Living healthier for longer
Supporting innovative ageing research through the Lifelong Health and Wellbeing initiative

Sharing data saves lives
Opinions from two MRC researchers
£39.1m for improving data research

A £32m MRC investment, announced by Universities and Science Minister David Willetts at the High Performance Computing and Big Data Conference in London on 6 February, plus an additional £7.1m, is the latest instalment of a £90m funding initiative to tackle health and bioinformatics challenges for the advancement of medical research.

Six major strategic awards will strengthen collaborative links, improve tools and infrastructure for researchers and support the safe use of biological and patient data for medical research across all diseases.

The awards, to Leeds MRC Medical Bioinformatics Centre, University of Oxford Big Data Institute, MRC/UVRI Medical Informatics Centre at the MRC/UVRI Uganda Research Unit, the MRC Consortium for Medical Microbial Bioinformatics led by Warwick University, the Medical Bioinformatics partnership led by Imperial College London and University College London Partners which includes the Francis Crick Institute, will also support career opportunities for computational scientists, technologists, and programme leaders, enhancing the UK’s skills in this area.

Mr Willetts said: “Making the most of large and complex data is a huge priority for Government as it has the potential to drive research and development, increase productivity and innovation and ultimately transform lives. This funding will help build UK medical research capability and improve collaboration across institutions, academia, the NHS and industry.”

Official opening of new metabolic diseases unit

In January, Sir John Savill, Chief Executive of the MRC and Dr Jeremy Farrar, Director of the Wellcome Trust, officially opened a £10.8m new university research facility – the MRC Metabolic Disease Unit (MDU).

The MDU is based at the Wellcome Trust-MRC Institute for Metabolic Science (IMS) on the Cambridge Biomedical Campus. Part of a £24m investment into obesity research, its mission is to improve understanding of the mechanisms responsible for obesity and related metabolic diseases. The eventual goal is to develop interventions to prevent and treat these diseases.

Sir Steve O’Rahilly, Co-Director of the IMS and Director of the MDU, said: “This joint initiative from the MRC and the Wellcome Trust will provide exciting new opportunities to better understand the fundamental causes of diseases such as obesity and diabetes and translate that knowledge into improved therapies.”

Sir John Savill said: “Obesity is one of the biggest challenges facing the future health of the developed world and understanding the causes and consequences of this condition are a major research priority. This additional investment from us and the Wellcome Trust reflects the quality of research undertaken by the University of Cambridge and lays the foundations for taking basic scientific discoveries right through to clinical advances.”

From left to right: Patrick Maxwell, Regius Professor of Physic at the University of Cambridge, Sir Steve O’Rahilly, Director of the MRC Metabolic Diseases Unit and Co-Director of IMS, Professor Nick Wathen, Director of the MRC Epidemiology and Biostatistics Unit and Co-Director of the IMS, Sir John Savill, MRC Chief Executive, Dr Jeremy Farrar, Director of the Wellcome Trust and Jane Ramsey, Chairman of Cambridge University Hospitals NHS Foundation Trust.
Interested in occupational or environmental epidemiology?

The 8th UK and Ireland Occupational & Environmental Epidemiology Meeting will be held on Thursday 3 April 2014 at the National Heart and Lung Institute at Imperial College London. Supported by the MRC-PhE Centre for Environment and Health and Public Health England, the aim of the meeting is to enable the sharing of knowledge between scientists with research interests in occupational and environmental epidemiology. Early career researchers are particularly welcome. Registration details and other information can be found here https://www.insight.mrc.ac.uk/events.php

For further information, contact Magda Wheatley mwheatley@imperial.ac.uk

Wikipedia-writing women

Throughout 2013, as part of our centenary year, the MRC joined forces with the Royal Society and Wikimedia to present a series of Wikipedia edit-a-thons. In total, over 90 pages of information on eminent female scientists were either created or expanded.

The edit-a-thons aimed to improve Wikipedia entries for female MRC-affiliated scientists and create articles for those who have been forgotten. The editors, made up of MRC scientists and anyone with an interest in Wikipedia editing, had access to printed and electronic works about women in science, including biographies and works authored by scientists.

Following events at the MRC National Institute for Medical Research, Royal Society, London, and the MRC Laboratory of Molecular Biology, Cambridge, the last in the series was held at the Royal Society of Edinburgh in December. A panel discussion on women’s experiences in science was led by Professor Dame Sally MacIntyre, an MRC Council member; Professor Lesley Yellowlees, president of the Royal Society of Chemistry and Professor Polly Arnold, winner of the 2012 Royal Society Rosalind Franklin Award. Using the award, Professor Arnold created a short film called ‘A Chemical Imbalance’ about the challenges faced by women in STEM.

Emma Claire Palmer, an MRC-funded PhD student at the Institute of Psychiatry (IoP), King’s College London attended the Royal Society event in London and wrote about Professor Janet Treasure from the IoP: “I had a fantastic time. Learning to edit was a really great experience and I felt I had done something good and useful with my time. The evening event was very inspirational. It was great to see so many women, and men, brought together to work towards a better representation of women of STEM in the public eye.”

