



## Life changing gift

Imperial alumnus gives £40m to transform biomedical engineering research

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### ROBOT REVOLUTION

Behind the scenes at the new Robotics Network

CENTRE PAGES



### LIGHT MATTERS

Scientists close in on quest to turn light into matter

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### MARKET LEADER

Diane Morgan, Associate Dean of Programmes at the Business School

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EDITOR'S CORNER

## The long game

I stumbled across a great tweet this week stating that 'there are just two types of research: applied and not-yet-applied.' History is littered with examples of **fundamental research** that many years later spawned applications that no one could have foreseen. One case that we are now seeing unfold before our very eyes (or not, in the case of its cloaking application!) is the work of Professor Sir John Pendry into the behaviour of light. It has laid the foundations for an entirely new field of technology – metamaterials – which some commentators believe could have a truly **transformative impact** on society (see right). Another piece of basic research at an even earlier stage is the recent work detailing how to turn light into matter (page 6). It's been a **huge hit** on Imperial's website, with some excited readers suggesting future applications themselves, including a Star Trek-style 'beam me up' transporter. While that's unlikely, don't rule out something else equally amazing.

ANDREW CZYZEWSKI, EDITOR

Reporter is published every three weeks during term time in print and online.

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## Sustainable Gas Institute launches at Imperial

A centre of excellence for research, technology and education in gas sustainability has launched at Imperial.

In collaboration with BG Group, the Sustainable Gas Institute aims to translate research into practical solutions for the energy industry, the international research community, policy makers and investors.

Professor Nigel Brandon (Earth Science and Engineering), Director of the Institute, said: "Right now we are at a crossroads when it comes to fossil fuels including natural gas. On the one hand there are concerns about it contributing to global warming.

On the other, natural gas can provide global energy security at a time when there is increased competition for resources. We are delighted to be working with our colleagues at BG Group on this initiative to develop the next generation of technologies and infrastructure that will help us to use gas resources in a sustainable way."

Chris Cox, Executive Vice President for BG Advance at BG Group, added: "Innovation is critical to deliver an increasingly cost efficient and less carbon intensive industry. This unique Institute is a crucial collaboration to ensure gas fulfils its long-term potential."

The Institute will draw on world-class expertise to carry out research to address critical issues for gas sustainability in both the short and long-term: energy efficiency, gas innovation, and carbon capture, storage and use.

—COLIN SMITH, COMMUNICATIONS AND PUBLIC AFFAIRS

## Pendry shares \$1M prize for perfect lens

Professor Sir John Pendry known for his work on the 'invisibility cloak' and the perfect lens has been awarded the 2014 Kavli Prize in Nanoscience.

An eminent theoretical physicist, Professor Pendry receives the prize in honour of his contributions to nano-optics, which explores how light behaves on a scale of one billionth of a metre, and to the field of metamaterials – manmade materials with unusual properties that can be manipulated and used for potentially transformative impacts.

The Kavli Prize honours scientists for outstanding research in the fields of nanoscience, astrophysics and neuroscience. Sir John shares the one million dollar Nanoscience Prize with Thomas Ebbesen from the University of Strasbourg and Professor Stefan Hell from the Max Planck Institute for Biophysical Chemistry. The winners will receive their awards from the King of Norway at an award ceremony in Oslo this September.

Professor Pendry said: "I am delighted and greatly honoured to receive the Kavli Prize. It is just wonderful that this Prize is rewarding optics research more than 150 years after Maxwell's equations when the great Scottish physicist James Clerk Maxwell first set out his equations governing how light moves."

Lauding Pendry as "one of the great Imperial scientists of all time," President & Rector Sir Keith O'Nions said: "This is a prime example of how investment in high-quality research pays dividends. Future generations of physicists and other researchers will benefit from the scientific foundations laid by John Pendry and his peers."

—GAIL WILSON, COMMUNICATIONS AND PUBLIC AFFAIRS



Sir John Pendry

## Flagship leadership course champions disabled staff

The latest cohort completing the College's pioneering development course for disabled staff marked their achievements and shared their experiences at an event held on 16 May.

The Calibre Leadership Programme, which launched for the first time at Imperial last year, aims to advance the career prospects of disabled staff by equipping them with leadership strategies that reflect the unique challenges that disabled people face in the workplace.

As the first course of its kind in the higher education sector, Calibre was also open to other institutions – Imperial staff were joined on the programme by staff from UCL, Oxford University NHS Trust, the University of Hertfordshire, and London School of Hygiene and Tropical Medicine.

Course participant Althea Wroblewska, from Imperial's Finance Division, said: "The Calibre Programme has been a real journey of self-discovery for me, and I've learnt a lot about my own leadership style, both from the course and from working with others taking part. It has given me the confidence to speak up about the barriers that I and other disabled people face in the workplace in order to educate others and drive positive change."

Presenting participants with certificates, Leyla Okhai, Imperial's Equality and Diversity Manager, said: "I was delighted to see, for the second year running, how participation in the Calibre Leadership Programme had inspired and empowered participants to develop both professionally and personally. I am proud that Imperial is championing this unique course and that we are encouraging the development of all staff across our diverse community."

—DEBORAH EVANSON, COMMUNICATIONS AND PUBLIC AFFAIRS

## Record £40M gift to create new biomedical engineering centre

Imperial is to build a pioneering biomedical engineering centre thanks to an unprecedented £40m gift from Michael Uren OBE and his foundation.

The donation will support the construction of the Michael Uren Biomedical Engineering Hub, a building at Imperial West, the College's new 25-acre research and innovation campus in White City, west London.

The centre will house life-changing research into new and affordable medical technology, helping people affected by a diverse range of medical conditions. The Hub will also incorporate clinical areas, providing patients with direct access to innovations in healthcare.

President & Rector Sir Keith O'Nions said: "Imperial is profoundly grateful to Michael Uren and his Foundation for this remarkable gift, the most generous it has ever received. It will create a wholly new building and set of facilities for engineers and medics to come together and make new discoveries and innovations on an unparalleled scale. It provides enormous impetus to the development of Imperial West as an innovation district."

Michael Uren graduated from Imperial in 1943 with a degree in



Sir Keith O'Nions and Michael Uren OBE seal the agreement for the transformational £40M gift

“Imperial was inspirational when I first joined it as a young engineering student in 1940... and it is inspirational today.”

Mechanical Engineering and Motive Power, going on to serve in the Royal Navy from 1943 to 1946. Mr Uren, who founded Civil and Marine Ltd, played a major part in the development of the UK offshore marine aggregate industry, and pioneered the use of blast furnace slag as a special cement to enhance the durability of concrete, while reducing the emission of carbon dioxide gases by over 90% compared with standard cement production. He received an OBE in 1999 for services to the Royal London Society for the Blind.

Mr Uren said: "It is an honour for me to be able to help this great university. Medical teaching and

research didn't exist at Imperial in my day, but it has evolved into an institution where the work between engineering and medicine is today one of its outstanding strengths. Imperial has always applied academic excellence for the greater good, and I am thrilled by the prospect of this Biomedical Engineering Hub doing exactly that.

"Imperial was inspirational when I first joined it as a young engineering student in 1940, when London was under attack every night, and it is inspirational today. May it continue to be so forever."

—ANDREW SCHEUBER AND CAROLINE DAVIS, COMMUNICATIONS AND PUBLIC AFFAIRS

### in brief

#### Fellowships for six who 'advanced medical science'

Six Imperial academics have been elected to the Fellowship of the Academy of Medical Sciences for their contributions to advancing medical science. Fellowship of the academy acknowledges original discoveries and innovative application of scientific knowledge that brings about advances in human health and welfare. The new Imperial Fellows are – Professors Majid Ezzati (School of Public Health), Sebastian Johnston (NHLI), Paul Matthews (Medicine), Dudley Pennell (NHLI), Nadia Rosenthal (NHLI), and William Wisden (Life Science). They will be formally admitted to the Academy at a ceremony on 2 July.

#### £14 m boost to future energy research

Research Councils UK has committed £14 million to the Imperial-based UK Energy Research Centre to advance future energy systems research. This new funding comes from three research councils The Engineering and Physical Sciences Research Council (EPSRC), the Natural Environment Research Council (NERC) and the Economic and Social Research Council (ESRC) via the Research Council's UK Energy Programme to allow the UK Energy Research Centre (UKERC) to continue to act as the focal point of UK energy research.

#### New centre to tackle CF complications

The Cystic Fibrosis Trust announced that it is spending £2.25 million on three new Strategic Research Centres (SRC's), including one at Imperial to develop novel and innovative research and find solutions to some of the most complex issues people with cystic fibrosis face. Professor Jane Davies (NHLI) will lead a SRC focused on understanding and developing treatments for CF patients with Pseudomonas infection.

