



Biology meets Engineering

Paul Freemont and Richard Kitney
discuss the growing field of
synthetic biology ... **CENTRE PAGES**



£9.3 MILLION UNIHEAT PROJECT

Imperial to
help improve
oil refining in
Russia

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TEDx AT IMPERIAL

Live talks
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speakers held
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a visit to ICU
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EDITOR'S CORNER

Brain food

One of my favourite things about editing *Reporter* is getting the chance to hear staff members talk passionately about their research. So, when my friend Katherine suggested I feed that interest further by logging onto the TED talks website last year, it wasn't long before I was dipping into the archive of inspirational free talks. "It's completely addictive," she warned me, and after watching five talks back-to-back – including one given by brain researcher, Jill Bolte Taylor, who gained huge insights into neurology after experiencing a massive stroke herself – I was completely hooked.

Soaking up intriguing and easily digestible ideas

emanating from the brains of amazing people across the world has now become a daily habit. And it's clear I'm not alone at Imperial in my enthusiasm for what TED offers. A **group of student fans** of the site will be opening up the world of TED to others at the College, and beyond, at a TEDx event on 24 March, showcasing research from Imperial in the bite-sized and engaging format that has been so popular online. To find out more about the event and how to win tickets, see page 10.

EMILY ROSS-JOANNOU, EDITOR

Reporter is published every three weeks during term time in print and online. The next publication day is 29 March. Contact Emily Ross-Joannou: reporter@imperial.ac.uk

ARTSFEST 2012

In the last week of February, the College celebrated Imperial's artistic and musical side with the annual ARTSFEST. Students were tempted into impromptu tango lessons in the JCR, gave dramatic soliloquies in the Sheffield Building foyer and even decamped to the Builders Arms pub to bravely recite their own poetry.

This year's events also included a fairytale-themed concert by Imperial College Symphony Orchestra, held at Cadogan Hall, a poetry night, acting workshop and dance classes.

One of the organisers of ARTSFEST 2012 is Heather Jones, an undergraduate in the Department of Physics. She said: "It's important for students to get the opportunity to try new things and a week like ARTSFEST, where almost everything is free, is an excellent way to give people a way into an activity they haven't tried before."

The giant web which colonised the Blyth Gallery last month was an exhibit organised by Photo-Soc and the Leonardo Fine Arts Society called Twisted (pictured). The piece, which included photographs, aimed to take visitors on a claustrophobic journey as they tunnelled further into the tangle,



and was made from more than three-and-a-half kilometres of black wool.

— JOHN-PAUL JONES, COMMUNICATIONS AND DEVELOPMENT

Exploring Japan on Sanka Day

Dancing, drums and judo aren't top of the list of subjects you would expect to learn at Imperial, but they were the core curriculum for the 100 schoolchildren visiting the College for its second Sanka Day last month (*sanka* is Japanese for "participation").

The event brought local primary schoolchildren to the South Kensington Campus to learn more about Japanese culture and history. The day is inspired by Imperial's role as host to Japanese athletes during this year's Olympics. It is also an opportunity for the children to visit a university campus and learn more about the upcoming games.

Alongside some traditional Japanese dancing and trying a few judo moves, the children turned their hand to taiko drumming and learnt Japanese phrases. Sanka Day also welcomed a film crew from NHK, the



Japan Broadcasting Corporation, who were visiting to film the day's activities, as well as some of the facilities Imperial will be providing to Japanese Olympic competitors, for their sports news broadcasts.

Carrie Flood, one of the teachers accompanying the schoolchildren, said: "The children have really enjoyed it and they've learnt a lot about Japan and Japanese culture"

"The children have really enjoyed it and they've learnt a lot about Japan and Japanese culture"

Japanese culture. They've also enjoyed having access to these types of facilities."

The day was organised by Sport Imperial, with support from the rest of the Commercial Services Division, following the first Sanka Day in September last year. Another will follow in May.

To watch a Sanka Day in action and hear from some participating schoolchildren see: <http://bit.ly/sankaday>

Imperial College London



JOIN THE VARSITY ACTION!

Imperial College vs Imperial Medicals
Wednesday 21 March • 19.30
The Stoop (Harlequins RFC)

Tickets to the annual rugby battle between the College and Imperial Medicals cost only £10 for staff.

For more information visit:
www3.imperial.ac.uk/sports/varsity

Improving oil refining in Russia

The Skolkovo Foundation has approved the establishment of a centre to involve Imperial, the Boreskov Institute of Catalysis, and BP, which will focus on making oil refining in Russia more efficient and environmentally sustainable.

Researchers at the Centre of Applied Research on Energy Efficient Heat Exchange and Catalysis will run the £9.3 million UNIHEAT project, which aims to increase energy efficiency and reduce heat loss in oil refining by up to 15 per cent through improved refining operations, enhanced oil production processes, and reduced CO₂ emissions. The Centre will be funded by the Skolkovo Foundation and BP Russia.

