2012 – A year with RCUK

Highlights from 2012

January

The Research Councils UK (RCUK) *Cutting Edge 2012: The Research Behind Sport* event series has been granted the Inspire mark by the London 2012 Inspire programme. *Cutting Edge 2012* is a series of events taking place across the UK in the lead up to the London 2012 Olympic and Paralympic Games. Each event brings together world-class researchers and top Team GB stars to showcase amazing athletic demonstrations, discuss elite performance and gives the public a chance to share views on the research behind the UK's sporting achievements. More information is available here.

Scientists estimated for the first time the extent to which genes determine changes in intelligence across the human life course. The study found that genetic factors may account for about 24 per cent of changes in intelligence between childhood and old age. The study was part of the RCUK Lifelong Health and Wellbeing Programme, which is funded by the Biological and Biotechnology Research Council (BBSRC), the Engineering and Physical Sciences Research Council (EPSRC), the Economic and Social Research Council (ESRC), and the Medical Research Council (MRC). More information is available here.

The ESRC large Research Catalogue grew even bigger. In addition to the 100,000-plus research outputs it featured in the catalogue, ESRC published details of over 900 datasets generated by ESRC-funded grants. Over 200 datasets covering every major project funded by ESRC, from the population, health and housing surveys to the British Crime survey, are available to download from the Economic and Social Data Service and UK Data Archive. More information is available here.

RCUK published the *RCUK Impact Report 2011* which complements the impact reports prepared by the individual Research Councils for the Department for Business, Innovation and Skills (BIS). The reports include various examples of Research Council-funded research that is having an impact on the growth, prosperity and wellbeing of the UK. More information is available here.

February

Muslims in England and Wales are practising their faith and passing it on to their children at much higher rates than any other religion, including Christianity. The research, co-funded by the Arts & Humanities Research Council (AHRC) and ESRC as part of the Religion and Society programme, said that the proportion of adult Muslims actively practising the faith they were brought up in as children was 77%, compared with 29% of Christians and 65% of other religions. More information is available here.

Tomorrow's aircraft could contribute to their power needs by harnessing energy from the wheel rotation of their landing gear to generate electricity. They could use this to power their taxiing to and from airport buildings, reducing the need to use their jet engines. This would save on aviation fuel, cut emissions and reduce noise pollution at airports. The feasibility of this has been confirmed by a team of engineers from the University of Lincoln with funding from EPSRC. This forms part of the RCUK Energy Programme. More information is available here.

New information from the OPERA collaboration based in Gran Sasso Laboratory in Italy shed further light on earlier experiments that suggested neutrinos can travel faster than the speed of light. The team identified two factors that could have had an influence on the initial measurement taken. One would show the speed at which a neutrino was traveling, was actually faster than initially claimed - the other would pull the plug on the proposition. The Science and Technology Research Council (STFC) is the UK sponsor of particle physics and manages the subscription to CERN. More information is available here.

March

A new European Union system to forecast space weather went live on 1 March. Led by researchers at the Natural Environment Research Council's (NERC's) British Antarctic Survey (BAS), the €2.54m SPACECAST project will provide frequent and reliable web-based forecasts so that satellite operators can take action to protect their satellites from space radiation damage. Space weather is of intense interest to the UK and US Governments. Millions of dollars have been lost as a result of large magnetic storms in space causing satellite damage. More information is available here.

Experts in low power electronics from Imperial College and its spin-off company Ervitech will be using their skills to benefit the mice used in laboratory tests of psychiatric diseases. Their goal is to create wireless equipment for recording brain activity that will weigh less than a 5p coin (3g) and will transmit data for at least 24 hours. This will make life less stressful for the mice and pave the way for better understanding and treatment of schizophrenia and Alzheimer's disease. The team is one of the first winners of a scheme called CRACK IT, developed by the National Centre for the Replacement, Refinement and Reduction of Animals in Research (NC3Rs). More information is available here.

E.coli, commonly found in the intestines of humans and animals, is generally considered to be a helpful bacterium that aids digestion. However, in some cases, it can be harmful to humans and is most commonly associated with food poisoning causing vomiting and diarrhoea which it can be particularly serious for young children, the elderly and people with weak immune systems. A team working on ISIS at STFC's Rutherford Appleton Laboratory have made a breakthrough that could help combat such illnesses and help develop new ways of treating food poisoning and other diseases including meningitis. More information is available here.