The next Wikipedia edit-a-thons are on 13 May at the University of Liverpool and 22 May at the University of Manchester. Book a place on the workshop in Liverpool at mrc.uk/wikipedia-edit-a-thon.

Watch the film about challenges faced by women in STEM here www.chemicalimbalance.co.uk

Have you done our hearing experiment yet?

Visit www.100yearsofamplifiedmusic.org to take over 4,500 people who have so far taken part in our online hearing experiment, to help MRC Institute of Hearing Research scientists reach their target of 10,000 participants and learn more about hearing loss. The results of the experiment will be announced by Dr Michael Akeroyd at the Acoustical Society of America meeting in May and will be published on our blog, MRC Insight.

Look out for updates here www.insight.mrc.ac.uk

Science festival fun

Why not come along to some of our MRC activities at a science festival near you?

Festival season is upon us, and many of our world-class research institutes, units and centres are getting involved in science festivals around the UK. They will be providing talks about their research as well as hands-on activities and entertainment for all the family. Here’s a taster of what’s in store:

- Edinburgh Science Festival (20-24 April)
  Visit our Mini Scientists workshop in the City Arts Centre where kids aged seven and over can race to match chromosomes, build a cell, create a new virus, solve hearing problems and find ways to make a city healthier. On Saturday 12 April Dr Owen Brimijoin, of the MRC/Chief Scientist Office Institute of Hearing Research - Scottish section, will deliver a talk for adults about our fragile and complex sense of hearing.
  Visit www.100yearsofamplifiedmusic.org to join over 4,500 people who have so far taken part in our online hearing experiment, to help MRC Institute of Hearing Research scientists reach their target of 10,000 participants and learn more about hearing loss. The results of the experiment will be announced by Dr Michael Akeroyd at the Acoustical Society of America meeting in May and will be published on our blog, MRC Insight.
  Look out for updates here www.insight.mrc.ac.uk

- Oxford May Music Festival (30 April-5 May)
  Look out for Professor Cyna Caper, Director of the MRC LifeCourse Epidemiology Unit, giving a talk about the prevention and treatment of osteoporosis. www.oxfordmaymusic.co.uk

- Cheltenham Science Festival (3-8 June)
  Hear MRC speakers unveil the latest research in dementia and regenerative medicine and try our hands-on activities in the Discovery Zone. www.cheltenhamfestivals.com/science
Macaque research at the MRC
Two new MRC-made films give viewers an insight into why macaques are so valuable in some areas of medical research.

The MRC’s Centre for Macaques breeds rhesus macaques for use in medical research in academic institutions in the UK. Using macaques from the centre means that researchers and those who fund or regulate research can be sure the animals were bred in conditions that meet high welfare standards.

Macaques are non-human primates with body systems similar to humans – such as their immune and nervous systems – which make them good research ‘models’ for a variety of human conditions. The films feature neuroscientist Dr Andrew Jackson, who uses macaques to study how brain signals control movement. He aims to help paralysed people control external devices, such as robotic arms or wheelchairs, with their thoughts.

Watch the films here mrc.io/macaque-research

Let’s talk about dementia

The workshop brought together funders, parliamentarians and researchers from diverse backgrounds, including healthcare and cognitive psychology, to discuss the significance of stigma and how it may considerably worsen disease symptoms.

Attendees advocated the need for solidarity and behavioural change, as well as to treat people with dementia with respect and provide support, as recommended in the 2009 Nuffield Council on Bioethics report. On discussing stigma as a new area for biomedical research, the jury was out: have we considered all contributing factors, and should we focus more on understanding the biology – the neural mechanisms behind the perceptions and responses which manifest as stigma?

Professor Hugh Perry, Chair of the MRC Neuroscience and Mental Health Board, attended the workshop: “Bringing stigma to the forefront and having a conversation about mental health, as you would about other illnesses, is hugely important for the diagnosis of dementias. If we can encourage people with early signs of disease to come forward and be diagnosed, they will benefit from the available support and, ultimately, new therapeutic approaches coming from research.”

Baroness Sally Greengross, Chief Executive of the International Longevity Centre-UK and Chair of the All Party Parliamentary Group on Dementia, said: “As dementia numbers rise, our services and society must respond. However, we’re at risk of falling at the first hurdle if we cannot address the problem of stigma.”

Outcomes from the workshop will go into a compendium report entitled ‘New perspectives and approaches to understanding dementia and stigma’ to be published this summer.

Virtual reality treatment for paranoia

Researchers at the University of Oxford are using virtual reality simulation to assess the role of adjusted height on levels of mistrust and paranoid thoughts.

