



About EPSRC

The Engineering and Physical Sciences Research Council (EPSRC) is the UK's main agency for funding research in engineering and the physical sciences. Our specific targets are set out in our Delivery Plan and Scorecard 2005/06 to 2007/08. The Delivery Plan provides EPSRC's funding priorities and outlines the activities that EPSRC intends to undertake over the 2004 spending review period. These will contribute to the Department of Trade and Industry's Public Service Agreement targets for the UK Science and Engineering Base set out in the Science and Innovation Investment Framework 2004-2014.

EPSRC invests in high-quality basic, strategic and applied research and related postgraduate training to help the nation exploit the next generation of technological change. The areas covered range from information technology to structural engineering, and mathematics to materials science. This research forms the basis for future economic development in the UK and improvements in everyone's health, lifestyle and culture. EPSRC also actively promotes public engagement in science and engineering. EPSRC works alongside sister Research Councils with responsibility for other areas of research. The Research Councils work collectively on issues of common concern as Research Councils UK. For more information about EPSRC, including copies of our reports and plans, visit: www.epsrc.ac.uk



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02/03

Chair of EPSRC's foreword

Julia Higgins



The Engineering and Physical Sciences Research Council (EPSRC) is the UK's main funding agency for frontier research, postgraduate training and knowledge transfer in engineering and the physical sciences. We invested over £600 million in 2006/07 in the basic knowledge that underpins future advances in technology, leading to a prosperous economy and improved health and quality of life.

As one of seven Research Councils funded by the UK Government, EPSRC works together with all the Councils on areas of common concern within the joint framework of Research Councils UK.

The EPSRC's vision of tomorrow's challenges is contained in our Strategic Plan 2006, launched at our Annual Conference attended by 200 delegates from industry, universities, Government, media and others. Considerable consultation went into preparing the Plan and we received a very good response from a wide range of stakeholders.

Funding high-quality research through responsive mode continues to play a seminal role in the health of our research base, enabling researchers to respond rapidly to new opportunities as they arise. While this provides a firm foundation, especially important for fundamental research, we are introducing some changes to our procedures to reinforce the need to be alert to commercial potential.

Professor Sir John O'Reilly, Chief Executive of EPSRC since 2001, left EPSRC following his appointment as Vice Chancellor of Cranfield University. He guided the Research Council with new ideas, enthusiasm and vision during his term. A recent example of this is the innovative Knowledge Transfer Challenge Awards scheme which he inspired. Launched in 2006 this promises exciting prospects for transforming knowledge into economic benefits.

This is my final year as Chair of EPSRC and I am delighted to welcome John Armitt who succeeded me in April to chair the Research Council for the coming four years. He is a highly respected senior industrialist who has taken a strong interest in university research during his career.

A handwritten signature in black ink that reads "J. S. Higgins". The signature is written in a cursive style.

Julia Higgins DBE FRS FREng
Chair

Interim Chief Executive's introduction

Randal Richards



EPSRC's Strategic Plan launched in 2006 is about building a lasting legacy. It sets out our vision for the years ahead, covering such issues as how to empower the people we fund, nurturing and developing talented scientists and engineers, tackling the grand challenges facing society, and stimulating world-class international collaborations. Most importantly it has put us on course to meet the objectives of the Office of Science and Innovation's two key goals of ensuring a healthy UK science and engineering base and driving forward exploitation of research outcomes. These two goals encapsulate the objectives of the Science and Innovation Investment Framework 2004 - 2014 jointly published by the Treasury, DTI and DfES.

During the year 2006-2007 EPSRC has responded to the need for a step change in the economic impact of Research Councils' investments. Already over 2000 companies benefit from EPSRC investment in university-based research. But to tackle this challenge with renewed vigour we published in 2007 a refreshed strategy for our role in knowledge transfer and its contribution to the UK economy.

The overall thrust of the strategy is to stimulate faster transmission of the fruits of research to the market place. For EPSRC this means focussing on knowledge transfer through forging stronger partnerships across the economy, raising the visibility of world-leading research, and maintaining a forward looking, dynamic approach. The foundation for effective economic impact is the support of excellent research and training producing skilled, competitive people. Because of this EPSRC will continue to use excellence as the major factor in determining what research and training is supported.

For researchers it is vital that they are fully aware of the economic potential of their work. The changes we are introducing to peer review are intended to reinforce this need for alertness to potential impact on the economy, including employment. These changes are modest however and should not be interpreted as making economic exploitation mandatory in all the research we support. We do however want to encourage industry, and the researchers we support, to engage more with each other to maximise the potential for the UK economy.

I welcome the new opportunities for knowledge transfer which arose in 2007 through the changes in the Technology Strategy Board, which became a body operating 'at arms length' from Government, and the future formation of the Energy Technologies Institute. We intend to work closely with these organisations.

Three very significant 'firsts' for knowledge transfer came to fruition during the year. The EPSRC Knowledge Transfer Challenge, which invited universities to compete for funds for innovative approaches to turning today's research into tomorrow's products and services, took place in 2006. Secretary of State for Trade and Industry, Alistair Darling presented the top award to Manchester University.

The first two pilot Integrated Knowledge Centres were announced in 2007 with initial funding of £5 million. These open up a new dimension in developing the knowledge transfer interface with business, and more are planned.

04/05

Key highlights of the year

- The new EPSRC Strategic Plan on a shared vision of tomorrow's challenges.
- The EPSRC Annual Conference 2006 attended by 200 delegates.
- New Science and Innovation Awards for seven universities.
- Strong endorsement of ICT research in the UK by an International Review.
- The first Knowledge Transfer Challenge awards.
- The appointment of the first EPSRC/QinetiQ Professor of Technology Transfer in the physical sciences.
- The announcement of two Integrated Knowledge Centres.
- Major new funding for Innovative Manufacturing Centres.
- An Energy Research Summit bringing together industry and Government.
- The appointment of an Energy Senior Research Fellow.
- Mathematics showcase event at the House of Commons.
- The Royal Institution televised Christmas Lectures presented by an EPSRC Senior Media Fellow.

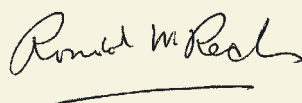
Also in 2007, Erkkö Autio was appointed as the first UK Professor of Technology Transfer in the UK, at Imperial College London. We are delighted to be funding this chair, jointly with QinetiQ, which promises to contribute significantly to the process of exploiting research ideas for economic benefit.

For the EPSRC, building and maintaining the health of the research base in engineering and the physical sciences is essential since it is the key factor that enables economic impact. During the year over £31 million has been deployed on seven new Science and Innovation Awards to universities. These are a component of our activities directly aimed at ensuring a future healthy and vibrant research resource for the UK. The awards, made in partnership with the Funding Councils of England, Scotland and Wales, focus on sustaining strategic research areas by building the leadership capacity required for major advances in research and the availability of well trained people for the UK's future.

Energy research is a major part of EPSRC's programme and critical to the UK's future. As part of a drive towards greater international engagement and impact, a new Energy Research Fellow, Professor Nigel Brandon of Imperial College London, was appointed in 2006. In addition we took part in a productive Energy Summit in 2006 which involved industry and Government.

The decline in the number of young people showing an interest in some areas of engineering and the physical sciences is a concern for the future supply of skilled researchers. We are working with a range of partners to help inspire the young, and have appointed three new Senior Media Fellows to boost the public profile of research. One of our established Senior Media Fellows, mathematics Professor Marcus du Sautoy, presented the highly regarded televised Royal Institution Christmas Lectures 2006 which are popular with the young.

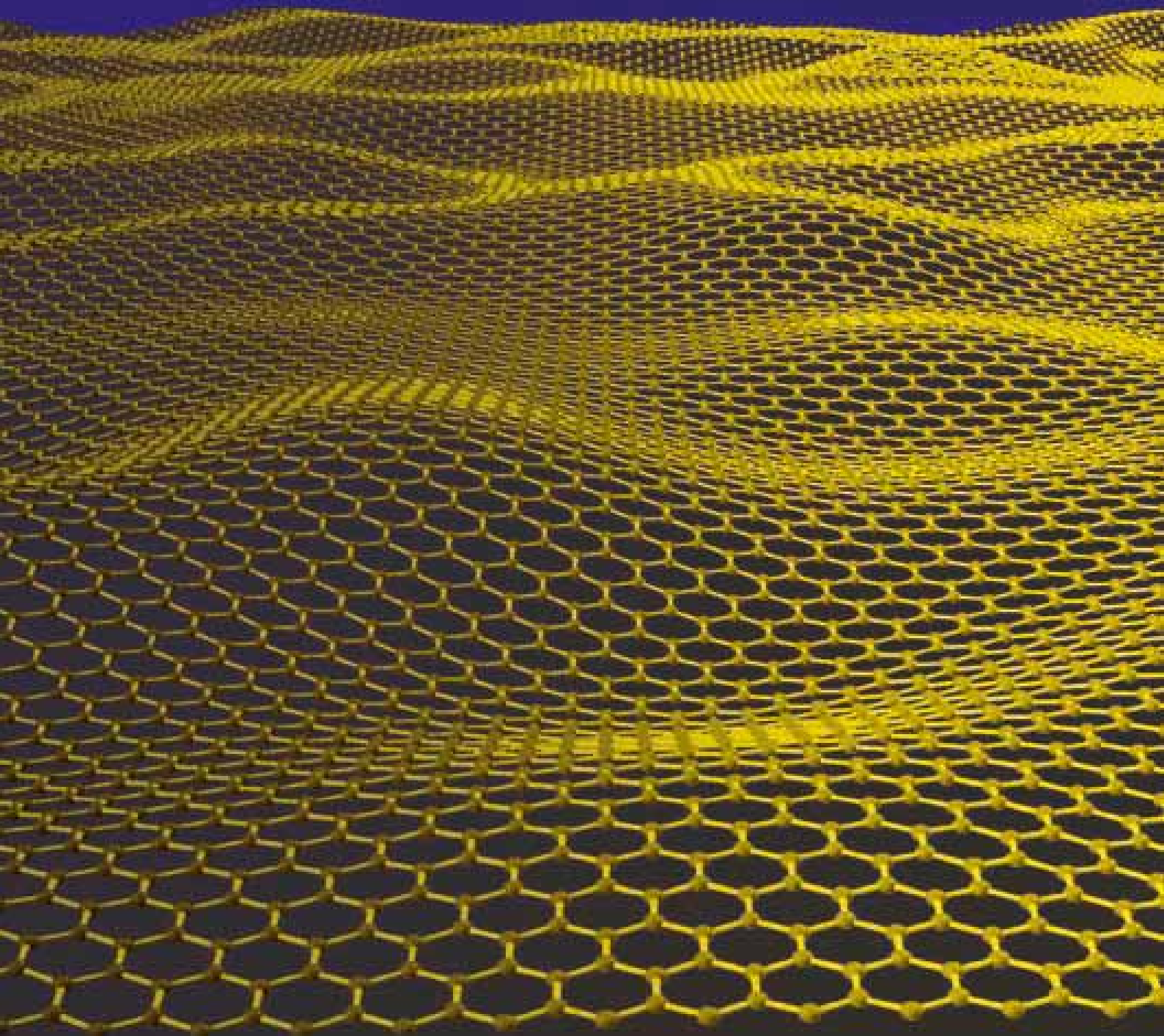
Finally, Julia Higgins who has steered the Council for the last four years has ended her term with us. She made an invaluable contribution to EPSRC through a period of rapid and productive change. I am however confident that EPSRC will be in excellent hands under her successor John Armitt who became Chairman of EPSRC in April this year. Also, I welcome the announcement of the new Chief Executive and Deputy Chair of EPSRC, Professor David Delpy, Vice-Provost for Research at UCL, who will be a great asset to the Council.



Randal Richards
Interim Chief Executive

RESEARCH

Engineering and physical sciences research is vital to the UK's future. It is exciting and challenging in its own right, it fuels the economy with knowledge and trained people and it provides an essential platform for the rest of science.



The year in context

The EPSRC continues to sustain a healthy research base in the UK through its support for university research in the core engineering and physical sciences which in turn support a range of other sciences and innovations. EPSRC funding in this area fulfils a vital role in securing a vibrant knowledge economy and enabling research and development that has a direct influence on the UK's wellbeing. Much of this funding supports responsive mode grants, for researchers proposing high quality projects, and for critical mass investment to ensure major areas have appropriate resources.

Our 10-year vision, outlined in the current EPSRC Delivery Plan, is to improve the international quality across all disciplines of engineering and the physical sciences research in the UK. To achieve this goal EPSRC will:

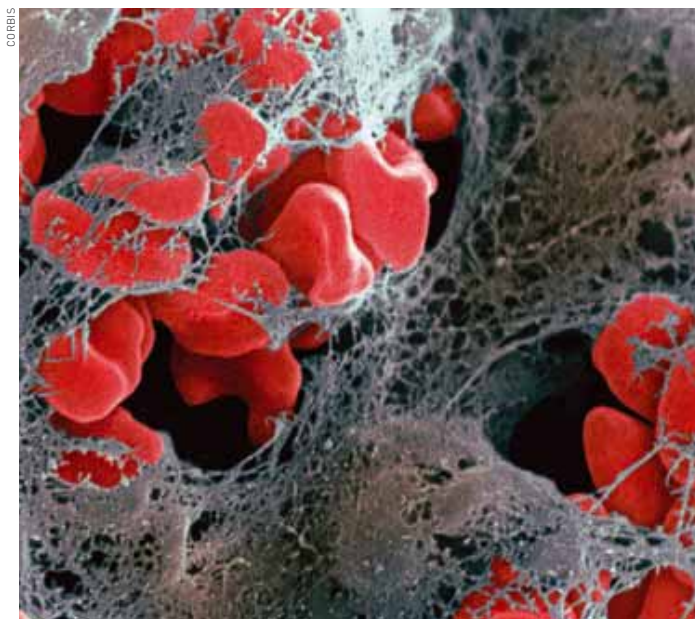
- build and strengthen capacity in strategically important research areas, in collaboration with funding councils, nucleating and extending research centres of excellence in universities;
- foster agility in addressing new and fast moving research areas;
- promote and support critical mass through the maintenance of sufficiently strong research groups and retention of key personnel to enable the UK to make an impact internationally;

- increase engagement of UK researchers with the best research groups internationally;
- promote the development of talented researchers, for example through research fellowships and discipline hopping awards;
- fund research sustainably in line with the Government's commitment to move towards the full economic costs of research being paid by the Research Councils.

The portfolio

EPSRC's research portfolio is wide ranging and spans many science and engineering disciplines. It encompasses fundamental areas such as **physics** (£49 million)*, **chemistry** (£52 million), and **mathematical sciences** (£21 million). These are of intrinsic importance but also provide a platform for advances in many other areas of research and innovation. Advances in pharmaceuticals for example rely on new chemical synthesis techniques, while magnetic resonance imaging diagnosis in healthcare draws on fundamental physics research.

Major EPSRC support is also targeted at programmes in **information and communications technologies** (£87 million) which touch on virtually every aspect of the economy. Such research feeds into the 'digital economy' ranging across most industry sectors in the UK, including one of the fastest growing sectors, the creative industries, as



Micrograph of a blood clot showing red blood cells trapped in fibrin. The ability to tell whether a clot will behave normally or break away and cause an embolism would help in the treatment of a wide range of medical conditions.

Fluids and flows - unravelling complexity

From the highly speculative to the very practical - the £3 million 'Complex fluids and complex flows' EPSRC-funded Portfolio Partnership grant which is held by the Universities of Swansea and Cardiff, covers many areas. 'The Portfolio is a mixture of heavily focused work with immediate applications and more blue sky projects,' explains Professor Rhodri Williams of the School of Engineering at the University of Swansea, the lead investigator. 'To better explore the science behind complex fluids and flows we need new measurement techniques as well as improvements in theory and simulations,' he says. 'The Portfolio brings together expertise in all areas to provide coherent progress.'

The Portfolio includes projects such as research into the structure of simultaneously superheated and supercooled fluids. Other projects could lead to practical applications in areas such lubrication, printing, membrane separations and blood flow.

Some are already bearing fruit. Research by Professor Williams to develop improved rheometric (flow measurement) techniques to study the early stages of blood clot formation has formed the basis of a new blood clot detection technique. It also earned him a Brian Mercer Innovation award from the Royal Society in February 2007 to develop it to the point where it could become a commercial application.

Research

well as health, education, transport, the built environment and many more. Research in **materials** (£53 million) is providing new and improved materials and technology to meet the demands of a growing economy.

The **engineering** programme (£97 million), stimulates blue-sky, adventurous research, the transmission of basic science and technology into applications, and the fostering of emerging areas. It is complemented by research programmes in **infrastructure and the environment** (£13 million) which focus on issues of increasing concern to society. These include the sustainability of the urban environment, the increasing threat of flooding, and the implications of an ageing population. Research into **innovative manufacturing** (£82 million) covers research required to develop innovative processes or improve on existing techniques.

The **life sciences interface** programme (£31 million) funds high-quality research at the engineering and physical sciences/life sciences interface. **Energy** research (£28 million) plays a key role in helping develop the power supply infrastructure, enhance efficiency, promote more sustainable consumption and reduce undesirable impact on the environment.

Sustaining a healthy research base

A healthy research base depends on areas of strategic importance to the UK being of sustainable capacity. This requires a sufficient supply of well skilled people and inspired research leadership for university groups. Evidence of these characteristics being compromised in some key areas of research continues to be of concern. One factor is the changing research landscape as undergraduates choose new options leaving some traditional core disciplines with a small proportion of new university entrants.

The Science and Innovation Awards, launched by EPSRC in 2005, have now been developed into a sustained programme to focus on building capacity in areas of scientific and economic importance adjudged to be at especially high risk.

Seven new Science and Innovation programmes involving 12 universities, with over £31 million joint funding from EPSRC, the Higher Education Funding Council for England, the Scottish Funding Council, and the Higher Education Funding Council for Wales, were announced in December 2006. These will reinvigorate research capacity in mathematical analysis, renewable energy, chemical engineering at the life sciences interface, quantum coherence, and physical organic chemistry (see also page 12).

The Challenging Engineering initiative focuses on supporting engineering

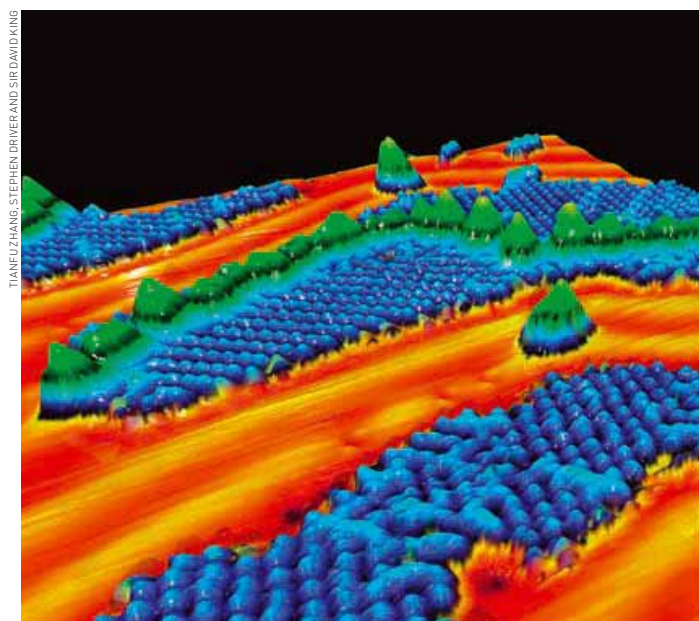
Cracking the catalyst conundrum

Metal catalysts that speed up or re-direct reactions are widely used to prevent environmental pollution or to make important high-value chemicals out of uninteresting low-value ones. In many cases, the chemical reactions crucial to catalysis involve processes that occur when passing molecules settle on the surfaces of solid transition metal particles. Gaining a better understanding of the detailed chemical interactions between these molecules and the metal surface is the key to developing new and better catalysts.

In their EPSRC-funded research, Dr Stephen Jenkins, Professor Sir David King and colleagues at the Department of Chemistry at the University of Cambridge, are making

sophisticated measurements of these interactions under highly controlled conditions and comparing the results with their theoretical calculations. 'The aim is to build up a complete picture of the surface chemistry so that we can predict better catalysts for future industrial and environmental use' explains Dr Jenkins.

The value of this type of fundamental research has not escaped the notice of a number of major industrial users. The group earlier worked with Toyota and are now collaborating with Johnson Matthey on catalysts for use in automotive applications. They will also be working with divisions of Shell and BP on catalyst applications in petroleum synthesis and in hydrogen production for fuel cell technology.



A scanning tunnelling microscope image showing gold nanoclusters (green) squeezed out of a gold surface (yellow/orange) by the influence of adsorbed molecules of nitrogen dioxide (blue).



researchers at an early stage of their careers. It was developed in response to the need for young researchers to be more creative and explore high-risk projects, identified in a 2004 international review of engineering research in the UK. Our support includes 'Exploration Funding' to identify future leaders of engineering research, and by March 2007 we had supported 13 outstanding researchers, committing £9 million. We have also arranged two 'Exploring the Future' events, providing training in areas such as creative problem solving, career development, and networking, for 100 delegates.

Responding to new opportunities

The health of the research base also rests on EPSRC funding for high-quality research through the responsive mode. Many areas promoted and supported by EPSRC are fast moving and rapid response to emerging opportunities from talented researchers is often the key to success. Responsive mode is used to fund a wide range of proposals at any time and in any field of research within EPSRC's remit. The funding support is very flexible covering projects ranging in scale from small travel grants to multi-million pound research programmes.

Projects proposed with a high risk but a high potential return, embracing new concepts or techniques, are particularly encouraged.

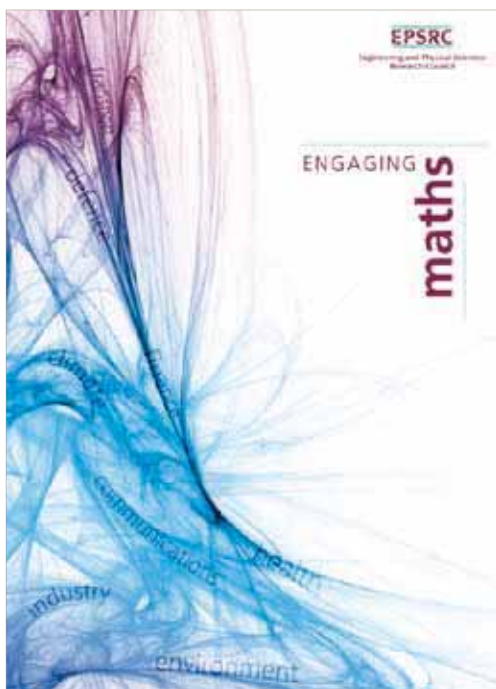
The energy challenge

The backdrop of mounting energy demand, the increasing urgency to respond to the threat of climate change and the UK's dwindling fuel reserves represents a major challenge to society. Finding reliable, diverse, sustainable, affordable, publicly acceptable and safe ways of energy supply and use is a priority for the Government's 10-year *Science and Innovation Investment Framework*. EPSRC is therefore taking the lead across the Research Councils to develop a full spectrum of energy research with joint Councils' funding planned to rise from £46 million to £77 million a year by 2007/08.

Energy research is a major part of EPSRC's programme and critical to the UK's future. As part of a drive towards greater international engagement and impact, a new Energy Senior Research Fellow, Professor Nigel Brandon of Imperial College London, was appointed in 2006.

An Energy Research Summit, held in 2006 to engage with industry and Government, focused on six priority areas for developing a business driven research action plan:

- carbon abatement technologies;
- socio-technical issues;
- networks;
- wind energy;
- hydrogen;
- fuel cells.



Engaging maths

This brochure was launched at 'Engaging Maths', a showcase event at the House of Commons in February 2007. Organised by the EPSRC in conjunction with the Council for the Mathematical Sciences to highlight the latest UK research in mathematics, it covered areas as diverse as security, finance, the environment and transport. 'From credit cards to the internet and medical screening to aircraft scheduling, mathematics touches on so many aspects of our lives,' said MP Anne Snelgrove, who hosted the event. 'The mathematical

research that EPSRC supports is fundamental to the future of the UK as a high-technology nation. As well as showcasing some fantastic research we also want to inspire a new generation of mathematicians.'

Research

A further Summit, planned for 2007, will focus on the requirements of energy related industries for postgraduate training skills.

The aim of reducing the UK's carbon footprint was given impetus by a new £10 million research fund announced by the energy company E.ON and EPSRC in 2006. This opens up funds for UK universities for research projects such as the development of low carbon buildings, smart meters and energy efficient technologies.

Progress on nuclear power research included plans for a consortium to investigate the economic, social, political and environmental sustainability of nuclear generation. A workshop held during the year brought together expertise from fields ranging from economic risk analysis to geological waste storage to assist in plans for making an award for a Consortium with funding of £2 million from EPSRC and ESRC during 2007.

The long-term potential for a 'clean' energy source for the future from the UK fusion research programme was enhanced by a new EPSRC award in 2006 of £46 million. This supports improvements to the Joint European Torus (JET) and early research and development work at the International Tokamak Experimental Reactor (ITER).

A new Nuclear Engineering Doctorate Centre, supported by EPSRC to meet the need for more energy related skills training, opened its doors to students in 2006. The centre is a

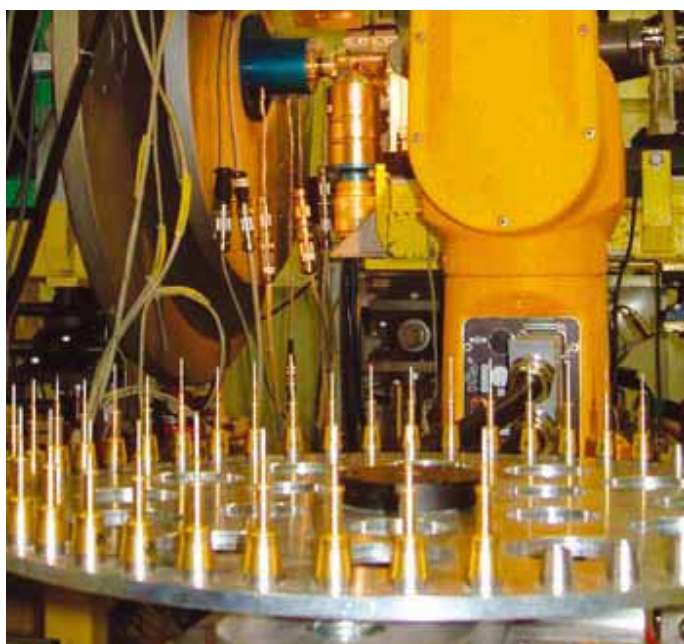
partnership between Manchester University and Imperial College with participation from four other UK universities.

Digital economy research is world class

Exciting, high-quality, world-class research in Information and Communications Technologies is widespread in the UK. This was the ringing endorsement reported by a major international review of ICT commissioned by EPSRC, together with IET, BCS and Intellect, during 2006. The panel, made up of leading international experts in ICT, also concluded that 'the UK is in the premier league in many research areas'.