New ultrafast laser equipment, capable of generating intense pulses of light as short as a few femtoseconds from the UV to the Infra Red, will help scientists at the University of East Anglia measure how energy is transferred from molecule to molecule and point the way to molecular structures for exploiting solar radiation. Funded by a £466,000 grant from EPSRC, the new laser will be used for 2D electronic spectroscopy experiments that look at the very fastest reactions. More information is available here

April

The development of research project proposals, cohort management and even peer review meetings could be radically changed by the use of digital technologies that allow participants to meet in a 3D cyberspace. This is one of the conclusions to be drawn from a groundbreaking project led by the Transformative Research team at EPSRC. EPSRC staff are delivering the project by working closely with a team from the Horizon Digital Economy Research Hub at the University of Nottingham. Over the past year the Horizon Digital Economy Hub have provided technical support and are running an independent scientific evaluation of the project. More information about this project is available here.

Professor George Lomonossoff was named the BBSRC Innovator of the Year 2012 for his work with Dr Frank Sainsbury, to develop a system for producing vaccines and pharmaceutical proteins rapidly in plants. The system could allow vaccines to be produced much more rapidly for emergency vaccination programmes in the face of disease pandemics. Professor Lomonossoff, of the John Innes Centre in Norwich, and Dr Sainsbury, of Laval University in Canada, received their prize and trophy from Business Secretary, Vince Cable. More information is available here.

New AHRC-funded research findings were published about the increase in the quantity and quality of parliamentary debate about human rights between 2000 and 2010. The report revealed the scope for parliaments to redress the democratic deficit in human rights in future by taking a more active role in both their protection and realisation. There is still considerable scope for Parliament's human rights role to be significantly enhanced. This central finding has important implications for parliaments throughout the world. More information is available here.

The STFC e-Science Centre is set to explore new opportunities for applying High Performance Computing (HPC) to scientific and industrial research challenges. A new Graphics Processing Unit based computer with a peak performance of 247.6 teraFLOPS (247.6 million million simple calculations per second), funded by EPSRC, is being installed at STFC Rutherford Appleton Laboratory. It will be the largest system of its type in the UK and will accelerate research into important areas such as climate change, drug design and aerospace engineering. More information is available here.

May

RCUK and Universities UK held a major event to bring together senior representatives from the business and university sectors to discuss how the current successes in collaboration can be built on to ensure further productive collaborations between UK researchers, and business and industry. The event, which included leading speakers such as Karren Brady, explored how both sectors can work together to ensure that the UK is a global hub for research, bringing benefits to business, industry and to the prosperity and wellbeing of the nation. More information is available here.

MRC-funded scientists have shown for the first time that transplanting light-sensitive photoreceptors into the eyes of visually impaired mice can restore their vision. The research suggests that transplanting photoreceptors – light-sensitive nerve cells that line the back of the eye – could form the basis of a new treatment to restore sight in people with degenerative eye diseases. More information is available here.

NERC scientists have been flying through the turbulent storms being experienced in the UK at present to try and understand what causes such extremely stormy weather. A research flight off the southwest coast of England yesterday collected valuable data that should help to improve weather forecasts and predictions of flooding following heavy storms. Flying through such storms is the only way to collect this type of data and the research team has been carrying out similar flights over the past few months under the DIAMET project, which is funded by NERC. Project leader Professor Geraint Vaughan from NERC's National Centre for Atmospheric Science was on board yesterday's flight, along with television crews from the BBC and Channel 4. More information is available here.

Research from the BBSRC-sponsored John Innes Centre and the Max Planck Institute has found that barley grown in Scandinavian countries is adapted in a similar way to reindeer to cope with the extremes of day length at high latitudes. The researchers have found a genetic mutation in some Scandinavian barley varieties that disrupts the circadian clock that barley from southern regions use to time their growing season. This new knowledge may be useful in efforts to adapt crops for regions where the growing season is short. More information is available here.