The research, led by MRC Senior Clinical Fellow Professor Daniel Freeman, shows that in those prone to having ‘mistrustful thoughts’, experiencing a social situation from a lower height, using a virtual reality simulation of a London Underground Tube journey, can make people feel more inferior and excessively mistrustful.

Intrigued? Read more about the research online in Psychiatry Research www.psy-journal.com or watch our film capturing the research in action mrc.io/virtual-research
Following her retirement after 30 years working for the MRC and the National Cancer Research Institute, Dr Jane Cope reflects on the importance, and the challenges, of bringing together hearts and minds.

On joining the MRC in 1983 I was asked to manage the new Working Party on AIDS. It was excellent training. I was fortunate to be able to see from the inside how the biomedical community tackles a new, and fatal, disease. Soon afterwards, a small team of us were working full-time on AIDS initiatives and I was privileged to work with some top MRC scientists, including Max Perutz and Richard Doll.

On one memorable day, Sir James Gowans, the MRC Chief Executive at the time, asked me to write on one sheet of paper how I would spend £1 million (worth more in the 1980s) on AIDS research, and to let him have it by 4pm that day! That one page was expanded into our bid for the MRC AIDS Directed Programme, aimed at vaccine and drug development. We used the money to persuade the top labs in virology and immunology to take on AIDS-related research projects, alongside their main work.

In 1992, after two years as secretary to one of the MRC’s research boards, I moved to Hammersmith Hospital to help set up the MRC Clinical Sciences Centre. This provided political challenges, and taught me about persuasion and change management.

In summary, the last 30 years have been about working with people and organisations with differing agendas. Helping them to find common ground enables the delivery of high-quality research and the best return on investment – for the benefit of patients, the public and our society as a whole. I am fortunate that I found the right niche and had some wonderful experiences along the way.

Read about Jane’s experience of the changing relationship between clinical trial researchers and patients on our blog, MRC Insight.

The NCRI partnership brings together government, charity and industry funders of cancer research to tackle problems that cannot easily be addressed by funders individually. The Secretariat team needs not only to be skilled in relationship management but also to be able to take a bird’s eye view of the whole cancer scene and identify opportunities for joining up people and activities. In this way, the NCRI has helped partners to collectively boost research in areas of need such as radiotherapy, palliative care and early diagnosis of cancer, and to coordinate research resources such as biobanking. More recently we established a closer working relationship with the clinical trials community which had been separately managed in the past.

One of the most fulfilling aspects of my career in research management has been working with patients and lay committee members, advisors and research participants. Such involvement is particularly strong in cancer. For example, researchers running a trial in prostate cancer, known as ProCaT, consulted groups of patients about how they would prefer to be approached about participating and how the trial was described to them. When the results were implemented, the acceptance rate for the study rose from 48 per cent to 70 per cent of those asked. It is both heart-warming and humbling to work with people who are facing, or who have faced, the challenges of serious illness and debilitating treatment, and who then want to contribute to research that will help others. Their experience brings an added dimension to, and strengthens, the research effort.

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www.insight.mrc.ac.uk
In a small room in the bowels of the MRC National Institute for Medical Research (NIMR), researchers in the Margrie Laboratory are using a serial vibratome to slice thin sections of the brain. As each slice is removed, the microscope photographs the exposed surface of the brain. After three days, they will have 3.2 terabytes of digital images, and a pile of about 350 microscope photographs the exposed surface of brain. After three days, they will have 3.2 terabytes of digital images, and a pile of about 350 microscope photographs the exposed surface of brain.

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The brain slices are precious because they capture the result of a new technique developed by Troy’s lab. It involves detecting the activity of a single neuron, and then delivering a virus to it. The virus produces a fluorescent protein, which then spreads to reveal the brain-wide connectivity of that cell. When researchers stimulate visual pathways, they can see how the neuron responds, and, crucially, which of the many millions of cells in the brain are connected to it. By finding out how the brain is wired, Troy and his team hope to gain insights into what happens when the brain is rewired in conditions such as schizophrenia or autism.

By working together they have found a solution to the problem. Martyn and his colleague Nicholas Burczyk have designed a new device to handle the brain slices, as well as a slice storage system. They have combined this with an on-the-fly robotic arm and control system, which they are now programming. The robotic arm grabs each brain slice as it’s released and places it into a specific location in the custom-designed storage carousel.

It’s not unusual to have to develop new technologies or adapt commercial equipment, says Martyn: “The nature of our job is to design new things and quite often that involves using new techniques we’ve never used before. You have to be really flexible.”

That sentiment is echoed by Owen Brimijoin, a researcher at the MRC Institute of Hearing Research (IHR). “Science by its nature can’t usually be accomplished with readily available off-the-shelf tools. If you’re doing it right then what you’re doing is new, so there’s no equipment out there that you can use.”

Owen’s research looks at how both hearing-impaired people and people with normal hearing make sense of the moving, three-dimensional auditory world. “We use information about where sound comes from to help us hear in noisy backgrounds, but hearing aids aren’t very good at telling you where that sound is coming from.”