The review's favourable report covered research across the spectrum from electronics and photonics through to fundamental computer science which feed into the digital economy. It observed 'substantial and pervasive' transfer of knowledge from universities to industry. EPSRC's role as a key agent for change since an earlier review in 2001 was also emphasised. The variety of funding mechanisms such as Platform Grants, an increase in ICT funding, and improved EPSRC/universities interactions were highlighted.

EPSRC plans to accelerate the transformation of fundamental ICT research into applications that embrace the UK's digital economy. We will work with programmes across the EPSRC remit, other research funders and major end users, as part of our



Searching for a solution - experimental technique to determine the structure of materials with possible hydrogen storage potential.

Material advances help hydrogen hit the road

Fuel cells have great potential to reduce carbon emissions. But the widespread introduction of fuel cell cars is hampered by the lack of on-board hydrogen storage technologies that would provide a driving range of at least 300 miles - the minimum considered necessary for a mass market application. Thanks to research carried out by a team from the Universities of Birmingham and Oxford and the Rutherford Appleton Laboratory, and funded by the multi-disciplinary Sustainable Power Generation and Supply (SUPERGEN) initiative managed and led by EPSRC, this drawback could soon be overcome.

The key to practical on-board storage of hydrogen lies in the process of chemisorption,

in which atoms of a gas are absorbed into the crystal structure of a solid-state material, then released when needed. After testing thousands of solid-state compounds, the team have produced a variety of lithium hydride capable of the chemisorption of hydrogen rapidly and safely at typical operating temperatures for fuel cells.

'This could be a major step towards the breakthrough that the fuel cell industry and the transport sector have waited for,' says Professor Peter Edwards of the University of Oxford who coordinated the project. 'This work could make a key contribution to helping fuel cell cars become viable for mass-manufacture within around 10 years.'

role in stimulating a new generation of products and services supported by a highly qualified workforce with a broad skill set.

Meeting national needs

Other research areas of national importance that are of growing significance to the UK economy are being met by targeted funding as well as responsive mode support. EPSRC continues to tackle research priorities in the areas of information technologies, complexity, nanotechnology, healthcare, and crime and security.

For example, EPSRC has built on its early lead for the UK in supporting complexity science which meets the challenge of understanding the behaviour of the increasingly complicated systems that characterise the modern world. During the year it established a five-year, £5 million research centre in large scale complex IT systems. Led by Professor David Cliff it will deal with research relevant to a wide range of industry sectors. A further two awards totalling £8 million were awarded to the Universities of Warwick and Bristol to build research capacity in complexity science including the specialised postgraduate training required.

Nanotechnology is another example of a major research challenge where nanomaterials and devices promise to revolutionise society. EPSRC conducted a strategic review of research in this area in 2006 and the outcomes will inform the continued support for

nanotechnology ranging from basic science to practical realisation of nanoengineering. Funding of nearly £6 million for a research programme on engineering of nanomaterials was committed during 2006/07. Professor Richard Jones will be appointed as Senior Strategy Advisor Nanotechnology during 2007. His role will be to help co-ordinate a focussed programme to pull through nanoscience into engineering and applications, as well as the launch of the programme itself.

The well established Extending Quality of Life (EQUAL) initiative has developed its multi-disciplinary research programme to meet the needs of an ageing population and those with disabilities. Two new research consortia with total funding of £3 million were agreed in 2006. One project led by the University of Cambridge, will research the requirements for design to be more 'inclusive' for older people, for example in the workplace and healthcare areas. Another project led by Edinburgh College of Art is looking at the most effective means of ensuring that the outdoor environment is designed with sensitivity to the needs of older people. Plans for 2007/08 include KT-EQUAL, an activity to support the transfer of knowledge between researchers interested in the social inclusion of older and disabled people, and users and beneficiaries of such research.



High-flying partnership - Professor Bill Lionhart, University of Manchester (left) and Ed Morton of CXR Ltd, with circuit board.

New 3-D luggage scanner could make air travel safer

The risk of terrorist attacks on passenger aircraft could be reduced, thanks to an innovative x-ray scanning system being developed with the help of cutting-edge UK maths expertise.

Now at the prototype stage, the system produces 3-D images that make it much easier to detect explosives concealed in hold baggage. Most airport X-ray machines currently in use only provide a 2-D view of a bag's contents. The new system not only generates better images but also does so very quickly, offering potential reductions in baggage processing times, which could help avoid flight delays.

The system is being developed by CXR Ltd, a research-led organisation set up by airport security specialist Rapiscan Systems. A key contribution is being made by mathematicians from the University of Manchester - funded by CXR Ltd and EPSRC. They have been overcoming the mathematical challenges involved in developing the specialised computer hardware and software that underpin the system's world-leading capabilities.

Research

New Science and Innovation Awards

Seven new programmes with funding of over £31 million will help build the UK's research base in the areas of mathematical analysis, renewable energy, chemical engineering at the life sciences interface, quantum coherence, and physical organic chemistry.

New dimension in physical organic chemistry

Catalysing and sustaining a new dimension in the UK's research capability in physical organic chemistry is the aim of a centre at the Universities of Strathclyde and Glasgow. It will focus on a range of topics of international significance such as new electronic materials, devices and technologies; chemical reactions to revolutionise energy use in chemicals and pharmaceutical industries; and new and more effective medicines.



From picoseconds to millennia

A new research centre, Analysis of Non-linear Partial Differential Equations (PDEs), will be based at the University of Oxford's Mathematical Institute. PDEs are ubiquitous in most applications of mathematics, where they provide a natural mathematical description of many phenomena. The behaviour of every material object, with length scales ranging from sub-atomic to astronomical and timescales ranging from picoseconds to millennia, can be modelled by PDEs or by similar equations

Mathematics for wide ranging applications

A new centre, Nonlinear Partial Differential Equations, will operate under the aegis of the Maxwell Institute for Mathematical Sciences. It also involves the mathematics departments of the University of Edinburgh and Heriot-Watt University. Nonlinear partial differential equations and related areas of mathematical analysis form a key area of modern research in mathematics. They involve profound theoretical challenges and have wide applicability in such diverse areas as medicine, financial modelling, environmental science, and industry.

Chemical engineering at the life-science interface

Chemical engineers will work with biologists at the life-science interface in this new centre. Based in the Department of Chemical and Process Engineering at the University of Sheffield, it will act as a portal for the academic chemical engineering community in the UK to access life science problems and techniques. Initial projects will be in the areas of stem cells and regenerative medicine, kidney diseases, reproductive biology and protein aggregation.

Quantum coherence

The centre will create a new collaboration of complementary expertise between the Physics Departments at Imperial College London and the Universities of Cambridge and Oxford in the area of quantum coherence. It will lead to an increase in the capacity for research and training in quantum coherence in the UK and stimulate collaborative research.

Revolution in quantum physics

A new multidisciplinary research centre is being set up to generate a step change in the capacity and impact of UK research at the interface between cold atoms, condensed matter, and optical physics. Located at the Universities of Birmingham and Nottingham it will focus on this vast new area, recognised by the 1997 and 2001 Nobel Prizes in physics. The Award will assist the UK in responding to major opportunities for fundamental science and resulting breakthrough technology in this field.

Renewable energy

A new centre at the University of Cardiff's School of Engineering covers the field of integrated renewable energy generation and supply. It builds the interdisciplinary nature and integration of the Cardiff institutes to set up a multidisciplinary group with international expertise. It will also receive additional investment from the University and the Higher Education Funding Council for Wales.



Crossing boundaries

Many great challenges for research span the boundaries between the traditional research disciplines. In addition to promoting exciting multidisciplinary research programmes within EPSRC's remit, we continue to work in close partnership with the other Research Councils involving a wide range of disciplines.

Examples of current collaborations include:

- Designing for the 21st century, with AHRC;
- New Dynamics of Ageing, with EPSRC, BBSRC and MRC;
- Management Research, with ESRC.

Collaborations in modelling climate change, with NERC; technology enhanced learning, with ESRC; and 21st century statistics, with MRC, BBSRC, NERC and ESRC, are being explored.

e-Science enables resources held on computer at widely dispersed locations to be pooled through high-speed networks. The e-Science Core Programme (eSCP) is managed by EPSRC on behalf of all the Research Councils. Techniques developed under the initiative continue to find application across an ever broader range of research for example through use of facilities of the National e-Science Centre and e-Science Institute at Edinburgh.

Three pilot projects began during the year to demonstrate how e-Science techniques can open up possibilities for faster, improved or innovative science. With funding of £9 million

under the third phase of the programme, they each apply a variety of tools and techniques developed through earlier phases to deliver research that would otherwise be impossible.

Researchers in the arts and humanities are amongst the newest recruits to e-Science. One of three new projects designed to demonstrate how the technology can be applied in this area will enable the public to view ancient manuscripts in unprecedented detail. This is funded jointly by eSCP, EPSRC, and the AHRC.

The EPSRC has continued to support the building of a national e-infrastructure for research and innovation. This emerging infrastructure incorporates the networks, services and software needed to do e-Science. An assessment of the short and medium term needs of current e-infrastructure users was jointly funded by the eSCP and the Joint Information Systems Committee. A key aim of the eSCP is to ensure that grid infrastructure and tools are usable by a wide range of users whatever their level of e-Science knowledge.

A record attendance of 650 delegates was achieved for the fifth e-Science All Hands meeting held in September 2006. One of the highlights of the many research success stories presented was an innovative flood warning system based on intelligent sensors.



The new microscope in action: the X-ray generator is on the left, the specimen for examination is in the middle and the lead-lined camera is on the right.

In exquisite detail

Close study of the structure and behaviour of bone or teeth to further the understanding of diseases such as osteoporosis is one of many potential applications of a unique three-dimensional microscope developed in an EPSRC-funded project by a multidisciplinary team drawn from six UK universities. Other uses include observing oil bearing rocks to improve oil extraction, investigating the mechanical behaviour of metals to aid in the development of new materials, and the study of fossils.

The microscope works by applying time delay integration to smooth out imperfections in images created using X-ray microtomography, a technique in which variations in the

sensitivity of pixels that make up an image are captured by a sensor and processed to create a computer-generated, three-dimensional image. The use of time delay integration makes it possible to generate much higher quality images and also to examine larger objects without loss of image quality.

The microscope looks set to be a valuable research tool offering benefits in many different sectors. 'As well as developing these microscopes to study subtle variations in internal structure, a main aim of ours is to work with the wider scientific community to identify problems where they could make a real contribution', says Professor Jim Elliot of Queen Mary, University of London, who led the project.

Research

Basic Technology, an EPSRC research programme spanning the interests of all the Research Councils, focuses on building UK capability in underpinning technology. It supports high-risk projects to produce generic technologies and processes with high potential impact across science and for the basis of future industries. During the year, five additional research consortia were funded for basic technologies bringing the total to 47, well on target to reach the 50 planned for 2007/08.

The research challenges for the new consortia are:

- building a 'laboratory scale' particle accelerator with potential to probe the inner secrets of molecules, materials and medical samples;
- developing a 'molecular nose' which could revolutionise research into the workings of cells, tissues, and the biochemistry of living organisms;
- a revolutionary imaging system that could 'see' inside very small objects with incredible clarity without good quality lenses;
- harnessing laser bombardment of materials to develop new radiation sources for use in basic science, industrial analysis, and medical diagnosis;
- developing a new Magnetic Resonance Imaging technique that makes visible features not seen by conventional MRI such as abnormal proteins present in Alzheimer's patients.

The Technologies for Crime Prevention and Detection programme has continued to support innovative research that will help achieve a safe urban environment, improve security of people and property, reduce the risk of fraud and identity theft, and aid forensic science and crime detection.

The programme has increasingly focussed on high-risk security challenges to society. For example, in 2006 an IDEAS Factory was held jointly with AHRC and ESRC on 'Countering Terrorism in Public Places' (see page 37). To ensure that the topics addressed by the research fit with UK priorities in crime and security, EPSRC has continued to work closely with the Home Office and other related organisations. By March 2007 the programme had funded 66 research projects and seven multi-disciplinary networks.

Stem cell research increasingly requires solutions from the engineering and physical sciences. They are called into play for areas such as understanding cellular signalling, the scaling up of stem cell production, and storage techniques that prevent deterioration. Previous commitments have involved close collaboration with the BBSRC, MRC and ESRC, and EPSRC continues to explore possibilities for joint activities. One of these is the development of the UK National Stem Cell Network, co-funded by all four Research Councils, which promotes research activities and events at the national level to speed translation of basic stem cell research into therapeutic applications.

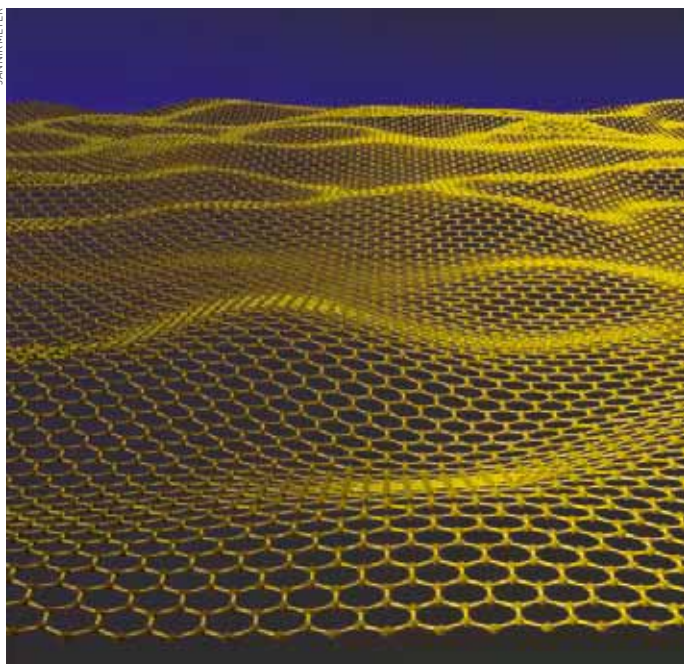
Graphene - pencil this in

In a new twist on chewing on a pencil, back in 2004 Professor Andre Geim and his group at the Department of Physics and Astronomy at the University of Manchester working on EPSRC-funded research, used sticky tape to pull off individual atomic planes from graphite, the material used for the writing tip in pencils. In so doing they created graphene - a membrane just one atom thick and composed of carbon atoms formed into hexagonal groups of six to create a mesh-like pattern.

Although theoretically graphene membranes shouldn't exist, the group has now shown that they are stable enough to survive without a substrate in air and at room temperature. In a recent Letter in the journal Nature, they reported on further

EPSRC-funded research which helps to explain why. Their experiments revealed tiny undulations in two dimensional graphene sheets, and they hope further investigation of this waviness will reveal what makes the membranes so stable.

Graphene membranes have remarkable electrical properties and could find revolutionary new applications in areas ranging from electronics to medical research. 'These membranes represent a completely new type of technology,' says Dr Kostya Novoselov, who now leads the research in Manchester. 'And we believe that the technology transfer to other areas should be straightforward.'



Artist's impression of a graphene membrane.

The global dimension

Research with an international dimension involving EPSRC supported researchers is as diverse as our research portfolio. It ranges from mathematical modelling of locust swarms with the University of Sydney to sharing research in soil mechanics for major new civil engineering projects with universities in China. Our strategy for building on such collaboration is to enable UK researchers to take even greater advantage of global opportunities. The main elements of this drive are to:

- encourage researchers to develop their work in partnership with leading groups in other countries, for example through EPSRC facilitating travel and workshops;
- promote greater collaboration between universities in the UK and specifically targeted countries such as the USA. EPSRC will support this by building relationships with agencies in the USA such as the National Science Foundation;
- support researchers with information and travel funds to stimulate more collaboration across Europe, focussing especially on participation in European research programmes.

A highlight of EPSRC grant funding to foster links between the UK and overseas was the six new awards worth £900k under the INTERACT programme. This initiative stimulates collaborations with China, India and Japan.

For example, UK universities led by Nottingham University received EPSRC funding for the UK-China Geo-Net. This brings top engineers from the two countries together and promises to help the UK geotechnical industry to compete in the rapidly growing Chinese construction market. The network will also generate high-level staff mobility, breaking down geographical and cultural barriers.

To encourage collaboration on energy research with China, EPSRC and the DTI arranged a workshop in China in 2007. An agreement between EPSRC and the Chinese Ministry of Science and Technology, focussing on energy technologies, will be announced in 2007. Opportunities for EPSRC to fund future beneficial interactions in this area through the agreement are being explored.

EPSRC also actively supports international research programmes such as the thriving EUROCORES (European Science Foundation Collaborative Research) programme which brings together national basic research on multidisciplinary issues of Europe-wide concern. Other progress during the year included improved engagement with the EraNET consortium with two new UK groups funded by EPSRC for collaborative nanoscience research.



Bitublocks use materials that would otherwise end up in landfill. Opposite shows sample bitublocks being tested in the lab to ensure they can take the loads required for building materials.

Rubbish to residences

Most of us are happy to do our bit for recycling – but few take recycling as seriously as Dr John Forth of the University of Leeds and Dr Salah Zoorob of the University of Nottingham. By developing a new type of building block made up of 100% of recycled and waste materials bound together by bitumen – a by-product of the petroleum industry – they, and their nine industrial collaborators, are aiming to turn rubbish into new houses.

The blocks themselves, dubbed 'Bitublocks' were developed during the course of EPSRC-funded research and can contain mixtures of waste such as crushed glass, metallurgical slag, and various types of ash. The use of bitumen as a binder makes it

possible to substitute waste products for up to 100% of the traditional aggregate mix used in conventional blocks.

The composition of the Bitublocks, reports Dr Forth, can be tailored to match – and even exceed – the typical performance characteristics of the full range of conventional building blocks. 'We can produce units with a wide range of strengths, densities and water absorption to suit different structural applications and environments,' he explains. 'And by optimising and varying the composition we can also enhance their durability and cope with variations in waste streams – while still keeping the cost on a par with conventional materials.'

Research

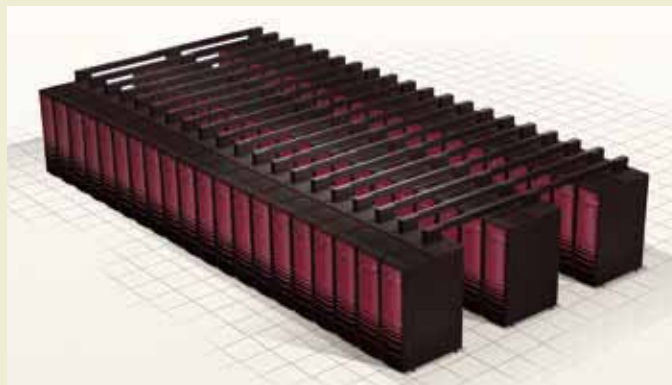
Access to the best facilities

As part of the EPSRC vision for improving the international quality of engineering and physical sciences in the UK, EPSRC is working with Government, STFC and others to ensure that engineering and physical sciences researchers have access to the best facilities.

There is currently one national high performance computing service in operation called the HPCx service. This is provided by a consortium led by UoE HPCX Ltd, consisting of the University of Edinburgh and STFC, with IBM. The computing system, located at Daresbury Laboratory, started operation in 2002 and is planned to finish in December 2008 with a total expenditure of £55 million.

The next generation high-end computing service, HECToR, is planned to start by end October 2007. EPSRC is currently procuring the service on behalf of BBSRC, EPSRC and NERC. The three Research Councils will invest a total of £113 million in providing the service for academic researchers. The HECToR service will be provided by UoE HPCX Ltd in partnership with Cray and NAG Ltd. UoE HPCX Ltd will accommodate and manage the system, which will be located at the University of Edinburgh. The computing hardware will be provided by Cray, and NAG Ltd will supply the computational science and engineering (CSE) support for the service.

HECToR will be a world-class service for leading-edge scientific research. Based on Cray's vision for Adaptive Supercomputing, the system hardware will have an initial peak performance of approximately 60 Tflop/s, increasing to 250 Tflop/s in October 2009. A further upgrade in peak performance to at least 500 Tflop/s is planned for October 2011. In addition to the main system, an additional vector system with a peak performance of 2 Tflop/s will be provided from August 2008. To enable our researchers to obtain the best science from the computing hardware, a significant investment has been made in CSE support for the service. In addition to providing central support and training to enable researchers to utilise HECToR, NAG Ltd will provide in-depth optimisation of computational codes through staff employed within individual research groups.



Right: How the next generation supercomputer HECToR will look when installed in Edinburgh.

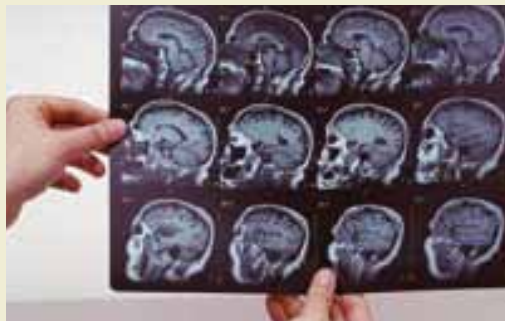
Below: UoE HPCX Ltd, Cray and NAG Ltd with the HECToR project team.



Research

Advances through e-Science

Three new e-Science projects highlight how the technology can open up faster, better or different science. The research and development focuses on the work of neuroscientists, environmental pollution analysts, and designers of tiny electronic circuits.



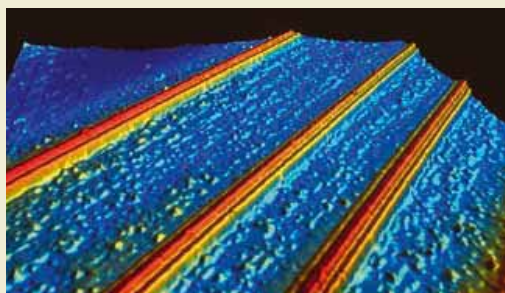
Brain networking

The CARMEN project, led by Professor Colin Ingram, University of Newcastle, is harnessing e-Science techniques to enable neuroscientists working on different aspects of brain function at different laboratories to share and integrate their data and models. Neuroscientists use many different techniques to unravel the processes within individual neurons – brain or nerve cells – or the interactions between networks of neurons that lead to thoughts and behaviour. The techniques are time-consuming, difficult and expensive, but researchers rarely record their data or models so that other researcher groups can use them.

CARMEN is developing a grid-enabled, real time virtual laboratory to enable widely dispersed neuroscientists to collaborate. It is focusing initially on data that records the electrical activity within and between neurons. The project uses software and e-Science techniques developed under a number of previous EPSRC e-Science projects including workflows developed under the myGrid project, signal analysis software developed by the DAME project, and security software developed by GOLD.

Designing tiny electronics

The NanoCMOS project, led by Professor Asen Asenov of Glasgow University is developing e-Science methodology and tools to allow designers of tiny electronic circuits to meet the highly demanding challenges created by future nanoscale electronic components.



Right: Coloured scanning tunnelling micrograph of nanowires. Just 10 atoms wide, these wires could be used in computers operating at the limits of miniaturisation.

These components will be so small that their behaviour will be highly variable, governed by individual atoms rather than the average behaviour of large collections of atoms. The NanoCMOS project is building a grid infrastructure and e-Science tools to enable circuit designers to share models that simulate nano-component behaviour and explore the implications for circuit design. NanoCMOS is using software developed under the earlier myGrid e-Science project and issued by OMII-UK (Open Middleware Infrastructure Institute).



Closing in on traffic pollution

Helping planners take better account of pollution when making traffic management decisions is the purpose of the MESSAGE initiative, led by Professor John Polak, Imperial College London. It is developing new e-Science and grid technologies using a network of mobile and fixed sensors to gather and interpret data on important traffic pollutants.

Government policies and traffic management schemes aim to minimise the impact of air pollution, and more detailed knowledge of how traffic-generated pollution behaves in the urban environment could greatly enhance their effect. Factors such as street and building design, vehicle braking and accelerating patterns, individual traveller decisions and local weather conditions affect the concentration of pollutants that individuals are exposed to as they move around. MESSAGE will collect and analyse data on pollution at an unprecedented level of detail enabling these factors to be fully understood. The project is using technologies developed under the earlier DiscoveryNet and OGSA-DAI e-Science projects.

Other applications of mobile sensor networks like climate or weather mapping will be able to use the MESSAGE e-Science technologies.

Research

Rapid response mode

EPSRC supports most of its research through responsive mode funding. This provides rapid response to proposals for exploring emerging opportunities. A small selection of projects supported in 2006/07 is highlighted here.



Model waste management

Reduce, reuse, recycle - but no matter how diligent we are, there will always be some waste that must be disposed of in landfills. Helped by a £3 million EPSRC grant, Professor William Powrie and his colleagues at the University of Southampton will carry out field and laboratory tests and develop simulation tools to help them gain a better understanding of the bulk properties of waste in landfills. The results will be used to improve the sustainability of landfills by developing landfill management strategies that will reduce the time needed to bring the pollution potential of the waste into equilibrium with the surrounding environment.

NMR boost for cutting edge chemistry

Nuclear magnetic resonance (NMR) spectroscopy is an essential technique for identifying new chemical substances. Thanks to a £900k award from EPSRC to Professors Chris Moody and Martin Schroder, researchers at the University of Nottingham will be able to make better use of this fundamental technique to carry out cutting edge chemistry. Knowledge gains in chemical synthesis impinge on areas as diverse as chemical biology, medicinal chemistry and co-ordination chemistry (leading to developments in waste management), materials and electronics and nanotechnology.

Maps for the blind

Screen readers - software tools that read out text on a computer screen - have opened up vast amounts of intelligence available as computer-based text to people with a visual impairment. But current screen readers cannot read out information contained on maps. This may be about to change.

In a £104k project funded by EPSRC, Dr Yaji Sripada at the University of Aberdeen is working with the Grampian Society for the Blind to develop techniques to automatically generate text descriptions of map data, which then can be accessed using existing screen readers.

Making light work on microbes

Bacteria and viruses living on surfaces are responsible for many infections, but cleaning them off effectively can be difficult. Now, thanks to a £444k grant from EPSRC to Professor Ivan Parkin and Professor Mike Wilson at University College London, decontaminating surfaces should become a lot easier. The group is developing new antimicrobial coatings that work by creating activated molecules by absorption of visible light. These molecules chew up the walls of micro-organisms, destroying bacteria and viruses. The coatings offer great potential benefits in hospitals, where they could help to make hospital-acquired infections, including MRSA, a threat of the past.



Less expensive - but accurate

Photolithography is the standard but expensive method used in the electronics industry to deposit the electronic elements of a chip onto a wafer's surface in very precise patterns. Cheaper methods, such as ink jet printing exist, but are only suitable for depositing features in the range of tens of micrometres. In a £155k EPSRC-funded project, Dr Mark Paine at Queen Mary, University of London is working to develop a nanoelectrospray technique that will offer 'drop on demand deposition' with photolithography accuracy - at a fraction of the cost.

