Exploring & Understanding Science

fascination

WANTED: small businesses with big ideas

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www.stfc.ac.uk
The STFC annual Photowalk Competition took place last autumn and saw over 200 amateur and professional photographers take part across four STFC sites: the UK Astronomy Technology Centre (UK ATC) in Edinburgh, Daresbury Laboratory (DL) in Cheshire, the Chilbolton Observatory in Hampshire and Rutherford Appleton Laboratory (RAL) in Oxfordshire.

The competition gives photographers the opportunity to gain a behind the scenes look at the science that STFC undertakes at its sites. The images that the competitors took had to capture the science, innovation and technology that STFC encompasses. The images were voted for by the general public online and the following six winners were selected by regional and national judging panels:

1. National Winner - Mrs Lisa Ward, with a shot of the 25m Chilbolton dish antenna
2. Online winner - Mrs Angela Davison
3. Daresbury Laboratory (DL) regional winner - Mr Greg Harding
4. Rutherford Appleton Laboratory (RAL) regional winner - Mr Vince Mo
5. UK Astronomy Technology Centre (UK ATC) regional winner - Mr William Palin
6. Chilbolton regional winner - Dr Roger Dingley

Welcome to the twelfth edition of Fascination. This edition is a general update of what’s been happening in and around STFC over the last few months.

STFC delivers impact to the UK by the delivery of world class research, innovation and skills through programmes at universities, national and international large facilities, Science and Innovation Campuses, and our UK based laboratories. STFC aims to catalyse knowledge exchange and economic impact arising from all of these activities.

Our research seeks to understand the Universe from the largest astronomical scales to the tiniest constituents of matter, yet creates impact on a very tangible, human scale. From cancer treatment to airport security, high-tech jobs to hydrogen-powered cars, energy generation to accident-scene emergency care, our impact is felt within and beyond the UK in many aspects of daily life.

In STFC’s second Impact Report, we present quantitative data and case study examples which illustrate the breadth and depth of our economic and societal impact, across the whole of the UK’s science and innovation landscape.


Have a look at the STFC highlights brochure to see some of the great research STFC and its facilities have played a part in. The highlights feature a variety of areas in which STFC continues to support and deliver an inspiring portfolio of world class science, technology and innovation. http://www.stfc.ac.uk/2419.aspx

The purpose of the Programmatic Review is to define a balanced programme of excellent science within a realistic financial planning envelope. As a part of this procedure, a prioritisation for projects and science areas will be defined. This will be used in deciding whether planning provision should be made within the programme for a given area or project, and as part of the process of deciding the size of any such provision.

The Programmatic Review is thus designed to inform planning decisions and to help optimise excellent science and impact in any financial scenario (positive, negative or neutral). The level and timing of funding for any project or area may be affected by the overall funding available. In the event of greater or smaller financial resources being available, decisions will need to take into account excellence, balance, costs, and spend profile in a way that goes beyond considering just raw ratings. Future unanticipated opportunities will also be assessed in a consistent way, when they arise over the next few years, and this will help STFC decide whether and how they should be accommodated within the programme at that time.
Hartree opening starts revolution in High Performance Computing

The importance of high performance computing (HPC) to UK society and industry was highlighted in a series of events at Daresbury Laboratory earlier this year.

A two-day HPC workshop began the week, featuring speakers from well-known worldwide organisations such as Jaguar, Land Rover, IBM and Unilever, with presentations that showed off the many advantages of using HPC. Over 120 delegates from both industry and research institutions were present for the event, which was the first in a series that will provide current and prospective HPC users from all science sectors with information about the world-class resources available and highlight potential collaboration opportunities.

The week culminated in a visit from the Chancellor of the Exchequer, George Osborne MP, who announced a capital investment of £30 million into the Square Kilometre Array (SKA) project and in HPC at the Lab, and to officially open the Hartree Centre. An essential signing with Unilever also took place, consolidating a promising research partnership.

STFC’s Hartree Centre is a research collaboration with IBM, the world’s biggest IT and consulting services company. Its facilities include a cutting-edge surround wall visualisation suite and advanced software training facilities. The Hartree Centre was formed to allow new collaborations and projects between industry, academics and the Government that will promote economic growth.