The vibrotome is a vibrating razor used to cut thin slices of the brain.

The robotic arm is designed to grab each brain slice as it’s released and store them safely.
As a population we can expect to live longer than ever before, but it’s important that these extra years are healthy and productive. New funding from Lifelong Health and Wellbeing (LLHW) is helping researchers work out how we can extend our working lives in a practical way. The MRC LLHW team reports.

Extending Working Lives

Lifelong Health and Wellbeing (LLHW) is a cross-research council initiative, addressing the challenges of our ageing population, including working later in life. The MRC leads LLHW on behalf of four other research councils* with additional funding from the UK Health Departments.

Abolition of the default retirement age, rising state pension age and an ageing population mean that an increasing proportion of the UK workforce is over 60. According to current projections, a child born in 2013 can expect to work until they are 77. However the impacts that our extended working lives will have on health are unknown.

Chair of the LLHW Advisory Group of Experts, Professor David Armstrong, says: “We need to know more about what factors mean a person can or can't work into their older age”.

*AHRC, Arts & Humanities Research Council; BBSRC, Biotechnology and Biological Sciences Research Council; EPSRC, Engineering and Physical Sciences Research Council, and ESRC, Economic and Social Research Council.

Promoting physical activity and wellbeing

In 2013 the LLHW funding partners awarded £15.5m, in the areas of cognition, design for wellbeing and physical activity, towards improving the lives of older people.

- £4m was awarded to five projects on promoting physical activity, including studies on the effect of physical activity on bone mineral density and muscle function, and identifying the determinants of sedentary behaviour.
- £8m was awarded to seven projects exploring how the built environment can facilitate mobility and physical activity among older people within the community.
- The Centre for Cognitive Ageing and Cognitive Epidemiology (CCACE) in Edinburgh was awarded renewed funding of £3.5m. Find out more about CCACE research by exploring LLHW-funded researcher Professor Ian Deary's work space on page 16.

For LLHW-funded research updates and to learn more about the initiative visit www.mrc.ac.uk/LLHW • Follow LLHW on Twitter: @LLHWresearch

What impact has the envisage project had?

The local hospital in Strathclyde has invested in a human biomechanical movement science lab, due in part to the success of envisage.

The envisage project is about promoting independence among stroke, falls and joint-replacement patients. New visual technologies are used to help patients visualise the stresses and movements of their muscles and joints. This information helps patients and non-specialist professionals to understand the rehabilitation process.

What influence has LLHW funding had on your career?

My career focus was interdisciplinary from the start, but the opportunities for this type of research were not available when I wanted them. Now that the research council work more closely together, my area of research and my career trajectory have been accelerated.

What has your work become more interdisciplinary as a result of LLHW funding?

My career was interdisciplinary from the start, but the MRC LLHW allowed me to apply for something I had wanted to apply for since my PhD. With the envisage project, we’ve been able to engineer technology and test it in practice. This means that the technology is well-applied and can have a greater patient impact. Had this funding not come along, I probably would have reverted to being a straightforward engineering researcher.

Has your work become more interdisciplinary as a result of LLHW funding?

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To read the full interview and more about envisage, visit www.mrc.ac.uk/LLHW and www.envisagerehab.co.uk

Interview with an LLHW researcher

Philip Rowe is a Professor of Rehabilitation Science at the University of Strathclyde. He talked to Cara Steger about envisage, his LLHW-funded research project which uses innovative visual technologies to improve rehabilitation practice.

Can you tell us a bit about envisage?

The envisage project is about promoting independence among stroke, falls and joint-replacement patients. New visual technologies are used to help patients visualise the stresses and movements of their muscles and joints. This information helps patients and non-specialist professionals to understand the rehabilitation process.

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Has your work become more interdisciplinary as a result of LLHW funding?

The local hospital in Strathclyde has invested in a human biomechanical movement science lab, due in part to the success of envisage. They need partners like us who understand the clinical side.

To read the full interview and more about envisage, visit www.mrc.ac.uk/LLHW and www.envisagerehab.co.uk
LATEST DISCOVERIES

Genetic mutations shed light on schizophrenia

An international team, led by Cardiff University’s MRC Centre for Neuropsychiatric Genetics and Genomics, has discovered new genetic mutations in people with schizophrenia which have similarities to those causing other neurodevelopmental disorders.

With the Icahn School of Medicine at Mount Sinai, New York, the Broad Institute of the Massachusetts Institute of Technology, and Harvard and Cambridge Universities, the team examined DNA blood samples from 623 sufferers and their parents.

They discovered that new mutations, found in affected individuals but not their parents, play a role in triggering schizophrenia. The mutations disrupt specific sets of proteins, involved in pathways with important roles in brain development, learning, memory and cognition. They also found some overlap with genetic mutations causing autism and intellectual disability.

Professor Mike Owen, who co-led the research with Professor Mick O’Donovan, said: “We already had evidence supporting the importance of these pathways, but the new findings, together with those from another study published in the same issue of Nature, confirm the importance of these and related sets of proteins.”