“We have trillions of bugs in our large intestine that ferment fibre – like when you make beer – and they use that for their energy source.”

PROFESSOR GARY FROST (MEDICINE), CHAIR IN NUTRITION AND DIETETICS, TALKS ABOUT THE ROLE OF FIBRE IN APPETITE SUPPRESSION ON THE IMPERIAL PODCAST.

For more visit: [bit.ly/1h82MPq](http://bit.ly/1h82MPq)



## Study to explore impact of mobile phones on children's brains

**A new Imperial-led study will investigate whether the use of mobile phones and wireless technologies might affect children's cognitive development.**

Seventy percent of 11–12 year olds in the UK now own a mobile phone, rising to 90 per cent by age 14. Most research to date on mobile phones has focused on adults and risk of brain cancers. While there is no convincing evidence that radio wave exposures from mobile phones affect health, scientists remain uncertain as to whether children's developing brains are more vulnerable than adults' brains.

The independent three-year Study of Cognition, Adolescents and Mobile Phones (SCAMP) is commissioned by the Department of Health, on behalf of multiple funders, and carried out by Imperial working with other partners. The study will follow cognitive development, including memory and attention, in approximately 2,500 year 7 (aged 11–12 years) pupils in participating schools from this September.

Current UK health policy guidelines advise that children under 16 should be encouraged to use mobile phones for essential purposes only, where possible use a hands-free kit or text and, if calls are really necessary, to keep them short.

Principal Investigator Dr Mireille Toledano (School of Public Health) explains: "This advice to parents is based on the precautionary principle, given in the absence of available evidence and not because we have evidence of any harmful effects. As mobile phones are a new and widespread technology central to our lives, carrying out the SCAMP study is important in order to provide the evidence base with which to inform policy and through which parents and their children can make informed life choices."

*Anyone who wants to find out more, or nominate their school to take part in SCAMP, can visit the website at [www.scampstudy.org](http://www.scampstudy.org)*

—FRANCESCA DAVENPORT, COMMUNICATIONS AND PUBLIC AFFAIRS

## Pledge on openness on animal research

**Imperial is one of 72 organisations to sign the Concordat on Openness on Animal Research in the UK, which was published last month.**

The Concordat was developed following an opinion poll in 2012, which showed that the public wants to know more about what goes on in animal research. It is underpinned by an agreement that communication about animal research should provide accurate descriptions of the benefits, harms and limitations of research, be realistic about the potential outputs of such research and be open about its impact on animal welfare and the ethical considerations involved.

The 72 signatories, which include universities, charities, commercial companies, research councils and other funding organisations, umbrella bodies and learned societies, have undertaken to fulfil the Concordat's

four commitments to: be clear about when, how and why they use animals in research; enhance communications with the media and the public about research using animals; be proactive in providing opportunities for the public to find out about research using animals; report on progress annually and share experiences.

Professor Maggie Dallman, Dean of the Faculty of Natural Sciences and newly appointed Chair of the Animal Welfare and Ethical Review Body (AWERB) at Imperial, said: "This Concordat comes at a good time for Imperial as we continue to review the way we manage animal research at the College in clear, accountable and transparent ways.

"My hope is that the Concordat will help organisations working in this area give their staff the confidence and support that they need, so that talking about this important work becomes the norm rather than the exception."

—NATASHA MARTINEAU, COMMUNICATIONS AND PUBLIC AFFAIRS

## Science investment boosts UK economic growth

**Researchers have found that investing public money in science and engineering research generates overall economic growth for the UK's economy.**

Professor Jonathan Haskel, Chair of Economics at the Business School, and his colleagues found that Government funding for science attracts substantial private sector investment, especially from overseas. They calculated that for every £1 spent by the Government on research and development (R&D), private sector R&D output rises by 20 pence a year. This puts the rate of return on public investment at around 20 per cent.

The report authors met with Universities and Science Minister David Willets recently to discuss the findings of the report and how it can help shape government policies.

Currently, the UK Government allocates £4.6 billion per annum to science and research programmes. According to the report authors,



Professor Jonathan Haskel

if the government made a one-off increase in public spending on R&D of £450m, market sector output would rise by £90m per year, every year.

Professor Haskel said: "The UK excels in research, development and innovation, and innovative companies are an important contributor to economic growth. The country could benefit even more if the UK Government invests further in science through university and research funding because it further attracts private investment. This could help deliver strong economic returns and growth."

—MAXINE MYERS, COMMUNICATIONS AND PUBLIC AFFAIRS

## media mentions



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### Statins for all over-40s, heart surgery pioneer urges

*THE TELEGRAPH* ▶ 17.05.2014

Everyone over the age of 40 should take statins, according to pioneering heart surgeon Sir Magdi Yacoub (National Heart & Lung Institute), *The Telegraph* reports. Sir Magdi, who is believed to have carried out more heart transplants than any other surgeon, insisted that any side effects of the drugs were ‘very minor’ compared with the benefits. He said they should be made available for sale over the counter and without the need for a prescription. His intervention follows a furore over a report in the *British Medical Journal*, which was accused of overstating the side-effects of statins by a factor of 20.

### awards and honours

#### MEDICINE

#### Presidential call for Frilling

Professor Andrea Frilling, Chair in Endocrine Surgery in the Department of Surgery and Cancer, has been elected as President of the European Surgical Association. It is the first time a woman has been called to this prestigious office. Andrea will serve for the period 2015–2016.

#### NATURAL SCIENCES

#### Five got chemistry

Five Imperial chemists have been awarded Royal Society of Chemistry Prizes in recognition of the advancements they have made in chemical sciences through academia, research, business industry or education. Dr Matthew Fuchter is this year’s Harrison-Meldola

### University building boom will boost economy

*BBC NEWS* ▶ 20.05.2014

A £9bn building boom at some of the UK’s best known universities will create jobs and boost the economy, according to a report for the Russell Group covered by *BBC News*. The study looked at building plans for the four years to March 2017. Projects range from new student accommodation to medical research facilities, science labs, office space and facilities to help start-up businesses and universities work better together. In London, Imperial West, a new campus being built at White City, will locate research, healthcare and businesses on the same site, the report says. The Russell Group’s Director General, Wendy Piatt said investment “would help keep UK universities among the world’s best.”

### Antibiotic threat ‘worse than global warming’

*THE TIMES* ▶ 23.05.2014

The threat to humanity from drug resistant infections is worse than that of climate change, a group of Britain’s most eminent medical

experts warned yesterday as they called for a global body to be created to tackle the crisis. Speaking at the Royal Society in London, the group – including Professor Sir Roy Anderson (School of Public Health) – warned that the world is facing an apocalyptic scenario in which people will die from routine infections because effective drugs have run out. Noting that the IPCC had failed to deliver legally binding international targets on climate change, Sir Roy said that action on drug resistance was likely to be “less fraught with controversy.”

### The detox delusion

*DAILY MAIL* ▶ 21.05.2014

Faddish detox treatments are not just a waste of money, they can actually harm you, Professor Alan Boobis (Medicine) told the *Daily Mail*. “As a toxicologist, I can say categorically that detox diets and products that claim to do the same are, at best, a money-gorging waste of time and, at worst, can even make you ill,” he said, adding: “Mother Nature, honed by years of evolution, has gifted the human body with a very efficient detoxing system of our own – in the form of the liver, kidneys and intestinal tract.”

Memorial Prize Winner, Professor Iain McCulloch has been named the Tilden Prize winner (both Chemistry), Professor Milo Shaffer (Chemistry) and Professor Molly Stevens (Materials) have received the Corday-Morgan Prize, and Dr Edward Tate (Chemistry) has received the Norman Heatley Award.

#### COLLEGE

#### Stepping up for latest Athena SWAN awards

The College’s Department of Materials and the School of Public Health were both successful in renewing their Silver SWAN awards for promoting women in science, while the Department of Computing took away a Bronze. This brings the total number of awards the College holds to 11. The School of Public Health was noted for its annual Athena SWAN Lecture Programme for pioneering women and the Department of Materials for its appointment of Professor Mary Ryan as Tutor for Women.



Amanda Cerny from Student Marketing and Elspeth Farrar

#### CAREERS SERVICE

#### What Uni? This Uni

Imperial has scooped first place at the What Uni Student Choice Awards in the Job Prospects category ahead of nine other nominees. The WUSCAs are voted exclusively by students at UK universities, showcasing and celebrating the excellence of UK Higher Education. Elspeth Farrar, Director of the Careers Service collected the award on behalf of her team at a ceremony held at the Waldorf Hotel in London on 13 May and hosted by broadcaster Clive Anderson.