The Government’s investment into the UK’s e-infrastructure will support one of the Hartree Centre’s main goals of developing energy efficient computing technologies, as well as data intensive computing for the SKA. The world’s largest radio telescope is expected to produce an unprecedented amount of data; the data collected in a single day by the SKA would take nearly two million years to play on an iPod. Software capable of handling such large amounts of data is therefore a high priority. The development of new technology for scientific research will inevitably lead to spin-outs that will benefit society, from improved communications systems to entertainment.
The next step on the road to more accurate weather forecasts

Severe winter weather experienced in the UK over the last couple of years reduced the UK’s GDP by 0.5 per cent, and resultant travel disruption cost the UK economy £280 million per day. The weather has a huge impact on our lives, affecting transport, agriculture, energy use and leisure.

For this reason, we rely heavily on weather forecasting to inform us about severe weather, to allow us to prepare, plan and manage the weather in a way that not only saves money but can save lives.

Gung-Ho, a project to design and build a next generation weather forecasting model for the UK, is a collaboration between the Met Office, the Natural Environment Research Council (NERC) and STFC. Utilising the combined expertise of all three research bodies, that already makes the UK a world-leader in weather forecasting, its aim is to ensure we can exploit ever more powerful computers so we continue to provide the most accurate forecasts possible.

This research was one of the first major projects to benefit from STFC’s new Hartree Centre, one of the world’s foremost centres in future software development based at Daresbury Laboratory in Cheshire. The Centre is home to the UK’s most powerful supercomputer, Blue Joule, which is made up of 98,304 processors and is capable of running over a thousand trillion calculations per second (see page 4 for more details).

The overall aim for the Gung-Ho project is to develop a ‘new dynamical core’ for a new weather and climate model. This dynamical core is an essential part of the model that deals with how air moves; i.e., the dynamics. The use of ultra-fast computers allows for a much more detailed simulation of the changing weather conditions, providing even more detail further into the future.

Research for the Gung-Ho project, which is part of the Next Generation Weather & Climate Prediction joint programme, began with a two year initial research phase to explore the most effective options for the dynamical core. It has recently entered Phase 2 - a three year ‘development’ stage that will build on the previous research to begin to develop a fully functioning dynamical core for the new, advanced weather and climate model.

A new launchpad competition designed to accelerate new business projects and their commercial success has been announced by the Technology Strategy Board (TSB), in partnership with STFC.

Small businesses in the early stages of start up throughout the UK could benefit from a total of £3 million funding to help accelerate innovative R&D. Based at the National Science and Innovation Campuses in Didcot, Oxford and Daresbury, Cheshire, the two launchpads will target different areas of expertise, with the aim of encouraging small and medium sized businesses into a science environment.

The competition involves companies putting forward a video proposal which summarises their project idea, followed by a written application. The launchpad offers up to 60 per cent funding of the initial project cost, and helps businesses through the process of applying for additional money.

Up to £100,000 R&D funding could be available to advanced materials and manufacturing start-ups, companies and entrepreneurs in the North West through the £2 million launchpad which will be centered around Sci-Tech Daresbury and Runcorn Heath Business and Technical Park in Cheshire.

WANTED: small businesses with BIG IDEAS

Paul Vernon, Head of Campus Development at STFC, explained: “Using our own business support expertise and research facilities we will be working with organisations across the cluster to ensure that entrepreneurs and small businesses are in the best possible position to accelerate the growth of their project or idea.

Importantly, for applicants that have not been successful, we will also be identifying how we can help them accelerate their business ideas to ensure maximum impact from STFC’s capabilities and expertise.”

In addition, a space launchpad is being initiated at the Harwell Oxford campus in Oxfordshire. This £1 million launchpad is strategically placed among the strong space cluster based around the Oxford campus, which includes RAL space and the new Satellite Applications Catapult, a world class centre for the development of satellite technology. These groups will be able to offer high quality business support and services to successful businesses.