Published online at www.nature.com, January 2014

Folic acid could suppress Parkinson’s disease

MRC Toxicology Unit scientists have discovered that the common vitamin folic acid (vitamin B9), can improve cell signalling and rescue problems associated with neurodegenerative diseases such as Parkinson’s disease.

The team, led by MRC Programme Leader Dr L. Miguel Martins, was investigating chemical pathways in the cells of fruit flies. They identified an unexpected pathway that, through the manipulation of a particular gene, led to the creation of a ‘super-fly’. These flies moved faster, had more energy and were resistant to mitochondrial poisons, combating the effects of Parkinson’s features.

Providing cells with a key product, in this case folic acid, that improves their signalling, stimulated mitochondria – the ‘powerhouses’ of cells – and stopped presentation of Parkinson’s disease symptoms, both in flies and cultured human cells.

Dr Martins said: “The results indicate that folic acid enhances the generation of new mitochondria which protects the neurons that die in Parkinson’s disease. This opens up the possibility that diets rich in this vitamin or supplements could play a role in protecting mitochondria and therefore prevent or delay neurodegenerative diseases associated with mitochondrial problems such as Parkinson’s disease.”

Published online at www.nature.com/nctb, January 2014

New clues to how bacteria evade antibiotics

Scientists at the MRC Centre for Molecular Bacteriology and Infection (CMBI) at Imperial College London have revealed how a subset of bacterial cells can escape being killed by antibiotics.

Many bacterial pathogens cause persistent infection despite exposure to multiple antibiotics. But little is known about how persisting cells arise. The team developed a method for tracking single cells using a fluorescent protein produced by the bacteria. Upon infection, Salmonella were engulfed by immune cells called macrophages and formed large numbers of non-replicating ‘persisters’. The non-replicating subpopulation, with enhanced survival characteristics, was able to tolerate antibiotic exposure. The tolerant phase was only temporary but may contribute to later development of resistance.

Dr Sophie Helaine, a lead author, explained: “Now we know the molecular pathways and mechanisms that lead to persister formation during infection, we can work on screening for new drugs to coax them out of this state so that they become vulnerable to antibiotics.”

The other lead authors, Professor David Holden, Director of the MRC CMBI, said: “One of the most striking findings is that conditions inside immune cells activate two different responses from Salmonella: causing some bacteria to replicate and others to enter a non-replicating persister state. Activating these two responses together is likely to be an important mechanism by which Salmonella survives during infection.”

Published online at www.sciencemag.org, January 2014

Potential drug treatment to tackle viruses

Scientists have developed a new compound which shows promise for preventing a range of viruses from infecting humans.

Researchers from Oxford, Leeds and Diamond Light Source, UK; Beijing, China; and Innsbruck, Austria, collaborated on the inhibitor compound. It targets a group of viruses responsible for hand, foot and mouth disease, especially the HEV71 virus – a human enterovirus – which can cause fatal disease and is currently untreatable.

After solving the structure of HEV71 in 2012, they studied how the virus changes shape in order to enter host cells. Once inside, the outer shell of the virus breaks apart, releasing viral RNA. By disabling the mechanism which breaks the shell, the compound prevents viral infection of the host.

Professor Dave Stuart, MRC Research Professor at the University of Oxford and Life Science Director at Diamond, worked on the new inhibitor. “By targeting a structural feature also found in related viruses, it should be possible to devise similar therapeutics to target them. Within the field, I am aware of one company that is already making progress in targeting the major common cold virus. Our work is still at an early stage, but we are working with academic groups in China to take the hand, foot and mouth disease inhibitor forward.”

Published online at www.nature.com/ncb, February 2014

Read more discoveries from the past 100 years on our timeline www.centenary.mrc.ac.uk/timeline

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Read more discoveries from the past 100 years on our timeline www.centenary.mrc.ac.uk/timeline
Ian Deary is Professor of Differential Psychology at the University of Edinburgh and Director of the Lifelong Health and Wellbeing-funded Centre for Cognitive Ageing and Cognitive Epidemiology. He showed Hazel Lambert around his huge office where airy windows framed by wood-panelled walls overlook George Square gardens.

Standing desk
I'd always liked standing to read if I was thinking about something, sometimes walking up and down. So I thought, why not get a standing desk? It can go up and down. It was a bit of a surprise, because once I got it I didn't put it back down again. I do all my writing and work and reading at this standing desk and I find it very refreshing to be able to do that. I have four computer screens, making a single large one. I've always wanted a 'desktop' to be a desktop. If you have a proper desk you spread things around on it. It seemed limiting to have one little screen and to have everything piled on top of it. With four screens you can spread things around. But I think probably the best object in the whole room, are the three large windows; it's a lovely outlook.