# Scientists discover how to turn pure light into matter



When photons collide...

In 1905 Einstein described how energy and mass are intimately related, with perhaps the most famous equation in all of science,  $E=mc^2$ . Over 100 years later, researchers in the Department of Physics have set out a way to create mass from the energy of pure light – a process thought to be important in the first 100 seconds after the Big Bang.

The research, led by PhD student Oliver Pike, sought to corroborate the theoretical Breit-Wheeler Process, which states that smashing together two particles of light (photons) will create an electron and a positron. This way of creating matter has long been considered to be mathematically plausible, but demonstrating it with existing technology was deemed impossible – until now.

“Despite all physicists accepting the theory to be true, when Breit and Wheeler first proposed the theory, they said that they never expected it to be shown in the laboratory. Today, we prove them wrong,” said Professor Steve Rose (Physics).

Pike and his colleagues were discussing different applications for the apparatus used in laser fusion energy research (an active area of expertise at the College), when it dawned on them that, all along, they might have been looking at the ideal conditions to facilitate photon-photon collisions.

Their paper, published in *Nature Photonics*, outlines the plan to use a high-powered laser to blast a beam of electrons at a slab of gold. The electrons, moving at just under light speed, will interact with the gold atoms to create high-energy photons. Meanwhile, for the next stage of the experiment, the inside of a tiny gold cylinder called a hohlraum is heated to extreme temperatures by a focused laser beam. The walls of the miniature chamber emit photons in a radiation field that is similar to starlight. The photons from the first experiment are aimed into this field, enabling the energetic light particles to collide.

“The design we propose can be carried out with relative ease and with existing technology,” said Pike. “The race to carry out and complete the experiment is on!”

—GAIL WILSON WITH ALIYAH KOVNER,  
COMMUNICATIONS AND PUBLIC AFFAIRS

“Smashing together two particles of light will create an electron and a positron.”



#### History in the making

Demonstrating the 1934 Breit-Wheeler theory would provide the final jigsaw piece of a physics puzzle that describes the simplest ways in which light and matter interact. The six other pieces in that puzzle, including Dirac’s 1930 theory on the annihilation of electrons and positrons and Einstein’s 1905 theory on the photoelectric effect, are all associated with Nobel Prize-winning research.

Electrons and positrons have been created before through the interaction of many photons, but in the presence of high-energy particles. The minimalist recipe of Breit and Wheeler relies strictly on pairs of high-energy photons to collide and create an electron and a positron, as seen in the following equation:  $\gamma\gamma \rightarrow e^+e^-$ .



62% of the world’s tropics could be impacted by climate change

## Climate change about ‘more than melting ice’ researcher says

A new study has shed fresh light on how climate change will affect global biodiversity by exploring different measurements of climate change together.

Scientists use climate change metrics, such as changes in seasonality or the emergence of new climates, to predict how climate change will impact biodiversity levels; however these climate change metrics are typically studied in isolation, limiting their accuracy.

For the very first time, a study has compared climate change metrics together, on a global scale, to look at how biodiversity will be impacted.

This unique comparison reveals that when multiple dimensions of climate change are studied together, different regions emerge as threatened. For example, this new research predicts that tropical areas are set to experience novel climates, much hotter than today’s tropical climates, that are not currently experienced by species anywhere on Earth. Such climates are projected to affect up to 62 per cent of the world’s tropical areas.

Lead researcher Professor Miguel Araújo (Life Sciences) said: “Polar regions have gained substantial attention because they are experiencing a very high temperature increase. Polar climates will shrink by up to 66% in area, providing reduced habitat for arctic and subarctic species, but climate change is more than melting ice.

“Warming in the tropics will create entirely novel climatic conditions, owing to increased temperatures. Whether species will be able to adapt to them is an open question. By building an overall picture of the likely changes in climate and the ways in which these changes will affect biodiversity, as we have in our new research, we can get a much more rounded insight into how the world’s species are likely to be affected.”

The researchers argue that understanding this contrasting, but complementary, information is crucial to understanding the threats and opportunities for biodiversity. They hope this will ultimately improve natural resource management and conservation efforts.

—GAIL WILSON, COMMUNICATIONS AND PUBLIC AFFAIRS

## ‘Lethal Factor’ could be X-factor for new anthrax vaccine

Researchers have identified a section of the anthrax toxin Lethal Factor that could help produce a more effective vaccine.

Anthrax is a potentially lethal disease caused by a bacterium called *Bacillus anthracis* whose spores release toxins when inhaled, ingested or absorbed into the skin. When anthrax affects the lungs or intestines it can cause death within a few days whilst infection of the skin (cutaneous anthrax) is less dangerous.

Infection can occur from contact with infected livestock, meat or hides, but most people know about anthrax from its use as a biological weapon, notably in the 2001 attacks through the US postal system.

The international research team led by Professor Danny Altmann (Medicine) was funded by US National Institutes of Health (NIH) to explore a new form of vaccine against the anthrax bacterium. The study focussed on the part of the toxin known as the ‘Lethal Factor’ (LF) following reports of a cohort of Turkish farmers who had developed natural immunity to the less dangerous form of cutaneous anthrax.

By studying this group and using a mouse model, the researchers mapped the regions of the LF toxin



Anthrax is a potentially lethal disease caused by a bacterium called *Bacillus anthracis* (pictured)

that are targeted by the body’s protective T lymphocytes (a type of white cell that is essential for human immunity). Using this section of the LF protein as a prototype vaccine they successfully protected mice against the toxic effects of the anthrax bacterium.

The researchers say a vaccine based on these peptides should offer protection across genetically diverse human populations.

Professor Altmann said: “We have discovered a tiny section of protein that could potentially protect against this horrific disease. In this research we are not trying to revolutionise current vaccines, which is a long-haul process. Rather we are trying to demystify the immunology of this frightening infection, hopefully providing clues to help develop future vaccines.”

—FRANCESCA DAVENPORT, COMMUNICATIONS AND PUBLIC AFFAIRS



### On the defensive

Vaccination works by stimulating our immune systems to make protective antibodies. The toxic effects of anthrax are caused by a combination of three proteins – Protective Antigen (PA), Edema factor (EF) and Lethal Factor (LF). On their own each of these individual proteins are not toxic but they can still produce an immune response in terms of stimulating white blood cells. This makes them potential candidates on which to base a vaccine. Initial anthrax vaccines used weakened forms of the anthrax spore, which produced some concerning side effects.

More recently researchers have developed next generation vaccines to protect the military against bioterrorism. Until now these have focussed on the Protective Antigen (PA) protein as a means to stimulate the immune system but these vaccines require extensive treatment regimes and there are concerns about effectiveness and longevity.

## Yellow fever in retreat after mass vaccinations

New research has estimated that recent mass vaccination campaigns decreased the burden of yellow fever by 27 per cent across Africa in 2013.

Yellow fever is an acute viral disease, transmitted by mosquitoes, that affects people living in and visiting tropical regions of Africa and Central and South America. In rural areas next to forests, the virus typically causes sporadic cases or even small-scale epidemics but if it is introduced into urban areas, it can cause large explosive epidemics that are hard to control.

Although many people who contract yellow fever do not develop any symptoms, some have mild flu-like symptoms, and others develop a high fever with jaundice or hemorrhaging from the mouth, nose, eyes, or stomach. About 50 per cent of patients who develop

these severe symptoms die. Fortunately, an effective vaccine against the disease exists.

A new study led by Professor Neil Ferguson (School of Public Health) used sophisticated statistical methods to estimate the burden of yellow fever in Africa based on outbreak data, serological surveys (analysis of samples of bodily fluids which have been taken for other medical reasons) and environmental data.

They found that yellow fever was responsible for 78,000 deaths in Africa in 2013 but that recent mass vaccination campaigns, from 2006 to 2012, have led to a 27 per cent decrease in the number of confirmed cases and deaths.

Co-author of the study Dr Tini Garske (School of Public Health) said: “These results could be sustained if a high level of immunization is reached through a strong infant immunization program and preventive vaccination of populations that remain at-risk, such as migrants or populations from as yet unvaccinated districts.”

Partly as a result of the researchers’ estimates, the GAVI Alliance Board (a public-private global health partnership committed to increasing access to immunisation in poor countries), offered support for additional yellow fever vaccination campaigns in late 2013, targeting 144 million people across the endemic region in Africa.

—FRANCESCA DAVENPORT, COMMUNICATIONS AND PUBLIC AFFAIRS

“Yellow Fever is still a huge problem in parts of Africa and fortunately we have an effective vaccine.”