For more general information, please visit: http://www.innovateuk.org/deliveringinnovation/launchpad.ashx
Taking graphene’s fingerprints

Research on the electronic properties of graphene could bring us one step closer to taking it from the laboratory to developing it for use in commercial products. Scientists at the SuperSTEM facility at STFC’s Daresbury Laboratory have, for the first time, been able to observe changes to the electronic structure of graphene as it bonds with a foreign element added by just one atom at a time. The results have been published in the journal Nano Letters.

First discovered in 2005, ‘miracle’ material graphene is the lightest, strongest and most conductive material known to man, with great commercialisation potential due to its mechanical strength and electronic properties. It is hundreds of times stronger than steel but, at just one atom thick and therefore two-dimensional, it is extremely difficult to manipulate to make use of these advantages, or to bond it with other materials to develop marketable products.

As a two dimensional material, graphene is all surface and is therefore completely exposed to its environment and strongly affected by its surroundings. Led by SuperSTEM’s Professor Quentin Ramasse, along with researchers from the Universities of Leeds and Manchester, the team has now been able to observe the minutest of variations that occur when a sheet of graphene is doped with a single atom of silicon.

Professor Quentin Ramasse, Scientific Director at SuperSTEM, said: “What we have shown here is that we can now tell exactly how a single foreign atom integrates within the graphene - whether it slots in seamlessly, or whether it is distorting the graphene lattice by as little as ten trillionths of a metre, and importantly how the distortions and precise bonding arrangement influence the electronic structure of that atom and of its environment. You could say that this marks the start of experimental physical chemistry at the single atom level.”

The precise characterisation of the bonding of single atoms is essential for the development of practical applications of two-dimensional materials, such as graphene. In December 2012, the Chancellor of the Exchequer, George Osborne MP, announced £21.5 million in funding via the Engineering and Physical Sciences Research Council to the most promising graphene-related research projects in UK universities, in plans to boost the ‘manufacturability’ of graphene.

www.superstem.com

Credit: D.M. Kepaptsoglou, SuperSTEM. SuperSTEM microscopes reveal how single silicon impurity atoms in graphene can adopt different configurations, bonding to either 3 or 4 neighbouring carbon atoms.

“You could say that this marks the start of experimental physical chemistry at the single atom level.”
Neutrons helping to develop new materials for medicine and industry

Tough Bioglass could banish bone replacements

New research from the ISIS neutron and muon source in Oxford is being used to extend the potential range of uses for bioglasses without compromising their ability to stimulate new bone growth.

Credit: Prof Bob Newport (University of Kent) who used ISIS to visualise the atomic structure of the bioglass, and Dr Julian Jones (Imperial College London) who incorporated Bob’s results when making a tougher bioglass-polymer hybrid (shown in the image).

The aim in using bioglasses in implants is to encourage the body to mend tissue damage using its own repair mechanisms, rather than using biologically inert transplant materials, such as metal implants. Researchers are able to visualise the atomic structure of bioglass through use of neutron scattering at ISIS.

The results from these studies into the atomic structure of bioglasses at ISIS are being used to produce a tougher bioglass-polymer hybrid for potential use in hip and knee replacements. With an average life expectancy of 80 years in the UK, bioactive materials are increasingly relevant.

Polymer hybrids perform much better under biomechanical loads than bioglass alone, and are compatible with the internal environment of the body. They form a platform, or template, that can be used in the regeneration of tissues such as bone, and are successful because they can be highly tailored to their application.

At ISIS, it was found that alternating the elements used in the composition of bioglass changes its solubility properties once in the body. Dr Julian Jones, Imperial College London, has used these results to produce new types of hybrid materials with therapeutic properties.

Bioglass polymer hybrids display controlled decomposition in bodily fluids so that the platform can be transferred to the newly formed tissue growing in its place. ISIS has also been used to help in the optimisation of bioglasses as anti-bacterial coatings and for use as drug delivery materials.

The experiments conducted at ISIS used silk proteins from within the silk glands of mulberry silkworms, which were placed in the beamline of ISIS instrument Sans2d. As the silk proteins interacted and coagulated into a silk fibre, the scattering of neutrons changed, enabling the researchers to watch the silk coagulation process at molecular level, giving new insights into how it works. Research remains on-going as more and more information is gathered on the mechanical properties of silk and how they convert into a solid silk fibre.