Research

Rapid response mode

Maths gets real

Mathematics is often thought of as an abstract science. But it also has enormous practical applications. With funding of nearly £2 million, 20 mathematicians, led by Professor John Hogan at the University of Bristol are teaming up with industrial partners and visiting researchers in engineering and life sciences, to use nonlinear mathematics to tackle four 'real world' challenges. These include work to predict the onset of epilepsy; studies that could lead to better walking robots; developing hybrid testing methods in engineering; and devising ways of avoiding noise and vibrations in mechanical transmission systems. By considering such real problems, they also intend to produce new mathematical advances.

Shedding light on black holes

Black holes are the subject of thousands of theory papers - but no experiments. With the help of a £670k EPSRC grant, Professor Ulf Leonhardt and his colleagues at the University of St Andrews plan to change that. The group will be using relatively simple fibre optics to demonstrate the features of

quantum black holes in the laboratory and provide the first experimental evidence to test ideas about the behaviour of black holes. Their work will also help to demystify the concept of black holes in the public's imagination.

Renewable acquaintances

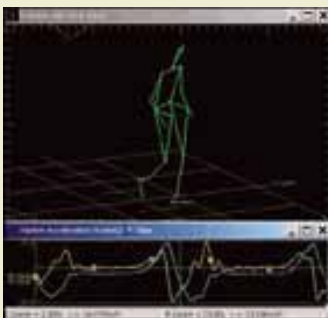
A £10k EPSRC grant was awarded to Professor Robin Wallace at the University of Edinburgh for travel and subsistence to allow UK doctoral students to participate in the British Council 'International Networking for Young Scientists' programme. For example, at a workshop in Shanghai five young UK researchers and four doctoral students worked with their prospective Chinese partners to promote research in suitable areas of renewable energy.

Random walk

Understanding how people walking and running affects structures such as floors and footbridges is at the heart of a new £307k project at the University of Sheffield. Variations in how different people walk and run make the effect of such movements on engineering structures unpredictable. Professor James Brownjohn and his colleagues are gathering data on variability and statistics of the loads induced by walking and running of individuals and groups using motion capture techniques. The data will be used to create new probability-based mathematical models that researchers hope will help predict more realistically the vibration behaviour of footbridges and floors, leading to more rational and efficient designs.

Right: The St Andrews University team plans to use fibre optics to probe the physics of the event horizon.

Below: Walk this way: Motion capture techniques will be used to investigate how people running and walking affect different structures. The Millennium footbridge across the Thames famously 'wobbled' as a result of pedestrian traffic until modified.



Research Facts and figures

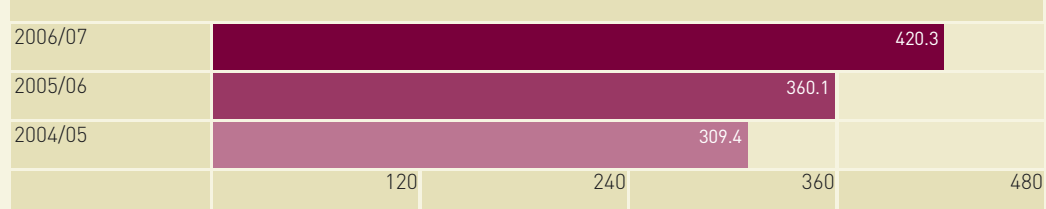
Net research grant expenditure by programme (£m)

Programme	2004/05	2005/06	2006/07
Chemistry	30.7	37.8	47.6
Engineering	47.8	63.8	70.2
Information and Communications Technologies	49.6	52.1	63.0
Infrastructure and Environment	21.0	21.5	14.9
Innovative Manufacturing	21.0	24.8	27.2
Life Sciences Interface	12.7	15.1	18.5
Materials	32.1	38.3	41.0
Mathematical Sciences	8.7	10.0	11.6
Physics	24.3	31.1	35.6
Energy	-	-	9.5
Public Engagement	1.8	2.9	3.9
Total	249.7	297.4	343.0
Joint programmes with other Research Councils			
Core e-Science	13.1	10.3	10.2
Basic Technology	16.1	22.2	28.1
Total	29.2	32.5	38.3
Other activities			
Fusion	18.7	15.9	20.6
Other activities	11.8	14.2	18.4
Total	30.5	30.1	39.0
Grand total	309.4	360.0	420.3

£420.3m

Our net research grant expenditure in 2006/07 was £420.3m

Net research grant expenditure (£m)

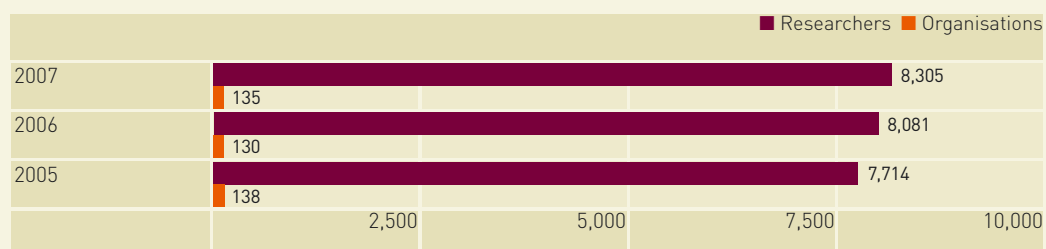


In the above table grant expenditure is shown on a net basis (i.e. after deducting receipts). The annual accounts show grant expenditure on a gross basis (i.e. before deducting receipts).

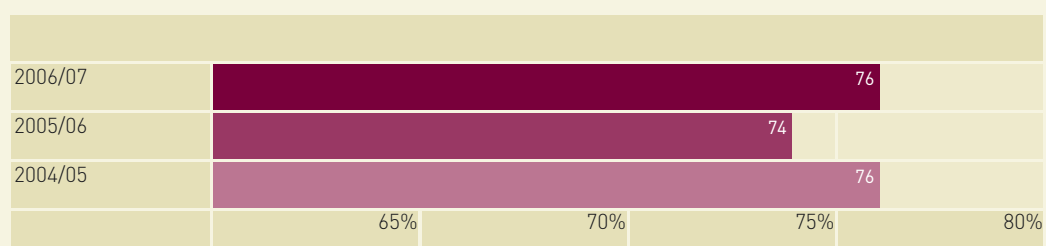
Total number of researchers and organisations with current funding on 1st April each year

3,336

The research grants announced in 2006/07 funded 3,336 researchers in 112 organisations



Trends in final reports achieving the highest approval rating* (%)



*Tending to outstanding and outstanding
A Final Report is required to be produced at the end of every grant. The report is then peer reviewed and graded.

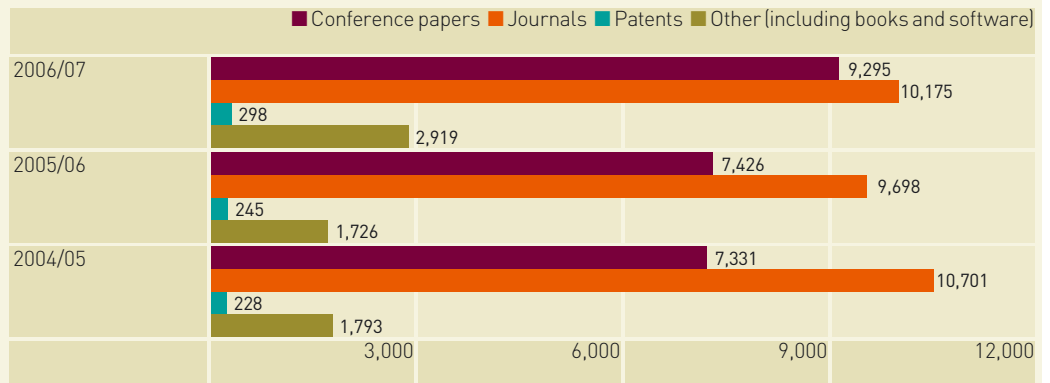
20/21

Research Facts and figures

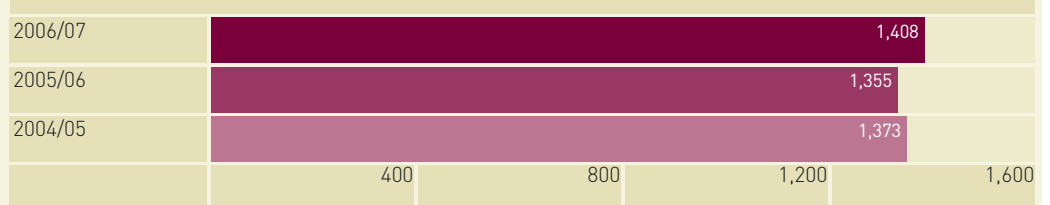
22,687

22,687 publications were reported on grants assessed in 2006/07

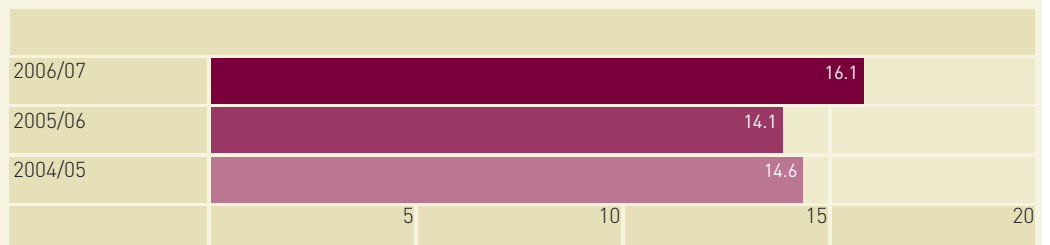
Trends in publications



Number of assessed Final Reports reporting publications

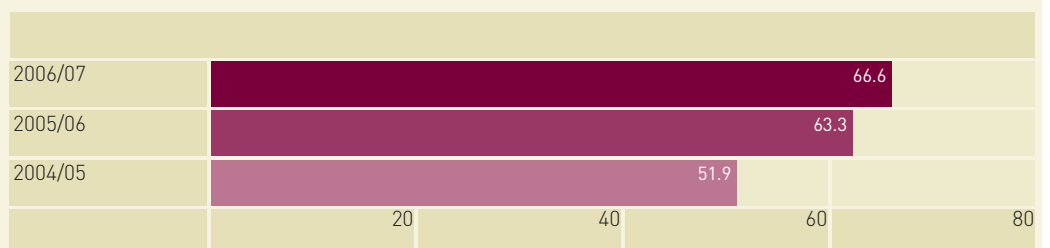


Average number of publications per assessed Final Report

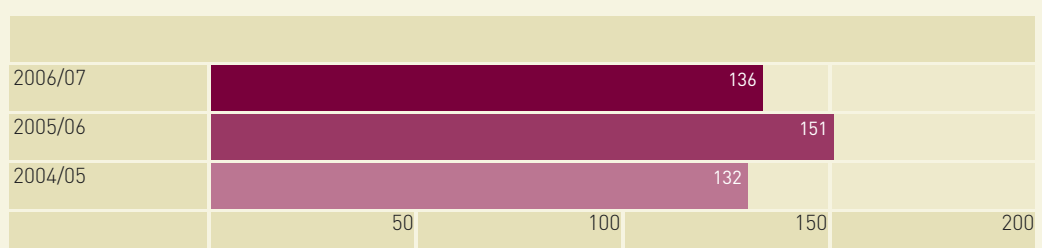


Researchers are asked via the final report to indicate total numbers for the following types of publications: conference papers, journals, patents, books and software. The dataset has been updated to analyse Final Reports assessed during the financial year instead of those received during that period.

Trends in equipment investment – capital grants (£m)



Number of first grant scheme research grants announced



PEOPLE

The future of the UK depends on the supply of well-qualified physical scientists and engineers, needed to maintain a vibrant academic research base as well as populate industry and other areas of the economy.

The year in context

The continuous generation of internationally competitive researchers equipped with high-level skills in engineering and the physical science is essential to drive discovery and innovation in the UK. This is crucial to the Government's aims of increasing research intensity and exploitation of outcomes.

To achieve this and position the UK as a key knowledge hub in the global economy, EPSRC's aims for the 10-year period of the Government's *Science and Innovation Framework* are to:

- develop postgraduate training provision as part of an integrated approach to strengthening the UK science base;
- develop features to attract an adequate supply of high-quality students into postgraduate training, and to increase the appeal of careers in research in the UK;
- expand relationships with business and public sector employers to make the system 'demand led';
- work with schools and others to enthuse the young about science and engineering.

A further element of EPSRC's vision now being developed is to explore how to identify and nurture the next generation of world leading individuals in engineering and the physical sciences.

EPSRC provides most of its support for postgraduate training through Doctoral

Training Grants and Collaborative Training Awards. This funding is tailored to the universities' need for flexibility, enabling them to manage the duration of training and levels of stipend. We also continue to fund studentships in association with research grants and awarded 788 project studentships in 2006/07.

Major activity during the year includes building up skills capacity in strategically important areas. For example, the Engineering Doctorate (EngD) has been extended to research training in the key area of nuclear engineering (see page 24). Postgraduate studentships have been included in our capacity building by their association with the Science and Innovation awards. Seven awards were announced in 2006 to support strategic areas of research that are considered to be 'at risk' (see page 8).

Boosting the domestic supply of students entering postgraduate studies in science, engineering and technology depends on successful policies for widening participation from women and ethnic groups, and increasing the attractiveness of research careers. The Research Councils UK Research Careers and Diversity group, hosted within EPSRC, is pursuing imaginative approaches that can be deployed across the Research Councils. During the year, the group's strategy was published on its wide ranging activities and targets up to 2008.



Professor Ifor Samuel demonstrates a new light-emitting sticking plaster that could revolutionise the treatment of skin cancer.

Plastic and fantastic

From display screens to lasers, optoelectronic devices that combine light with electricity have a wide range of applications. Now, thanks to the freedom offered by an EPSRC

Senior Fellowship which began in 2006, Professor Ifor Samuel, of the Department of Physics and Astronomy at the University of St Andrews, is able to look at optoelectronics in a new light.

In his research on plastic-like organic (or carbon-containing) semiconductor materials, Professor Samuel is not only furthering the basic understanding of the properties of optoelectronic materials. He is also exploring new applications.

During his Senior Fellowship he is working on applications for light-emitting dendrimers - a new class of organic semiconductor he invented in collaboration with chemist Dr Paul Burn of Oxford University, and the most efficient light-emitting diodes made from solution in the world. He is also focusing on the development of advanced lasers and optical amplifiers using organic

materials, and continuing to work with colleagues at Ninewells Hospital in Dundee to make a light-emitting 'sticking plaster' for the treatment of skin cancer.

Although his past achievements have recently been recognised by the 2007 Beilby prize, an award jointly administered by the Royal Society of Chemistry, the Society of the Chemical Industry and the Institute of Materials to recognise work of exceptional practical significance, he is already looking towards the future. 'The EPSRC Senior Fellowship is giving me time to communicate the outputs of my research,' he says, 'and to develop new research directions.'

People

Building strategic capacity

EPSRC's flagship postgraduate training programme, the Engineering Doctorate (EngD) scheme, provides UK business with leadership, technical and management skills. The EngD is a work-based alternative to the traditional PhD, where students – known as research engineers – spend around three-quarters of their time working with their collaborating company. Industry partners play a key role in designing the projects undertaken, in sponsorship and joint supervision.

The scheme has been extended by establishing two further EngD Centres, both meeting the need to build strategic capacity in skills provision. A centre in nuclear engineering was set up at the University of Manchester and a joint centre in systems engineering was established at the Universities of Bristol and Bath. The possibility of an EngD centre in complex systems is also under consideration. This brings the total of EngD Centres currently funded by EPSRC to 24, based at 14 universities.

EPSRC has also continued to build on its support for postgraduate training at the interface between the life sciences and the engineering and physical sciences. Three Doctoral Training Centres (DTCs) in the area of systems biology were introduced in 2006 in partnership with BBSRC. These new centres are based at the Universities of Manchester, Oxford and Warwick. A further new DTC in

targeted therapeutics has also been funded in partnership with AstraZeneca at the University of Nottingham.

EPSRC also invited proposals for new DTCs. In addition, the first eight DTCs have been invited to submit proposals for a further funding period of up to five intakes of students. These proposals will all be considered for funding during 2007.

A vibrant research environment

EPSRC's mainstream support for training talented postgraduates engaged in stimulating research is through Doctoral Training Accounts (DTAs) and Collaborative Training Accounts (CTAs). The DTAs are awarded in relation to the scale of research grant income provided by EPSRC, on an algorithm basis. Universities are encouraged to convert a proportion of their awards to be collaborative, to stimulate collaboration with research users. During the year, funding of £106 million for around 1780 students was announced for training starts in 2006/07.

During 2007, the DTA scheme will be tested through an independent evaluation to assess its effectiveness and impact. Tenders for undertaking the process have been issued by EPSRC, with completion planned for Autumn 2007. The evaluation will judge the degree to which these five key aims of the scheme are being met:



Dr Máire O'Neill, Queen's University, Belfast.

Security on a chip

The potential for cybercrime is growing with the expansion of communications networks. These include applications such as satellite communications, broadband wireless technology and virtual private networks (VPNs) and the internet. But thanks to research carried out by Dr Máire O'Neill, an EPSRC/Royal Academy of Engineering (RAEng) Fellow at the Electronics, Communications and Information Technology (ECIT) Research Institute at Queen's University, Belfast, cybercriminals will be finding life a lot more difficult.

'It's a major challenge to provide data security over modern high speed communication networks in real-time,' she explains. 'In my research I'm working

on analysis of encryption and authentication techniques and the development of high-speed cryptographic systems-on-a-chip architectures.'

Her work is highly prized, and some of her results have already been commercialised. She also won the 2006 Women's Engineering Society prize and was named Female Inventor of the Year at the 2007 British Female Inventors & Innovators Network Conference for her work on high-speed data security.

One of the secrets of her success lies in her EPSRC/RAEng Fellowship, which ends in 2008. 'It's been of immense benefit to me in my research career, and helped me to build collaborative links, present my work more widely and become more involved in professional activities,' she says.

- encourage a vibrant research environment;
- provide appropriately trained people;
- respond to strategic demand and need;
- empower universities, industry, students and EPSRC;
- enable partnerships with stakeholders.

A new EPSRC Vacation Bursary Programme, introduced in 2006, is designed to encourage the most capable undergraduate students to gain first-hand, practical experience of research in a UK university. The aim is to motivate them to aspire to a future career in research as well as to help them make more informed career choices.

Evaluation feedback of the pilot programme, held for students from 15 universities during the summer, was positive and it is planned to hold a further programme in 2007.

'The vacation bursary scheme offers a unique insight into academic life. I would recommend it to anyone thinking of entering academia as it offers you first hand experience that cannot be replicated in lecturers or career talks.'

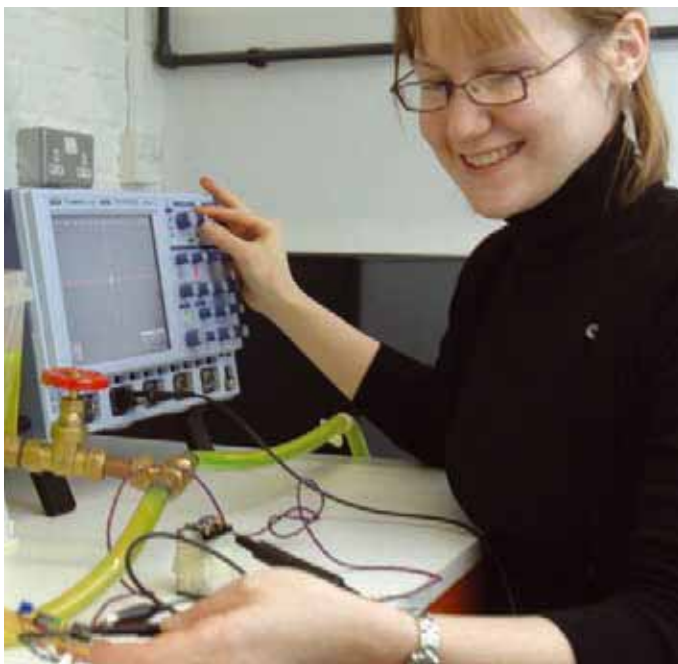
A participant in the 2006 pilot Vacation Bursary Programme.

Fellowships for outstanding researchers

Six new Senior Research Fellowships were awarded to outstanding academic scientists and engineers in 2006/07. These enable the Fellows to devote themselves full time to personal research for up to five years. EPSRC also awarded 50 new Advanced

Research Fellowships to exceptional researchers at an earlier stage in their career. They are expected to establish an independent research career of international standing by the end of the award.

Postdoctoral Research Fellowships have been awarded in a number of programmes including five in theoretical physics, five in theoretical computer science and nine in mathematics. Eight awards were also made in engineering, jointly with the Royal Academy of Engineering, and 11 overseas Postdoctoral Research Fellowships were awarded at the interface with the life sciences.



Charlotte Morton, University of Cambridge.

Going with the flow

It was the courses in fluid dynamics and mechanics during her final year studying for a degree in mathematics and physics at Bristol University that set Charlotte Morton off in a new direction. 'I liked the idea of bringing those together', she explains. And now, a three and a half year postgraduate Industrial CASE award which began in April 2006, is allowing her to do just that.

Charlotte, a PhD student in the Institute for Manufacturing at the Department of Engineering at Cambridge University, is carrying out research with Litre Meter Ltd, on the manufacture and design of flow meters. 'The aim of my research,' she says, 'is to understand the science, and hence improve the design of the meter so that it can measure at

lower and lower flow rates'.

Although her research is still in a relatively early stage, she's already convinced of the value of her Industrial CASE award. 'CASE studentships are great because they provide you with the opportunity to see the difference you could make to a product,' she comments. 'Litre Meter is giving me good support, and it is great to be able to talk to real people who work with the flow meter every day. I am getting the gift of knowledge which only years of expertise and working with the product can give you - that is priceless'.

People

Facts and figures

Net training expenditure (£m)

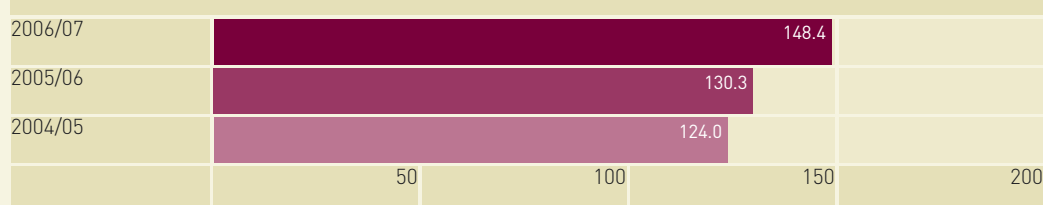
	2004/05	2005/06	2006/07
Doctoral Training Grants/Accounts	69.0	73.3	75.2
Life Sciences Interface Doctoral Training Centres	2.0	3.4	5.0
Industrial Case Training Grants	7.9	6.7	3.0
Collaborative Training Grants/Accounts	39.0	37.7	44.7
Graduate schools	1.9	0.9	1.3
International Doctoral Scholarships	0.4	0.9	1.4
Dorothy Hodgkin Awards (EPSRC only)	0.1	0.5	0.7
Roberts Skills Payments*	3.7	6.9	12.3
Other training	–	–	4.8
Total	124.0	130.3	148.4

*In the above table training expenditure is shown on a net basis (i.e. after deducting receipts)
The annual accounts show training expenditure on a gross basis (i.e. before deducting receipts)

£148.4m

Our total training expenditure
in 2006/07 was £148.4m

Net training expenditure (£m)

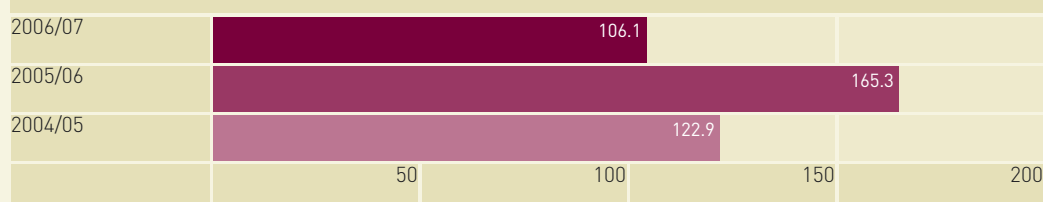


Training commitment (£m)

	2004/05	2005/06	2006/07
Doctoral Training Grants/Accounts	72.0	75.7	78.4
Industrial Case Training Grants/Accounts*	6.7	–	–
Collaborative Training Accounts	40.3	87.4	25.0
CASE for New Academic Appointees	2.4	–	–
Dorothy Hodgkin Awards (EPSRC only)	1.5	2.2	2.7
Total	122.9	165.3	106.1
Academic Fellowships (All Research Councils)	49.8	–	50.0

*In addition, a further £8.6m relating to Industrial CASE 2004/05 was committed in May 2005.
Academic Fellowships are administered on behalf of all Research Councils.
Commitment is made on a biennial basis.
In 2006/07, Collaborative Training Accounts included £4.9m relating to CASE for New Academic Appointees
and £16.0m relating to Industrial Case Training Grants/Accounts.

Training Commitment (£m)



People

Facts and figures

Estimated number of studentships supported by EPSRC programmes at 31st March 2005, 2006 and 2007

	Doctoral students ^{1,3}			Project students ²		
	2005 (est'd)	2006 (est'd)	2007 (est'd)	2005	2006	2007
e-Science	-	-	-	32	23	20
Basic Technology	-	-	-	67	99	116
Total	-	-	-	99	122	136
All engineering	796	784	729	472	515	617
Mathematics	541	507	499	38	43	60
Physics	425	421	389	147	157	178
Chemistry	783	726	677	257	297	294
Materials	619	620	619	208	218	245
Information and Communications Technologies	685	672	651	279	358	469
Life Sciences Interface	132	187	203	6	4	11
International studentships ⁴	39	99	159	-	-	-
IDEAS Factory	-	-	-	-	7	17
Other activities ⁵	11	31	50	4	79	121
Total	4,031	4,047	3,976	1,411	1,678	2,012
Grand total	4,031	4,047	3,976	1,510	1,800	2,148
Number of organisations with funding from Collaborative Training Accounts	-	-	89			
Number of organisations with funding from Doctoral Training Accounts	-	-	78			
Number of institutions with Studentship support ⁶	-	-	95			

7,714

We supported an estimated
7,714 postgraduate students
during 2006/07

EPSRC administers the Core e-Science and Basic Technology programmes on behalf of RCUK.