Yellow fever vaccination campaign in Africa



The Imperial Festival showcased new research in robotics as well as providing interactive experiences for visitors

# Automated for the people

The Imperial robots assisting humans in the home, in the clinic and over land, sea and air

There are few areas of technology that capture the public's imagination quite like that of robotics. Science fiction is probably partly responsible, with the promise that one day we might all lead lives of leisure and health with robots dealing with any demanding tasks.

The truth is that robots have been playing an ever more important role in industry and labour ever since the mechanisation of the textile loom in the 19th Century. But recent advances – including significant work at Imperial – is ushering robotics out of the shadows of the factory floor into the 'real' human world. Some of these developments were showcased at the Imperial Festival last month in the new dedicated Robot Zone in the Sir Alexander Fleming Building – which also served as a launchpad for the new Imperial Robotics Network (see box opposite page). We spoke with just a few of the researchers working in the network to find out what's coming next in the world of robotics.

## In our homes

Most of the robots in operation today are found in very controlled environments such as on assembly lines in automotive plants, where they work within a strict set of parameters on a range of repetitive tasks. They are not very good at reacting to changing circumstances, for one quite simple reason: they are effectively blind.

"The whole question of how robots are to understand enough about the world to act autonomously and intelligently within it, is the area I'm interested in," says Andrew Davison (Computing), Professor of Robot Vision. "You can call it perception, or more specifically vision, because that is the most interesting and powerful sense."

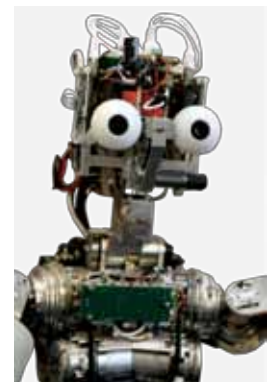
So can we just strap a digital camera on to robots' bodies and let them get on with it? Yes and no, says Andrew. He and his team make a point

of using fairly standard digital imaging technology but the real challenge is in making sense of that input.

"Really all a robot sees is a string of 0s and 1s – we have to train it to be able to identify something as a shoe or a wall, for example," Andrew says.

First, a robot must be able to map its surroundings accurately, then place itself within that map and update as it moves around – something the academic community terms Simultaneous Localisation and Mapping (SLAM). It does this by identifying key features and landmarks in the scene and estimating their position based on probability theory. As the robot gathers more data from different angles, it gradually builds up a more assured map.

Andrew has been working for some time now with British firm Dyson with a view to developing domestic robots that might perform a range household functions such as cleaning, vacuuming and maintenance. Current domestic



“Really all a robot sees is a string of 0s and 1s.”



robots are rather inefficient and dumb – relying on trial and error mostly. In February this year a new collaboration was announced with the £5 million Dyson Robotics Laboratory, with top robotics researchers being recruited from around the world. The aim is to get prototypes out in a few years' time. Perhaps then we can finally put our feet up.

### In the clinic

Historically, Imperial has pioneered the use of robotics in surgery – St Mary's was the first hospital in the UK to host the ground-breaking da Vinci surgical robot, and the first in the world to use it for heart bypass surgery in 2001. During such procedures a large robotic station equipped with mechanical manipulators and scalpels is remotely controlled by a surgeon sitting at a separate console.

While robotic surgery research continues apace at Imperial, smaller and cheaper robotic devices are also starting to find their way into other diverse areas of healthcare – including for rehabilitation, neuro-prosthetics and assistive technology.

Etienne Burdet (Bioengineering) is Professor of Human Robotics and one of his many research interests involves helping stroke patients recover some of their physical mobility. Often this is done with quite simple robotic levers that patients move to interact with a game on a computer screen. The games are

incentive-based and the robotic devices can be adjusted to deliver varying degrees of mechanical assistance, depending on the patient's impairment and level of recovery. It's affordable technology that is currently being developed with Imperial Innovations for use in various care settings and even in patients' homes.

"A patient might be asked to simulate an everyday task using our tools, such as opening a lid. We can then examine their performance and encourage them to repeat or change their movements," Etienne says.

Another robotics solution – on display at the Imperial Festival last month – is designed for people who can't move their arms or legs at all.

Dr Aldo Faisal (Bioengineering/ Computing) has developed a device that can be attached to a wheelchair, which alongside a laptop, allows people to drive around using just their eyes. Although similar systems allowing people to steer with their eyes exist, the new set-up is unique in that it can discern if the user is looking in a direction and actually wants to move there – or simply looking around to assess their surroundings. Initial tests carried out by researchers at the Imperial Festival suggest it is intuitive and responsive.

"All the smartness is in the software," says Faisal, adding that the device could cost no more than £50 and be on the shelves in 3 years' time.

### Over land, sea and air

Some would argue that we're already surrounded by the ultimate robots – perfectly adapted to their environments; their design honed over millions of years.

Dr Mirko Kovac (Aeronautics), Director of the Aerial Robotics Lab, looks to nature when designing his small, autonomous, lightweight robots that could potentially be deployed in swarm formation for exploration, sensing and even construction.

"I'm fascinated by the beauty of natural solutions; it's something that drove me to go into robotics and work at this interface between biology and engineering," Mirko says, adding: "at the moment we can't compete with the level of energy efficiency that biology achieves routinely."

Mirko and his team have built and demonstrated various bio-inspired robots to perform certain tasks: such as a 'grasshopper' robot that can jump 27 times its own height with gears and springs; a gliding robot that steers towards light using special shape-changing alloys; and a butterfly inspired glider propelled by a tiny three-stage rocket.

"We address different key challenges, demonstrate prototypes, then move to another key challenge; and as we go along we integrate certain features into more complete systems," Mirko explains.

One such system currently in development is an aerial-aquatic robot inspired by diving birds and flying fish. The team has drawn up an early design with a mass of around 2.6g that would propel itself 4.8m out of the water using a water jet propulsion mechanism. A fleet of these would work together to survey waters polluted by an oil spill for example.

At the Imperial Festival Mirko and team also showcased a new prototype aerial robot using a quad-copter capable of 3D printing a foam 'nest' for itself to land on and perform tasks. The concept could find a use in maintenance and building in remote or hostile locations such as offshore wind farms and decommissioned nuclear plants.

Who knows, perhaps someday we might see our city skylines dotted with airborne insectoid builders, busy day and night, assembling the skyscrapers of the future.

"I'm fascinated by the beauty of natural solutions."



#### Plugged into the network

The Imperial College Robotics Network launched last month brings together all the basic and applied robotics research being carried out by Imperial researchers. With more than 18 separate groups from the departments of Aeronautics, Bioengineering, Computing, Electrical Engineering, and Mechanical Engineering it forms the largest university robotics centre in the UK.

Dr Mirko Kovac has also recently co-founded a London Robotics Network, gathering Imperial, King's College and company Shadow Robotics with funding support from the government's Technology Strategy Board (TSB) to develop this regional cluster.

Meanwhile, the student Robotic Society at Imperial has also grown into quite a force after starting up around four years ago. They deliver talks, workshops and courses – and of course build robots, some of which have entered international robotics competitions such as Eurobot. With around 200 members they have access to dedicated lab space with 3D printers that they built themselves. They have even attracted private funding from companies like global chip-maker ARM.



Dr Mirko Kovac demonstrates how quadcopter robots can be used in research

# The road less travelled

Diane Morgan recently joined Imperial as Associate Dean of Programmes at Imperial College Business School after an eclectic path to the heights of business education

With artworks, travelling artefacts and a towering, colourful plant taking centre stage, Diane Morgan's office decor is somewhat removed from the sober greywash you might expect from someone senior in business or academia. But then Diane's career path is far from conventional – including stints selling wares at an Italian flea market, marketing the *New York Times* and *Washington Post* as well as spearheading innovative business education in China, the US and Europe.

Diane took up her new role at Imperial in February – her mission, to develop the vision and strategy for the MBA and MSc programmes at the Business School. It's quite an undertaking, but judging by her relaxed, friendly and calm demeanour, she isn't fazed. Having previously served as Associate Dean of Degree Programmes and Career Services at London Business School, she's confident drawing on valuable lessons learned there and applying them to the unique environment of Imperial.

"Making the most of Imperial's core strengths – science, technology, engineering, mathematics and medicine – through a globally ranked business school is the reason I moved here," she says.

Near the top of Diane's priorities is to further expand the Business School's international brand, building on the platform of Imperial's Global MBA, set to start in January 2015.

"Online courses are already having a dramatic impact on the higher education marketplace. They can offer access to students

in every country of the world including those previously excluded whilst at the same time giving us access to smart students."