The ability to produce silk has evolved independently in many arthropod species, such as silkworms and spiders. The silk which we exploit to weave into textiles comes from the cocoons of the larvae of the mulberry silkworm, which they build around themselves for protection during metamorphosis into silk moths. When artificially grown for silk production, two thirds of the silkworm’s body is dedicated to silk production.

In comparison, spiders have evolved silk production for a variety of reasons, each of which requires a unique type of silk. The most obvious is for spinning webs to catch prey, which came about after more than 40 million years of evolution, as spiders had to start catching aerial prey once insects had evolved flight. However, some spiders remain on the ground, such as Trapdoor spiders, which ambush their prey once they disturb the ‘trip’ lines laid out by the spider.

Did you know a cable made of spider silk which is no thicker than five centimetres diameter could support an airplane? Nature produces astounding materials, and if we can unpick millions of years of evolution to understand how these mechanisms developed over time, then we have the chance to make materials that it hasn’t been possible to make before.

Credit: Prof Bob Newport (University of Kent) who used ISIS to visualise the atomic structure of the bioglass, and Dr Julian Jones (Imperial College London) who incorporated Bob’s results when making a tougher bioglass-polymer hybrid (shown in the image).
A major step forward in our understanding of the structure and behaviour of some of the most elusive atomic nuclei in existence is now taking place thanks to a new advanced detector at the GSI Helmholtz Centre for Heavy Ion Research in Darmstadt, Germany.

**Advanced Gamma Tracking Array (AGATA)**

AGATA is a large European collaboration involving 13 countries and over 40 institutions. In the UK, AGATA has been developed by the STFC’s Nuclear Physics Group, and a group of UK Universities funded by STFC, with the aim of studying the very rarest and heaviest elements predicted to exist.

A thousand times more sensitive than any previous detector built, and with an unparalleled level of sensitivity to electromagnetic radiation, AGATA will, at final set up, be able to observe the structure and interior of these rare and exotic nuclei by measuring the gamma rays they emit as they decay.

Professor John Simpson, Head of STFC’s Nuclear Physics Group and International AGATA Spokesperson, said: “Nuclear physicists look to create and study the very rarest and heaviest elements predicted to exist, so it is really exciting to see technology developed by the STFC’s Nuclear Physics Group, and UK Universities, contribute to this research that could answer some of the most fundamental questions about our Universe.”

Atomic nuclei make up most of the visible matter in the Universe. Exotic nuclei, such as those produced by fusion in stars, are so unstable that they might only exist for a matter of seconds before they destruct and produce the stable matter from which we are made. By understanding the structure of these unstable, exotic nuclei we may reveal why some are more stable than others, or have particular shapes, leading to deeper insights into how stars are born and evolve.

STFC’s scientists, along with other key partners from the Universities of Liverpool, Manchester, Surrey, West of Scotland and York, have taken a leading role in AGATA’s development, particularly in the engineering and electronics design. The mechanical structure was delivered by the UK to GSI early in 2012, and experiments started in September after an intense period of installation and commissioning.

http://www-win.gsi.de/agata/overview.htm

Professor John Simpson (far left) with the AGATA team in Germany

**GAMMA RAY CAMERA**

will give new insights into the life of stars
Ten years on and still shining bright
A decade of success for Diamond Light Source

Diamond Light Source, the UK’s national synchrotron light source facility based on the Harwell Science & Innovation Campus, celebrated its 10th Anniversary in 2012. This milestone was marked throughout the year with special public open days, creative writing competitions and feature articles. The celebrations culminated in top scientists, industrial researchers and funding agencies gathering at the Royal Society in London on 27 November to gain insights into the scientific achievements that have been driven by the facility to date.

The Rt Hon David Willetts MP, Minister for Universities and Science, attended the event and, during his speech, said: “One of the things that has been achieved with the development of the Diamond Light Source is once more giving us confidence in Britain that we can plan, finance and deliver world class scientific infrastructure. I believe that it has done for the self-confidence of scientists in this country what the Olympics did more widely for infrastructure. I believe that it has done for the self-confidence of Britain that we can plan, finance and deliver world class scientific infrastructure. I believe that it has done for the self-confidence of scientists in this country what the Olympics did more widely for the self-confidence of the nation and the sports community.”

