethical implications; and
- (4) get an insight into the wonderful and critical subject they are rarely exposed to in formal education.

DR DONAL MCNALLY, University of Nottingham
Public engagement in the mechanical engineering curriculum: automotive and road safety for primary schools

This project will pilot a novel method of bringing training in Public Engagement and Engineering Communication into the demanding curriculum of an accredited Mechanical Engineering degree. The outcome of this training, a series of exciting and innovative activities based on the topic of 'engineering road safety' (a research strength of the applicant), will engage primary school children in a dialogue about how and why engineering is affecting their lives, even to the extent of legislation such as the requirements to wear seatbelts, use booster seats and obey speed limits.

The undergraduates will be mentored and supported by a number of experts from the motor industry, academic research, primary and science education and the news media. The activities will be disseminated to primary schools through the outstanding movement engineering and science based Awesome Athletes theme day programme.

KATRINA NILSSON, The Science Museum
Bring on the Music

Fine Tuning was a series of three innovative and high profile Science Museum's Dana Centre events and one afternoon workshop, which took place in June-July

2008. Fine Tuning was designed to explore the theme of 'engineering and music.' It aimed to engage non-specialists directly in engineering and raise awareness of the ways engineering helps us to explore and enjoy music in modern life through dialogue, meaningful interaction and mutual learning on engineering-related issues. The theme of music also facilitated discussion on social impacts of some of the latest engineered technologies.

Fine Tuning drew upon the achievements and institutional learning gained from the 5 Senses event series (Ingenious award, October 2007) and successfully engaged c.20 engineers and 200 members of the public in open dialogue.

This was the first time that the Dana Centre directly explored the subject of engineering through the theme of music. Events employed new and innovative formats to do so. A wide range of engineer and other specialists were consulted during the event development period to help shape event content and formats, and participating engineers also had the opportunity to attend a training workshop to help them to gain new communication skills for the events and future career development.

DR AMANDA NOLTE, The Oxford Trust
Engineering Engagement

- Local engineering companies (Fugro Geoconsulting Ltd., Crown Packaging Plc., Rutherford-Appleton Laboratory (RAL), Regenattec and Crowcon) were involved in the project.
- 26 engineers were directly engaged.
- We ran engineer training sessions, which included an introduction to public engagement, and ways of engaging with different audiences. All of the Fugro engineers received Science, Technology, Engineering and Maths Ambassador (STEMA) training. Most of the RAL and Crown engineers were already registered STEMAs.
- With support and direction, each engineer from Fugro produced a photo diary. Several diaries are available on the Fugro website (www.fugro.co.uk/careers/profiles.asp), and a selection were printed as postcards for career event handouts. Crown developed a can-design workshop and materials for a careers event and new careers stand. RAL developed a workshop for a careers event, which they also adapted for a public event. Regenattec developed materials for a public event, which were then adapted for a display and website resource (www.scienceoxfordlive.com/news/biofuels). Crowcon had scheduled a public session, but cancelled before the event took place.
- Fugro delivered one public event, Crown delivered one careers event, RAL delivered one careers event and seven public events, and Regenattec delivered one public event.
- We received audience and engineer evaluation from the majority of events and engineer training sessions.

DR GEOFF PARKS, Cambridge University Engineering Department
Discover Engineering

Deliver 6 Discover Engineering workshops (2 for each theme) for local families and schools. Each workshop will accommodate 40

family/school teams (of 4 people, including adults). A series of 6 workshops will allow approximately 800 children and adults to visit the Engineering Department, talk to real engineers, take part in a hands-on activity and explore the role of engineering in society.

- Recruit and train a team of staff, student and alumni volunteers who will design and deliver the workshops. Each workshop will be supported by 15+ engineering volunteers.
- To make a positive impact on the participants' understanding and awareness of, and interest in engineering.
- To produce comprehensive, detailed resources which will be made available to other interested groups, particularly STEMTEAM Cambridgeshire and Engineering alumni through Cambridge University Engineers Association

DR HEATHER REA, Heriot-Watt University

E4 = (Engineering)4 = Engaging * Exciting * Enthusing *

We set out to create a team of four PhD level engineers from electrical, mechanical, civil and chemical engineering to develop and deliver events at museums, schools and other public venues over the course of a year. The project was designed to help nurture early career engineers' communication, leadership, project management and event management skills. The university wanted the engineers to start thinking about their subject more creatively and to experience the enjoyment and challenge of enthusing the public about engineering. Over the course of the project a number of engineering experiments were developed. The team opted to focus on the Energy sector, which is an important and current topic, and aimed to engage members of the public with new and innovative developments. The team also felt it was important to establish and communicate the fundamentals of energy transformation, i.e. where does energy come from and where does it go? A number of activities were developed, including demonstrations of energy from fruits, building bridges and an interactive drama activity for primary and secondary schools on the subject of searching for "The Search for the Lost Energy".

ALICE TAYLOR-GEE, The BA

BA Media Fellowships

The Media Fellowships aim to create a greater awareness and understanding of the workings of the media among practising scientists and engineers. The Fellowships provide placements with a national press, broadcast or internet journalist. The Royal Academy of Engineering funded two engineers to take part in the scheme in 2008/9.

Each engineer spent about a month working within the conditions and constraints of the media, mentored by an experienced journalist, producing accurate and well informed pieces about developments in science. One Fellow was based with The Guardian and the other with the Times Higher Education supplement. The Fellows also attended the British Science Festival, experiencing the intensity of a busy press centre and reporting on hundreds of events. Fellows were given training at the start of the scheme in an interactive workshop run by journalists and communications experts.

The two engineering Fellows produced nearly 30 written and audio pieces between them, both online and in print.

The scheme's impact extends well beyond the summer placements. Fellows are better equipped to communicate their research and expertise to the public and their colleagues. Amongst other activities, these engineers gave a seminar to over 200 academics and started a research group blog.

PROFESSOR PHILIP WITHERS, The University of Manchester

So you think you can design a Jet Engine?

The project supported the training of PhD/Postgraduate engineers in public engagement, the development of communication tools and their delivery to schools and the general public on Meet the Engineer Days at the Museum of Science and Industry, the Design a Jet Engine Design Exhibit, Materials selection tools, Aerospace and the Environment Days and a new Tool looking at recycling. This new team of young engineers allowed us to engage with many more schools and the public, through high profile events.

Outputs:

- 30 young engineers trained in Public Communication.
- Engagement events including (Farnborough Airshow, 2 x Southport Airshow, Wrexham science festival, 3 x Family Day, that altogether meeting over 30,000 people)
- Young engineers presented to over 85 Schools in NW.
- A new Debate Day on Aerospace and the environment delivered at MoSI to 42 school students
- Communication tools development workshop at which an idea for a Recycling Dancemat game emerged; this has subsequently been spun out as a small company.
- 10 achieved STEM Ambassador status (includes Professor P J Withers)