Imperial will play a key role in the consortium, carrying out research to find ways of reducing heat loss by improving the design of heat exchange equipment and energy recovery networks within refineries.

One of the major problems that consortium partners will focus on is crude oil fouling – the largest cause of heat loss in the refining process. This happens when oil impurities are deposited in piping, causing corrosion and wear, and leading to oil production losses and additional fuel being burnt in the refining process. Fouling also causes increases in CO₂ emissions, and significant operational and safety problems, with large economic impact.



Professor Sandro Macchietto, Chair of the UNIHEAT Steering Committee and

Joint Project Director (Chemical Engineering), said: “Imperial has a strong track record of working with industry around the world to find innovative solutions to make the refining process more efficient and sustainable. This is one of the first projects of

this kind in Russia to kick off. We hope it will lead to real efficiencies in the sector and help us to make the refining process as environmentally friendly as possible.”

—COLIN SMITH, COMMUNICATIONS AND DEVELOPMENT

“This is one of the first projects of this kind in Russia to kick off. We hope it will lead to real efficiencies in the sector”

Imperial signs up to strategic partnership with BBSRC

Imperial scientists hope to deliver advances in biosciences – including food security, bioenergy, ageing and synthetic biology – faster and more cost-effectively, thanks to a new high-level partnership between the College and Biotechnology and Biological Sciences Research Council (BBSRC).



BBSRC's strategic partnerships, of which there are seven currently, encourage scientists to work more closely with those who share the same research goals, and give universities the opportunity to take a coordinated approach to investing funds awarded by BBSRC for research activities and facilities. The partnerships recognise the longstanding record of excellent research that the universities have in biological sciences.

Professor Maggie Dallman, Principal of the Faculty of Natural Sciences, who leads the partnership on behalf of Imperial, said: “I am delighted that BBSRC has chosen Imperial as one its strategic partners. This agreement really underlines how closely each of our global priorities and research objectives mirror those of the other and takes our relationship to the next level. By opening up a forum to share our extensive bioscience knowledge, we can better develop and deliver solutions to the challenges the world faces in the twenty-first century. I look forward to seeing how our plans grow wings in the next few years.”

Professor Douglas Kell, BBSRC Chief Executive, said “We are very pleased to be working in closer partnership with Imperial College London ... Bioscience will play an important role in combating many of the major challenges that we face as a society, both in the UK and globally. Only by sharing our strengths and working together in partnership can we ensure that investment in UK bioscience delivers the greatest benefit to society and the economy.”

—SIMON LEVEY, COMMUNICATIONS AND DEVELOPMENT

in brief



College Tutor

Dr Lynda White (Mathematics) has been appointed as a College Tutor. She joins the team of current College Tutors: Mrs Margaret Cunningham, Dr Mick Jones and Dr Simon Archer. College Tutors advise

on student welfare matters, reporting to the Dean of Students, Learning and Teaching. Dr White joined Imperial as a PhD student in 1969 and was appointed lecturer in statistics in the Department of Mathematics in 1971. Subsequent promotions followed and she was Admissions Tutor in the Department from 1980–87 and Senior Tutor from 1995–2011.

Acting Principal, Business School

Professor Dorothy Griffiths, Deputy Principal, Imperial College Business School, has been appointed Acting Principal, following the recent retirement of Professor David Begg. The search for a successor to Professor Begg, who served as Principal from 2003, is underway. Professor Griffiths will lead the Business School until the new Principal takes up the appointment.

Bringing surgery to life

On 29 February, Professor Roger Kneebone (Surgery and Cancer) and over 100 clinicians, researchers and medical students hosted one of the Science Museum's Lates events on the science of surgery. The programme featured a number of unique interactive demonstrations, including one given by a surgeon and a tailor, comparing the skills of stitching up intestines with those of making clothing, plus a talk by Lord Ara Darzi about Imperial technologies on the horizon that will affect surgical techniques. Commenting on the evening, Professor Kneebone said: “It was a great success, equalling the museum's previous record of 4,600 visitors during the evening!”

New podcast

Imperial's latest podcast hears from PhD student Tom Whyntie, who discusses whether our clocks should be tethered to the rotation of the Earth, plus discover why Dr Robert Gross (Centre for Environmental Policy) thinks we need a more informed public debate on renewable energy, and much more.

Listen to the complete podcast: <http://bit.ly/podcastFeb>



Design show inspired by Paralympics

To celebrate more than 30 years of the Innovation Design Engineering (IDE) course, a collaboration between Imperial and the Royal College of Art, Imperial students and alumni are showcasing their technologies to the public at an exhibition in the Main Entrance until 9 March.