- In October 2001 EPSRC introduced Doctoral Training Grants to Universities to replace individual studentships. Exact student numbers for each EPSRC programme cannot be given under this system. In order to preserve continuity with previous data an estimate for the number of 2005, 2006 and 2007 starts based on the funds allocated by each programme has been used.
- Project studentship posts are at doctoral level and supported through research grants. The totals for 2006 have been amended to correct under reporting last year.
- EPSRC monitors the incidence of collaborative doctoral studentships – typically between 10 – 15% of standard DTA studentships are converted per annum. This is in addition to the specific collaborative schemes shown below.
- EPSRC acts as a scheme sponsor and administers the Dorothy Hodgkin Postgraduate Award (DHPA) Scheme on behalf of OSI (39 core students in 2004/05; 40 core plus 20 additional students in 2005/06 and 2006/07). The total for 2005/06 has been amended to reflect the 20 additional DHPAs awarded. In addition during 2004 the International Doctoral Scholarship scheme was introduced to allow leading research teams to recruit students from anywhere in the world. Universities with EPSRC supported Portfolio Partnerships or Interdisciplinary Research Collaborations (IRCs) have been given the flexibility to transfer up to 10% of their Doctoral Training Grants into the new scheme. In 2004 seven, in 2005 eleven and 2006 fifteen universities took advantage of the scheme, and funding to support around 20 students in 2004, 33 students in 2005 and 15 students in 2006 was provided.
- Other Activities includes, Science and Innovation Awards, Crime Prevention, Partnerships for Public Engagement and High Performance Computing.
- As institutions may receive funding for both Collaborative Training Accounts and Doctoral Training Accounts this figure reflects the total number of organisations that have received funding from either or both schemes.

Estimated number of PhD students supported by Collaborative Schemes as at 31st March 2005, 2006 and 2007

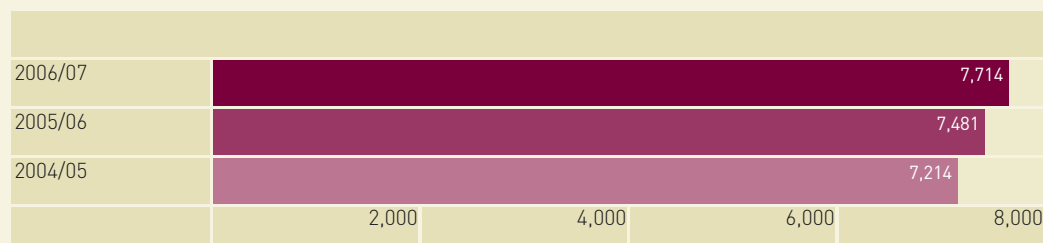
	2005	2006	2007
Engineering Doctorate	556	604	620
Industrial Case Training Grants	951	898	847
Case for New Academic Appointees	265	254	259
Total	1,772	1,756	1,726

- As a result of introducing Collaborative Training Accounts (CTA), data concerning masters students and courses is currently not available. As the CTA mechanism develops, more data will become available.
- All the above schemes are now delivered through Collaborative Training Accounts.
- The estimates for Industrial Case and Case for New Academic Appointees are based on training awards of 3 years duration.

People

Facts and figures

Total estimated PhD students supported



EPSRC Fellowships current at 31st March 2003, 2004, 2005, 2006 and 2007

Current Fellowships	Calendar year				
	2003	2004	2005 ⁷	2006	2007
Postdoctoral ^{1,7}	30	32	32	33	49
Overseas Postdoctoral ²	–	–	7	9	17
Springboard ³	–	–	–	6	5
Statistics Mobility	–	–	–	–	5
Advanced	185	186	198	219	211
Senior	15	16	14	18	21
Senior Media ⁴	1	2	4	3	6
EURYI ⁵	–	–	2	4	5
Total	231	236	257	292	319

319

319 Fellowships were current
in 2006/07

- 1 Postdoctoral Fellowships are available in mathematical sciences, theoretical computer science, and theoretical physics.
- 2 Overseas Postdoctoral Fellowships support research in appropriate physical sciences and engineering disciplines outreaching to the Life Sciences. Fellows spend up to half of their 3 year Fellowships working in overseas laboratories.
- 3 Springboard Fellowships provide short-term support (12 months in duration) to enable researchers in the mathematical sciences to work at the interface with another discipline, with business or industry or on an innovative project.
- 4 EPSRC awards Senior Media Fellowships through its Public Engagement Programme.
- 5 The European Young Investigator (EURYI) Awards Programme is a European scheme that EPSRC makes a financial contribution to (in 2004/05 EPSRC contributed 360k Euros and 2005/06 EPSRC contributed 720k Euros). Funds are awarded from a central resource comprising contributions from 20 participating organisations across Europe. From 2006/07 EPSRC will no longer be a participating organisation in this scheme, however the annual contribution will be continued until 2010/11.
- 6 In addition to the activities shown in the table, EPSRC is involved with the following fellowship schemes:
 - Administering the Academic Fellowships Scheme on behalf of RCUK;
 - Jointly administering the Engineering Postdoctoral Fellowships in collaboration with Royal Academy of Engineering;
 - Contributing to Royal Society Industrial Fellowships (£250k in 2006/07);
 - Contributing to the Daphne Jackson Memorial Fellowship Trust (up to £38k in 2006/07).
- 7 An adjustment has been made to the number of Postdoctoral Fellowships in 2005, from 42 to 32. This reduces the total to 257 from the quoted 267 in the 2004/05 Annual Report.

People

Facts and figures

First destination of Research Council PhD Students whose funding finished or who qualified in 2002/03 and 2003/04

RC Reporting Category prior to 2006	2002/03	%	2003/04	%
Further training	20	2	24	2
Government/other public sector	73	7	69	8
Permanent academic appointment	57	6	63	6
Fixed term academic appointment	278	27	286	29
Private sector industry & commerce	327	32	291	29
Not employed	214	21	217	22
Other employment	13	1	10	1
Teacher training	30	4	30	3
Total	1012		990	

First destination of Research Council PhD Students whose funding finished or who qualified in 2004/05

RC Reporting Category from 2006	2004/05	%
Engaged in study ²	131	15
Government and public sector – not research related	31	4
Government and public sector – research related	11	1
Higher education – academic (Research and Teaching)	30	4
Higher education – mainly research	209	25
Higher education – other	14	2
Industry and commerce – not research related	206	24
Industry and commerce – research related	39	5
Not employed	88	10
Other employment	13	1
Research & development, sector unknown	43	5
School (education other)	6	1
School teaching or teacher training	14	2
Self employed voluntary and unpaid work	13	1
Total	848	

1 Data source for both tables is the HESA Destinations of Leavers from Higher Education (DLHE) Survey.

2 To note for comparison purposes pre 2006 'Engaged in Study' shown in Table 2 was included in the 'Not employed' category.

3 Additional categories now reported to give greater disaggregation and to monitor the flow of trained people into research.

4 'Not knows' have been removed from the tables above.

EPSRC PhD students: thesis submission rates for degrees started since 1999 (%)

Survey year Year PhD started	2003 1999	2004 2000	2005 2001
Percentage submitted within 4 years of start date	77	72	67
Percentage submitted within 5 years of start date	85	82	n/a
Percentage submitted within 6 years of start date	85	n/a	n/a

1 Figures exclude those where the results were not known to EPSRC.

2 Each EPSRC survey has within it 3 cohorts of students i.e. the 2005 survey includes students from the cohort due to submit in 2004-05 (in the main 2001 starts); students resurveyed from the cohort due to submit in 2003-04 (in the main 2000 starts); students resurveyed from the cohort due to submit in 2002-03 (in the main 1999 starts). Data is therefore not available yet for the 2000 cohort of students re-surveyed for the third time or for the 2001 cohort of students re-surveyed for the second and third time.

3 The PhD submission survey is undertaken in the Spring each year and surveys students for the first time approximately 1 year after their funding end date e.g. the 2005 survey was undertaken between January and April 2006.

4 As more complete data becomes available for the 2001 cohort the % submitting within 4 years may increase.

BETTER EXPLOITATION

Improving the uptake and exploitation of research is very important to EPSRC and it is our vision to make the UK equally renowned for knowledge transfer and innovation as it is for research discovery.



Better Exploitation

The year in context

The drive for better exploitation of EPSRC support for research, training and knowledge transfer has gained considerable momentum during the year. A new proposed EPSRC strategy for knowledge transfer and its contribution to the UK economy was developed and published in 2007 for a wide ranging consultation with stakeholders.

This aligns with the Government's aspiration to boost economic growth by generating a stronger flow of ideas and talented people into the UK economy, as articulated in the Government's 10 year Science and Innovation Investment Framework. The thrust of the EPSRC strategy is to stimulate a shorter time to market for the fruits of research and encourage wider recognition that knowledge transfer contributes to a vibrant research base. Its five key objectives are to:

- strengthen partnerships to improve knowledge transfer;
- increase engagement with research user stakeholders;
- raise the visibility of knowledge transfer and economic impact;
- build on the changing environment in universities;
- maintain a forward-looking knowledge transfer agenda.

The EPSRC strategy underlines that an increased focus on knowledge transfer and the economic impact of its activities will be achieved while maintaining the research excellence of its world-class research and training programmes.

During the year EPSRC contributed to the Government response to the House of Commons Science & Technology Committee inquiry on Knowledge Transfer, and to a Research Councils UK action plan responding to the Warry Report 'Increasing the Economic Impact of the Research Councils', published in 2006. The Warry report acknowledged the many achievements in knowledge transfer made by EPSRC and the other Research Councils, and also that many of the strategies, policies and resources were already in place. It concluded that it was the Research Councils' joint responsibility to realise the full potential of their activities, working with a wide range of new and existing partners. The action plan published by the RCUK in 2007 sets out how the Research Councils will rise to this challenge through leadership, influencing the research base, working with users, and evaluating impact. A performance framework, developed by RCUK with the Office of Science and Innovation, will provide measures of the effectiveness of the strategy for knowledge transfer, and monitor economic impact. The results will be published annually. The EPSRC strategy will help to deliver RCUK's aspirations.



Dr Paul Linford, former academic and now Managing Director of Syrinix.

Spin-out wins top award

A spin-out company which grew out of blue-skies research funded by EPSRC was named Business Initiative of the Year in the Times Higher Education Supplement 2006 awards.

Established in 2004, Syrinix is a commercial spin-out of innovative technology developed by the University of East Anglia's School of Computing Sciences. The company has developed signal processing techniques and equipment to detect and locate very small leaks in large-trunk water mains. Early detection stops bigger, more devastating leaks from springing up and helps water companies prevent massive loss of water and damage to roads and buildings surrounding the pipes.

Dr Paul Linford, former academic and now Managing

Director of Syrinix, collected the award at a ceremony in London. Dr Chris Harrison, University of East Anglia, said, 'Syrinix represents an excellent example of the translation of university research - from blue-skies, Research Council-funded work, through to industry-funded collaborative projects, following on to consultancy and for-profit work for the university, and culminating in the spinning out of a new company to exploit new technology.'

Better Exploitation

Vision and plans

The 10-year vision of the EPSRC is for the UK to be as renowned for knowledge transfer and innovation as it is for research discovery. The key to achieving equality of excellence in both areas is effective partnerships. We recognise that it is not possible for EPSRC to achieve knowledge transfer alone. Exploitation of science-based outputs for the benefit of the UK economy and society is complex, possibly industry sector specific, and involves many organisations and people before the new knowledge is converted into innovation. EPSRC strongly advocates engaging users with the research base at the earliest opportunity, and rapid application of research results is encouraged.

The EPSRC approach is to make the knowledge transfer process seamless and integrated with research by developing a strong shared vision of tomorrow's major challenges with businesses, other users and universities. The key elements of the approach are to:

- give full prominence to the transfer of knowledge to users of the outcomes of research, and exploitation of that knowledge;
- help to increase the appetite of business and other users to take up output of research we support;
- work with universities and business to promote an environment that recognises, rewards and provides incentives for people engaged in effective knowledge transfer;

- ensure that the complexity and challenge of research needed by users is recognised by researchers.

Already over 2000 companies work alongside EPSRC to invest in university-based research. But our key vision for a stronger engagement with business is that it will become normal for many more firms to look to the science base as a source of innovation for potential benefit to their products and services. Raising the visibility of our activities across a wider range of business is well advanced, for example through the formation of Strategic Partnerships between EPSRC and leading companies. During the year six new partnerships involving nine companies were formed. The EPSRC funding commitment of £14 million was complemented by industry partner commitment of £12 million. This raises the total of Strategic Partnerships to 19, with 28 partner companies, and joint funding commitment of over £116 million. The scheme ensures a clear user focus for research investment and unlocks added funding from the companies to provide significant gearing for EPSRC resources. A new communications plan includes the publication of successful case studies and regular events to showcase high-impact research.



A 'seawater greenhouse', which can reduce the water needed for irrigation by 85%, near Muscat, Oman.

Award winning seawater greenhouse

A sustainable greenhouse for cultivating crops in hot, arid coastal conditions was designed by a UK company with the support of an EPSRC/Royal Society Industry Fellowship. The Seawater Greenhouse, which uses solar energy and seawater, is built from 100% recyclable materials, uses little energy, and can save between 5 and 8 litres of water per m² of land per day compared to conventional irrigation methods. It could have a big impact on the lives of people in some of the most challenging environments in the world. In 2006 it won the global annual Institute of Engineering and Technology award for sustainability.

The Fellowship enabled Dr Phillip Davies from Seawater

Greenhouse Ltd to spend two years working at the University of Warwick to further develop the design. As a result, the electricity consumption was reduced to match that available from solar panels. Computational fluid dynamics was used to optimise the airflow and heat distribution inside the greenhouse.

'The Industry Fellowship brought me into contact with new people and ideas; it enabled me to investigate technical innovations that probably would not have occurred in the 'business-as-usual' of everyday company life. One of these was a new solar-powered greenhouse cooling system that uses sea salts to vary the amount of moisture in the air.'

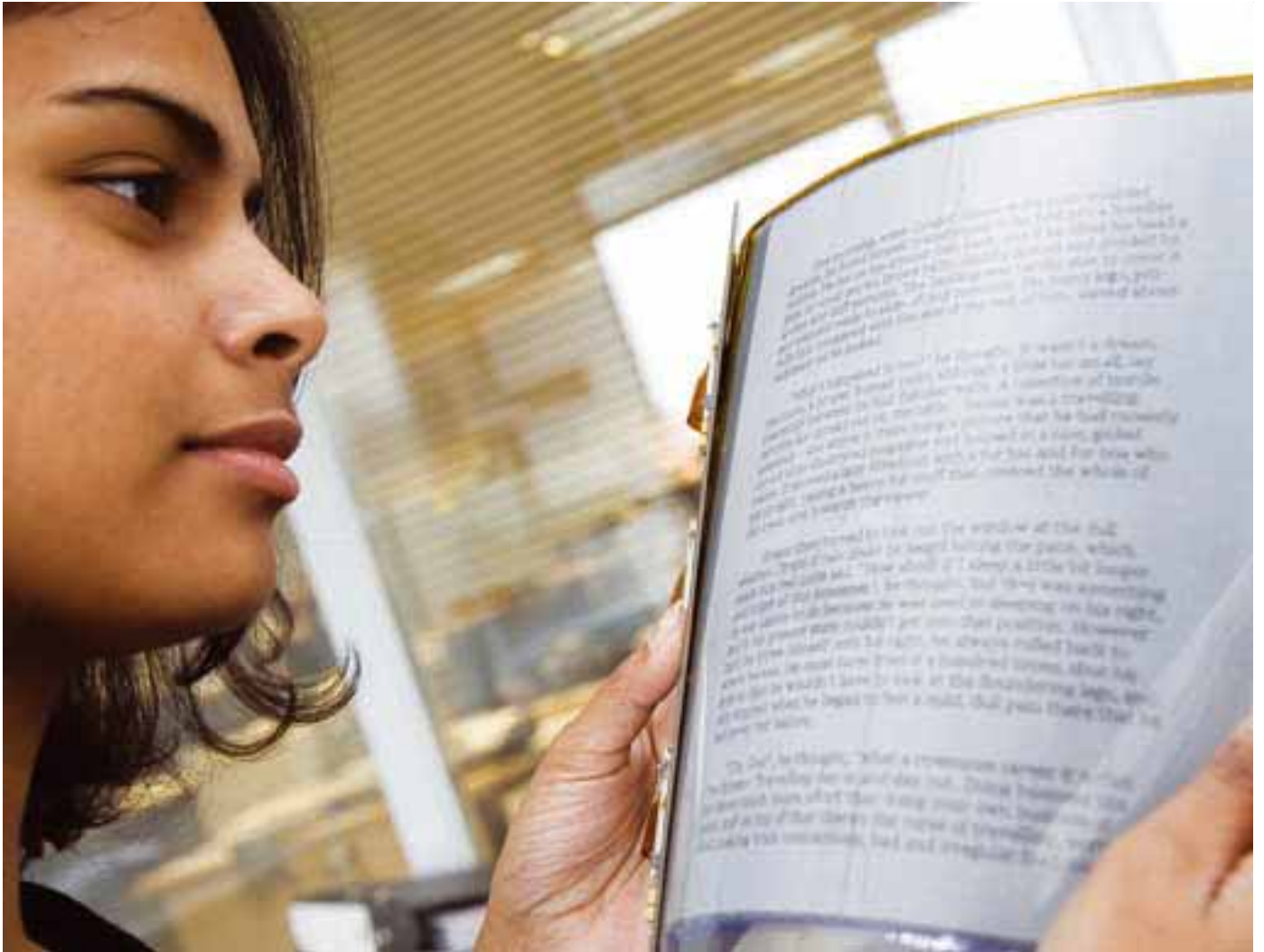
New steps in fitness technology

New steps in fitness technology An idea conceived during a PhD project has been taken up by one of the world's leading sports brands. Research undertaken at the EPSRC-funded Innovative Manufacturing and Construction Research Centre at Loughborough University has led to the development of an exciting new fitness product.

Commercial opportunities for the product were sought through a spin-out company, 'Progressive Sports', leading to a licensing deal with Reebok. The 'Reebok Deck' has proved very popular both in schools, and in the fitness club market, with 30,000 units sold before the full retail launch. Total sales for the Deck are projected to reach £50 million by 2009.



The Reebok Deck.



Plastic Logic flexible displays using E Ink® Imaging Film.

Making an impact

Along with the publication of EPSRC's strategy for increasing knowledge transfer, a brochure of case studies has been produced that shows how the research and training we fund is having an impact on the economy and society.

Many of the case studies were taken from the 2006 Knowledge Transfer Challenge Awards (see page 35), where universities not only had to come up with exciting proposals for new activities, but also demonstrate a successful track record in knowledge transfer. Examples ranged from innovations in wound care to satellite technology, with companies of all sizes getting involved.

Copies are available from the EPSRC website.

World's first plastic electronics factory

UK firm Plastic Logic, a spin-out company from the University of Cambridge will build the world's first factory to manufacture plastic electronics on a commercial scale.

The company has recently raised over £50 million in venture capital to build the plastic electronics manufacturing plant, to produce its 'take anywhere, read anywhere' electronic readers. These portable readers will make the experience of reading from an electronic device far more like using paper than any previous technology.

Plastic Logic was co-founded in 2000 by Sir Richard Friend and Henning Sirringhaus of the University of Cambridge's Cavendish Laboratory.

'This development comes on the back of a long-term programme of basic science supported by the EPSRC,' said Sir Richard Friend. 'It is this support that has enabled us to stay at the top internationally.'



Better Exploitation

Driving wealth-creating research

A national technology strategy for wealth creation that will drive future investment in research is taking shape through the Office of Science and Innovation (OSI). EPSRC interacts strongly with the Technology Strategy Board. The establishment of the Board as an 'arms length' body in 2007 enables EPSRC to develop a fully effective partnership aimed at accelerating commercialisation of research. This is expected to lead to support for leading edge technologies emerging from UK university research at a very early stage when there are exciting prospects for future exploitation by businesses. Opportunities for supporting more market and society focused collaborative research and development are also being followed up.

By the end of March 2007, EPSRC had committed a total of £22 million to 51 projects in seven key technology areas as part of the collaborative research and development activity. An additional £3 million was committed during 2006/07 to the 'Future intelligent transport systems' programme within the Innovation Platform on 'Intelligent transport systems and services'. A further £6 million was provided by the Department for Transport and the DTI. These Innovation Platforms are defined by the Technology Strategy Board as 'societal challenges bringing together a range of technologies and policy levers to deliver innovative new products and services for which

there are real customers in a potentially large global market'. A further Innovation Platform on network security has been established, and the potential for three more on assisted living, low impact buildings and low carbon emission vehicles is being explored.

The greater prominence given to knowledge transfer by the EPSRC is being realised without diverting significant funds from its core activities. A new senior post has been created in EPSRC to lead the expanding knowledge transfer activity. Following dialogue with the EPSRC User Panel, nine industry sector teams have been restructured to deliver much stronger strategic links with research intensive companies and their sectors. Best practice guidelines have been developed for interaction with companies.

A richer exchange of ideas

Two new Integrated Knowledge Centres (IKCs), offering a new approach to combining world-class academic research and strong partnerships with business, were announced in 2007 with initial funding of £5 million. One will be led by the University of Cambridge and will focus on Advanced Manufacturing Technologies for Photonics and Electronics. The other is at Cranfield University on Ultra Precision and Structured Surfaces.

The IKCs open up a new dimension through the provision of core funding to service and develop the knowledge transfer interface with business, firmly tied to pre-competitive



Dr Emma Feltham being interviewed about Chemistry Innovation at the Innovate 2006 conference.

Networking with the chemistry-using industries

The Chemistry Innovation Knowledge Transfer Network, launched in March 2006, was set up to bring together industry and academia to share knowledge and look for ways to innovate to ensure the future competitiveness of the chemistry-using industries.

Dr Emma Feltham, Process Industries Senior Sector Manager at EPSRC, spent two months on part-time secondment with Chemistry Innovation in Runcorn during the summer of 2006. The chemistry using industries are a priority sector for EPSRC.

'I wanted to understand more about the needs of the chemistry-using industries and to look for ways that EPSRC could work with Chemistry Innovation in areas

of common interest. I learnt a lot about Chemistry Innovation, its partner organisations, and the industry as a whole.'

The secondment has strengthened the relationship between the two organisations and a number of joint activities have arisen, including the Process Industries 2020 'sandpit' held in January 2007 (see page 37).

'The opportunity to bring together academics from a broad range of disciplines to tackle the real issues facing this industry was really exciting, and the support that Chemistry Innovation gave to the event really added to what we achieved.'

Secretary of State for Trade and Industry, Alistair Darling, congratulating the Manchester team, winners of the EPSRC 2006 Knowledge Transfer Challenge.

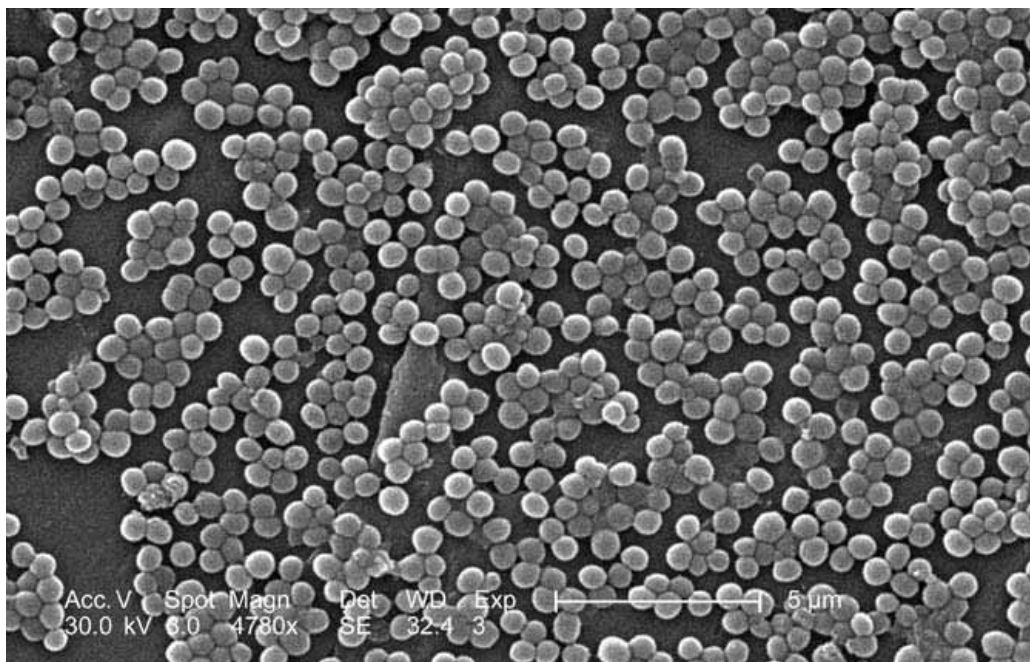


collaborative research and postgraduate training. It is intended to build on the concept by establishing more IKCs.

Another first for the year was the launch of a new competition, 'Knowledge Transfer Challenge Awards', for universities with compelling proposals that would transform knowledge into economic benefits, with prize money worth almost £1 million. Five finalists, selected from the 51 universities invited to bid, were Aston University, the Universities of Edinburgh, Leeds, Manchester, and Newcastle University. At an event held in November 2006 they came together to try and convince the

judging panel that they had innovative ideas for undertaking future knowledge transfer activity. Topics ranged from mine water pollution to innovative wound care. The top award of £500k and an EPSRC CASE award worth £60k went to Manchester for their proposal on major advances in getting different computer systems to talk to each other.

The final of the Research Councils' Business Plan Competition took place in December 2006. The winner was Warwick Warp, a team led by Dr Li Wang, who received £25k. Warwick Warp is developing a unique software-based finger print identification.



MRSA bacteria.

New weapons to fight hospital superbugs

Three drugs that are effective against antibiotic-resistant superbugs, such as MRSA, should be available for use within 2-3 years, according to the British company that discovered them.

They are the first antibiotics employing a novel mode of action to be discovered for more than 30 years. A spin-out company, e-Therapeutics, from Newcastle University used techniques developed under an EPSRC-funded project as part of the UK e-Science Programme to make the discoveries. The drugs are now entering clinical trials.

Better Exploitation

system which is substantially more reliable and also faster than those currently available. The next competition for 2007/08 will be launched this summer.

EPSRC continues to work with regional organisations to ensure that there are effective opportunities for interaction between the science base and users at a local level. A key aim is to improve our ability to deliver benefits by working closely with the Regional Development Agencies (RDAs) and Devolved Administrations (DAs) in collaborative research and training, commercialisation and staff interchange. During the year a strategy was developed for improving interactions with RDAs and DAs, and EPSRC worked with six of these local bodies to identify potential areas for mutual cooperation. Following earlier successful EPSRC 'study tours' designed to build relationships with RDAs/DAs, a further tour and workshop was held early in 2007.

Skills for the future workforce

Creating a workforce with high-quality skills in engineering and the physical sciences that will contribute to a dynamic UK economy is central to our support for collaborative training. The best form of transmitting knowledge arises from a flow of talented researchers. Our support for around 2,300 PhD students each year is a powerful influence with about half taking up employment in industry, commerce or the public sector. EPSRC funding of around

£60 million a year is committed to the support of collaborative training, involving 94 universities.

The existing mechanism for such training, called Collaborative Training Accounts (CTAs), is to be reviewed before transferring to a more flexible process called Knowledge Transfer Accounts (KTAs). The aim of the new KTAs is to boost the potential contribution to knowledge transfer by encompassing two-way transfer of ideas, research outcomes, expertise and skills between research organisations and user communities, in addition to training.