Carrying the torch for UK synchrotron science

On 27 March 2002, the UK Government and the Wellcome Trust signed a joint venture agreement that was the beginning of Diamond Light Source Ltd – the UK’s new national synchrotron facility. Diamond was to take up the baton from the Synchrotron Radiation Source (SRS) at the Daresbury Laboratory, in Cheshire, moving the UK into the next generation of synchrotrons. As a third-generation synchrotron source it would be able to produce X-rays ten billion times brighter than the sun, so focused that they are 100 billion times more intense than a hospital X-ray.

Over the next five years, the synchrotron grew literally from ground that had once been the runways for RAF Harwell up – 1,500 concrete piles were anchored into the chalk bed 15 metres below the surface to provide a stable base for the experimental hall floor. A synchrotron is particularly sensitive to movements in its foundations – the electron beam in the main storage ring is only a hair’s breadth across and the experimental X-rays are focused down to a spot just a millionth of a metre (one micron) in size – so a steady and stable platform for experiments is essential.

By 2004 the iconic doughnut-shaped building had appeared on the landscape, giving a futuristic feel to the Oxfordshire countryside and hinting at the advanced technology that was to come. Expertise gathered from around the globe came together to fit out the storage ring with its 450+ magnets and third-generation insertion devices. First light in the machine was achieved, the first seven beamlines were completed and by January 2007, Diamond was ready for its first user experiments. Now with six years of successful operation under its belt, Diamond is holding its place on the world stage of large scientific facilities. Operational beamlines have grown from seven to 22, with a further ten to be added by 2018.

Diamond’s impact – the story so far...

Nanoscale production
Scientists growing nanometre scale wires for tiny electronic devices are using Diamond to help them create individual components as small as possible without affecting how they function. Diamond’s nanoscience beamline allowed them to monitor the chemical state of individual nanoparticles and determine their chemical makeup, which in turn enabled them to identify a route for growing metallic nanowires on a dielectric substrate.

HIV understood
Researchers investigating HIV can now begin to fully understand how existing antiviral drugs are working, how they might be improved, and how to stop HIV developing resistance to them. By determining the 3D structures of the molecular machine used by retroviruses to insert copies of their genetic material into host DNA, they are now able to understand how this key mechanism works.

Overcoming corneal disease
Abnormalities in the structural organisation of collagen in the cornea have been implicated in the eye disease keratoconus, a leading cause of corneal transplant surgery. Diamond is being used to investigate a potential new therapy that would stiffen the cornea and overcome the astigmatism of keratoconus.

Earlier cancer detection
Survival rates of cancer are generally higher the earlier the cancer is diagnosed, but this relies on conclusive biopsy samples. Diamond’s infrared beamline is helping to identify at single cell level biomarkers in cancer cells to distinguish healthy cells from cancerous ones. The aim is to reduce the number of biopsies, thus reduce risks and side effects for patients, start them on treatment earlier, and reduce costs for the NHS.

Metals in the brain
Evidence shows that there are subtle differences in trace metals in the brain between people who experience a normal ageing process and people who develop a neurodegenerative disorder. Scientists are using Diamond to collect additional information about where the metal ions are distributed in brain tissues and what form they’re in, helping us to understand if they may be contributing to the disease process.

Renewable energy revolution
Scientists have used Diamond to gain insights into how ultra-cheap solar energy panels for domestic and industrial use can be manufactured on a large scale. They are working on producing nanoscale thin polymer films of solar cells that could be used to make cost-effective, light and easily transportable solar panels.

Engineering insight
Engineers from Rolls-Royce were the first to use Diamond’s unique JEEP beamline to test innovative coatings for the Trent 1000 engine which powers the Boeing 787 Dreamliner. They were able to capture 3D micrometre images inside the blade to assess risk of failure, without taking the blade apart.

Preserving our history
Diamond’s X-rays were used to study the chemical makeup of the timbers from Henry VIII’s famous warship the Mary Rose. The results have helped researchers from the Mary Rose Trust and the University of Kent to come up with a solution to help preserve the ship for centuries to come.