Diane also aims to continue the successful work of the College in supporting women's aspirations in business. Imperial already stands out from other business schools with a near equal proportion of male and female students.

Nevertheless, Diane believes that business schools (Imperial's included) could do more to boost the low numbers of women in senior positions at the executive director level and on the boards of public companies.

"I'm always excited when I hear an MSc candidate talk to me about her plans to be a CEO; I want to hear more women say this early on."

“I'm always excited when I hear a student talk to me about her plans to be a CEO; I want to hear more women say this early on.”

Diane also sits on the board of The Forte Foundation – a consortium of leading companies and top business schools working to launch women into fulfilling, significant careers.

## Off the script

While business education has been at the forefront of Diane's career – as a student then provider – she's also keen to emphasise



that it can sometimes be beneficial to take risks.

In her early twenties she moved to Italy and worked in a flea market in Florence – the Mercato di San Lorenzo – selling products such as leather belts and wallets to tourists.

"It was always good honest work. I took real pride in finishing at the end of the day and the simple metric of having to pack less in the evening than I had unpacked in the morning," she recalls.

Ten years later and after completing her MBA at Columbia Business School, Diane moved to China to teach international business to students and English language to academic staff at the Jiangsu Polytechnic University in China.

## Balancing act

Still, Diane has learned the hard way that success ultimately means certain sacrifices – with demanding jobs having had an impact on her private life.

"There have been times when my family and friends wouldn't call me because they knew I was so busy travelling and working and that can be a lonely place to be," she says, adding that she couldn't have progressed without having that supportive network.

Although Diane lived in London between 2005 and 2012, she says

she "only scratched the surface" and has promised herself things will be different this time round.

"I'm spending more time at the theatre, reading historical novels and taking walking tours of London. Even the Jack the Ripper tour has been a great source of cultural city knowledge!"

Diane also regularly flies to New York to see family and every year she takes her two teenage nephews to explore a different country.

"My mother taught me not to wait for the moments to happen but to celebrate the wonder of life every day," she says. "As you get older in your career you realise that you have to make time for things outside of work because it's good for the soul."

—MAXINE MYERS, COMMUNICATIONS AND PUBLIC AFFAIRS



## Careering ahead: Diane's milestones

- **Consultant**, USC Marshall School of Business
- **Associate Dean**, Degree Programmes and Career Services, London Business School
- **Director**, Career Services, LBS
- **Director**, International Career Development, NYU Stern School of Business
- **Director**, Business Development, *The Washington Post*
- **Senior Marketing Manager**, *The New York Times*

# inside\*

## story

### mini profile

## Dana Winogron

Dana Winogron (Medicine) is a Data and Output Officer for the Biomedical Research Centre (BRC) based at the St Mary's Campus. She is also actively involved in volunteering with the elderly outside of work hours.

### What does the Imperial BRC team do?

Our mission is to create an environment that allows our researchers to translate promising findings in the laboratory into potential improvements in clinical care. In real terms, that means identifying and funding excellent clinical research, training the next generation of clinical academics, creating new laboratory infrastructure, involving patients and the public in our research, and managing a database of clinical studies.

### You've also been involved with charity Contact the Elderly for a few years now?

Yes, it's a really simple idea, and in essence it involves getting a small group of volunteers and elderly 'guests' together for tea parties one Sunday a month to chat in a relaxed environment, tell stories, play games and generally get to know one another. Typically some of the volunteers will offer to host a tea party at their own



home while other volunteers (such as myself) ferry guests to and from the party. It's about providing guests with a social outlet and combating isolation that is a such burden for many elderly people.

### And volunteers also get something out of this too?

Absolutely! I've become firm friends with one of my guests, Olive, who is 98 and lives alone in Archway (pictured). Having old people in your life who are not your relatives is a very rewarding and interesting experience. You are there because you want to be there and before you know it you're cracking jokes with someone 60 years older than you!

### Is there a chance for Imperial staff to get involved?

Yes, although you will need access to a car – or a ground level flat if you're interested in the hosting. Looking to the future it would be really nice to do something at Imperial with the guests, with students coming along just to chat and interact.

*To learn more about the work of Contact the Elderly and even get involved, visit their website at: [www.contact-the-elderly.org.uk](http://www.contact-the-elderly.org.uk)*



Aspiring entrepreneurs get advice at Dispatch Day

## Dispatched!

Hundreds of budding entrepreneurs got the chance to tap into unique knowledge about starting ventures at London's largest free event for new businesses organised and hosted by Imperial on 28 May.

The Imperial College Business School Dispatch Day was open to anyone with a business idea or those with an existing business and introduced visitors to organisations that provide assistance and advice – including access to finance, mentoring and support networks and trademarking products.

The event was devised by Dr Marco Mongiello, Director of MSc Innovation, Entrepreneurship and Management at the Business School.

"The main feature of this unique event is that you can talk directly with the participating organisations. You can ask the same questions to more than one of them, compare the answers and start a dialogue which, hopefully, will lead to the launch, or boost, of your entrepreneurial venture. Its real value comes from what you make of this opportunity."

Advice stalls were set up for entrepreneurs to have one-to-one conversations with people from organisations such as Start Up Loans, a government-funded scheme that provides loans and mentoring to entrepreneurs. Other organisations were also on hand to look at business plans, evaluate business ideas and answer questions from visitors.



Dr Marco Mongiello

They included Sirius (UK Trade and Investment), Microsoft Ventures and Level39.

Ultimately, the event hopes to foster greater business development in the UK by connecting entrepreneurs with organisations that can guide them on how to increase their business visibility and attractiveness to potential investors.

“Entrepreneurship plays a key role in the UK's economy from creating jobs to increasing competition.”

“Entrepreneurship plays a key role in the UK's economy from creating jobs to increasing competition,” said Marco. “This event is a real chance for budding entrepreneurs out there to take full advantage of the opportunities that we are offering through this free event.”

—MAXINE MYERS, COMMUNICATIONS AND PUBLIC AFFAIRS

## Students celebrate staff dedication at annual awards

College staff were honoured at the second annual Student Academic Choice Awards (SACAs) hosted by Imperial College Union last month.

Nearly 600 nominations were submitted by students via the Union's website for academic staff, support staff and graduate teaching assistants across eight categories (see panel, right).

The award winners were announced on the evening of 15 May at a ceremony held in the Union Concert Hall. Opening proceedings, the Union's Deputy President (Education) Nat Kempston said: "These awards are about giving our 16,000 student members the chance to celebrate the best in teaching and support we have here at Imperial."

Collecting the award for Best Feedback, Dr Jane Saffell (Medicine) said: "It was really nice to be nominated in this category because it's an area that can be a problem. One of the things I've done is to develop 'feed forward' where I highlight feedback from previous years' assignments to students before they do it themselves."

Victor Boddy (Electrical and Electronic Engineering), Third Year Electronics Laboratory



Steve Tran, President, Imperial College School of Medicine Students' Union presents Dr James Wilton-Ely (Chemistry) with the award for Best Tutoring

Technician and 4th Year Project Laboratory Manager, won the award for Best Support Staff. He said: "It really means a lot as the award is coming directly from the students. I spend a lot of time with them in the lab and it's just nice they appreciate what I do."

Closing the evening's proceedings Provost, Professor James Stirling, said: "Here at Imperial we strive for excellence both in our research and in our teaching. These awards are a testament to our success in this and it's great see they are now a regular fixture on the College calendar."

The SACAs were established by Imperial College Union last year to celebrate achievement and share best practice across the College encouraging more academics and support staff to try new teaching or supervision techniques.

—JONATHAN NARCROSS, COMMUNICATIONS AND PUBLIC AFFAIRS

The winners

### Best Supervision

Prof Mark Sephton, Department of Earth Science & Engineering

### Best Tutoring

Dr James Wilton-Ely, Department of Chemistry

### Best Graduate Teaching Assistant

Mario D'Auria, Department of Electrical & Electronic Engineering

### Best Teaching for Undergraduate

Prof Omar Matar, Department of Chemical Engineering

### Best Support Staff

Victor Boddy, Department of Electrical & Electronic Engineering

### Best Innovation

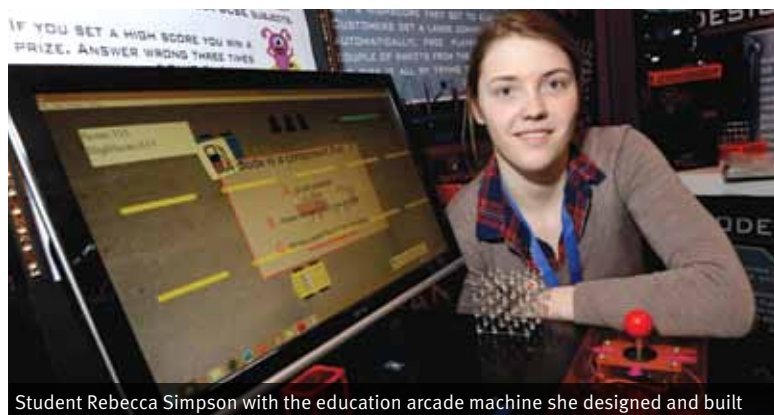
Dr David Dye, Department of Materials

### Best Feedback

Dr Jane Saffell, Department of Medicine

### Best Teaching for Postgraduates

Dr Mike Tennant, Centre for Environmental Policy



Student Rebecca Simpson with the education arcade machine she designed and built

## Student wows judges to become Young Engineer of the Year

The Big Bang Fair has grown to become the largest celebration of science, technology, engineering and maths for young people in the UK – and as such, the Science + Engineering competition that runs

alongside is hotly contested with a very high standard of entry.