An important spin-off from the recommendation in the recent Warr Report has been an EPSRC initiative to expand training with a focus on key entrepreneurial skills. EPSRC is investing over £1 million to support training in entrepreneurship to further enable researchers to seize opportunities to exploit research. The funding, made available from early 2007, is aligned with institutions with the highest numbers of postgraduate or postdoctoral researchers funded by EPSRC. Examples of suitable elements for the training initiative are:

- commercialisation of research;
- patenting;
- intellectual property;
- involving expertise from research managers, business policy makers and science communicators;
- placements for researchers to enhance entrepreneurial skills.



Professor Erkko Autio.

First Chair of Technology Transfer

Professor Erkko Autio, a Finnish academic, is to become the UK's first Professor of technology transfer in the physical sciences. The £1 million professorship is jointly funded by QinetiQ and the EPSRC. Imperial College London's Tanaka Business School was selected in competition with other universities to host the professorship.

The EPSRC-QinetiQ Chair has been established to address the comparative lack of systematic approaches for the commercial exploitation of ideas in engineering or the physical sciences when compared to the growing body of academic research on the commercialisation of innovation in bio-sciences, such as

medicine and pharmaceuticals.

Erkko Autio's previous research has focussed on the rapid international growth of technology-based new firms. As the EPSRC-QinetiQ Chair of Technology Transfer in the physical sciences he will lead academic research to establish reliable mechanisms which develop wealth-creating products and services from the physical sciences.

Better Exploitation

New dimensions in thinking

The IDEAS Factory has continued to explore research topics that need a new dimension in thinking. Interactive workshops called 'sandpits' are held over five days with 20-30 participants to stimulate highly innovative and risk-accepting research activities.

A multidisciplinary mix of participants ranging from active researchers to potential end users is essential. The aim is to spark off lateral thinking and radical approaches to research topics. Each sandpit has pre-determined research funding ranging from £1 - 3 million.

The six sandpits highlighted here were held during the year. Since the inception of the IDEAS Factory, we have invested £22 million for 60 research projects arising from 13 sandpits.

On the road healthcare

A key feature of future healthcare is that emergency services will be delivered increasingly to the patient at the roadside, the site of a disaster or in the home. A Department of Health vision is to provide a higher proportion of care to patients in the community with the right response, first time, in time. There are currently no proactive design programmes for developing the innovative care and treatment environments and transport systems needed to realise this vision. The sandpit outcomes included projects to explore improvements to transport and other technologies needed by the new Emergency Care Practitioners, and activity monitors to assist patients in the home.

Countering the terrorist

Research to protect society from the devastating consequences of terrorist attacks in public places can benefit from a multidisciplinary approach. A range of science and engineering approaches need to be combined to develop sound technologies that are reliable and acceptable to the general public and frontline security personnel. The sandpit was attended by participants with expertise ranging from design to geospatial science. They looked at long-term ideas for understanding and deterring terrorist behaviour, and designing technologies and environments to counter the impact of attacks. Three research projects on these topics were agreed.

Manipulating matter

The challenging question for this sandpit was 'Can we design and build a compiler of matter?' The group explored the possibilities for the manipulation of the fundamental building blocks of atomic/molecular matter, under software control, to form a macroscopic product. From computer controlled atom-by-atom epitaxy to the assembly of abiotic molecular machinery, the development of such a technique could revolutionise all areas of science. The aims of three follow up projects were: to build a molecular machine to build new materials; develop directed reconfigurable nano machines; and to investigate the control engineering and computer science needed for a 'matter compiler'.

Sustainable processing

The processing industries - chemicals, pharmaceuticals, biotechnology, food and drink, and personal care - serve most of the major supply chains in the UK. The aim of the sandpit was to explore innovative ideas and projects for improving the sustainability of industry processes using an integrated approach. A key to success was considered to be that the participants would build collaborations across disciplines to tackle effectively the research challenges involved.

Greater than the sum of the parts

'How, when and why is the whole greater than the sum of the parts?' was the daunting challenge for the sandpit group looking at the topic of 'emergence'. Complexity is not the only factor influencing emergence. For example, human and animal activity are also driven by context and instinct; climate change is influenced by human activity as well as weather patterns; and disease transference is affected by technology, social and commercial factors as well as networks of human contact. Four projects arose from the sandpit on topics including the emergence of artificial culture in a robot society, and the way self-regulatory social systems work.

Engineering ideas for public engagement

The issue of whether engineering research needed a fresh approach to public engagement was a key challenge for this sandpit. The group debated where successful engagement could be enhanced and brainstormed possible innovative approaches. The need for public engagement being an integral part of the engineering process was also explored. Follow up projects include: examining how society forms ideas about engineering; developing participatory visual and musical experiences to explain engineering concepts; and preparing concepts on engineering for inclusion in the schools science curriculum.



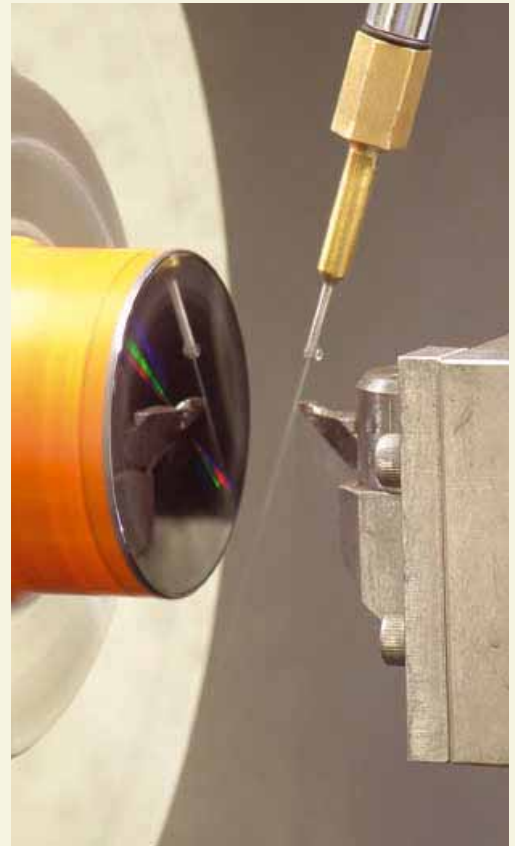
Better Exploitation Innovative Manufacturing

Collaboration between business and universities on research is a key factor in facilitating knowledge transfer and exploitation of research results. A significant component of this activity is delivered by 16 Innovative Manufacturing Research Centres (IMRCs). These provide focal points for research excellence encompassing the breadth of manufacturing, making a vital collective contribution to the future of UK business. Since the Centres were launched in 2001, EPSRC has awarded a total of £166 million to IMRCs. During 2006/07, 10 of the centres received renewal funding of £82 million, and renewal funding for three other Centres is planned.

The Innovative Manufacturing Programme also includes support for four large 'grand challenge' consortia with £14 million funding. Each of these mobilise large teams with multi-disciplinary expertise to concentrate on issues with significant potential for long term wealth creation in the UK. These range from the design and production of multi-functional three-dimensional devices to developing routes to better flow of ideas from research to the marketplace.

New generation of pharmaceuticals

The IMRC for Bioprocessing at University College London has a £6 million portfolio of projects which creates new ways of moving from discovery to bioprocessing. This has become critical for the new generation of complex pharmaceuticals which embrace human proteins and are likely in future to incorporate human genes and cells. There is huge potential for the research to avoid the expensive delays in drug manufacturing trials that are often experienced.



High precision

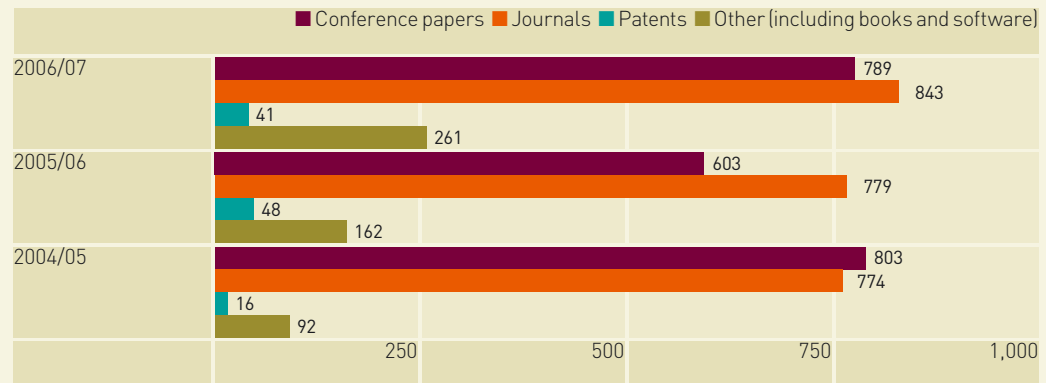
The £10 million IMRC at Cranfield University plays a leading role in shaping manufacturing research within the university as well as spotting the key technologies needed in the next 10 to 15 years. The Manufacturing Technology theme focuses on high-precision technologies and materials processing. The high-precision technology research includes ultra-precision machining, unconventional machining processes, and superabrasive grinding. Materials processing research includes areas such as novel welding processes and lightweight composite structures. Within the newly developed Product-service Systems theme, the centre is also exploring new manufacturing practices, decision processes and production environments that will be required for competitive manufacturing.

Above: Manufacture of ultra-precision surfaces.

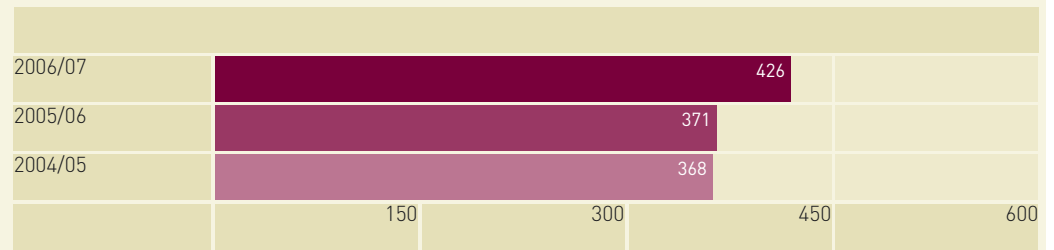
Left: IMRC Research Fellow investigating the ability to predict the behaviour of complex and delicate biopharmaceuticals in the potentially damaging environment of industrial equipment.

Better Exploitation Facts and figures

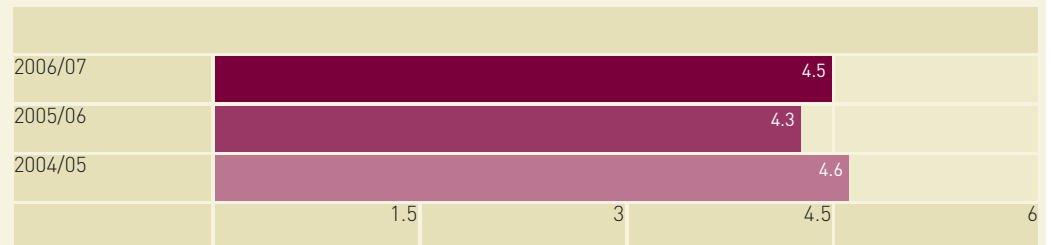
Number of co-publications with industry



Number of assessed Final Reports reporting publications with industrial co-authors



Average number of publications with an industrial co-author per assessed Final Report



Researchers are asked via the final report to indicate total numbers for the following types of publications: conference papers, journals, patents, books and software. The dataset has been updated to analyse Final Reports assessed during the financial year instead of those received during that period.

SCIENCE IN SOCIETY

New research developments in the physical sciences and engineering can impact on all aspects of society. EPSRC is committed to fostering engagement between researchers and the public to provide members of the general public with better opportunities to understand, comment on and influence developments in engineering and the physical sciences.



Science in Society

The year in context

EPSRC's commitment to a vibrant programme of engagement between researchers and the public has been underlined by a rise in the budget allocation from £3 million in 2005/06 to £4 million in 2006/07. The EPSRC has also played an important role in the drive for greater coherence of outreach activities to maximise their impact.

EPSRC has continued to work closely with the Research Councils UK Science in Society Unit, formed in 2005, and also to collaborate with appropriate external partners. During the year, the new £8 million Beacons for Public Engagement initiative was launched. This brings together the Research Councils, the UK higher education funding councils and the Wellcome Trust to promote excellence in public engagement and effect a culture change in UK universities towards public engagement.

Beacons will tackle a major obstacle, highlighted by a recent report, that researchers found that the pressure to publish and attract research funding made it difficult to take time for public dialogue. Engaging with the public can bring real benefits to universities and research institutes and the aims of the new Beacons initiative include:

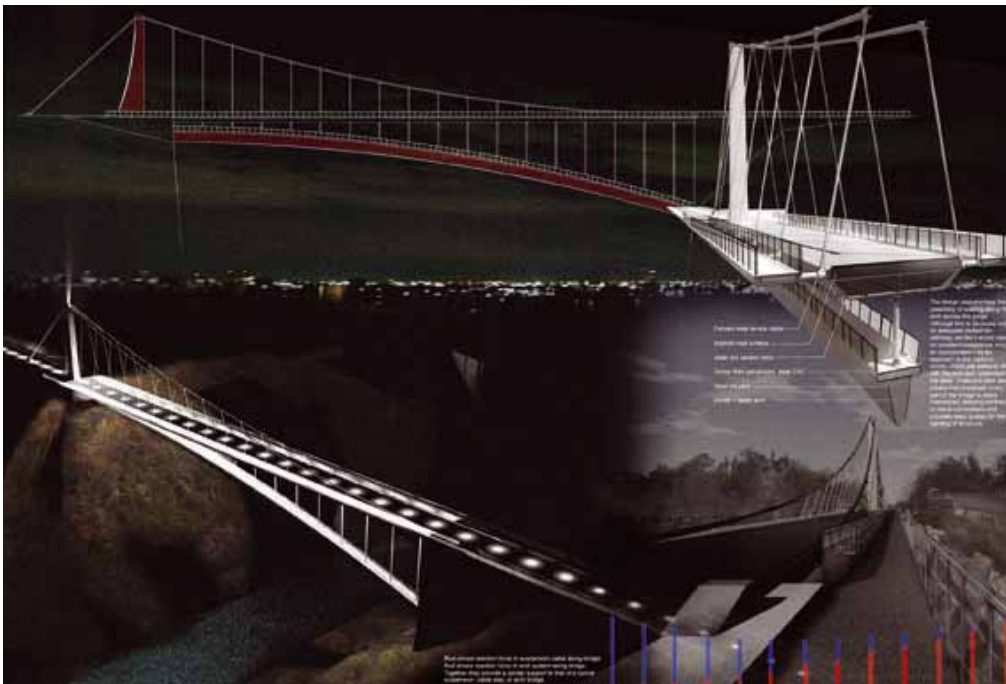
- working to ensure public engagement is recognised at a strategic level in universities;
- encouraging more staff and students to get involved;

- linking with partners such as museums and science centres;
- advising researchers on public engagement.

The funding will support Beacons for an initial period of four years and include the setting up of a UK-wide co-ordinating centre to develop the initiative and promote best practice.

Other collaborative activity includes the National Science Week Awards scheme which was opened up to researchers from all the Research Councils during the year. Joint Research Council working with the BA Crest awards and Nuffield Bursaries scheme continues.

The Societal Issues Panel (SIP) has been developing its approach to helping EPSRC take greater account of public thinking when deciding how to invest in research. During the year it commissioned a review of best practice in this area, consulting a wide range of other organisations. This confirmed that EPSRC is taking a leading role in a new field of activity while it also provided some useful recommendations. SIP also held a workshop in 2007 to develop ideas about how EPSRC's digital economy research theme might be used as an exemplar for helping EPSRC identify societal concerns, attitudes and aspirations across its research portfolio. The output from both these activities has provided a useful basis from which to develop EPSRC's future strategies and approach.



Gorge on Brunel

The winning entries from a competition to design a crossing of the Avon Gorge at Clifton have been turned into an invaluable educational resource thanks to an EPSRC Partnerships for Public Engagement project led by Bristol University. Uses of the designs will include support for the Royal Academy of Engineering's 'Shape the Future' campaign.

Winning student design by Ben Hopkins, Tom White, Rachael Lee and Eric Cheung from Nottingham University.

Science in Society

Left to right:
Professor Jim Al-Khalili, Professor
Trevor Cox and Professor Peter Styring.



Encouraging the research community

We have continued to encourage and support researchers to engage with schools and the general public. The Researchers in Residence scheme, now a joint Research Council programme, enables PhD students to work in schools to inspire the young to continue with science. The EPSRC Partnerships for Public Engagement awards, which supports a range of public engagement activity by researchers, made 27 awards with over £3 million funding to researchers during the year. This programme forms an important part of the RCUK Science in Society strategy to create a joint funding framework for Research Councils' grants for public engagement activity open to all researchers.

New champions of research

EPSRC Senior Media Fellowships are awarded to leading researchers to be high profile champions for science and engineering through

the mass media and public events. During the year three new Fellowships were announced and a further Fellow will be appointed in 2007, bringing the total to seven:

Professor **Jim Al-Khalili**, head of theoretical nuclear physics at Surrey University, who appears regularly on television and radio and has published several popular science books. In 2007 he was awarded the Royal Society's prestigious Michael Faraday Prize for his outstanding achievements in science communication.

Professor Trevor Cox, University of Salford, whose interests include room acoustics, digital signal processing and sound perception, was a finalist at Famelab a pop idol style competition to find science communicators for television.

Professor Peter Styring's research interests at Sheffield University include green, benign and sustainable technologies. A key project for his Fellowship is to collaborate with sports broadcasters and publishers to bring engineering and science into sport.



NOISE role model Nic Harrigan demonstrates his giant bubbles experiment.

Making a NOISE

Young 'NOISE' role models from a range of science and engineering professions are sponsored by EPSRC to show young people how interesting and rewarding their careers can be. Their activities have included appearances on 'teen' websites, articles in many leading national and local newspapers, and spots on TV and radio programmes. They also appear at major science events.

In 2007, a successful new 'science cabaret' was performed to several Kent schools. It featured large scale experiments and demonstrations by NOISE role models, and talks about their careers. It is planned to run it again at events such as the Cheltenham Science Festival and the BA Festival in 2007.

Inspiring the young

Our priority is to ensure the coherence of initiatives to engage schoolteachers and students by working through the RCUK Science in Society Unit. One of the successes of the year was a project to update busy science teachers on the latest findings of cutting edge research through the Government funded Science Learning Centres. It proved to be the most successful set of courses run by the Centres, directly meeting a requirement in the OSI Science and Innovation Framework. The RCUK SIS Unit is seeking funding for a greatly expanded three-year follow up scheme.

In response to the call from Government to co-ordinate the resources available to enhance the school science curriculum, EPSRC has worked alongside the other Research Councils and the Association for Science Education. This has resulted in all materials developed by the Research Councils for school students or teachers being made accessible through a single portal – SchoolsScience.co.uk.

A new project to demystify 'engineering' for primary school children and family groups is being supported by EPSRC in partnership with Cardiff University, the ERA Foundation and the IET. The intended impact on the audience is to shift the 'car mechanic' image of engineers to a perception of a profession which can improve life and save the planet. Thousands of children and adults will experience entertaining and informative shows which convey the message.

The project also aims to raise awareness amongst engineers of the importance of effective public communication through a programme of training days.

'Engineering a Better World', an initiative to tackle the problem of the decline in the numbers of young people taking up careers in engineering particularly, is continuing with joint funding of £1 million from EPSRC and Yorkshire Forward. A structured evaluation of the impact of this three-year regional project on school students' choices of related education routes is due for completion early in 2008.

Fostering dialogue

Plans to promote a free-flow of information between researchers, the public and policy makers made significant headway during the year. The Research Councils UK Energy Research dialogue project was commissioned to inform decision-making by the EPSRC led Energy Research Programme. The initial programme for public dialogue during 2007 includes a series of one-day regional workshops involving a cross section of the local communities. The aim is to gather participants' spontaneous priorities for energy research and generation.

We are also working in collaboration with BBSRC in a Nano-dialogues Sciencewise project being led by DEMOS. This will investigate the mechanisms for upstream public engagement.



A uranium glass fruit bowl with the properties of fluorescence and radioactivity.

Please touch

Materials science entered the realms of great art at the Tate Modern in 2006 as part of an EPSRC Partnerships for Public Engagement award.

The invitation to Tate visitors to ignore the usual 'do not touch' advice enabled them to explore the nature of advanced materials at a series of events in several galleries. For example they were able to stand on a thermo-chromic version of Matisse, sit among a virtual gathering of the Surrealists and play a bugle made of lead. A stunningly beautiful 'uranium glass' that glowed was part of the experience.

A future for old age

A public debate with top researchers on how the growing population of older people in the UK can stay independent for longer was held at Cardiff's Techniquest Science Centre in 2006. The event is part of a series of public dialogues by the Royal Institution in partnership with EPSRC.

Three speakers, Professor Roger Orpwood, Bath University, Professor Mark Porter, Loughborough University and Professor Heinz Wolff, Brunel University guided the debate which focussed on issues such as the need to change the mindset of designers to include greater consideration for older users of products and services, and the prospects for future technologies to keep people independent in old age.

Science in Society

EPSRC is also supporting a major public attitudes to science survey, led by the RCUK SIS Unit and funded by the OSI. The largest study of its kind in the UK, it follows up earlier surveys therefore providing longitudinal data as well as an up-to-date report on public views.

Holmes Hines Memorial Fund

This charitable fund, administered by the EPSRC, was set up following a bequest which stated that it should provide annual prizes, scholarships, exhibitions or research grants, the incidental expenses of visiting scientists, the purchase of scientific apparatus and equipment, and funds for 'such other purposes for the advancement of scientific knowledge as the Council shall see fit'. The Holmes Hines Memorial Fund can be used to help individuals or organisations and offers awards for activities relating to science and engineering for which public funds are not available. Although the fund is administered by the EPSRC, awards are not restricted to subjects falling within the EPSRC remit and applications can cover any area of science or engineering.

Examples of awards made during 2006/07:

- funding towards the cost of the Cambridge Hands-On Science (CHaOS) 2006 Roadshow;
- support for students to attend the London International Youth Science Forum;
- funding towards the cost of materials for a school 'Scrapheap Challenge' as part of the National Science Week;
- funding towards the cost of running a school Science and Engineering Showcase;
- funding for equipment for a primary school to expand science opportunities;
- funding towards the cost of workshops and activities to showcase science at the Alnwick Gardens.



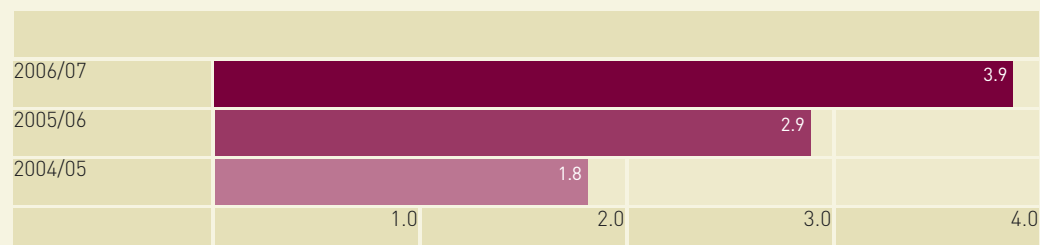
'Body Parts: New for Old' exhibition success

The focal point of the 'Body Parts' exhibition at the Thackray Museum in Leeds is a perspex human showing different joint replacements that are currently available.

Researchers at the Institute of Medical and Biological Engineering (IMBE at the University of Leeds) joined forces with the museum in 2006 to launch an exhibition, 'Body Parts: New for Old', which investigated the science and engineering of replacement body parts. The project was supported by an EPSRC Partnerships for Public Engagement (PPE) grant and sponsored by DePuy International and has been so successful that it has been extended until August 2008.

Science in Society Facts and figures

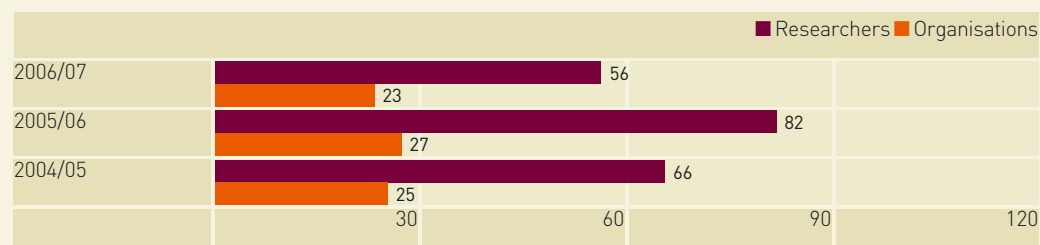
Science in Society Programme expenditure (£m)



Proposals considered and funded

	PROPOSALS CONSIDERED					
	2004/05		2005/06		2006/07	
	Number	Value (£m)	Number	Value (£m)	Number	Value (£m)
Partnerships for Public Engagement	96	7.8	111	9.7	59	7.0
Senior Media Fellow	4	0.4	3	0.3	5	0.6
Engineering Stage Awards	-	-	3	0.5	1	0.3
	PROPOSALS FUNDED					
	2004/05		2005/06		2006/07	
	Number	Value (£m)	Number	Value (£m)	Number	Value (£m)
Partnerships for Public Engagement	33	1.7	31	2.3	27	2.7
Senior Media Fellow	2	0.3	-	-	3	0.4
Engineering Stage Awards	-	-	3	0.5	1	0.3

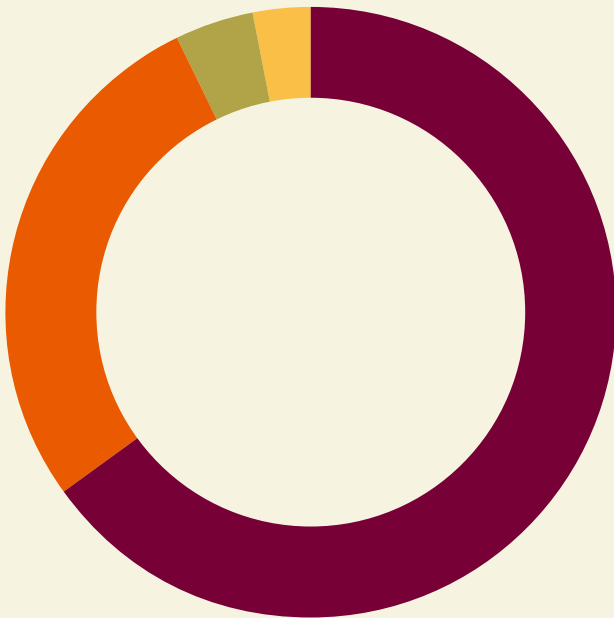
Number of researchers and organisations receiving Science in Society Programme funding by financial year



The data for 2005/06 is now higher than that reported in the 05/06 Annual Report due to the addition of Engineering Stage Awards data.