June

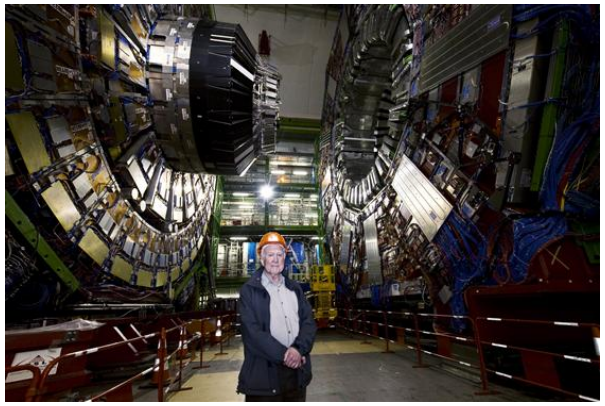
A breakthrough discovery that has shown how plants may defend themselves in the face of pathogen attacks could hold the key to making crops more disease-resistant and to boosting food production to help global food security. As part of a BBSRC-funded project led by Oxford Brookes University, STFC's Central Laser Facility has developed a unique technique that has answered a question which has puzzled scientists for many years – why certain proteins in plant cells don't move around as much as their counterparts in animal cells. More information is available here.

NERC and the São Paulo Research Foundation (FAPESP) announced a £9.6m investment to investigate how changes to tropical forests affect biodiversity, ecosystem services and the climate. The research will improve our understanding of the links between biodiversity and biogeochemical cycles in tropical forests and could be used to help manage forests more sustainably in the future. More information is available here.

Dr Adjanie Patabendige from the University of Liverpool received one of four inaugural David Sainsbury Fellowships from the NC3Rs to develop *in vitro* cell-based models to reduce the numbers of animals used in encephalitis research. The blood-brain barrier (BBB) that prevents virus entry to the brain can be disrupted during viral infection allowing virus particles and immune cells into the brain leading to encephalitis. A successful *in vitro* model could result in the saving of many thousands of animals – nearly 130,000 are estimated to have been used in the last ten years for encephalitis and BBB research. More information is available here.

Six pioneering Scottish projects that will harness digital technologies for the benefit of the arts and cultural sector have been selected to receive funding from the Scottish Digital Research and Development Fund for Arts and Culture run by Nesta, Creative Scotland and AHRC. More information is available here.

July



British researchers from the Large Hadron Collider (LHC) at CERN found a new particle consistent with the long-sought Higgs Boson. Speaking in London on 4 July, STFC Chief Executive Professor John Womersley confirmed the news, which marked a significant breakthrough in our understanding of the fundamental laws that govern the Universe. Thanks to the results coming from the two experiments, these preliminary findings appear to show a dramatic 5 sigma signal. More information is available here.

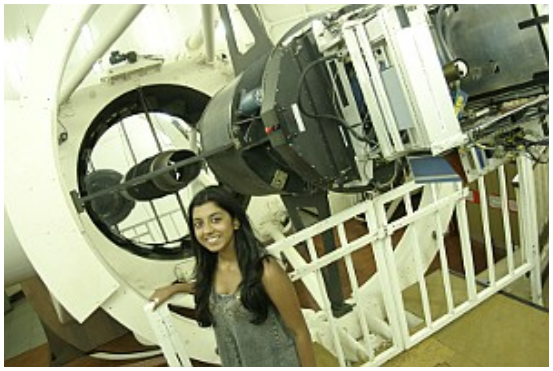
RCUK unveiled its new Open Access policy. Informed by the work of the National Working Group on Expanding Access to Published Research Findings, chaired by Professor Dame Janet Finch, the policy at once harmonises and makes significant changes to existing Research Councils' Open Access policies. More information is available here.

A team of scientists, funded by BBSRC and the Department for International Development (DfID) through the Sustainable Agriculture for International Development (SARID) initiative, made a novel discovery that could provide a new strategy for controlling armyworms and other insect crop pests around the globe. Researchers have been investigating safe, affordable alternative control measures to tackle the pests that do not rely on expensive imported chemicals. But an unexpected finding - inspired by recent research into mosquitoes - has opened the door to a new strategy which could multiply the effectiveness of these biopesticides. More information is available here.

Seven Days of social science research, a new ESRC publication, explores research from a wide range of areas: how we relate to our family, how we interact, the impact of work, the blight of poverty, our generosity, our self-perception, our concerns and our happiness. By using the well-known 'Monday's child' nursery rhyme, *Seven Days* presents findings from a range of different areas, complementing the recent video series and online resources following the same theme. The nursery rhyme highlights how we all are different, such as 'fair of face', 'loving and giving' or 'works hard for a living'. More information is available here.