To be in with a shot of scooping the overall Engineering prize, first year undergraduate Rebecca Simpson (Engineering) had to bring something special during two days of judging at the NEC Birmingham in March. And she did just that.

She wowed judges and students attending the fair with her

vending arcade machine devised to help GCSE students revise STEM subjects. The impressive thing is that Rebecca designed and built the 6 foot machine entirely from scratch, learning techniques as she went along. She used 2D design for the shell of the machine; off-the-shelf Arduino hardware for the 'brain' (which she programmed in C-based language), Flash to script the games and Photoshop for the graphics – finally wiring everything up together with electronics.

Games currently on Rebecca's arcade included a space-based maths challenge and a racing game incorporating aspects of design technology. Because the platform is open source the idea is for students to design their own games, and Rebecca says it might even be possible for schools to build the machine themselves. Jason Bradbury, a competition

judge and host of *The Gadget Show*, said, "Rebecca encompasses everything that this competition is about – her passion for engineering is irrepressible. Her creation is one of the most original and clever ideas I've ever heard of. As a father of three, I can tell you that using computer games to focus young minds on STEM subjects is right on the money."

Award winners were given a trophy, £2,000 and an experience prize. Rebecca said, "I'm so happy I've won. I'm going to use the money to develop this project further. I'm also really interested in making holograms by using LEDs, so I want to investigate this too."

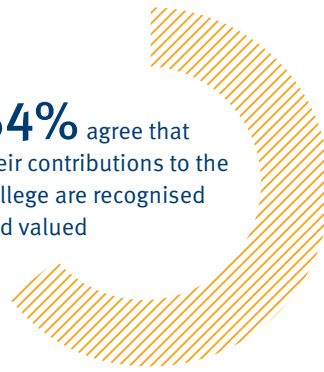
*The National Science + Engineering Competition recognises and rewards young people's achievements in STEM and encourages others to engage and consider STEM-related career paths. For more information visit: [www.nsecuk.org](http://www.nsecuk.org)*

# Your Imperial

The 2014 Staff Survey drew over 4,580 responses and paints a picture of motivated staff who enjoy working with their colleagues but have some concerns about their working environment and workload pressures. *Reporter* offers a preview.

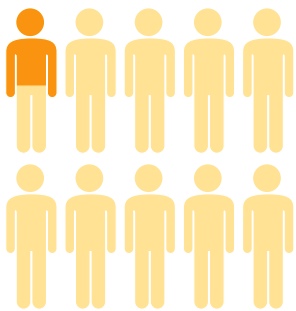
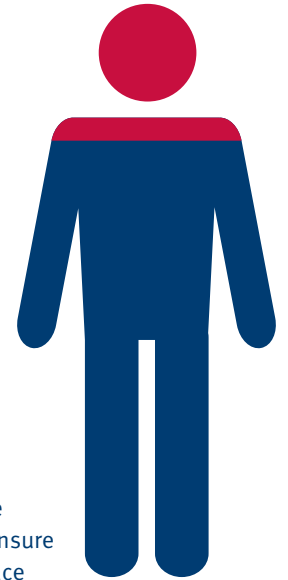
See back page for dates of presentations in June where staff can discuss the results. Later in the year *Reporter* will look at the actions departments and the College are taking in response to the survey.

**64%** agree that their contributions to the College are recognised and valued



**93%**

feel confident that the College takes the necessary steps to ensure safety in the workplace



**7%** feel they have experienced bullying from a colleague in their department/division

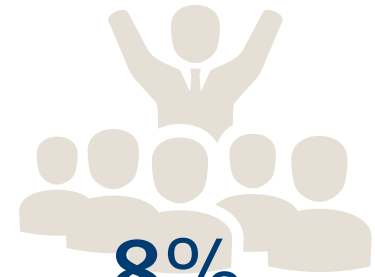


**20%**

are not confident about expressing their views and opinions without fear of negative consequences

**14%**

know about Harassment Support Contacts College-wide initiative



**8%**

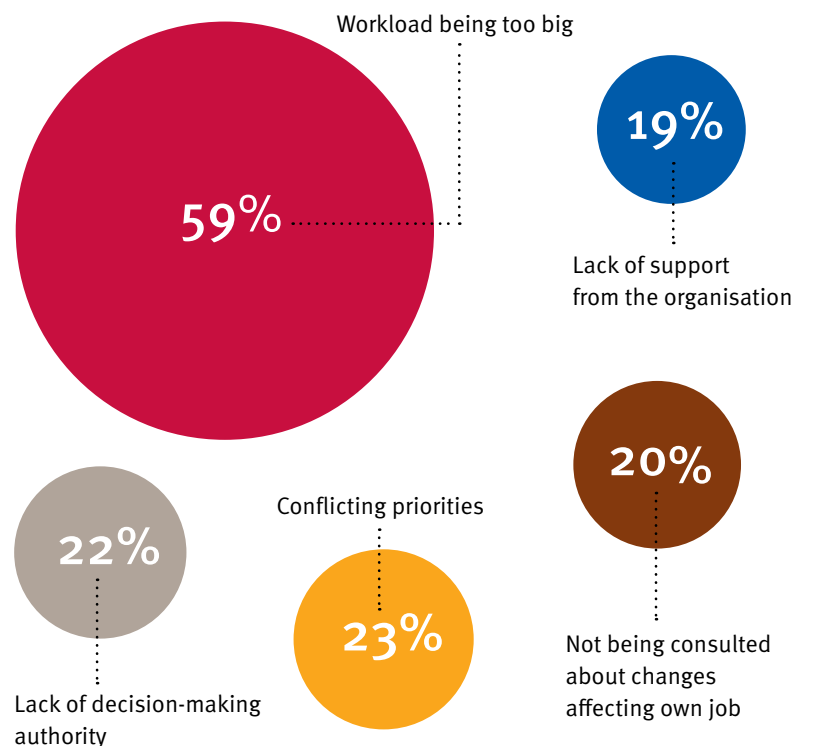
know about the Event Maker College-wide scheme

## The best thing about working at Imperial:

- 29% Colleagues & friendships
- 20% Proud to work at prestigious institute
- 17% Job satisfaction
- 9% Research collaboration
- 8% Inspirational and caring culture



## 77% have experienced unreasonable pressure at work caused by:



Student blogger Rafael

## Revision music is a dangerous thing

It's too loud. Now I can't hear it. This song is boring. This one too. No. Next. Old. Boring. This one? Or this one? Maybe I should make a playlist. Alejandro, Alejandroooo.

Sounds familiar? Revision music is massively distracting sometimes. Revising in silence can be boring, but if you have music on you'll probably spend half of the time changing the song or adjusting the volume. And if you're on YouTube, distraction is just one click away.

It only works if it is soft music, without lyrics. Ambient music, classical, maybe smooth jazz if you're feeling adventurous. Find yourself some hour-long playlist on YouTube, lock the laptop and you're set for a while.

For more of Rafael's revision tips visit: [bit.ly/1gMR9s2](http://bit.ly/1gMR9s2)



**long service**

Staff listed below celebrate anniversaries during the period 1 June – 30 June. The data are supplied by HR and correct at the time of going to press.

### 20 years

- Dr Robert Weinzierl, Reader in Molecular Biology, Life Sciences
- Sue Feller, Secretary, Civil and Environmental Engineering
- Dr Michael Bluck, Senior Lecturer, Mechanical Engineering
- Diane Lewis, Data Control Clerk, Finance Division
- Joanna Thompson, Divisional Manager, Medicine

### 30 years

- Professor Sue Smith, Professor of Medical Education, NHLI
- Professor Naomi Chayen, Professor of Biomedical Sciences, Surgery and Cancer
- Professor Peter Lindstedt, Consul for the Faculty of Engineering and the Business School

blog  
SPOT



Yachtsman and Imperial alumnus Phil Sharp

## Around the world... carbon-free

A British sailor is teaming up with researchers from Imperial to develop a zero-carbon energy system for the yacht he aims to race around the world.