FACTS AND FIGURES

21.23	+9.32	[1.56%]
20.34	+0.32	[0.32%]
72.20	-0.21	[3.10%]
2,322.00	+3.12	[0.04%]
3.70	-9.33	[0.66%]
7.38	-5.38	[5.29%]
255.27	-7.93	[8.12%]
928.10	+3.03	[0.89%]
38.23	+0.34	[0.93%]
4.23	+0.00	[1.93%]
46.02	-3.23	[1.32%]
47.38	+3.98	[0.32%]
74.32	-3.21	[0.99%]
2,494.87	-0.32	[5.32%]
2.48	+9.73	[0.02%]
332.45	+2.09	[1.87%]
86.39	+3.03	[0.89%]
4.21	+0.34	[0.93%]
132.09	+0.00	[1.93%]
33.83	+2.23	[3.78%]
57.92	-2.23	[1.32%]
23.33	-2.21	[0.73%]
832.98	+3.98	[0.32%]
73.12	+1.32	[2.12%]
833.22	-3.21	[0.99%]
8,212.30	-0.32	[5.32%]
3.00	+9.73	[0.02%]
83.12	+2.09	[1.87%]
63.98	+9.32	[1.56%]
234.22	+0.32	[0.32%]
2.32	-0.21	[3.10%]
24.13	+3.33	[0.32%]
74.75	+0.32	[2.23%]
89.43	+4.10	[1.93%]
92.42	-0.43	[9.83%]
9329.32	+3.03	[0.89%]
23.32	+0.34	[0.93%]
928.10	+0.00	[1.93%]
38.23	+3.23	[3.78%]
4.23	-23.23	[1.32%]
46.02	-29.21	[0.73%]
47.38	+3.98	[0.32%]
74.32	+1.32	[2.12%]
2,494.87	-9.21	[0.99%]
74.35	-0.32	[5.32%]



EPSRC expenditure by category (%)

	%
Research grants	65
Postgraduate training and fellowship awards	28
Administration and restructuring	4
CCLRC and other non-ticketed domestic facilities	3



EPSRC research grant commitment by programme (£m)

	£m
Chemistry	51.7
Engineering	96.8
Information and Communications Technologies	87.2
Infrastructure and Environment	12.9
Innovative Manufacturing	82.2
Life Sciences Interface	31.2
Materials	52.6
Mathematical Sciences	21.5
Physics	49.2
Energy (Includes TSEC)	41.2
Core e-Science	2.7
Basic Technology	28.6
Other activities (Includes PEP of £4.231m)	63.7
	621.5

Summary

Research grant investment by Programme

Research grant proposals considered and funded

Financial year 2006/07	Proposals considered ¹		Proposals funded		% funded	
	Number	Value (£m)	Number	Value (£m)	Number	Value (£m)
EPSRC core programme						
Engineering	1,131	327.2	313	91.2	28%	28%
Innovative Manufacturing	35	84.8	17	79.5	49%	94%
Infrastructure and Environment	44	22.3	21	9.2	48%	41%
Mathematical Sciences	259	43.6	108	18.2	42%	42%
Physics	324	112.0	124	46.6	38%	42%
Chemistry	598	158.1	193	49.2	32%	31%
Materials	630	197.8	156	53.2	25%	27%
Information and Communications Technologies	809	250.9	256	84.6	32%	34%
Life Sciences Interface	181	42.3	64	14.8	35%	35%
Total	4,011	1,239.0	1,252	446.5	31%	36%

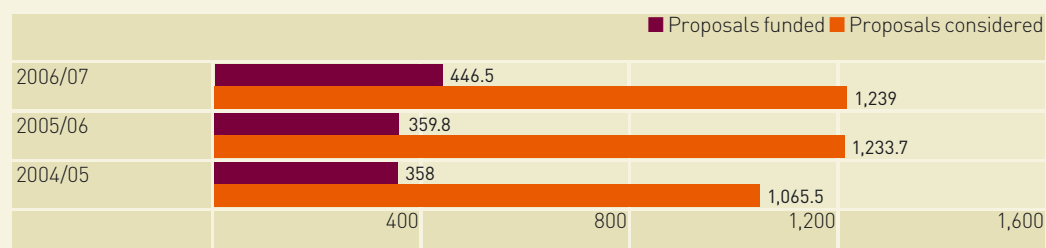
EPSRC core programme	Grant funding	Funding from other sources ²	Non grant funding ³	Net programme totals		
	Value (£m)	Value (£m)	Value (£m)	(2004/05)	(2005/06)	2006/07
Engineering	91.2	(1.1)	6.7	81.5	77.7	96.8
Innovative Manufacturing	79.5	(0.2)	2.9	23.4	15.6	82.2
Infrastructure and Environment	9.2	(0.4)	4.1	24.9	8.2	12.9
Mathematical Sciences	18.2	-	3.3	16.2	16.4	21.5
Physics	46.6	(0.1)	2.7	39.1	38.2	49.2
Chemistry	49.2	(0.4)	2.9	42.7	48.2	51.7
Materials	53.2	(0.8)	0.2	47.4	47.4	52.6
Information and Communications Technologies	84.6	(2.6)	5.2	80.4	88.8	87.2
Life Sciences Interface	14.8	(1.3)	17.7	28.2	26.9	31.2
Total	446.5	(6.9)	45.7	383.8	367.4	485.3
Joint programmes with other Research Councils						
Core e-Science				3.1	16.7	2.7
Basic Technology				26.5	30.7	28.6
Energy				-	26.3	41.2
Total				29.6	73.7	72.5
Other activities (including Public Engagement, Crime Prevention, Complexity, IDEAS Factory, Science and Innovation Awards)				21.7	49.5	63.7
Grand total				435.1	490.6	621.5

1 ie on which a final decision was made between 1st April 2006 and 31st March 2007.

2 Co-funding from other organisations e.g. Defence Science & Technology Laboratory (Dstl), Ministry of Defence (MoD), other Research Councils.

3 e.g. LSI Doctoral Training Centres, Research Chairs, Post Doctoral Research Fellows.

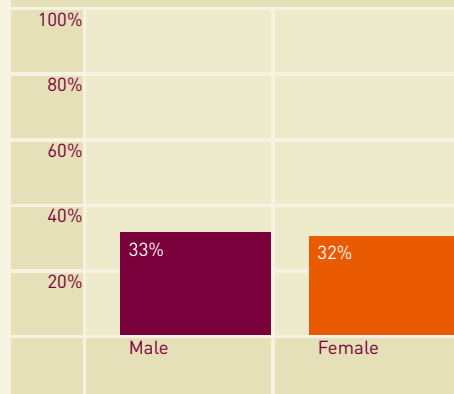
Value of grant proposals in EPSRC core programmes considered and funded (£m)



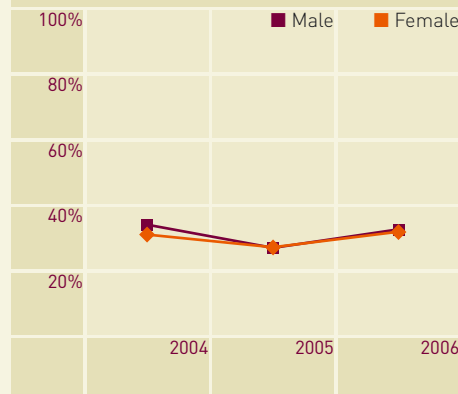
Summary

Success rates - by gender

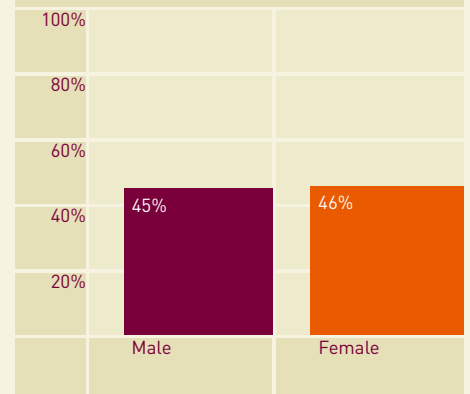
Standard research grants awarded 2006



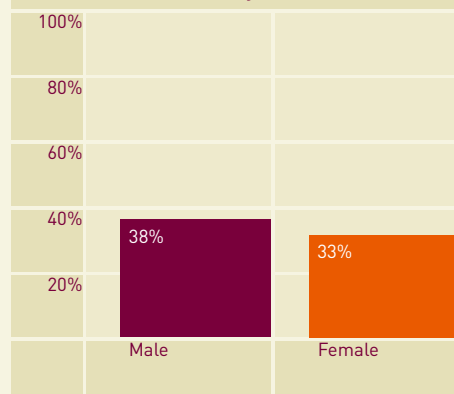
Standard research grants awarded between 2004 and 2006



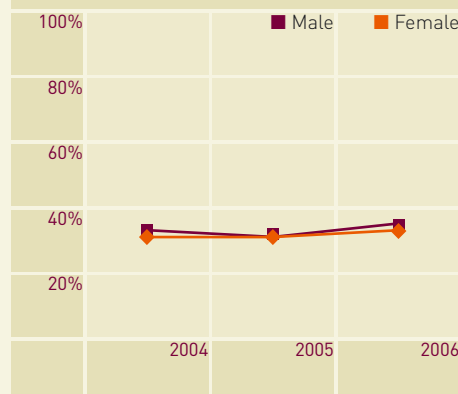
First Grant Scheme grants awarded in 2006



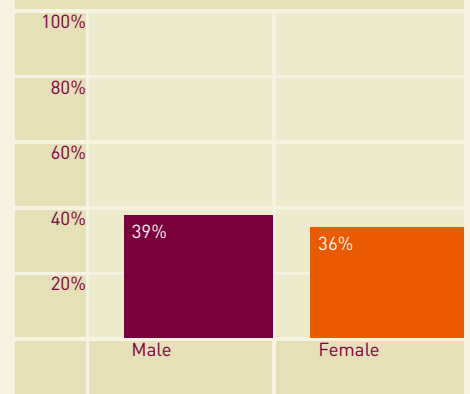
Research grants awarded to young researchers (under 35 years) 2006



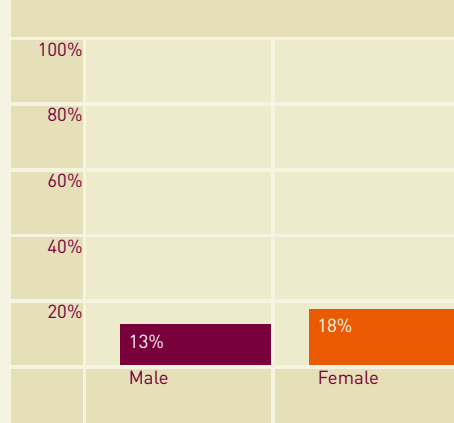
Research grants awarded to young researchers between 2004 and 2006



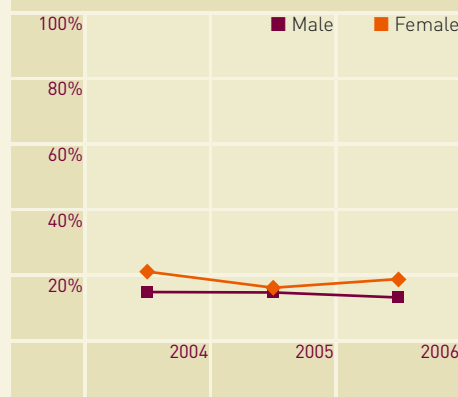
Partnerships for Public Awareness Awards (PPA) awarded in 2006



Advanced Fellows awarded 2006



Advanced Fellowships awarded between 2004 and 2006



Data is by calendar year

Ethnic origin of research grant Principal Investigators - where known (%)

	2004	2005	2006
Asian and Asian British	3.2	3.1	2.5
Black and Black British	0.5	0.2	0.2
Chinese or other	5.0	4.9	5.7
Mixed	0.5	0.5	0.9
Not disclosed	3.7	4.6	5.4
Unknown	2.2	2.0	2.4
White	84.9	84.7	82.9

Corporate Activities

The Engineering and Physical Sciences Research Council (EPSRC) was established by Royal Charter on 16 December 1993 and began operations on 1st April 1994. The EPSRC inherited part of the programme previously funded by the Science and Engineering Research Council (SERC).

The EPSRC receives its principal funding through the Grant in Aid from the Office of Science and Innovation (OSI). The amount received in 2006/07 was £637 million (2005/06 £555 million). Income was also received from other Research Councils, Government Departments and other bodies.

The Accounts have been prepared in accordance with the Science and Technology Act 1965 and the Secretary of State for Trade and Industry directions made thereunder.

Mission

The mission of the EPSRC as set out in the 1993 Government White Paper on Science, Engineering and Technology 'Realising our Potential' is:

“to promote and support high quality basic, strategic and applied research and related postgraduate training in engineering and the physical sciences (Chemistry, Physics and Mathematics), placing special emphasis on meeting the needs of the users of its research and training outputs, thereby enhancing the United Kingdom’s industrial competitiveness and quality of life”.

The EPSRC’s **objectives**, as defined in its Charter, are:

- a) to promote and support high quality basic, strategic and applied research and related post-graduate training in engineering and the physical sciences;
- b) to advance knowledge and technology and provide trained scientists and engineers to meet the needs of users and beneficiaries (including the chemical, communications, construction, electrical, electronic engineering, information technology, pharmaceutical, process and other industries), thereby contributing to the economic competitiveness of the United Kingdom and the quality of life of its citizens; and
- c) to provide advice, disseminate knowledge and promote public understanding in the fields of engineering and the physical sciences.

Review of the year

The Statement of Net Expenditure records net expenditure after reversal of cost of capital for the year of £654.9m (2005/06 £569.3m, restated). There was an increase in expenditure on research grants, with annual expenditure totalling £422.6m (2005/06 £366.1m) and an increase in expenditure on postgraduate and fellowship awards, with annual expenditure of £186.3m (2005/06 £159.1m).

During the year the EPSRC paid a total of £8k to the Consolidated Fund (2005/06 £5k).

Transfers to and from reserves are shown in Note 21 to the Accounts.

Full details of the activities in the year and future plans are shown in the Management Commentary.

We report on the extent we are exposed to financial risks in Note 2 to the Financial Statements.

The EPSRC’s status as a going concern is considered in Note 1b.

Research and development

As an organisation wholly engaged in research, the EPSRC does not classify research and development separately in the Accounts.

Payment policy

In accordance with Government guidelines, it is the policy of the EPSRC to seek to comply with the CBI Prompt Payers’ Guide that states that commercial invoices should be paid within 30 days of the presentation of a valid demand for payment.

During 2006/07 the majority of payments by the EPSRC were made to predetermined scheduled dates. Payment of commercial invoices, as defined by the CBI, was monitored throughout the year and 96% of those invoices were paid within 30 days of receipt.

The remittance advice, which accompanies payable orders, gives a point of contact within Finance for queries or complaints from suppliers on payment performance. No complaints, under the terms of the CBI code, were received during the reporting year.

In November 1998, the Late Payment of Commercial Debts (Interest) Act came into force, providing small businesses with a statutory right to claim interest from large businesses (and all public sector bodies) on payments that are more than 30 days overdue. Amended legislation (the Late Payment of Commercial Debts Regulations 2002) came into force on 7th August 2002 providing all businesses, irrespective of size, with the right to claim statutory interest for the late payment of commercial debts. One claim was received during the reporting year.

Details of the Prompt Payers’ Guide can be found at www.payontime.co.uk

Corporate Activities

Resource Audit Committee

The Resource Audit Committee (RAC) includes three members of Council together with other members from the commercial and academic communities. RAC meets three times a year to review corporate governance, risk management, internal and external audit matters, efficiency and the Council's Accounts.

Equality of opportunity

The EPSRC has a policy of non-discrimination against people on the grounds of gender, age, religion, religious beliefs, disability, race or sexual orientation. This applies in recruitment, training, promotion and to all aspects of employment within EPSRC. All relevant EPSRC policies have been reviewed in the light of the new age legislation to ensure they contain no age discrimination. The EPSRC will shortly publish its Race, Disability and Gender Equality Schemes.

EPSRC gained accreditation as a Disability Symbol user in 2004 approved under the scheme operated by the Employment Service. An EPSRC Equal Opportunities report was produced during the year for senior management.

EPSRC continues to be a member of the Research Councils' Equality and Diversity Advisory Group.

Learning and Development (L&D)

EPSRC continues to invest in L&D and is currently preparing for reaccreditation of Investors in People in November 2007.

In addition, the induction and evaluation policy and processes have been reviewed and improvements have been made.

The L&D Co-ordinator group (with representatives from each Directorate) has reviewed the L&D policy and processes to bring more emphasis on L&D activities.

A People Management Model has been created to help all EPSRC line managers. It outlines key responsibilities and attributes associated with managing people.

Health and safety

The EPSRC complies with all relevant legislation and regulations concerning health and safety at work. Comprehensive programmes of inspections, tests, risk assessments and training are carried out to ensure that safe and healthy working conditions are provided for all employees.

Employee involvement

Employee involvement in management and policy matters has continued through meetings between management, staff and the trade unions.

The Joint Pay Committee agreed the 2006 pay award which also introduced a restructured pay system with effect from 1 April 2007. This pay system has been designed to meet the future strategic aims of the Council and to facilitate pay convergence as well as addressing issues surrounding equal pay and age discrimination legislation.

Environmental policy

The Research Councils are committed, both individually and collectively, to adopting and promoting environmental good practice in all their operations. We have identified a number of operational areas where environmental good practice is important to us. To achieve those objectives, the Research Councils recognise that they must have a good understanding of the environmental impacts of their operations, and must develop realistic objectives and targets for the reduction of any adverse impacts.

Auditors

The Accounts of the EPSRC are audited by the Comptroller and Auditor General under the terms of Paragraph 3(3) of Schedule 1 of the Science and Technology Act 1965. The cost of the statutory audit in 2006/07 was estimated to be £43k (2005/06 £39k). There was no auditor remuneration for non-audit work.

So far as the Accounting Officer is aware, there is no relevant audit information of which the EPSRC's auditors are unaware. The Accounting Officer has taken all the steps that he ought to have taken to make himself aware of any relevant audit information and to establish that EPSRC's auditors are aware of that information.

Corporate Activities

Council Membership

Professor Dame Julia Higgins FRS, FREng Chair	Imperial College London
Professor Sir John O'Reilly FREng Chief Executive and Deputy Chair (until 26th November 2006)	Engineering and Physical Sciences Research Council
Dr R W Richards Interim Chief Executive (from 27th November 2006)	Engineering and Physical Sciences Research Council
Professor Sir Roy Anderson FRS	Ministry of Defence
Professor JS Archer CBE, FREng, FRSE (Until 30th September 2006)	Independent
Professor J N Chapman FRSE	University of Glasgow
Dr D A Clarke	Rolls-Royce plc
Professor L F Gladden OBE, FRS, FREng	University of Cambridge
Dr C R Harrison	Independent
Mr D Hendon CBE, FREng (From 1st September 2006)	Department of Trade and Industry
Dr A J Herbert CEng	Microsoft Research Ltd
Dr S E Ion OBE, FREng	Independent
Mr D Jordan CBE, CEng, FIEE, FCMA	Independent
Dr M Roberts (From 1st March 2007)	Guidance Ltd
Mr D Rutherford	Independent
Professor C M Snowden FRS FREng	University of Surrey
Professor M J Taylor FRS	University of Manchester
Professor WA Wakeham FREng	University of Southampton
Professor Lord Robert Winston (From 1st March 2007)	Imperial College London

In attendance: Professor EB Martin as Chair of the Technical Opportunities Panel
OSI Representative: Mr J Neilson

Corporate Activities

Technical Opportunites Panel
(TOP) Membership

Professor E B Martin FRSS, FICChemE, CEng Chair	University of Newcastle Upon Tyne
Professor B Cantor, FREng	University of York
Professor J Fisher	University of Leeds
Professor L F Gladden, OBE, FRS FREng	University of Cambridge
Professor J McDonald FREng	University of Strathclyde
Professor D A Rand	University of Warwick
Professor T Rodden FRSC	University of Nottingham
Professor M Sarhadi	Brunel University
Professor R H Templer, FRSC	Imperial College London
Professor H Thomas FICE, CEng	Cardiff University
Professor D Tildesley	Unilever Research
Professor I Walmsley	University of Oxford
Professor P Withers, FREng	University of Manchester

User Panel
(UP) Membership

Dr DA Clarke Chair	Rolls-Royce plc
Dr J Allis	GE Healthcare
Dr J Cooper	National Grid
Professor P Gregson FREng, CEng	Queen's University Belfast
Professor A Grieve	Pfizer
Dr A M Hodge MBE, FIEE, CEng	QinetiQ
Dr C H Luebkeman	Ove Arup & Partners
Dr WA MacDonald	DuPont Teijin Films
Mr C Mottershead	British Petroleum
Dr D W Prest	Johnson Matthey
Dr D Watson	IBM UK Labs Ltd
Mr D J Way CEng	Department of Trade and Industry
Mr D Wright	Manufacturing Advisory Service, West Midlands
Mr S Wright	BT Group

Societal Issues Panel
(SIP) Membership

Professor Lord Robert Winston Chair	Imperial College London
Dr D Bruce	Church of Scotland
Professor D Burke, CBE	Independent
Professor R Jones (From March 2007)	University of Sheffield
Mr D Jordan CBE, CEng, FIEE, FCMA	Independent
Professor G Laycock	University College London
Professor J Petts	University of Birmingham
Baroness Onora O'Neill, CBE	The British Academy
Professor K Sykes	University of Bristol

Resource Audit Committee
(RAC) Membership

Professor W A Wakeham, FREng Chair	University of Southampton
Mr S Buckingham	Lloyds TSB
Professor J N Chapman FRSE	University of Glasgow
Mr A Neal	Lancaster University
Mr D Rutherford	Independent

Corporate Activities

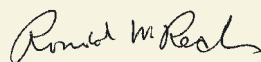
EPSRC Council Members' Register of Interests

Name	University interest	Industry interest	Other Government departments	Other
Professor Sir Roy Anderson, Ministry of Defence	Imperial College, London London School of Hygiene and Tropical Medicine	None	Chief Scientific Officer, Ministry of Defence	None
Professor J Archer, Independent (to 30 September 2006)	Heriot-Watt University	None	MTD	SEEL (Scottish Enterprise Edinburgh & Lothians) Member of Advisory Board, ITI Energy
Professor J Chapman, University of Glasgow	University of Glasgow	Research collaborations with Seagate, Philips and Siemens	DTI Link Assessor	Fellow of the Royal Society of Edinburgh Fellow of the Institute of Physics Senior Member of the IEEE
Dr D Clarke, Rolls-Royce plc	Visiting Professor in Engineering – Strathclyde University Industrial Advisory Boards: Surrey – Engineering Manchester – Mechanical & Aero Engineering Imperial College – Electrical Engineering Steering Committees – Manchester/Strathclyde DTI Distributed Generation Centre NATEC	Policy definition – Rolls-Royce University Technology Centres Industrial advisory board – Diamond Synchrotron source	None	None
Professor L Gladden, Cambridge University	Cambridge University	Unilever (Consultant) Johnson Matthey (major sponsor) Schlumberger (major sponsor)	None	National Physical Laboratory (member of NPL Royal Society/Royal Academy of Engineering Advisory Group to NPL)
Dr C Harrison, Independent	Newcastle University Molecular Engineering Advisory Board	Shareholdings in Imperial Chemical Industries plc, Astra Zeneca plc	Member of the DTI Innovation Stakeholder Group	Non-Executive Director of the Centre for Process Innovation, Chair of the Chemistry Innovation Knowledge Transfer Network
Mr D Hendon, DTI (from 1 September 2006)	None	None	Director Business Relations DTI (full-time employee)	Trustee, Radio Communications Foundation Member, Institute of Engineering & Technology Communications Sector
Dr A Herbert, Microsoft	Member 2008 RAE Assessment Panel for Computer Science & Information Technology	Managing Director, Microsoft Research Ltd Non-executive board member, Skinkers Ltd Non-executive board member, Cambridge Network Non-executive board member, Greater Cambridgeshire Partnership	Member 'Information Security Board' Defence Scientific Advisory Committee	Panel Member UK Computer Science Research Committee
Professor Dame Julia Higgins, Imperial College London	Imperial College London	Board member of Lonza	None	Royal Society: Vice-President, Trustee & Foreign Secretary Trustee of the National Gallery
Dr S Ion, Independent	University of Manchester – Potential recipient of EPSRC grants and other awards	BNFL & NNC – Potential receipt of EPSRC CASE awards or other funds	Council for Science and Technology – Policy Issues	Royal Academy of Engineering – Potential link with EPSRC awards and policy
Mr D Jordan, Independent	None	None	None	None

Corporate Activities

EPSRC Council Members' Register of Interests

Name	University interest	Industry interest	Other Government departments	Other
Professor Sir John O'Reilly, Chief Executive, EPSRC (to 26 November 2006)	University College London (leave of absence) Chairman of Board of CAST (Centre for Advanced Software Technology) Ltd Associated with University of Wales, Bangor Now at Cranfield University	None	Chair of the UK Network Interoperability Consultative Committee (NICC) for Ofcom	Past President, Council Member, Fellow and Trustee of IEE Fellow of Royal Academy of Engineering Fellow of Institute of Physics Fellow of the British Computer Society
Dr R Richards, Interim Chief Executive, EPSRC (from 27 November 06)	None	None	Scientific Advisory Council of DEFRA	Technology and Industrial Advisory Group of Plastic Electronics Technology Centre (PETeC) Strategic innovation Board of the Chemical Innovation Knowledge Transfer Network
Dr M Roberts, Guidance Ltd (from 1 March 2007)	Guidance have collaborations with Oxford University & Liverpool University	Managing Director of Guidance Ltd Managing Director of Guidance Monitoring Ltd Managing Director of Guidance Navigation Ltd Guidance Navigation Ltd have collaboration with QinetiQ	Guidance Monitoring Ltd have RDA award (East Midlands)	None
Mr D Rutherford, Independent	Strathclyde University – Visiting lecturer	Scottish Power shareholder	None	None
Professor C Snowden, University of Surrey	Vice-Chancellor	Intense Ltd – Non-executive Director Filtronic Plc – Part-time executive (Corporate Advisor)	None	None
Professor M Taylor, UMIST		None	None	Vice-President and Physical Secretary of the Royal Society
Professor W Wakeham, University of Southampton	Vice-Chancellor (£170,000) Universities & Colleges Employers Association – Board Member Southampton University Development Trust – Trustee Worldwide University Network Group – Board Member Worldwide University Network Trading – Board Member Worldwide University Network Foundation – Trustee Research Collaboration (CASE Award) Schlumberger Cambridge Research	Meridian TV Plc – non- executive director (£10,000) COGENT – non-executive director Southampton Asset Management Ltd – director	South East England Development Agency – director (£7,931)	Southampton and Fareham Chamber of Commerce – Board Member Higher Education South East – Board Member
Professor Lord R Winston, Imperial College London (from 1 March 2007)	Emeritus Professor of Fertility studies, Imperial College Director of Atazoa Ltd – a University spin out company involved in transgenic research	None	None	Trustee of Stem Cell Foundation



Dr Randal Richards Accounting Officer
18th June 2007

Remuneration Report

Remuneration policy

The remuneration of the Chief Executive of EPSRC is decided by a Remuneration Panel chaired by the Director General of Science and Innovation and approved by the DTI Permanent Secretary.