For further information please visit www.diamond.ac.uk

The Diamond Light Source Ltd is funded by the STFC and the Wellcome Trust, owning 86% and 14% of the shares respectively.
STFC, the University of Oxford and US company Emerald Bio, have entered into a strategic partnership that will provide the first data information management software system specifically for protein laboratories involved in structural drug development research.

The Protein Information Management System, PiMS, is the first such system designed to handle the complexity of data management in protein production laboratories. Structure based drug design is one of the goals of such laboratories. It is particularly significant in fields such as cancer chemotherapy, drug resistant infections, neurological diseases, to name a few examples. PiMS will support these laboratories by managing complex information relating to experiments, protocols and samples within the protein production workflow.

STFC’s Scientific Computing Department originally collaborated with the University of Oxford to develop the PiMS technology, and since 2009 has provided a PiMS service for European academic researchers, with support from the EU organisation Instruct (Integrated Structural Biology Infrastructure for Europe), which provides structural and cell biologists from industry and academia with the opportunity to further their research.

The new agreement, under which Emerald Bio holds the exclusive rights for the commercialisation of the software, means that it can now be offered to industrial researchers in the field. At the same time, it will also continue to support the growing academic user community, while providing a commercial framework for further adoption of PiMS. The new software, PiMS pro™, is expected to become available during 2013.

A new partnership that brings together the capabilities of the UK’s pre-eminent scientific computing team with commercial bio-technology organisations aims to advance discovery in protein science. This is a field of study particularly important in developing new drugs for use in cancer chemotherapy, combatting drug resistant infections and fighting neurological diseases.
CHILBOLTON ANTENNA - Chilbolton Observatory receives a new antenna

After more than a year of planning and many months of hard work, the RAL Space Ground Station has received a new 6.1 m antenna system to add to its ground station facilities.

Installed at the Chilbolton Observatory, this new system can support telemetry (remote data measurements) and control at S-band and receive X-band data (part of the microwave band of the electromagnetic spectrum, used by some communications satellites) at rates greater than 600 Mbps, necessary to support many new Earth observation missions, such as Radarsat and the Landsat satellite series. The 6.1 m antenna system is also compliant with the European Space Agency’s minimum set of ground station antenna technical and performance requirements.

This strategic acquisition was procured to initially support TechDemoSat-1, operating in conjunction with the Mission Control Centre at the International Space Innovation Centre (ISIC). However, it is anticipated that the first mission for this new dish, based on current launch dates, is likely to be the demonstrator CubeSats being launched by the US firm Cosmogia.

http://www.stfc.ac.uk/chilbolton/default.aspx

TDS - Revolutionary ‘test-bed’ for UK satellite technology

A new satellite to trial innovative space technologies from UK academia and industry has been designed by small satellite pioneer, Surrey Satellite Technology (SSTL).

Huge costs usually stand in the way of UK businesses gaining that all-important flight demonstration for novel technologies but TechDemoSat (TDS) will allow companies to demonstrate these in orbit, which could enable them to win international business.

The design phase for this exciting new ‘test bed’ for UK technology has been funded thanks to a £770,000 grant from the government’s Technology Strategy Board (TSB) and the South East England Development Agency (SEEDA). It is hoped that a further £2.7 million of investment for the build and test phase will enable this satellite to demonstrate the potential of a huge variety of payloads that will be loaded onto it.

From a 750 g ‘sugar-cube’ sized gyroscope to measure the orientation of the satellite, to a 7.5 kg earth observation instrument, the payloads present will represent the wealth of innovation and research in the UK space industry. Organisations contributing payloads include STFC’s RAL Space, University of Oxford and the Langton Star Centre which is coordinating a UK school project, offering schools a unique opportunity to contribute to a space mission.

One payload of particular interest is a ‘sail’ that will be used to end the satellite’s lifespan by pushing it out of the sky to burn up in the Earth’s atmosphere. Technologies that can do this efficiently are expected to have huge commercial value in the future.

TechDemoSat, the project that will keep the UK at the forefront of space technology.