The Borderland (by Sir Arthur Streeton)
The view is of the Eildon hills and the river Tweed. It's actually Sir Walter Scott's view, and he's interposed the Kelso Bridge. Scott's view is near the beginning of the St Cuthbert's Way that I walked with my father and my son just a couple of years ago, so the picture had all sorts of things going right for it.

Portrait of Godfrey Thompson
This is a portrait of Godfrey Thompson by R.H. Westwater (who also did Compton Mackenzie and Hugh MacDiarmid). It was painted when he was knighted. Thompson devised the mental test that was used in the Scottish Mental Surveys. A lot of my research is based on following-up the research he did from the 30s to the 50s. As I did more research on the Scottish Mental Surveys, I also wanted to learn more about Godfrey Thompson's work and life. He was a talented statistician who published a lot on the structure and importance of human intelligence differences.

Books
These are the four books I've written. Intelligence: A Very Short Introduction has been translated into 10 different languages. I've tried to keep at least one copy in each language. I also like to keep the great historical books in my area as well. The blue books on the second shelf are all the studies of the Scottish Mental Surveys that my research is based on. I refer to them a great deal. It's surprising how often you need to go back to a result that was collected in the 30s, 40s or 50s.

The Alumni of the Year Award
I think this is quite an attractive object. It's made of copper and is extremely heavy. It was made by a student at Glasgow Caledonian University. It was my award for Alumni of the Year in 2009. Before I did my medical degree I first did a Higher National Certificate in Medical Laboratory Sciences at Glasgow College of Technology, which then changed into Glasgow Caledonian University. They considered me one of their alumni. So, even before I came to Edinburgh University to do my medical degree I had that medical laboratory background. It was great training. Some of the best teaching I ever received was in the Higher National Certificate. It was an unusual route to university.

Dr James Drever's chair
This chair was presented to Dr James Drever in 1931 by the staff of the George Combe Psychological Laboratory on the occasion of his appointment as the first Professor of Psychology in the University of Edinburgh. His son was the second. It's not particularly comfortable; it does still get used though when my meetings are too big.

Cardboard bike mat
I cycle three and a half miles to work and back in all weathers. Sometimes it’s wet and I don’t like to get marks on the University’s carpet, so I put this torn up potato crisp box under the bike years ago. The bike oil and mud have accumulated a bit on the cardboard, but the carpet underneath is clean, so it’s done its job.

Portrait of Sir Francis Galton
This is a likeness of Sir Francis Galton surrounded by all the things he discovered; for example the anticyclone in weather mapping and the normal curve for heights. My approach in psychology is to understand the nature and causes of individual differences in psychological traits. He was the first to try and systematise the study of individual differences in cognition and personality.
Professor Susan Gathercole, Director of the MRC Cognition and Brain Sciences Unit (CBU), Cambridge

“There’s something rather special about being an MRC director. You need to know what everybody’s doing and they need your support and direction. We have a very close and productive community, a place that doesn’t have much regard for hierarchy; I’m completely in support of that.”

Career in brief
• Career highlight: Returning to the CBU as director in 2011, having completed a four year post as a junior scientist at the unit in 1988.

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The field of psychology that still engages me most, 35 years after graduating as a psychology undergraduate, is cognition. For me it’s the heart of the discipline, focusing on the processes and systems involved in the higher mental processes that are central to adaptable human behaviour. Research has been transformed, in the past 15 years, by the development of cognitive neuroscience methods that enable us to understand how cognition is embedded the brain.

My particular interests are in the areas of memory, attention, language and learning. I investigate how these systems operate during childhood, the period of life when learning is most vital. Much of our work focuses on how these can go wrong during development, leading to difficulties in reading, mathematics, language and attention control. The ultimate goal is to improve children’s outcomes by developing interventions and effective methods of educational support.

The CBU (previously the Applied Psychology Unit) is a very special place to work, with a history spanning nearly 70 years of ground-breaking research on cognition. It’s a unique place to work – we’re in a beautiful Georgian house close to central Cambridge with lovely gardens. History has it that the first director of the unit, a university employee, personally bought this house and then informed the MRC they needed to reimburse him the price!

The building may look traditional from the front, but we’ve got highly specialised facilities on site. A state-of-the-art magnetic resonance imaging (MRI) machine looks at the fine-grained structure of the brain, and a magnetoencephalography (MEG) facility gives us the precise temporal resolution needed to understand how brain activity changes millisecond by millisecond. Combining these techniques, we get a really good set of insights into how the brain works.

My day-to-day work is a mix of research and administration, as well as strategic thinking and direction. A lot of my time is spent liaising with people within and outside Cambridge, finding ways to move forward that go beyond the unit; a very exciting prospect. Protecting my time for research is probably the biggest challenge.

The most pleasurable activity for me is writing. I really love crafting written language to convey findings and ideas in a simple way. A few years ago I wrote a practical guide for teachers, as a lot of what I do is relevant to the classroom. I wanted to write a book that wasn’t clogged up with academic language and references. I wrote it in eight weeks and could think of nothing else; it was quite a relief to finish it.