EPSRC's Council has established a Remuneration Committee to assess, annually, the individual performance of the EPSRC Directors, and decide, in the light of these assessments, the remuneration they shall receive. The Committee members are the Chair of EPSRC, Chair of the Resource Audit Committee and EPSRC's Chief Executive.

The remuneration of members of EPSRC's Council is reviewed annually by the Office of Science and Innovation. Details of the service contracts of the Chief Executive and Directors are given in the table below.

Directors do not have any specific contractual rights for compensation on termination of their contract as a Director.

	Contract start date	Contract end date	Notice period
Professor Sir John O'Reilly, Chief Executive (to 26 November 2006)	1 October 2001	26 November 2006 resignation	3 months
Dr R Richards, Director (to 26 November 2006), Interim Chief Executive (from 27 November 2006)	Temporary contract from 27 November 2006	26 November 2007 or until replacement is appointed	3 months
Mrs C Coates, Director	Permanent Contract	-	3 months
Mr A Emecz, Director	Permanent Contract	-	3 months
Dr L Thompson, Director (from 27 November 2006)	Temporary contract from 27 November 2006	26 November 2007	3 months
Mr S Ward, Director	Permanent Contract	-	3 months

Remuneration Report

Audited information**Salary and pension entitlements**

The following section provides details of the remuneration and pension interests of the Chief Executive, Directors and EPSRC Council Members.

Remuneration

	2006-07 Salary £k (a)	2006-07 Performance related bonus (b)	2005-06 Salary £k (a)	2005-06 Performance related bonus (b)
Chief Executive and Directors				
Professor Sir John O'Reilly, Chief Executive (to 26 November 2006)	120-125	to be decided	115-120	15-20
Dr R Richards, Director (to 26 November 2006), Interim Chief Executive (from 27 November 2006)	100-105	to be decided	75-80	0-5
Mrs C Coates, Director	70-75	to be decided	65-70	0-5
Mr A Emecz, Director	55-60	to be decided	50-55	0-5
Dr L Thompson, Director (from 27 November 2006)	50-55	to be decided	-	-
Mr S Ward, Director	75-80	to be decided	70-75	0-5

(a) 'Salary' is per full year equivalent, includes gross salary; overtime; recruitment and retention allowances and any other allowance to the extent that it is subject to UK taxation.

(b) Performance related bonuses are determined by the Remuneration Committee on an annual basis. In the case of the Chief Executive, it is decided by a Remuneration Panel chaired by the Director General of the Research Councils and approved by the DTI Permanent Secretary.

(c) There were no benefits in kind during either 2005/06 or 2006/07.

(d) The average annual earnings increase for these members of staff was 12%.

Remuneration Report

Pension benefits

A Cash Equivalent Transfer Value (CETV) is the actuarially assessed capitalised value of the pension scheme benefits accrued by a member at a particular point in time. The pension figures shown relate to the benefits that the individual has accrued as a consequence of their total membership of the pension scheme, not just their service in a senior capacity.

The real increase in CETV reflects the increase in CETV effectively funded by the employer. It takes account of the increase in accrued pension due to inflation, contributions paid by the employee (including the value of any benefits transferred from another pension scheme or arrangement) and uses common market valuation factors for the start and end of the period.

	Prof. Sir John O'Reilly Chief Executive (to 26.11.06)	Dr R Richards Director (to 26.11.06) Interim Chief Exec (from 27.11.06)	Mrs C Coates Director	Mr A Emecz Director	Dr L Thompson Director (from 27.11.06)	Mr S Ward Director
	£'000	£'000	£'000	£'000	£'000	£'000
Chief Executive and Directors						
Accrued pension at age 60 as at 31.03.07 or at date of leaving	5-10 plus 20-25 lump sum	35-40	20-25 plus 70-75 lump sum	10-15 plus 35-40 lump sum	15-20	30-35 plus 100-105 lump sum
Real increase in pension at age 60	0-5 plus 0-5 lump sum	0-5	0-5 plus 5-10 lump sum	0-5 plus 0-5 lump sum	0-5	0-5 plus 0-5 lump sum
CETV at 31.03.07 or at date of leaving	162	773	476	167	264	780
CETV at 31.03.06	139	700	426	156	259	743
Real increase in CETV	20	38	36	9	1	31

The Research Councils' Pension Schemes (RCPS), of which most of the Council's employees are members, are unfunded multi-employer defined benefit schemes, but EPSRC is unable to identify its share of the underlying assets and liabilities. A full actuarial valuation was carried out at 31st March 2002 and details can be found in the Research Councils' Pension Schemes Account at www.bbsrc.ac.uk. An actuarial valuation as at 31st March 2006 is being completed and the report is expected to be available by August 2007. Financial information is made available through the Research Councils' Joint Superannuation Scheme.

For 2006/07, normal employers' contributions of £1,678,256 were payable to the RCPS (2005/06 £1,652,129) at a rate of 21.3% (2005/06 21.3%). Employer contributions are to be reviewed every four years following a full scheme valuation by the Government Actuary. The contribution rates reflect benefits as they are accrued, not when the costs are actually incurred, and reflect past experience of the scheme.

No members of the RCPS retired on ill-health grounds during 2006/07.

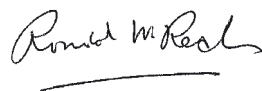
Remuneration Report

Council Members' remuneration

The Chairperson and the Council Members are appointed by the Office of Science and Innovation (OSI) on behalf of the Secretary of State for Trade and Industry. The contract terms vary between individual members, but the terms and conditions of appointment are standard. EPSRC provides each member of Council with a Code of Practice which sets out a framework in which they are expected to operate.

Council Members receive an honorarium in recognition of their service to EPSRC, together with a refund of their reasonable expenses. Council Members are not employees of EPSRC and the appointments are not pensionable. Members of Council who are civil servants are not entitled to receive an honorarium.

Remuneration	2006-07 £	2005-06 £
Professor Dame Julia Higgins FRS, FREng – Chairperson	15,275	14,900
Professor Sir Roy Anderson FRS	–	–
Professor J Archer CBE, FREng (to 30 September 2006)	3,140	6,200
Professor J N Chapman FRSE	6,345	6,200
Dr D Clarke	8,455	–
Professor A P Dowling CBE, FREng, FRS (to 31 March 2006)	–	8,265
Professor S E Gibson (to 31 March 2006)	–	6,200
Professor L Gladden OBE, FRS, FREng	6,345	–
Dr D Grant CBE, FREng (to 31 March 2006)	–	6,200
Dr C Harrison	6,345	6,200
Mr D Hendon CBE, FREng (from 1 September 2006)	–	–
Dr A Herbert CEng	6,345	–
Mr D Hughes, FREng (to 31 March 2006)	–	–
Dr S Ion OBE, FREng	6,345	6,200
Mr D Jordan CBE, CEng, FIEE, FCMA	6,345	6,200
Mrs J A G Kennedy OBE, FREng (to 31 March 2006)	–	8,265
Mr J N Loughhead (to 30 September 2005)	–	4,080
Dr M Roberts (from 1 March 2007)	–	–
Mr D Rutherford	6,345	–
Professor C Snowden	6,345	–
Professor M Taylor FRS	6,345	6,200
Professor W A Wakeham FREng	8,455	6,200
Professor Lord Robert Winston (from 1 March 2007)	–	–



Dr Randal Richards Accounting Officer
18th June 2007

Statement of Account

Statement of the responsibilities of the Engineering and Physical Sciences Research Council and of its Chief Executive with respect to the Financial Statements

Under Paragraph 3 of Schedule 1 to the Science and Technology Act 1965, the Secretary of State for Trade and Industry has directed the EPSRC to prepare for each financial year a Statement of Accounts in the form and on the basis set out in the Accounts Direction. The Accounts are prepared on an accruals basis and must give a true and fair view of the state of affairs of the EPSRC and of its income and expenditure, recognised gains and losses and cash flows for the financial year.

In preparing the Accounts the Accounting Officer is required to comply with the requirements of the *Government Financial Reporting Manual* and in particular to:

- observe the Accounts Direction issued by the Secretary of State for Trade and Industry, including the relevant accounting and disclosure requirements, and apply suitable accounting policies on a consistent basis;
- make judgements and estimates on a reasonable basis;
- state whether applicable accounting standards as set out in the *Government Financial Reporting Manual* have been followed, and disclose and explain any material departures in the financial statements; and
- prepare the financial statements on a going concern basis.

The Secretary of State has appointed the Chief Executive as the Accounting Officer for the EPSRC. The responsibilities of an Accounting Officer, including responsibility for the propriety and regularity of the public finances for which the Accounting Officer is answerable, for keeping proper records and for safeguarding the EPSRC's assets, are set out in the Accounting Officers' Memorandum, issued by HM Treasury and published in *Government Accounting*.

Accounting Officer's
Statement on Internal
Control

1. Scope of responsibility

As Accounting Officer, I have responsibility for maintaining a sound system of internal control that supports the achievement of the EPSRC's policies, aims and objectives, whilst safeguarding the public funds and organisational assets for which I am personally responsible, in accordance with the responsibilities assigned to me and described in *Government Accounting*.

2. The purpose of the system of internal control

The system of internal control is designed to manage risk to a reasonable level rather than to eliminate all risk of failure to achieve policies, aims and objectives. It can therefore only provide reasonable and not absolute assurance of effectiveness. The system of internal control is based on an ongoing process designed to identify and prioritise the risks to the achievement of organisational policies, aims and objectives, to evaluate the likelihood of those risks being realised and the impact should they be realised, and manage them efficiently, effectively and economically. The system of internal control has been in place in the EPSRC for the year ended 31st March 2007 and up to the date of approval of the annual report and accounts, and accords with Treasury guidance.

3. Capacity to handle risk

Executive Management Group

The Executive Management Group (EMG), comprising the Chief Executive and the four Directors, is the executive body for the EPSRC, providing top-level leadership and guidance on risk management issues. EMG has agreed a corporate risk management policy. EMG regularly considers risk matters, and reviews the corporate and Directorate risk registers for changes in risk status and for issues requiring consideration and action. Business-critical projects are reviewed at least every three months and, should problems arise, EMG will consider appropriate actions at one of its twice-monthly meetings.

Business Assurance

The Head of Finance is responsible for the business assurance function within the EPSRC, including the co-ordination of risk management activities. These activities include: maintaining the Performance and Risk Management (PRM) System; maintaining the corporate risk register; providing advice and guidance to Directorates; ensuring that Directorate risk registers are kept up-to-date; obtaining quarterly business-critical project progress reports and providing these to EMG; and liaising with internal audit on its audit activities.

Performance and Risk Management Project

EPSRC implemented the Performance and Risk Management (PRM) System from 1st April 2006. PRM is based on the balanced scorecard model and brings together performance measures, actions and risk under EPSRC objectives.

Management of risk

EPSRC plans to introduce a new risk initiative based on the Office of Government Commerce Management of Risk (MoR) approach from 1st April 2007. This is a structured approach based on nine key processes for embedding risk in an organisation.

Staff training

All staff undergo an induction process that involves a risk awareness element, familiarising them with the need for risk management activities within the Council. During the financial year 2007/08, mandatory seminars on risk management will be held for all staff. Further seminars will be held for the owners of risks and of mitigation plans, providing them with training on how to identify, evaluate, monitor and control risks.

The EPSRC risk register is accessible to all staff through the PRM intranet site. Other documents, such as the EPSRC risk policy, once finalised, will be linked to PRM. The *Research Councils' Internal Audit Service Good Practice Bulletin on Risk Management* is also available for guidance.

Any staff requiring more information than is described above have available two options. The Head of Performance and Risk Management can provide relevant advice and guidance. If it is decided, by a line manager or Director, that an individual requires formal training in risk management, perhaps as a result of having responsibility for one or more major risks, then this can be undertaken. Adequate resources are provided to allow for staff training, and Directorate Learning and Development Co-ordinators are able to find appropriate courses with external providers.

Statement of Account

Good practice

The Research Councils' Internal Audit Service (RCIAS) regularly carries out audits relevant to the Councils' risk management activities. In 2006/07 relevant audits were carried out for business critical projects, the Performance and Risk Management system, Delegated Authority, and the use of the Government Procurement Card. Final reports have been received for these audits, and issues have been brought to the attention of EPSRC staff. There were no significant issues raised by RCIAS during 2006/07.

Relationships

EPSRC works closely with the Director General of Science and Innovation (DGSi) both in terms of strategic decisions and also in terms of our accountability for the stewardship of public funds. We also work closely with Research Councils UK (RCUK), a strategic partnership of the seven Research Councils, through which we discuss common issues and share best practice.

4. The risk and control framework

The Council of the EPSRC

The Council of the EPSRC has a responsibility to ensure that high standards of corporate governance are observed at all times. Council periodically receives information about risk management. It also receives a report at each meeting and an annual report from the Resource Audit Committee, which includes comment on risk management and business critical projects. Council has responsibility for decisions on major capital projects, after having reviewed the business case and the risks involved in the venture.

Directors and Directorates

EMG delegates responsibility for each of the corporate risks to one or more of the Directors. Each Director bears a responsibility for these and the risks associated with his/her Directorate's activities. A Director may choose to delegate responsibility for the day-to-day management of risk and associated mitigation or contingency plans to a member of the Directorate staff. Directors and relevant staff regularly review the Directorate risks: for new elements to a risk; for changes in status (changes in the likelihood of occurrence or in the impact that would be felt should the risk be realised) as a result of factors internal or external to the Council; for progress in mitigating risks; to determine whether or not the existing controls are adequate; and to determine whether further actions are required. Proposed projects or initiatives are considered at an early stage to assess risk management and to determine the balance of benefits and risks. The Director or delegated member of staff responsible will then make a decision on whether or not to proceed, or will seek a decision from EMG.

Each Directorate has an individual responsible for co-ordinating risk management activities.

The Resource Audit Committee

The Resource Audit Committee (RAC) is a committee of Council tasked with monitoring standards of internal control and propriety, economy, efficiency and effectiveness, and for evaluating the extent to which systems and procedures are appropriate to allow the EPSRC's objectives to be met. The Resource Audit Committee's responsibilities include: examining the manner in which management ensures and monitors the adequacy of the nature, extent and effectiveness of internal control systems, paying particular attention to risks and contingency plans on all business-critical projects; and monitoring the nature and scope of the work of Internal Audit. RAC receives information and advice from the National Audit Office and from external audit, currently KPMG. RAC makes recommendations to EMG and reports to Council following its meetings.

Research Councils' Internal Audit Service

The Research Councils' Internal Audit Service (RCIAS) and EMG work together to agree the range of audits to be carried out each year. The Resource Audit Committee confirms the annual audit plan. The report of this audit is used by EMG in its decision-making on what actions are necessary to maintain high standards in the EPSRC's corporate governance and risk management procedures.

In addition to the advice resulting from audits, Internal Audit guidance is welcomed as a source of updated best practice.

Statement of Account

Controls

EPSRC has in place a system of controls which includes:

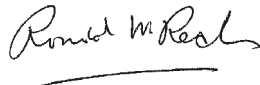
- annual Directors' Internal Control Statements;
- a programme of visits by officials to Higher Education Institutions and office-based tests which seek assurance that research grant funds are used for the purpose for which they are given and that grants are managed in accordance with the terms and conditions under which they are awarded;
- ongoing review of risks and the necessary resulting actions;
- responsibility for managing risks delegated to the appropriate level within the organisation;
- regular management review of risks and business-critical projects;
- regular external review of risk management procedures.

EPSRC currently has two projects designated as business critical – the procurement of the next generation UK high performance computer service, and the Research Councils' Shared Service Centre project.

5. Review of effectiveness

As Accounting Officer I have responsibility for reviewing the effectiveness of the system of internal control. My review of the effectiveness of the system of internal control is informed by the work of the internal auditors and the executive managers within the EPSRC who have responsibility for the development and maintenance of the internal control framework, and comments made by the external auditors in their Management Letter and other reports. I have been advised on the implications of the result of my review of the effectiveness of the system of internal control by the Council and the Resource Audit Committee, and a plan to address weaknesses and ensure continuous improvement of the system is in place.

The internal control system provides confidence that the risk is managed to a reasonable level and I can provide assurance that it supports the achievement of the EPSRC's policies, aims and objectives.



Dr Randal Richards Accounting Officer
18th June 2007

Statement of Account

The Certificate and Report of the Comptroller and Auditor General to the Houses of Parliament

I certify that I have audited the financial statements of the Engineering and Physical Sciences Research Council for the year ended 31 March 2007 under the Science and Technology Act 1965. These comprise the Statement of Net Expenditure, the Balance Sheet, the Cashflow Statement, Statement of Total Recognised Gains and Losses, and the related notes. These financial statements have been prepared under the accounting policies set out within them. I have also audited the information in the Remuneration Report that is described in that report as having been audited.

Respective responsibilities of the Council, Chief Executive and Auditor

The Council, and Chief Executive as Accounting Officer, are responsible for preparing the Annual Report, the Remuneration Report and the Financial Statements in accordance with the Science and Technology Act 1965 and Secretary of State for Trade and Industry directions made thereunder and for ensuring the regularity of financial transactions. These responsibilities are set out in the Statement of Council and Chief Executive's Responsibilities.

My responsibility is to audit the financial statements and the part of the Remuneration Report to be audited in accordance with relevant legal and regulatory requirements, and with International Standards on Auditing (UK and Ireland).

I report to you my opinion as to whether the financial statements give a true and fair view and whether the financial statements and the part of the Remuneration Report to be audited have been properly prepared in accordance with the Science and Technology Act 1965 and Secretary of State for Trade and Industry directions made thereunder. I report to you whether, in my opinion, certain information given in the Annual Report, which comprises the Interim Chief Executive's Introduction and the Corporate Activities section (excluding the Register of interests), is consistent with the financial statements. I also report whether in all material respects the expenditure and income have been applied to the purposes intended by Parliament and the financial transactions conform to the authorities which govern them.

In addition, I report to you if the Engineering and Physical Sciences Research Council has not kept proper accounting records, if I have not received all the information and explanations I require for my audit, or if information specified by HM Treasury regarding remuneration and other transactions is not disclosed.

I review whether the Statement on Internal Control reflects the Engineering and Physical Sciences Research Council's compliance with HM Treasury's guidance, and I report if it does not. I am not required to consider whether this statement covers all risks and controls, or form an opinion on the effectiveness of the Engineering and Physical Sciences Research Council's corporate governance procedures or its risk and control procedures.

I read the other information contained in the Annual Report and consider whether it is consistent with the audited financial statements. I consider the implications for my report if I become aware of any apparent misstatements or material inconsistencies with the financial statements. My responsibilities do not extend to any other information.

Statement of Account

Basis of audit opinion

I conducted my audit in accordance with International Standards on Auditing (UK and Ireland) issued by the Auditing Practices Board. My audit includes examination, on a test basis, of evidence relevant to the amounts, disclosures and regularity of financial transactions included in the financial statements and the part of the Remuneration Report to be audited. It also includes an assessment of the significant estimates and judgments made by the Council and Accounting Officer in the preparation of the financial statements, and of whether the accounting policies are most appropriate to the Engineering and Physical Sciences Research Council's circumstances, consistently applied and adequately disclosed.

I planned and performed my audit so as to obtain all the information and explanations which I considered necessary in order to provide me with sufficient evidence to give reasonable assurance that the financial statements and the part of the Remuneration Report to be audited are free from material misstatement, whether caused by fraud or error and that in all material respects the expenditure and income have been applied to the purposes intended by Parliament and the financial transactions conform to the authorities which govern them. In forming my opinion I also evaluated the overall adequacy of the presentation of information in the financial statements and the part of the Remuneration Report to be audited.

Opinions

Audit opinion

In my opinion:

- the financial statements give a true and fair view, in accordance with the Science and Technology Act 1965 and directions made thereunder by the Secretary of State for Trade and Industry, of the state of the Engineering and Physical Sciences Research Council's affairs as at 31 March 2007 and of its net expenditure for the year then ended;
- the financial statements and the part of the Remuneration Report to be audited have been properly prepared in accordance with the Science and Technology Act 1965 and Secretary of State for Trade and Industry directions made thereunder; and
- information given within the Annual Report, which comprises the Interim Chief Executive's Introduction and the Corporate Activities section (excluding the Register of interests), is consistent with the financial statements.

Audit opinion on regularity

In my opinion, in all material respects the expenditure and income have been applied to the purposes intended by Parliament and the financial transactions conform to the authorities which govern them.

Report

I have no observations to make on these financial statements.

John Bourn Comptroller and Auditor General, 25 June 2007
National Audit Office, 157-197 Buckingham Palace Road, Victoria, London SW1W 9SP

Statement of Account

Statement of net
expenditure
for the year ended
31st March 2007

	Notes	2007 £'000	2006 Restated (Note 1a) £'000
EXPENDITURE			
Research	6	422,577	366,137
Foresight Link 3	7	318	212
Public Engagement Programme	8	3,897	3,231
UK research facilities	9	18,673	21,625
International subscriptions	10	174	171
Postgraduate awards	11	155,481	134,750
Research Fellowships	12	30,867	24,340
Staff costs	13	13,422	13,751
Other operating expenditure	14	13,836	9,207
Total operating expenditure		659,245	573,424
INCOME			
Foresight Link 3	7	318	212
Other operating income	4	4,073	3,867
Total operating income		4,391	4,079
NET OPERATING EXPENDITURE		654,854	569,345
Non-operating income	5	(8)	(5)
Amounts payable to the consolidated fund	5	8	5
Notional cost of capital (Credit)	20	(1,160)	(1,406)
NET EXPENDITURE FOR THE YEAR		653,694	567,939
Reversal of notional cost of capital	20	1,160	1,406
NET EXPENDITURE FOR THE YEAR AFTER REVERSAL OF NOTIONAL COST OF CAPITAL		654,854	569,345

All activities are continuing.

The Notes on pages 69 to 79 form part of these Accounts.

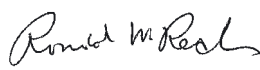
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Statement of Account

Balance sheet
as at 31st March 2007

	Notes	2007 £'000	2006 Restated (Note 1a) £'000
FIXED ASSETS			
Tangible fixed assets	15	13,794	7,658
CURRENT ASSETS			
Debtors	16	22,157	8,121
Cash at bank and in hand	17	2,213	3,594
		24,370	11,715
CREDITORS DUE WITHIN ONE YEAR	18	(66,618)	(51,051)
Net current liabilities		(42,248)	(39,336)
Total assets less current liabilities		(28,454)	(31,678)
CREDITORS DUE AFTER MORE THAN ONE YEAR	19	(218)	(255)
		(28,672)	(31,933)
CAPITAL AND RESERVES			
Revaluation reserve	21	2,566	2,650
Income and expenditure account	21	(31,238)	(34,583)
Deficit on Government funds	21	(28,672)	(31,933)

The Notes on pages 69 to 79 form part of these Accounts.



Dr Randal Richards Accounting Officer
18th June 2007

Statement of Account

Cash flow statement
for the year ended
31st March 2007

	Notes	2007 £'000	2006 Restated (Note 1a) £'000
CASH FLOW STATEMENT			
Net cash outflow from operating activities		(652,334)	(576,675)
Capital expenditure:-			
Payments to acquire fixed assets	15	(6,999)	(1,293)
Net cash outflow before financing		(659,333)	(577,968)
Financing:-			
Grant-in-Aid received	3, 21	637,134	554,521
From other Research Councils	21	8,086	9,262
From Government departments, executive agencies and EU	21	5,689	4,906
From other bodies	21	7,043	3,592
DECREASE IN CASH	17	(1,381)	(5,687)
RECONCILIATION OF NET OPERATING EXPENDITURE BEFORE FINANCING TO NET CASH OUTFLOW FROM OPERATING ACTIVITIES			
Net operating expenditure		(654,854)	(569,345)
Depreciation charge/losses on disposal of assets	14	1,026	635
(Increase)/decrease in debtors	16	(14,036)	1,161
Increase/(decrease)in creditors	18,19	15,530	(9,126)
Net cash outflow from operating activities		(652,334)	(576,675)
RECONCILIATION OF NET CASH FLOW TO MOVEMENT IN NET FUNDS			
Cash at 1st April		3,594	9,281
Decrease in cash in year	17	(1,381)	(5,687)
Cash at 31st March	17	2,213	3,594

Statement of total
recognised gains
and losses
for the year ended
31st March 2007

	Notes	2007 £'000	2006 Restated (Note 1a) £'000
Net expenditure for the year		(653,694)	(567,939)
Grant-in-Aid received in the year		637,134	554,521
Other sources of financing received in the year	21	20,818	17,760
Reversal of Notional Cost of Capital		(1,160)	(1,406)
Surplus on revaluation of Fixed Assets in the year		163	715
Total recognised gains and losses relating to the year		3,261	3,651

The Notes on pages 69 to 79 form part of these Accounts.

Notes to the Accounts

1. Accounting policies**(a) Accounting convention**

These Accounts have been prepared under the historical cost convention, adjusted to include the revaluation of certain fixed assets, complying with the Accounts Direction of 27th November 2001 given by the Secretary of State for Trade and Industry in accordance with section 2(2) of the Science and Technology Act 1965.

The Accounts conform, in so far as is practicable and appropriate, with the Accounting Standards, Companies Acts, Financial Reporting Manual and specific Treasury guidance.

The accounting policies have been applied consistently, except for the change in treatment of Grant-in-Aid for revenue and general capital purposes, which is now being treated as financing inflow and credited directly to Reserves rather than being recognised in income for the year. (See note 1f). The same treatment has been adopted for other sources of financing.

(b) Going concern

The Balance Sheet at 31st March 2007 shows net liabilities of £28.7m. In addition, note 22 shows costs to completion of £1,581m arising from research and training grants already committed. This reflects the inclusion of liabilities falling due in future years which, to the extent that they are not to be met from the EPSRC's other sources of income, may only be met by future grants or Grant-in-Aid from the EPSRC's sponsoring department, the Department of Trade and Industry through the Office of Science and Innovation (OSI). This is because, under the normal conventions applying to parliamentary control over income and expenditure, such grants may not be issued in advance of need.

Grant-in-Aid for 2007/08, taking into account the amounts required to meet the EPSRC's liabilities falling due in that year, has already been included in the Department's Estimates for that year, which have been approved by Parliament. As part of the formal accounting and audit process the OSI has provided an assurance of their financial support for the accumulated deficit, and there is no reason to believe that the Department's future sponsorship and future parliamentary approval will not be forthcoming. It has accordingly been considered appropriate to adopt a going concern basis for the preparation of these financial statements.

(c) Fixed assets and depreciation

Capital expenditure includes the purchase of land and/or buildings, construction and services projects, and equipment valued at £3,000 or more. Individual items valued at less than the threshold are capitalised if they constitute integral parts of a composite asset that is in total valued at more than the threshold. Individual items valued at less than the threshold and not forming part of a composite asset are not capitalised.