August

The London 2012 anti-doping facilities will be developed after the Olympic and Paralympic Games into a world-class resource that could help revolutionise healthcare. The MRC-NIHR Phenome Centre will use the cutting edge facilities developed for London 2012 to help develop better and more targeted treatment for patients. The Centre will be the first of its kind in the world and will enable researchers to explore the characteristics of disease in order to develop new drugs and treatments for patients. More information is available here.



Three young people embarked on special trips to some of the most prestigious scientific facilities in the world, thanks to RCUK. As prize winners at the National Science + Engineering Competition 2012 at the Big Bang Fair 2012, Kirtana Vallabhaneni, Wasim Miah and Saoirse Nash were each treated to exclusive scientific trips provided by RCUK where they had an opportunity to meet with scientists and take part in exciting experiments. Wasim's design of a smaller and cheaper foetal contraction monitor with a fellow student earned him the title of Young Engineer of the Year. The 'experience' part of his prize was to visit CERN in Geneva. Young Scientist of the Year winner Kirtana visited the Roque de Los Muchachos Observatory in La Palma. RCUK also runs its own award for Best Use of Research within the National Science + Engineering Competition. The prize for this year's winner, Saoirse, was a trip to Diamond Light Source – the UK's national synchrotron science facility in Oxfordshire. More information is available here.

Thanks to funding from AHRC, a Research Fellow at the University of Portsmouth gained international recognition and generated thousands of pages of enthusiastic and practical debate not about what games are or do, but what they can be. Dr Dan Pinchbeck developed a game, called Dear Esther, to engage the right audience for a discussion about the nature of narrative in videogames. It has won awards for storytelling and visual art, and received accolades from reviewers worldwide. Most importantly, it's also been a commercial success, recouping its development costs within six hours of going on sale in February 2012. More information is available here.

September

Vince Cable, Business Secretary, visited the headquarters of the Research Councils in Swindon on 6 September. He met with the Chief Executives of the Research Councils to discuss how the Research Councils contribute to economic growth and how they can maximise the impact of their research. Mr Cable also met with other colleagues from the Research Councils, the Shared Services Centre, the UK Space Agency and the Technology Strategy Board (TSB), while being shown a range of different pieces of work that were on display. More information is available here.

Innovative tailor-made seats were used for the first time by the Paralympics GB team for the wheelchair basketball events. Using cutting-edge research, the seats are individually moulded for each player to provide the best possible support and help them to improve their speed, acceleration and manoeuvrability around the court. The seats were developed with UK Sport funding at Loughborough University's Sports Technology Institute, which is supported by EPSRC. More information is available here.

MRC held its annual Max Perutz Science Writing Award ceremony, which was developed almost 15 years ago to encourage its early-career scientists to communicate their research to a wider audience. This year entrants were asked to explain - why their research matters - in just 800 words, for a chance of winning a £1,500 cash prize. Dr Andrew Bastawrous, an MRC Research Fellow at the International Centre for Eye Health at the London School of Hygiene and Tropical Medicine, won the top prize on the night. More information is available here.

Scientists on the Dark Energy Survey (DES) collaboration have announced that the Dark Energy Camera, the product of eight years of planning and construction by scientists, engineers, and technicians on three continents, has achieved first light. The first pictures of the southern sky were taken by the 570-megapixel camera on 12 September. UK astronomers are key players in the DES collaboration, which is led by Fermilab in the US. The UK consortium comprises University College London, Portsmouth, Cambridge, Edinburgh, Sussex and Nottingham. The construction of the camera was partially supported by STFC. Read more here.

October

ESRC and MRC launched the Cohorts and Longitudinal Studies Enhancement Resource (CLOSER) – a world-leading initiative which brings together some of the most important studies of people's lives in the UK. The UK is home to the largest and longest-running longitudinal studies in the world, and CLOSER will play a vital role in maximising the use, value and impact of these studies both within the UK and abroad. It will focus on nine of the country's leading studies, with participants born as early as 1911 and as recently as 2007. More information is available here.

Jalsa, meaning 'celebration', was a celebration of its kind, bringing together key research funding agencies and individuals from the fraternity of arts and humanities, both from the UK and India, to explore and strengthen collaborative research. Jalsa showcased UK-India arts and humanities research funded by AHRC and was organised in partnership with their representative office RCUK India. The event was hosted by the British High Commissioner to India, Sir James Bevan at his residence in New Delhi. More information is available here.