Being an academic provides a degree of flexibility you won’t find in many other professions. I’ve got five children, aged between 13 and 27. To succeed in this career, you have to be prepared to make firm decisions about what you can and can’t do, and the time you will put to it.

The highlights of my career have undoubtedly been coming back to the CBU as director. I was contacted to suggest potential candidates for the position by the head hunter, without being asked if I was interested in applying myself! But encouraged by others, I applied anyway. It has meant that I can play a role in preserving the core values of the CBU: understand cognition, use the highest quality methods guided by innovative theory and try to make a difference.

Suffrage Science

On International Women’s Day in 2013, Susan was one of 12 scientists to be honoured with a Suffrage Science heirloom for her achievements in science.

The bespoke jewellery heirlooms were designed by students from Central Saint Martins UAL. The awards scheme draws its inspiration from the presentation of jewellery to members of the suffrage movement. Launched in 2011 by the MRC Clinical Sciences Centre, 44 women scientists and communicators have now been honoured with an heirloom. Susan will pass her heirloom on to a nominee of her own choosing in 2015. “It was a lovely surprise to have been recognised and honoured in this way. The passing-on element of this award will help to encourage others in the future.”

International Women’s Day this year was marked by the distribution of a beautiful heirloom (picture), designed by undergraduate jewellery designer, Woo Seok Leon. His design, which fuses the male and female insignia to symbolise gender equality, will also be manufactured as cuff-links.

The 2014 annual awards ceremony will take place this summer in partnership with L’Oréal. For more information about the Suffrage Science project, check for updates at www.csc.mrc.ac.uk/PublicScience/FabricsOfLife

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UPDATE AT...
The Research Complex at Harwell (RCaH) has been awarded a funding renewal of £11m by the MRC, STFC, BBSRC, EPSRC, NERC and Diamond Light Source to enable continued operation of this leading multi-disciplinary centre of scientific excellence. The building is managed as a ‘research hotel’ with core funding for the Director, core staff and access to a centrally-managed equipment base. This support enables both life and physical sciences groups to base RCUK-funded science programmes on-site, providing stability for long-term groups to tackle challenging problems and take advantage of the proximity to Diamond and other facilities on the Harwell Campus.

Director Professor Simon Phillips said: “I am delighted that RCaH funding has been extended until 2019. Since the laboratory opened in 2010 it has grown rapidly to house a remarkable multidisciplinary community of physicists, chemists and engineers as well as biomedical scientists. We now have a unique opportunity to work together and apply novel techniques in imaging, time-resolved methods and structural biology to a range of challenges, not only in biology and medicine, but also in novel materials, engineering and industrial processes.”

www.rc-harwell.ac.uk

Biological imaging at Diamond

The MRC, with the Wellcome Trust and the Biotechnology and Biological Sciences Research Council, has granted £15.6m for a new biological cryo-electron microscopy imaging centre at Diamond Light Source.

The new centre will be co-located with one of Diamond’s Phase III beamlines – the X-ray nanoprobe – in a new purpose-built building alongside the landmark silver doughnut-shaped synchrotron on the Harwell Campus. Operating like a beamline, it will complement Diamond’s current capabilities.

Powerful cryo-electron microscopes will probe cells to advance understanding at the molecular level and provide new tools for visualising single bio-molecules. The facility will offer a centralised approach for broad, cost-effective access to specialised techniques. It will be accessed through peer review and open to UK, EU and other international scientists.

Professor Dave Stuart, MRC Research Professor at the University of Oxford and Life Science Director at Diamond, said: “This new investment will provide a unique approach which will integrate the activities of the synchrotron and the capabilities of electron microscopy. It will create a new synergy between the scientific techniques on offer. It is hoped that through the major advances in visualising of sub cellular mechanisms will be made.”

For more information, contact Silvana Westbury, PR Manager, Diamond Light Source silvana.westbury@diamond.ac.uk

Cardiff

The MRC Centre for Neuropsychiatric Genetics and Genomics (CNGG) has been awarded continued MRC funding of £2.3m until 2019, with 10 per cent co-funding from the National Institute for Social Care and Health Research. The award will allow the centre to continue its work in understanding how genes are involved in a range of common psychiatric and neurological disorders and help to develop new approaches to diagnosis and treatment.

CNGG Director Professor Mike Owen said: “We have known for a long time that genes play an important role in disorders such as schizophrenia, bipolar disorder, depression, attention deficit hyperactivity disorder, Alzheimer’s disease and Parkinson’s disease. Now, using modern genetic technologies, we have begun to identify some of the specific genes and brain mechanisms involved.