Tangible fixed assets are included at cost or at valuation. The basis of valuation is Open Market Value for existing use where this can be established, otherwise Current Depreciated Replacement Cost.

Land and Buildings and major items of equipment are professionally valued at least every five years, at which time the remaining useful life of each revalued asset is also reassessed. The last valuation was in January 2006, conducted by Powis Hughes and Associates, Chartered Surveyors. The basis of the valuation was Open Market Value. Between formal professional valuations appropriate indices are used.

Surpluses or deficits on revaluation are taken to the Revaluation Reserve, except that any permanent diminution in value is charged to the Statement of Net Expenditure in the year in which it arises. Increased depreciation charges arising from the revaluation are matched by annual transfers from the Revaluation Reserve to the Income and Expenditure Reserve. On the disposal of a fixed asset, that element of the Revaluation Reserve which thereby becomes realised is transferred directly to the Income and Expenditure Reserve.

Tangible fixed assets are depreciated at rates calculated to write off the costs or the valuation of each asset evenly over its expected useful life, as follows:

Freehold land	not depreciated
Freehold buildings	62 years
Specialist scientific equipment	3 – 15 years
IT equipment	3 years
Software (third party licences)	the lesser of 5 years or the term of the licence
Software (not third party licences)	5 years
Fixtures and fittings	5 years
General office equipment	5 years

Notes to the Accounts

(d) Ownership of equipment purchased with EPSRC research grants

Equipment purchased by an organisation with research grant funds supplied by the EPSRC belongs to the organisation and is not included in the EPSRC's fixed assets. Through the Conditions of Grant applied to funded organisations, the Research Council must be informed if, during the life of the research grant, the need for the equipment diminishes substantially or it is not used for the purpose for which it was funded. The Research Council reserves the right to determine the disposal of such equipment and to claim the proceeds of any sale.

(e) Equipment located elsewhere

EPSRC owns assets with a combined net book value of £8.3m which are located elsewhere but are included in the Balance Sheet.

A pool of scientific equipment is provided and updated by the Council for the Central Laboratory of the Research Councils (CCLRC) on behalf of the EPSRC, specifically for loan to research organisations. Wherever located, this equipment remains the property of the EPSRC and is therefore included in the Balance Sheet.

In 2006/07 EPSRC owned equipment, with a net book value of £716k, for Fusion research at Culham. The equipment was professionally revalued in December 2006 by GVA Grimley, resulting in a loss on revaluation of £202k. The assets will be transferred to UKAEA in 2007/08.

Scientific equipment derived from the dismantled Nuclear Structure Facility at Daresbury Laboratory remains in the care of organisations in the UK and abroad.

(f) Grant-in-Aid

In 2006/07, in line with changes in FReM, Grant-in-Aid received for revenue purposes has been regarded as a contribution from a controlling party giving rise to a financial interest in the organisation. Hence, Grant-in-Aid has been accounted for as financing, not income i.e. credited to the Income and Expenditure Reserve rather than being recognised in the Income and Expenditure Account for the year. The same treatment has been adopted for other sources of financing. As a result, the Income and Expenditure Account now shows net expenditure for the year, rather than a surplus or deficit, and has consequently been renamed 'Statement of Net Expenditure'. Grant-in-Aid for capital purposes is only credited to the Government Grant Reserve if it is for the purchase of a specific asset, with all other Grant-in-Aid credited to the Income and Expenditure Reserve. The presentation of comparative figures has been restated as a result and a prior year adjustment made to transfer Capital Grant-in-Aid for general purposes from the Government Grant Reserve to the Income and Expenditure Reserve. The same treatment has been adopted for the Capital Land Reserve, which is similar in nature. (See note 21).

(g) Research and development

As a research organisation, all the EPSRC's research and development expenditure is charged to the Statement of Net Expenditure when it is incurred. Intellectual property rights arising from research and development funded by the EPSRC are passed to the organisations performing the research.

(h) Foreign exchange

Transactions denominated in foreign currencies are translated into sterling at the rate of exchange ruling at the date of transactions. Any exchange differences arising in the ordinary course of business are taken to the Statement of Net Expenditure. Assets and liabilities in foreign currencies in existence at the balance sheet date are translated at the rates ruling at that date.

(i) Research grants

Subject to the terms and conditions under which research grants are awarded, the EPSRC makes payments for grants on the basis of pre-determined quarterly profiles. Profiles are arranged, in overall terms, to reflect the rate and incidence of expenditure at the grant holding organisation. Payments are normally made in the period to which they relate, although the EPSRC retains some latitude in timing. Grant expenditure is accounted for on an accruals basis to reflect the usage of grant funds on work carried out. Future commitments at the balance sheet date are disclosed in note 22.

Notes to the Accounts

(j) Value Added Tax

As the EPSRC is partially exempt for VAT purposes, all items of expenditure and fixed asset purchases are shown inclusive of VAT where applicable. Residual input tax reclaimed under the partial exemption scheme is taken to the Statement of Net Expenditure as other income.

(k) Superannuation schemes

Employees of the Council are members of the Research Councils' Pension Scheme, which is funded on a pay-as-you-go basis. The amount charged to the Statement of Net Expenditure represents the contributions payable to the scheme in respect of current employees in the accounting period. Contributions are charged on a year-by-year basis in accordance with the requirements of the scheme administrators. One member of the EPSRC staff retains membership of the UKAEA Principal Non-Industrial Superannuation Scheme (PNISS) by virtue of their earlier employment.

(l) Notional cost of capital

In line with HM Treasury requirements, the EPSRC has included non-cash income in respect of cost of capital charged at 3.5% (2005/06 3.5%).

2. Financial instruments

FRS 13, *Derivatives and Other Financial Instruments*, requires disclosure of the role which financial instruments have had during the year in creating or changing the risks an entity faces in undertaking its activities. Because of the largely non-trading nature of its activities and the way in which the EPSRC is financed, the EPSRC is not exposed to the degree of financial risk faced by business entities. Moreover, financial instruments play a much more limited role in creating or changing risk than would be typical of the listed companies to which FRS 13 mainly applies. The Council's financial assets and liabilities are generated by day-to-day operational activities and are not held to change the risks facing the department in undertaking its activities.

As permitted by FRS 13, debtors and creditors which mature or become payable within 12 months from the balance sheet date have been omitted from the currency profile.

Liquidity risk

The Council's net revenue resource requirements are financed by resources voted annually by Parliament, as is its capital expenditure. The EPSRC is not therefore exposed to significant liquidity risks. The EPSRC is dependent on funding from the Department of Trade and Industry to meet liabilities falling due in future years, but there is no reason to believe that this funding will not be forthcoming.

Interest-rate risk

None of the Council's financial assets or liabilities is subject to interest, and the Council is not therefore exposed to interest-rate risk.

Currency profile

At the balance sheet date the EPSRC held no significant foreign currency assets or liabilities.

Foreign currency risk

The Council's exposure to foreign currency risk is not significant. Foreign currency expenditure and income during 2006/07 were negligible.

Notes to the Accounts

3. Parliamentary Grant-in-Aid

The grant was provided under the Request for Resources 2 for the financial year 2006/07.

There has been a change in the treatment of Grant-in-Aid, which is now being treated as a financing inflow and credited directly to reserves rather than being recognised in income for the year. The impact is explained in notes 1(f) and 21.

4. Other operating income

	2007 £'000	2006 Restated £'000
Income from other Research Councils for services provided	4,073	3,867
Total other operating income	4,073	3,867

5. Non-operating income

	2007 £'000	2006 Restated £'000
Unanticipated receipts this financial year relating to amounts paid or claims registered in previous year	8	5
Total surrendered to consolidated fund (CFER)	8	5

6. Research

Total gross expenditure on research grants shown by programme:

	2007 £'000	2006 Restated £'000
Basic Technology	27,971	22,229
Chemistry	48,273	38,346
Core e-Science	8,495	10,428
Engineering	73,447	65,741
Energy	30,605	17,461
High Performance Computing	548	468
Information and Communications Technologies	62,852	53,437
Innovative Manufacturing	27,254	25,067
Infrastructure and Environment	16,685	23,789
Life Sciences Interface (LSI)	19,050	15,494
Materials	41,683	39,561
Mathematical Sciences	11,699	10,138
Physics	36,029	31,549
Other activities	17,986	12,429
Total expenditure on research	422,577	366,137

Gross expenditure on the Energy programme is inclusive of £20,616k with regard to Fusion (2005/06 £15,932k). The 2005/06 figures above have been restated to show Fusion as part of the Energy programme.

Gross expenditure on the Physics programme is inclusive of £5,126k with regard to Nuclear Physics. With effect from 1st April 2007, this will be transferred to Science and Technology Facilities Council (STFC). The transfer has had no impact on the 2006/07 financial statements.

Notes to the Accounts

7. Foresight Link

EPSRC has acted as a managing agent for Foresight LINK 3 (FLA3) awards on behalf of the DTI. A final FLA3 claim was made in 2006/07 to recover costs incurred.

8. Public Engagement Programme

The EPSRC has a Public Engagement Programme (PEP) for its research grant holders and Fellows. In 2005/06 this programme had been referred to as Science in Society programme.

	2007 £'000	2006 £'000
PEP awards	2,176	1,471
PEP Fellowships	205	87
PEP additional programme expenditure	1,516	1,673
Total Expenditure on PEP	3,897	3,231

9. UK Research facilities

	2007 £'000	2006 £'000
High Performance Computing:		
CSAR	1,919	5,961
University of Edinburgh (HPCx)	7,020	8,165
Total High Performance Computing	8,939	14,126
CCLRC	3,786	3,405
Other expenditure on research facilities	5,948	4,094
Total expenditure on UK research facilities	18,673	21,625

EPSRC provides facilities to enable world class research. The provision of high end computing support for research via the Computer Services for Academic Research (CSAR) facility ended in June 2006. A new high end computing facility, HECToR, is under construction.

10. International subscriptions

Total amounts paid in the year for current operations:

	2007 £'000	2006 £'000
European Science Foundation (ESF)	174	171

11. Postgraduate awards

	2007 £'000	2006 Restated £'000
Collaborative Training Accounts:		
Collaborative Training Grants	44,741	34,873
Engineering Doctorates	37	754
Industrial CASE	3,042	6,659
Masters Training Packages	397	716
Total Collaborative Training Accounts	48,217	43,002
Doctoral Training Grants	75,152	72,259
Dorothy Hodgkin Postgraduate Awards	5,893	3,593
International Doctoral Scholarships	1,425	901
LSI Doctoral Training Centres	5,408	3,568
Roberts Skills Training	12,342	6,870
Other awards	7,044	4,557
Total expenditure on Postgraduate Awards	155,481	134,750

Roberts Skills Training is not an EPSRC Postgraduate Award; rather it is expenditure to deliver enhanced training for postgraduate and postdoctoral award holders. Roberts Skills Training expenditure has been separated out to reflect the significant level of expenditure, and 2005/06 figures have been restated to reflect this.

EPSRC acts as a manager for the Dorothy Hodgkin Awards on behalf of RCUK. Funding toward Dorothy Hodgkin Awards is provided by the Research Councils and by industrial collaborators.

Notes to the Accounts

12. Research Fellowships

	2007 £'000	2006 £'000
Academic	11,054	8,929
Advanced	11,581	9,090
European Young Investigator (EURYI)	653	694
Postdoctoral	3,691	2,164
Senior	1,476	852
Other Fellowships	2,412	2,611
Total expenditure on research Fellowships	30,867	24,340

Gross expenditure on Fellowships is inclusive of £305k with regard to Nuclear Physics. With effect from 1st April 2007, this will be transferred to STFC. The transfer has had no impact upon the 2006/07 financial statements.

13. Staff**(a) Staff costs**

	2007 £'000	2006 £'000
Salaries and wages		
Permanent staff	8,007	8,222
Agency staff and contract personnel	2,584	2,830
Social security costs	589	573
Other pension costs	1,643	1,668
Council and Panel Members' fees and honoraria	525	439
Current staff costs	13,348	13,732
Net early retirement costs (see note (b) below)	74	19
Total expenditure on staff costs	13,422	13,751

(b) Staff early retirement costs

Staff early retirement costs are stated net of a release of pension funds amounting to £30k. The total staff restructuring costs increased by £55k during the year.

(c) Staff numbers

Average numbers of full-time equivalent employees during the year:

	2007	2006
Senior management	39	37
Managerial and supervisory	180	173
Administrative support	89	92
Average number of staff employed	308	302
Contract staff	32	34
Agency staff	4	5
Total average number of staff	344	341

Notes to the Accounts

(d) Remuneration of senior employees

The following numbers of senior employees, including Directors, received remuneration falling within the ranges shown:

Full year equivalent remuneration	2007	2006
£100,000 and above	2	1
£90,000 – £99,999	-	-
£80,000 – £89,999	-	-
£70,000 – £79,999	2	2
£60,000 – £69,999	-	1
£50,000 – £59,999	6	5

(e) Remuneration of Council and Panel Members

The total emoluments of the Chairperson, Professor Dame Julia Higgins, were £15,275 (2005/06 £14,900) including taxable benefits.

The standard honorarium paid to Council Members was £6,345 (2005/06 £6,200).

The standard daily attendance allowance paid to Panel Members was £160 (2005/06 £160).

	No	2007 £'000	No	2006 £'000
Council Members' annual honoraria:				
£5,001 to £10,000	12	77	12	77
Daily attendance fees paid to Panel Members		433		357
Social security costs		3		3
		513		437
Chair's emoluments		15		15
Total expenditure on Council and Panel Members		528		452

14. Other operating expenditure

	2007 £'000	2006 £'000
Services	8,347	3,859
Travel and subsistence	1,671	1,692
Equipment and supplies	307	99
Consultancies	924	1,096
External auditors' remuneration	43	39
Rent, rates and maintenance	694	694
General administration	823	1,095
Write-offs and recoveries	1	(2)
Depreciation and loss on disposal of assets	1,026	635
Total other operating expenditure	13,836	9,207

Notes to the Accounts

15. Fixed assets

	Freehold land & buildings £'000	Super- computing/ assets in the course of construction £'000	Office & scientific equipment £'000	Totals £'000
Valuation				
Balance as at 1st April 2006	7,557	–	7,251	14,808
Additions (see note below)	–	5,875	1,124	6,999
Revaluation for year	489	–	(417)	72
Disposals	–	–	(49)	(49)
Valuation at 31st March 2007	8,046	5,875	7,909	21,830
Depreciation				
Balance as at 1st April 2006	2,636	–	4,514	7,150
Charge for the year	124	–	896	1,020
Revaluation adjustments	170	–	(261)	(91)
Disposals	–	–	(43)	(43)
Depreciation at 31st March 2007	2,930	–	5,106	8,036
Net book value:				
at 31st March 2007	5,116	5,875	2,803	13,794
at 1st April 2006	4,921	–	2,737	7,658

These assets are funded solely from Grant-in-Aid. Additions for the year include assets valued at £143k purchased for Fusion research, assets valued at £825k purchased for the Engineering Loan Pool at CCLRC and assets valued at £5,875k purchased for HECToR.

Included in Freehold Land and Buildings is £907k (2005/06 £852k) in respect of Freehold Land which is not depreciated.

In 2006/07 EPSRC owned equipment, with a net book value of £716k, for Fusion research at Culham. The equipment was professionally revalued in December 2006 by GVA Grimley, resulting in a loss on revaluation of £202k. The assets will be transferred to UKAEA in 2007/08.

The last professional valuation of land and buildings was in January 2006, conducted by Powis Hughes and Associates, Chartered Surveyors. The basis of the valuation was Open Market Value for existing use. The valuation was made in accordance with RICS Appraisal and Valuation Manual or a named alternative. Between formal professional valuations appropriate indices are used.

16. Debtors

	2007 £'000	2006 £'000
Debtors:		
Other central Government bodies	3,723	1,220
Public corporations and trading funds	651	14
Debtors held in Escrow	5,875	–
Other debtors	4,410	2,529
Prepayments and accrued income:		
Other central Government bodies	5,335	2,884
Public corporations and trading funds	617	905
Other prepayments and accrued income	1,546	569
Total debtors	22,157	8,121

Other debtors includes the sum of £82k (2005/06 £195k) relating to debtors due after more than one year.

Amounts held in Escrow relates to £5,875k paid into an Escrow account with regard to HECToR. The payment of £5,875k from Escrow will be made to Cray Inc on achievement of project milestones. If the milestones are not achieved, EPSRC will receive the payment from Escrow.

Notes to the Accounts

17. Cash at bank and in hand

	2007 £'000	2006 £'000
Office of the Paymaster General (OPG) account balance	2,139	3,564
Commercial account balance	74	30
Total cash at bank and in hand	2,213	3,594

18. Creditors due within one year

	2007 £'000	2006 £'000
Creditors:		
Other central Government bodies	1,355	315
Public corporations and trading funds	-	4
Other creditors	27,373	28,361
Accrued expenditure:		
Other central Government bodies	1,879	2,947
Public corporations and trading funds	-	18
Other accrued expenditure	29,015	12,208
Deferred income:		
Other central Government bodies	2,287	995
Other deferred income	4,709	6,203
Total creditors	66,618	51,051

19. Creditors due after more than one year

	2007 £'000	2006 £'000
Early retirement costs	218	255

20. Notional cost of capital

	2007 £'000	2006 £'000
Notional cost of capital	1,160	1,406

The EPSRC is not funded for interest-bearing debts, but to ensure that the Statement of Net Expenditure bears an appropriate charge for the use of capital employed, a notional interest charge has been included.

In accordance with HM Treasury guidance, the cost of capital is calculated as 3.5% of the average of net assets or liabilities during the year. Because the net assets of EPSRC are negative, the cost of capital is a credit rather than a charge, and has been included in the Statement of Net Expenditure.

Notes to the Accounts

21. Reconciliation of movements in Government funds

	Government Grant Reserve £'000	Revaluation Reserve £'000	Capital Land Reserve £'000	Income and Expenditure Reserve £'000	Government Funds £'000
Opening balance	4,739	2,650	270	(39,592)	(31,933)
Prior year adjustment	(4,739)	–	(270)	5,009	–
Opening balance restated	–	2,650	–	(34,583)	(31,933)
Transfer from revaluation reserve to income and expenditure reserve	–	(247)	–	247	–
Net surplus on revaluation of tangible fixed assets	–	163	–	–	163
Grant-in-Aid financing received in year	–	–	–	637,134	637,134
Funding from other Research Councils	–	–	–	8,086	8,086
Funding from Government departments, Executive agencies and the EU	–	–	–	5,689	5,689
Funding from other bodies	–	–	–	7,043	7,043
Net expenditure for the year after reversal of notional cost of capital	–	–	–	(654,854)	(654,854)
Closing balance	–	2,566	–	(31,238)	(28,672)

22. Research and training grant commitments

The future costs to completion of research and training grants at 31st March 2007 are estimated to be £1,581 million. These figures exclude liabilities for Nuclear Physics, as these liabilities will be transferred to STFC with effect from 1st April 2007. It is anticipated that this expenditure will be spread over the following four years in the proportions 4:3:2:1.

23. Capital commitments

Contractual commitments of £45m existed at 31st March 2007 with regard to the construction of the supercomputer HECToR, due for delivery in September 2007. This contractual commitment is in respect of the supply of the production system, the test and development system, and storage and backup by Cray Inc.

In addition there is a contractual commitment of £12.6m with the University of Edinburgh (UoE HPCX Ltd) for the provision of system support for the supercomputing facility for the 6 years of the service.

24. Contingent liabilities

The EPSRC had no contingent liabilities as at 31st March 2007.

25. Related party transactions

(a) The EPSRC is a Non Departmental Public Body (NDPB) sponsored by the Department of Trade and Industry (DTI). It complies with the Financial Reporting Standard on Related Party Transactions (FRS 8) issued by the Accounting Standards Board, as amended for Central Government use by HM Treasury.

The DTI is regarded as a related party. During the year, the EPSRC had a number of material transactions with the DTI and with other entities for which the DTI is regarded as the parent Department (viz. the Economic and Social Research Council, the Biotechnology and Biological Sciences Research Council, the Particle Physics and Astronomy Research Council, the Council for the Central Laboratory of the Research Councils, the Natural Environment Research Council, the Medical Research Council and the Arts and Humanities Research Council). In addition, the EPSRC had material transactions with other Government Departments and with other Central Government Bodies (viz. the Ministry of Defence, HM Treasury and the Department for Environment, Food and Rural Affairs).

(b) During the year the EPSRC announced the following grants to organisations in respect of proposals from members of the EPSRC Council:

Organisation	Proposer	Grant reference	Value £000
University of Cambridge	Professor L Gladden	EP/E012205/1	341
University of Leeds	Professor L Gladden	EP/E048811/1	877

The relevant Council Members were not involved in the approval of these grants.

Notes to the Accounts

25. Related party transactions continued

(c) During the year the EPSRC announced the following numbers and cumulative values of grants and postgraduate and Fellowship awards to organisations where Council Members occupied senior positions in the organisation:

Organisation	Research grants		Partnership for Public Engagement Awards		Postgraduate Awards		Research Fellowships	
	No.	£'000	No.	£'000	No.	£'000	No.	£'000
Heriot-Watt University	22	7,772	1	204	2	1,658	1	500
Imperial College, London	105	59,770	–	–	5	8,254	17	9,694
Newcastle University	34	7,205	–	–	2	1,657	1	750
University of Manchester	75	28,661	1	225	6	5,426	6	4,612
University College London	62	24,511	1	9	3	3,656	9	5,981
University of Cambridge	72	40,804	3	472	3	6,346	7	2,566
University of Glasgow	31	14,912	–	–	5	3,407	6	2,957
University of Southampton	54	25,578	–	–	3	4,346	2	1,743
University of Strathclyde	31	23,311	1	8	3	2,985	2	1,101
University of Surrey	10	1,525	1	3	2	1,650	2	768
University of Wales, Bangor	5	1,348	–	–	1	250	–	–

No Council member was involved in the approval of grants or awards to the organisation where he/she is a member of staff.

(d) The EPSRC operates a process of peer review of proposals for research grants, as part of which 'Colleges', panels formed of senior members of the academic and industrial communities, evaluate grant proposals for technical merit and then propose a ranking for funding. The EPSRC receives their recommendations but is not bound by them, taking as it does other significant factors into account, such as the availability of funds and Government policy. These Panel Members are not therefore regarded as Related Parties within the context of FRS 8.

(e) The EPSRC has adopted a Code of Practice for all those who assist the work of the Council, which embraces the 'Seven Principles of Public Life' drawn up by the Nolan Committee and endorsed by Parliament. This is designed to remove any staff member from any decision-making process under which he/she or any of his/her close family may benefit.

During the year, the EPSRC identified those members of staff who could be regarded as being in positions of financial influence, and required a declaration from each of any financial transactions with the EPSRC under which the staff member or a member of his/her immediate family was in receipt of a significant amount of money from the EPSRC, and where the staff member was able to exercise any influence over the transaction.

During the year the EPSRC announced the following grants to organisations in respect of proposals from related parties of EPSRC staff members:

Organisation	Proposer	Grant Reference	Value £000
NERC Centre for Ecology and Hydrology	Professor I Thompson	EP/E012299/1	96

Such a declaration was also required from members of Council, the Resource Audit Committee, the Technical Opportunities Panel and the User Panel. A Council Members' Register of Interests is available for viewing on the EPSRC website.

26. Post balance sheet events

There were no post balance sheet events between the balance sheet date and the 27th June 2007, the date when the Accounting Officer dispatched the Accounts to the Office of Science and Innovation. The Financial Statements do not reflect events after this date.

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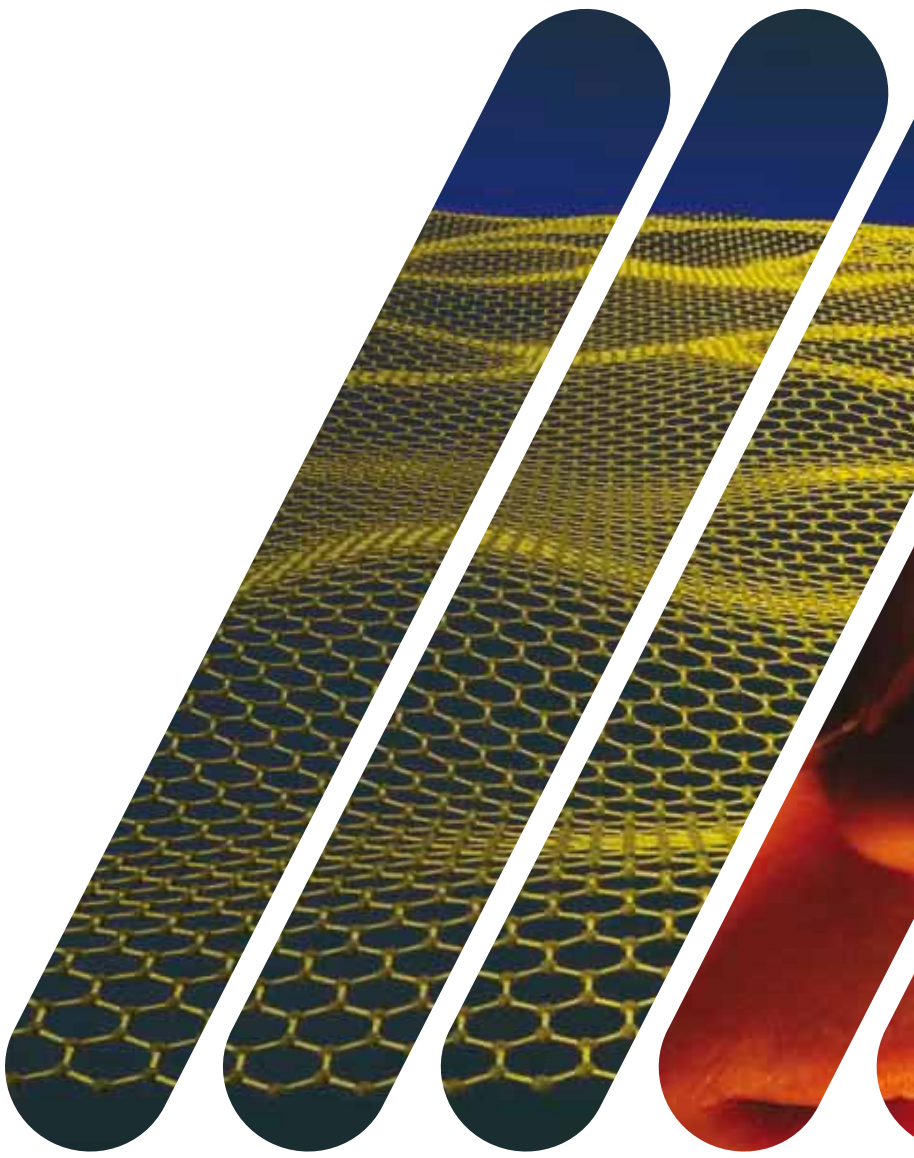
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