TDS is exactly the sort of programme the Space Innovation and Growth Strategy (Space-IGS) set out to achieve when they set out their twenty year plan to maximise the potential of the UK space industry. By cutting the time taken for technologies to get into space, TDS will give UK businesses a competitive edge in the crowded and lucrative space market.
Every year STFC offers some of its PhD students the chance to spend some time as a fellow at the Parliamentary Office for Science and Technology (POST). Based in Westminster, POST produces about 20 four - page briefings, known as ‘POST notes’ each year on a variety of topics likely to affect policy decisions in the short, medium and long term. For the duration of their placements, usually around three months, POST Fellows are assigned a supervisor to oversee the production of a full POST note on a set topic.

We caught up with Lisette Sibbons, a STFC-funded PhD student studying astrophysics, who recently completed her three month POST Fellowship.

F: How did the fellowship benefit you?
LS: I think it was really interesting to work in that environment. It’s very different to my PhD. It was particularly interesting to sit in on things like one of the board meetings where the POST note topics were decided. We also got to go to lots of different events by lots of different fellows and work with PhD fellows from lots of other subjects which just wouldn’t have happened in my day to day life. It was really interesting to see science written so differently as well – it has to be accessible to people with no science background.

F: Finally, how do POST Fellowships benefit STFC?
LS: I think that the fellows gain a new strong to their bow and STFC also benefits through the relationships that are built up between different departments. All the people we work with were PhD students themselves and a lot of STFC fellows and students will go on to work in a scientific or advisory capacity. I just think it’s a really great experience and I’m really glad that STFC funds it.

LHC IN SCOTTISH PARLIAMENT

The LHC on Tour exhibition visited Scottish Parliament this February, in a celebration of the Scottish involvement in the world’s biggest science experiment. Visitors were privileged to have Professor Peter Higgs at the reception, the unassuming physicist who first theorised the existence of the particle that has taken his name.

LS: I worked on the infrastructure of Machine To Machine (M2M) communication. It wasn’t something I knew about before I started – it’s about machines that communicate, with almost no human interaction, to pass information from place to place. M2M is just about getting the world to run as smoothly as possible with humans having as little involvement as possible.

CERN@school: using technology from CERN to inspire particle physics teaching

CERN@school is a project that brings technology from CERN into the classroom to aid with the teaching of particle physics. It aims to inspire the next generation of physicists and engineers by giving school students access to the type of experiments and equipment that are used by researchers at CERN and showing them what a career in science could be like.

The project will take data from school based research projects and LUCID (the Langton Ultimate Cosmic ray Intensity Detector), a cosmic ray detector in space, and make it available to all schools. It will give students the chance to analyse this new data, giving them a real experience of cutting edge science.

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F: Fascination: Why did you apply to be a POST Fellow?
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Find out more about POST Fellowships
http://www.parliament.uk/mps-lords-and-offices/offices/bicameral/post/fellowships/

Read the POST note of M2M that Lisette produced during her fellowship
http://www.parliament.uk/business/publications/research/briefing-papers/POST-PN-423

LHC on Tour Team with Professor Peter Higgs

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CERN@school was piloted at Simon Langton Grammar School, where LUCID was developed, and it has already led to a huge uptake in physics. Students love the challenge of working on real research. Physics teachers have also found this approach to lessens invigoriang, and have been inspired by being part of a research team.

This new project forms just part of a national bid to try and transform the experience students have of physics. Changing the negative connotations that many school students associate with the subject will hopefully mean a change in attitude towards the subject, boosting interest and enthusiasm.

DSD - All eyes on the sky

Throughout the UK, members of the public were able to gain a hands-on astronomy experience with STFC’s Dark Sky Discovery (DSD) events that saw thousands turn out to launch rockets and gaze at the stars. DSD is a unique national network of local partnerships between astronomers and community groups, led by STFC, and funded in England by the Big Lottery Fund through Natural England’s Access to Nature scheme. Dark Sky sites are nominated by the public due to their low-levels of light pollution as well as being safe and accessible, ideal for everyone to take part in star-gazing. Over fifty sites across the UK were nominated with a huge number of events that aimed to engage people of all ages in astronomy and space.