Phil Sharp is an Imperial alumnus (Mechanical Engineering, 2003) who first made sporting headlines in 2006, when he won his class in the single-handed transatlantic Route de Rhum race. He is leading a new project in a bid to lead the first zero-carbon, fully-sustainable racing yacht in the next Vendée Globe non-stop round the world race in 2016.

Although wind is the obvious essential factor in keeping a racing yacht moving, the energy system – powering the autopilot, navigation systems and the water maker device that converts seawater into drinking water – is also critical for performance.

Phil Sharp Racing will be working with researchers from Imperial's Energy Futures Lab (EFL) to design an energy system that uses no fossil fuels and is sufficiently lightweight, robust and efficient to enable the yacht to perform in the world's most challenging races. This will draw on the latest innovations in hydrogen fuel cell, energy storage and solar technologies.

Professor Nigel Brandon (Earth Science and Engineering) co-supervisor of the research said of the project: "We believe it provides a powerful opportunity to demonstrate the competitiveness, adaptability and reliability of the green energy technologies of tomorrow. The association is also inspirational for students at Imperial."

Phil Sharp said: "I am very excited to be working with Imperial and the EFL, a technical centre of excellence that includes some of the country's leading researchers in solar power, energy storage and fuel cell technology."

—LAURA GALLAGHER, COMMUNICATIONS AND PUBLIC AFFAIRS

“We believe it provides a powerful opportunity to demonstrate the competitiveness, adaptability and reliability of the green energy technologies of tomorrow.”

## Welcome

### new starters

Dr Dafne Accoroni, Accommodation  
 Mr Rashid Almasarwah, Medicine  
 Dr Stephanie Archer, Surgery and Cancer  
 Mr Martin Archer, Physics  
 Dr Piotr Balwierz, Clinical Sciences  
 Dr Hella Baumann, Life Sciences  
 Dr Ayan Bhowmik, Materials  
 Mr Alastair Bond, ICT  
 Dr James Buckley, NHLI  
 Dr Natalie Butterfield, Medicine  
 Mr Diagarajen Carpanen, Bioengineering  
 Miss Mahalia Chambers, Accommodation  
 Miss Alexandra Cheung, Grantham Institute  
 Dr Michelle Clements, Public Health  
 Mr Matthew Coles, Chemistry  
 Mrs Katherine Costelloe, Surgery and Cancer  
 Mr Robert Currie, Physics  
 Mr Tom Curtin, Mechanical Engineering  
 Dr Maria Dasi Espuig, Physics  
 Dr Claire Dooley, Life Sciences  
 Mrs Mulenga Duodu, Faculty of Medicine  
 Miss Catherine Edlin, Business School  
 Mr Paschal Egan, Bioengineering  
 Miss Ellen Fryer, Development  
 Mrs Karyn Georges, Environmental Policy  
 Dr Christoforos Hadjichrysanthou, Public Health  
 Professor Peter Harrison, Computing  
 Mr Robert Horton, ICT  
 Professor Brian Hoskins, Grantham Institute  
 Mr Steven Howes, Finance  
 Miss Bernice Huang, Finance  
 Ms Gemma James, Human Resources  
 Mr Andrew Jenkins, Chemistry  
 Miss Courtney Johnson, Accommodation  
 Mr Hawkeye King, Computing  
 Dr Nitya Krishnan, Medicine  
 Dr Emma Lawrence, Public Health  
 Dr Guillaume Lepert, Physics  
 Dr Ifung Lu, Surgery and Cancer  
 Mr Massimiliano Lucci, Imperial College Union  
 Dr Miguel Magano Hipolito de Jesus Oliveira, ICT  
 Mr Jowayne Marks, Accommodation  
 Dr Horst-Moritz Maus, Bioengineering  
 Ms Natalia Molodecky, Public Health

Mr Christopher Neill, Medicine  
 Miss Annuh Ngatai, Business School  
 Miss Hanna Nicholas, Surgery and Cancer  
 Dr Mu Niu, Public Health  
 Dr Zhan Ong, Materials  
 Dr Kerstin Pannek, Computing  
 Dr Robert Parker, NHLI  
 Dr Perrine Pelosse, Public Health  
 Dr Maxime Petit, EEE  
 Ms Mel Phillips, ICT  
 Dr John Porter, Surgery and Cancer  
 Mrs Hayley Protheroe, Medicine  
 Dr Nishanthi Ranganathan, Medicine  
 Mr Florian Rathgeber, Computing  
 Mr Paulo Ribeiro Faria, Accommodation  
 Mr Georgios Rigas, Aeronautics  
 Mr Gabriele Rocco, Aeronautics  
 Dr Agnieszka Rutkowska, Chemistry  
 Dr Matteo Scala, Physics  
 Miss Francesca Scozzafava, Faculty of Medicine  
 Mr Cameron Setchell, Business School  
 Dr Eleanor Sheppard, Faculty of Medicine  
 Mr Chun Siew, Public Health  
 Mr Graham Smith, Chemistry  
 Dr Anna Sroka-Bartnicka, Chemical Engineering  
 Mr Simran Sroya, Accommodation  
 Mr Andrew Styles, Accommodation  
 Miss Kai Sun, Computing  
 Miss Alexis Thomas, Surgery and Cancer  
 Mr Christophe Tytgat, NHLI  
 Mr Jonas Van Hove, Business School  
 Ms Carolin Vegvari, Public Health  
 Dr Anju Verma, Public Health  
 Miss Ruth Verstraten, NHLI  
 Dr Alessandra Vitale, Chemical Engineering  
 Mr Robert Walecki, Computing  
 Dr Andrew Waters, Life Sciences  
 Miss Samantha Wilkinson, Public Health  
 Miss Peng Wong, Public Health  
 Mr Dean Woodhouse, Imperial College Union  
 Mr Alexander Wray, Chemical Engineering  
 Dr Wan Yue, Chemistry  
 Dr Xiaoxue Zhang, Materials  
 Dr Long Zou, EEE

## Farewell

### moving on

Mrs Stella Ajoku, NHLI  
 Miss Sarah Atkinson, Business School  
 Mr Vasileios Avgerinos, Civil and Environmental Engineering  
 Dr Ryan Bayliss, Materials  
 Ms Julie Bennett, Business School  
 Mr Sam Bott (5 years), ICT  
 Mrs Hanna Box, NHLI  
 Dr Valeria Branciforti, Faculty of Engineering  
 Ms Sonia Brownsett (7 years), Medicine  
 Dr Byambajav Buyandelger, NHLI  
 Miss Mira Chawda, Medicine  
 Dr Wonjae Choi, Mechanical Engineering  
 Dr Hassanul Choudhury, Life Sciences  
 Mr Jonathan Colmer, Grantham Institute  
 Miss Kate Colthurst, Imperial College Union  
 Mr Jose Cortell Fores, Mechanical Engineering  
 Mr Martin Dansey, Bioengineering  
 Mr Paul Dingwall, Chemical Engineering  
 Mr Nicolas D'Ippolito, Computing  
 Dr Panagiotis Drymoussis, Surgery and Cancer  
 Dr Marjet Elemans (6 years), Medicine  
 Dr Enas Elsafa, Medicine  
 Dr Gianlorenzo Fagiolo (8 years), Clinical Sciences  
 Dr Sarah Filippi, Life Sciences  
 Dr Paolo Gabrieli, Life Sciences  
 Dr Alejandra Garcia-Cattaneo, NHLI  
 Mr Ian Gillett (26 years), Health and Safety  
 Mr Rishi Goburdhun, Bioengineering  
 Dr Chris Haley (7 years), Development & Corporate Affairs  
 Mrs Mary Harrison, Medicine  
 Ms Philippa Hayes, Surgery and Cancer  
 Dr Neveen Hosny, Chemistry  
 Dr Jennie Hutton, Chemistry  
 Mr Matthew Jackson, Surgery and Cancer  
 Dr Rajeshree Khengar, Medicine  
 Dr Rustem Khusainov, Bioengineering  
 Dr Paul Kirk, Life Sciences  
 Mrs Gudrun Knoell, NHLI  
 Dr Giorgos Kopanos, Chemical Engineering  
 Dr Lemonica Koumbi, Medicine  
 Mr George Kyriakides (17 years), Finance  
 Dr Anna Leczkowska, Chemistry