Children's parties or activity days, where prospective adopters meet children awaiting adoption, could be part of the solution to the current adoption crisis. Evidence from the US suggests that adoption activity days are twice as effective as any other method of family finding for children who are waiting for adoptive families. The ESRC-funded research suggests that such success could be replicated in the UK. More information is available here.

In celebration of *Biology Week 2012*, which took place from 13-19 October, broadcaster and author Chris Packham helped scientists to unlock the secrets of soil by unravelling its genetic fingerprint. His garden soil had its 'DNA' sequenced in a race against the clock, to highlight both the rapid advances in DNA sequencing technology and its expanding range of uses in biological science. This cutting edge soil analysis, known as 'metagenomics', is still in its infancy but could offer great benefits for agriculture, helping us to understand how soil works, how climate and farming can affect soil systems, and how to ensure productivity and sustainability. More information is available here.

November

RCUK launched its Strategic Framework for Capital Investment, as part of a speech made by the Chancellor of the Exchequer George Osborne at the Royal Society in London. *Investing for growth: Capital Infrastructure for the 21st Century*, is a strategic framework against which Research Councils will plan future investments in the UK's capital infrastructure for research. The rate of technological advance is accelerating and our researchers need the very best facilities to deliver the excellent research needed for economic growth. More information is available here.

EPSRC-funded scientists at Imperial College London have developed a prototype ultra-sensitive sensor that would enable doctors to detect the early stages of diseases and viruses with the naked eye. They report that their visual sensor technology is ten times more sensitive than the current gold standard methods for measuring biomarkers. These indicate the onset of diseases such as prostate cancer and infection by viruses including HIV. More information is available here.

Cornish farmers are benefiting from improvements to their farms that will also cut pollution levels in the River Fowey, which originates high on Bodmin Moor and runs for about 30 miles until it reaches the sea. Soils, pesticides and manure from farmland can wash into the river during heavy rain, affecting water quality and wildlife. Water companies have to invest more money in cleaning the water, ultimately leading to higher water bills for customers. South West Water has now invested £360,000 in a pilot project, partly funded by NERC, that could be good news for everyone. More information is available here.

Marking the tenth anniversary of the Festival of Social Science, the 2012 Festival was bigger than ever before. With over 180 events nationwide, the Festival delivered social science research to a wide variety of audiences between 3 and 10 November. From Edinburgh to Exeter and Aberystwyth to Aberdeen, the geographical spread of events was as impressive as previous years. Early indications suggest the Festival reached over 23,000 people, including policymakers, school and college students, professionals and the general public. More information is available here.

December

RCUK has released a 'beta' version of a new web-based portal that gives the public better access to information about research funded by the UK Research Councils. *Gateway to Research* aims to provide a mechanism for businesses and other interested parties to identify potential partners in universities to develop and commercialise knowledge, and maximise the impact of publicly funded research. The beta *Gateway to Research* contains information such as who, what and where the Research Councils fund, as well as details about the outcomes, outputs and impact held on RCUK's Research Outcomes System (ROS) and ResearchFish. More information is available here.

Scientists co-funded by MRC discovered a patient-friendly and efficient way to make stem cells out of blood, increasing the hope that scientists could one day use stem cells made from patients' own cells to treat cardiovascular disease. The study, also funded by the British Heart Foundation (BHF) and the Wellcome Trust, outlines a way for scientists to get the cells they need to make induced pluripotent stem (iPS) cells from a routine blood sample. More information is available here.

RCUK held an event at the Houses of Parliament to showcase a range of cross-Council programmes of work through visual and interactive displays from each Research Council. The event was very well attended with MPs and peers, including David Willetts, Minister of State for Universities and Science, and Andrew Miller MP. Delegates had the opportunity to speak with researchers about their work and there were many discussions on the positive announcement of new funding for research and innovation, made during the Chancellor's autumn statement earlier in the day.

Heavy rainfall and the problems of flooding in towns have never been far from peoples' minds or the news headlines during November and December. Now scientists say that new research, funded by NERC, will help to accurately pinpoint which individual streets are most at risk from flooding during severe rainstorms. The Environment Agency, Met Office and others use computer models to predict how heavy rainfall moves over the land surface. But the models can't show exactly where the rain will accumulate and cause problems. More information is available here.

New Year Honours 2013

RCUK would like to congratulate the following on their recognition in the 2013 New Year's Honours list.

Members of the Order of the Companions of Honour

Professor Peter Higgs - Emeritus Professor of Theoretical Physics, University of Edinburgh
For services to Physics.