“An important focus over the next five years will be to continue this work and to understand how genetic risk impacts on psychiatric symptoms and brain function both across and within current diagnostic categories. We will also look at how risk genes lead to illness, essential if we are to understand the mechanisms by which these disorders come about. These advances will be crucial if we are to develop novel and more effective treatments for these disabling conditions.”

medicine.cardiff.ac.uk/cngg

Leicester is to house a prestigious Cancer Research UK Centre as part of a national £100m investment by Cancer Research UK to help train a new generation of cancer researchers and get new treatments and diagnostics to cancer patients sooner.

The Leicester centre is a partnership between the University of Leicester and Leicester’s Hospitals, working with the MRC Toxicology Unit and the locally-based charity Hope Against Cancer.

The investment marks the latest phase in the development of the Cancer Research UK Centres network of excellence – a unique chain of research hubs that have been established across the country.

Cancer Research UK is providing funding over three years from April 2014 and will provide staff positions to support the Centre’s infrastructure and a PhD studentship account for training the next generation of cancer researchers.

To find out more visit mrc.io/cancer-research-uk

Hope against cancer

For the latest information on MRC funding opportunities, visit www.mrc.ac.uk/fundingopportunities
Sharing data saves lives

Having the necessary infrastructure and information governance in place is essential to ensure that patient data are handled in accordance with current ethical norms and that identifiable data are safeguarded; that is what is meant by ‘safe data in safe havens’. Recently we have invested £90m to tackle health and bioinformatics challenges for the advancement of medical research. Here, two MRC researchers explain how medical records can be handled safely to improve the services provided to patients and the population as a whole.

Professor Jill Pell is Director of the Institute of Health and Wellbeing at the University of Glasgow

I am fortunate to have spent my whole career in Scotland where it has been possible to access high quality data on hospitalised patients for several decades. I first used patient data for research 30 years ago, as part of my MD, and have continued to do so since.

Patient data are extremely versatile in their uses. As an NHS public health consultant, I used patient data to undertake health services research and observational intervention studies in order to improve health service design and delivery. For example, linking a disease register with hospitalisation and death certificates enabled us to study whether the outcomes of trials undertaken on specific sub-groups of patients were generalisable to the whole population. This allowed us to make informed decisions about how best to translate research findings into clinical practice.

As an academic, I have used patient data to perform both epidemiological studies, to identify modifiable risk factors for diseases, and natural experiments, to study the impact of new health policies. An example of the latter includes a portfolio of projects we undertook following removal of identifiers. Approved data users, who have been trained in information governance, can then analyze the data remotely. The actual data remain within a safe haven throughout and users can only extract results. Safeguards are in place to prevent re-identification of individuals, including controlled access to data that could potentially identify individuals. Such developments will help to maintain the confidence of data controllers and the general public as data become more widely used.

Over the last 30 years, I have witnessed the important contributions that patient records can make to our understanding of health and provision of healthcare. I look forward eagerly to the new possibilities that the ongoing developments will afford.

Of particular note is the ongoing development of ‘safe havens’. Individual level data can be linked and placed within a safe haven following removal of identifiers. Approved data users, who have been trained in information governance, can then analyze the data remotely. The actual data remain within the safe haven throughout and users can only extract results. Safeguards are in place to prevent re-identification of individuals, including controlled access to data that could potentially identify individuals. Such developments will help to maintain the confidence of data controllers and the general public as data become more widely used.

Over the last 30 years, I have witnessed the important contributions that patient records can make to our understanding of health and provision of healthcare. I look forward eagerly to the new possibilities that the ongoing developments will afford.

Professor Liam Smith is Head of the Department of Non-Communicable Disease Epidemiology and Professor of Clinical Epidemiology at the London School of Hygiene and Tropical Medicine

Information from people’s medical records is not just important for running a safe effective health service; it’s absolutely central and essential. An example of when I first used patient data was during the MMR vaccine and autism scare. We used electronic, confidential and anonymised health records from general practice to show that the vaccine was safe. This was complemented by studies done in other countries (Denmark, the USA) based on medical records showing that the worry about autism was misplaced. This has since led to restored faith in the vaccine.

Plenty of new vaccines are coming along and what we need to do as they are introduced in the UK is to see that they are safe and effective, and that the people who need them are getting them. The only way we can do this thoroughly is through using people’s medical records.

As a GP I look in the records of people in my practice, several thousand people, but that’s not enough. We need to look at millions of records to reliably measure the effects of drugs and other interventions. These data are essential for basic science as well as knowing how many people are having strokes and in turn whether we are providing the right care for them in hospitals.

This isn’t new. We’ve been using electronic health records for a long time with great benefits and there haven’t been adverse leaks. In fact I think they’re much safer and provide more opportunities than paper records for example, which can go missing.

The risks are there but small and can be minimised. For example, MRC-funded research requires approval by a research ethics committee; the use of de-identified data in an approved research environment with robust technical and security standards; a full audit trail of data use and privacy impact assessment of results. Crucially, all of these actions are the responsibility of named scientific leadership carried out by accredited researchers.

The benefits are huge. In fact the benefits are not just huge – I think the use of these records is completely central to a modern, safe, effective health service.