Mrs Olga Leonova, Medicine  
 Dr Laura Lombardero Iturrizaga, Medicine  
 Dr Kit Longden (8 years), Bioengineering  
 Mr Christopher Lynch, Medicine  
 Mr Jonathan Marshall, Chemistry  
 Mr Craig McFarlane, Finance  
 Mr Henrik Morgen, Climate KIC  
 Mr John Morland (28 years), ICT  
 Dr Jovan Nedic, Aeronautics  
 Dr Quang-De Nguyen (8 years), Surgery and Cancer  
 Mr Pavan Parthyally Narasimhareddy, ICT  
 Miss Clare Pearson, Public Health  
 Dr Amandine Prelat, ESE  
 Mr Pedro Rente Lourenco, Bioengineering  
 Miss Zoe Richardson, Imperial College Union  
 Mr Brian Robertson (18 years), Health and Safety  
 Miss Laura Roca Alonso, Surgery and Cancer  
 Miss Katie Rogers, Public Health  
 Mr Reuben Rowe, Computing  
 Mrs Anu Sadasivan Pillai, NHLI  
 Mr Patrick Scarff, Registry  
 Dr Ulrike Schoetz, Surgery and Cancer  
 Dr Adam Scholefield, EEE  
 Ms Elham Shamsaei (6 years), Surgery and Cancer  
 Dr Safa Shoai, Chemistry  
 Miss Helene Skarparis, EYEC  
 Miss Isabelle Smith, Imperial College Union  
 Mrs Paula Smith, Business School  
 Dr Graeme Stasiuk, Chemistry  
 Dr Eleni Stavrinidou, Materials  
 Mr Paul Urquhart (7 years), ICT  
 Miss Rosemary Waldron, Comm and Public Affairs  
 Mrs Sharona Walker, Outreach  
 Mr Peter Wilcox, Estates Division  
 Dr Huifang Xu (5 years), NHLI  
 Dr Thomas Zlosnik, Physics

This data is supplied by HR and covers staff leaving the College during the period 8 May – 3 June. This data was correct at the time of going to press.

✉ Please send your images and/or comments about new starters, leavers and retirees to the Editor at [reporter@imperial.ac.uk](mailto:reporter@imperial.ac.uk)

The Editor reserves the right to edit or amend these as necessary.



12 JUNE ▶ PUBLIC TALK

## Annual Athena Lecture: Passion, parasites and people

The annual Athena Lecture celebrates the achievements of women in science, technology and medicine. It is delivered this year by Professor Deborah Smith OBE, Pro-Vice

Chancellor for Research, University of York. Professor Smith will talk about her career journey, which has taken place on the crest of the molecular biology revolution. Now a prominent leader in higher education, her research is underpinning the development of drugs and vaccines for neglected infections, including human leishmaniasis and African sleeping sickness.



12 JUNE ▶ PUBLIC TALK

## Going brown or getting greener

Whilst some aspects of climate change remain hotly debated, it is beyond dispute that concentrations of atmospheric carbon dioxide are continually increasing as a result of human activities. Yet, if all of our carbon dioxide emissions stayed in the atmosphere, we would

have expected to see a much higher rate of increase than the current level. This has led to the theory that the Earth's vegetation helps moderate increases in carbon dioxide. In his inaugural lecture Professor Jon Lloyd (Life Sciences) explores the mechanisms involved in this process and evaluates how vegetation and soils may operate in the future.

### Cheltenham Science Festival

Imperial's clinicians, surgeons and engineers are putting on an amazing array of talks, debates and interactives at this popular public event about all things science. Join in the Twitter chat at #cheltscifest.

3 JUNE

#### Flexible tech

Join Jenny Nelson (Physics) to learn about flexible solar panels that are far smaller, cheaper and more flexible than today's best technology.

4 JUNE

#### Flu: a pandemic in waiting?

Professor Peter Openshaw (Medicine) speaks flu and how to prevent future pandemics.

6 JUNE

#### How to build a bionic man

Dr Dominic Southgate (Bioengineering) shows off the latest in prosthetics and exoskeletons, which join human and machine.

6 JUNE

#### The psychology of war

Medical historian Dr Emily Mayhew (Co-curricular studies) explores the trauma of battle in World War I.

6 JUNE

#### The BMI lie

Professor Jimmy Bell (Institute of Clinical Sciences) explores the topics surrounding this complex issue, asking: what size is healthy?

6 JUNE

#### Future of human enhancement

Professor Robert Winston (Professional Development) discusses the benefits, implications and ethics of human enhancement.

6-8 JUNE

#### Surgery live

Professor Roger Kneebone's Explore Surgery team (Surgery & Cancer) runs surgical simulations throughout the Festival.

7 JUNE

#### Is intelligence inheritable?

Professor Robert Winston (Professional Development) argues the case for nature and nurture in determining our intelligence.

7 JUNE

#### Will we ever understand the universe?

Theoretical physicist Professor Fay Dowker (Physics) discusses the big unanswered questions about the universe.

9-13 JUNE ▶ EXTERNAL

#### Universities Week

UK universities celebrate improving lives. Knit a blood vessel and chat with researchers from the NHLI at Imperial's Blood Lines stand on 9-10 June at the Natural History Museum. Also join in online as Imperial takes part in #UniWeek #IdeasForLife Twitter chat every day this week.

11 JUNE ▶ PUBLIC TALK

#### The electron revolution in propulsion

Combining gas turbine and superconducting electrical technologies for future aircraft propulsion, with Dr Colin Smith, Rolls Royce at the Gabor Lecture 2014.

16 JUNE ▶ PUBLIC TALK

#### Disruptive innovations in life sciences

Dr Noubar B Afeyan, Managing Partner & CEO, Flagship Ventures & Senior Lecturer at MIT Sloan School of Management delivers the Institute for Global Health Innovation annual lecture.

19 JUNE ▶ PUBLIC TALK

#### Elliptic curves

Explore the history of counting points on elliptic curves, from ancient Greece to the present day. Inaugural lecture of Professor Toby Gee (Mathematics).

### Royal Society Summer Science Exhibition

Come and support Imperial researchers presenting exhibits at this annual display of UK science and technology, free and open to all, from 1-6 July.

#### Set controls for the heart of the Sun

Physicists showcase how lasers are recreating the sun's core to explore nuclear fusion. Interact with Arthur Turrell (Physics) on Twitter @arthurturrell using #asksummerscience.

#### Smart wing design

Learn about the aerodynamics of flow control and wing design. Interact with Dr Kevin Gouder (Aeronautics) on Twitter @aeflowcontrol using #asksummerscience.

#### Brain networks

Discover how the brain changes when affected by severe and traumatic injuries, with Professor David Sharp (Medicine).

#### Higgs boson and beyond

Find out about the Higgs boson with Dr Paul Dauncey (Physics). Interact on Twitter @HiggsBosonRS14 using #asksummerscience.

## take note

### Staff feedback

The Provost is inviting staff to discuss the results of the 2014 Staff Survey at presentations taking place at:

- South Kensington Campus: Wednesday 11 June, 10.00, Clore Lecture theatre, Huxley Building
- Hammersmith Campus: Thursday 12 June, 10.00, Lecture Theatre 2, Wolfson Education Centre
- St Mary's Campus: Friday 20 June, 09.30, Anthony de Rothschild Lecture Theatre, Medical School Building, 2nd Floor
- Silwood Park Campus: Friday 20 June, 13.30, Fisher Lecture theatre

For more info visit: [bit.ly/staffsurvey14](http://bit.ly/staffsurvey14)



MEET THE READER



### Daniel Mapp, Development Communications Officer

#### What are you doing in the picture?

Looking through donor reports from US universities. The US is the world leader in philanthropy for higher education and there's a lot of interesting work communicating the difference that donors make. We're catching up fast in the UK, with a number of eight-figure gifts for universities in the past ten years, including Michael Uren's recent £40m donation (page 3).

#### What would you do if you were Editor of Reporter for the day?

One of the things we fundraise for is scholarships, providing tuition fees and living expenses for students. I'd like to interview scholars who graduated ten years ago to see what they're doing now and how their scholarship benefited them.

#### Who would be your cover star?

I'd like to feature Kenneth and Mary Minton who recently endowed a chair in renal medicine. I was lucky enough to meet them and was really impressed by their determination to make a difference through their support for church buildings, education in Africa, and now this substantial donation to Imperial.

Want to be the next reader featured in Reporter? Send in a picture of yourself to:

✉ [reporter@imperial.ac.uk](mailto:reporter@imperial.ac.uk)

## Stay in the loop

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