Knights Bachelor - Knighthoods

- **Professor Ian David Diamond, FBA FRSE** - Principal and Vice-Chancellor, University of Aberdeen; Former Chief Executive of ESRC
  For services to Social Science and Higher Education

- **Professor Simon Charles Wessely** - Vice Dean in Academic Psychiatry, Institute of Psychiatry, King's College London
  For services to Military Healthcare and to Psychological Medicine

- **David Payne** - Director, Optoelectronics Research Centre, University of Southampton
  For services to Photonics Research and Applications

- **Keith Burnett** - Vice-Chancellor, University of Sheffield
  For services to Science and Higher Education

Dames Commander of the Order of the British Empire

- **Carol Robinson** - Professor of Physical Chemistry, University of Oxford
  For services to Science and Industry

Commanders of the Order of the British Empire - CBE

- **Stephen Visscher** - Deputy Chief Executive and Chief Operating Officer, Biotechnology and Biological Sciences Research Council.
  For services to the Support of Scientific Research

- **Professor Josephine Dawn Ades** - Professor of Art History and Theory, University of Essex
  For services to higher education and art history

- **Professor Richard Holdaway** - STFC's Director of RAL Space
  For services to Science and Technology

- **Professor John Richard Britton** - Honorary Consultant in Respiratory Medicine; Professor of Epidemiology at the University of Nottingham; Director of the UK Centre for Tobacco Control Studies; ESRC grant holder
  For services to Respiratory Medicine

- **Professor Judith Anne Freedman** - Professor of Taxation Law, University of Oxford; ESRC grant holder
  For services to Tax Research

- **Brian Cantor** - Vice-Chancellor, The University of York
  For services to Higher Education.

- **David Cleevely** - Founding Director, Centre for Science and Policy, University of Cambridge
  For services to Technology and Innovation.

- **Professor Joanna Haigh** - Professor of Atmospheric Physics, Imperial College London
  For services to Physics

- **Professor Richard Jonathan Parker** - Director of Research and Technology, Rolls-Royce Group
  For services to Engineering

- **Michael Terrett** - Chief Operating Officer, Rolls-Royce plc
  For services to UK Engineering

- **Professor Francis Patrick Kelly, FRS** - Professor of the Mathematics of Systems, University of Cambridge
  For services to Mathematical Sciences

Officers of the Order of the British Empire - OBE

- **Professor David Porteous, FRSE** - Professor of Human Genetics and Molecular Medicine, University of Edinburgh
  For services to Science

- **Professor Janet Treasure** - Psychiatrist, Eating Disorders Unit, South London Maudsley Hospital NHS Foundation Trust, King's College London
  For services to People with Eating Disorders

- **Professor Ian Bateman** - Professor of Environmental Science and Economics, University of East Anglia; Lead scientist for NERC's Valuing Nature Network programme
  For services to Environmental Science and Policy

- **Professor Susan Gibson** - Professor of Chemistry, Imperial College London
  For services to Chemistry and Science Education

- **Martin Sadler** - Director, Cloud and Security Lab, Hewlett Packard Laboratories
  For services to Science

- **Professor David John Hand** - Senior Research Investigator, Imperial College London
  For services to Research and Innovation

- **Dr Miles Parker** - Director, Strategic Evidence and Analysis, Department for Environment, Food and Rural Affairs; Member of the LWEC Partners Board
  For services to Improving Government Science

- **Dr Keith Ison** - Head of Medical Physics, Guy's and St Thomas' NHS Foundation Trust
  For Leadership and Development in Healthcare Science, Medical Physics, Engineering and Technology

- **Professor Winifred Mary Beard** - Professor of Classics, University of Cambridge
  For services to classical scholarship

- **Professor John Butt** - Gardiner Professor of Music, University of Glasgow
  For services to music in Scotland

- **Nichola Johnson**
  For services to Museums and Cultural Heritage

- **Professor James Ivor Prosser** - Personal Chair in Microbiology at the University of Aberdeen
  For services to environmental science

Members of the Order of the British Empire - MBE

- **Professor Linda Woodhead** - Professor of Sociology of Religion, Lancaster University; Director of the AHRC/ESRC Religion and Society Programme (2007-2012)
  For services to Higher Education

- **Alan Walker** - Honorary Fellow, School of Physics and Astronomy, University of Edinburgh
  For services to Science Engagement and Science Education in Scotland