Elizabeth Price - science artist in residence - Turner Prize

RAL Space’s first ever ‘Artist in Residence’ has been awarded the prestigious Turner Prize for 2012. The award recognises the artist under the age of 50 that is considered to have put on the best exhibition that year. Supported by the Leverhulme trust, Elizabeth has spent eight months in RAL Space, exploring the parallels between her artistic work and space-scientist Dr Hugh Mortimer’s research. She has often drawn on historical archives for inspiration and had recently focussed on solar imagery and black body sources.
From Spiders to Dinosaurs: the prize for 2012’s best young scientists

The achievements of young scientists from Oxfordshire were celebrated in two award ceremonies; one held at STFC’s own Rutherford Appleton Laboratory and one at the University of Oxford Museum of Natural History.

STFC invited year 9 students who had been nominated by their school, as the best young scientist, to hear a talk from Dr Ann Terry, a researcher at the Rutherford Appleton Laboratory’s ISIS Neutron Source and to receive their prize, which consisted of a certificate and a book token worth £25.

Dr Terry wowed the students and their parents with a talk about her research on spider’s webs; a material that is still being understood but has great potential. ISIS is a particle accelerator that produces neutrons, which are then used to investigate materials at the subatomic level, just as light is used in a microscope. For more detail about this research, see page 6.

For the event at the University of Oxford Museum of Natural History, year 13 students were awarded the title of ‘Scientist of the Year’. Each student was nominated as the best physicist, chemist or biologist in their school. In total 66 students from 26 schools were put forward for the award, which was a collaboration between STFC, the Society for the Chemical Industry and Science Oxford.

After their presentation amongst the fossilised dinosaurs, they were treated to talks by mechanical engineering apprentice Jamie Pinnell, who highlighted some of the different career pathways available to them and Dr Ceri Brenner, a laser and plasma physicist at STFC’s Central Laser Facility, who commented after the event.

I was very grateful for the opportunity to speak at this wonderful celebration of young scientists. I wanted to give them a glimpse of what working on the frontiers of scientific knowledge feels like and that, for me, it’s about using my scientific training and inquisitive nature to contribute to the world that we live in and indeed the future.

Daresbury Laboratory is also celebrating promising students by hosting a School Science Prize. Year 9 students from the local area have been invited to write 500 words about why they love science. Selected finalists will then be invited to an awards evening at the Laboratory in July, where they will have two minutes to answer questions from a panel of judges on the same topic.

For more information, or if you are interested in entering please visit: http://www.merseystem.co.uk/

The ‘best young scientists’ receive their awards
STFC funding scheme for Public Engagement projects

The Granada Foundation works to inspire young people and adults in fine arts and science, by funding both artistic and scientific projects across the North West of England.

They have been a long-term supporter of the Manchester Museum of Science and Industry (MOSI) as far back as 2001, awarding grants that have helped to fund numerous exhibits. They have also helped with the STEMNET (Science, Technology, Engineering and Maths Network) initiative ‘STEM Club Boxes’. These boxes are full of exciting science experiments and ideas that are used by after-school science clubs across the North West.

The advisory panel meets three times a year to discuss applications for funding and award grants of up to £10,000 for successful applicants.

Please visit http://granadafoundation.org/ for more information on applying.

STFC offers a variety of funding for all kinds of projects promoting science and technology. Anyone can apply, including grant-funded research groups, STFC research facility users, schools, museums, etc.

Projects must be relevant to publicising engagement or teaching about the STFC science and technology areas.

Previous winners of the Small Award grant (between £500 - £10,000) have included Dr David Berman, from Queen Mary’s University of London, with his project “The Higgs and Beyond: exploring particle physics today – and in the future”, which aims to harness the current excitement in particle physics following the discovery of the Higgs Boson and promote it to A Level and GCSE Students, and their teachers.

Another previous winner is Ms Liz Mermin, Crow Hill Films Ltd, with her project “Minds of Matter: CERN People Films”, which is a series of short films of scientists at CERN. They will give the viewer a chance to see the thrills and headaches of world class experimental particle physics.

The Open University, funded through the Large Award scheme (up to £100,000), have produced a series of animations called 60 Second Adventures in Astronomy. Since going live at the end of 2012, they have already amassed more than 127,000 views on YouTube, and on iTunes U the films have been downloaded more than 21,000 times.

For more information, please visit http://www.stfc.ac.uk/1361.aspx