The Past, Present and Future exhibition features prototype technologies that current IDE students have developed as part of an intensive four-week module. Their inventions were entered into the latest round of the Rio Tinto Sports Innovation Challenge, inspired by the London 2012 Paralympics, which aims to harness the creativity of Imperial's students to make sports more accessible to people with disabilities, by improving sporting and training equipment.

Among the creations on display is a device developed by Yuta Sugawara, Jenny Shih and Tim Boukley which aims to involve spectators more in the game of Goal Ball. Currently spectators have to remain silent while the blind folded teams hit a ball, which they track using a bell inside it, around the court. The sensors that the students have developed (pictured above)

can be worn by players, wirelessly transmitting their vital signs such as heart beat which are worn by spectators to take them closer to the action on the court.

Alumni of the IDE double Master's course are also speaking at the exhibition about the spin-out companies they have set up.

Professor Peter Childs, IDE joint course director (Mechanical Engineering), says: "We are extremely proud of our current students, who have developed some great technologies that may help to make sports more inclusive for spectators and people living with disabilities. We are also proud of our alumni, many of whom have gone on to develop innovative spin-out companies based on their work while here at the College."

—COLIN SMITH, COMMUNICATIONS AND DEVELOPMENT

Watch a video about the inventions: <http://bit.ly/IDEexhibition>

Honours for Bloom, Donaldson and Phillips



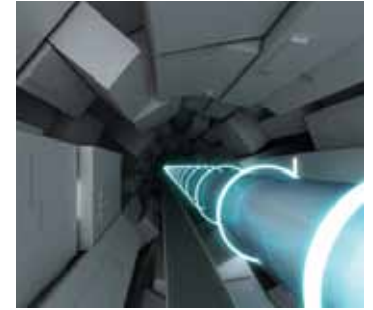
Professor Steve Bloom (Medicine) and Professor Simon Donaldson (Mathematics) formally received their knighthoods from The Prince of Wales at Buckingham Palace on 29 February. Emeritus Professor David Phillips (Chemistry) received his CBE on the same day.



Top to bottom: Professors Bloom, Donaldson and Phillips.

Professor Bloom was accompanied by his wife Margaret (a previous CBE recipient) and two daughters. "It was a great family occasion," he said. "I spent some time chatting with David Phillips during the rehearsals and at that point it was nice to have a friendly

face to quieten nerves. Prince Charles talked about obesity and diet, so obviously someone had done some homework. The best part might have been the lunch afterwards, certainly less of a strain!"



Stateside Higgs hunt

Physicists searching for evidence of the Higgs Boson at the USA's Fermi National Accelerator Laboratory, including a team from Imperial, have announced new results that closely match those revealed at CERN last December. The team led by Professor Gavin Davies and Dr Jonathan Hays (Physics) contributed to the analysis high energy particle collisions at Fermilab's Tevatron particle accelerator. Accelerators allow scientists to recreate the energy conditions found in the universe shortly after the Big Bang.



Labour leader tours engineering innovations exhibition

Labour Party leader Ed Miliband visited the College on Tuesday 6 March to tour the Past, Present, and Future exhibition and to talk to students from the Innovation Design Engineering course.

The winning student team (pictured with Mr Miliband above) have designed a paralympic training device that fits to the arm and vibrates when the athlete has adopted the optimum arm position for the sport. The team has been awarded a £1,000 prize, plus £5,000 to develop their invention further.

Speaking after his visit, Mr Miliband said: "I was hugely impressed by the excellent exhibition. We should be proud and patriotic about Britain's world-leading engineering sector. Imperial has a strong history of groundbreaking innovation and this exhibition shows that this excellent work continues today."

media mentions

—SIMON LEVEY, COMMUNICATIONS AND DEVELOPMENT



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TORONTO STAR ▶ 18.2.2011

Cat scat fever



A parasite that is contracted by touching cat faeces can cause an increase in risk-seeking behaviour, according to the

Toronto Star. Toxoplasmosis, the disease caused by the parasite, is known to cause mild flu-like symptoms and problems in unborn babies or people with compromised immune systems, but the new finding was revealed after scientists conducted personality tests on infected people. Professor Joanne Webster (Public Health) told the newspaper “A toxo-infected rat looks and acts, in general, happy and healthy and very much like an uninfected rat. However, specific behaviours likely to enhance transmission to the cat definitive host are subtly altered or manipulated. They are more active, less neophobic (fearful of new things) and in particular have the ‘fatal feline attraction’ where they are actually attracted to the feline definitive hosts.”

THE GUARDIAN ▶ 23.02.12

Science communication goes viral

A film created by four MSc Science Communication students has gone viral on the internet, with over 350,000 views on the video-sharing site *YouTube*, reported *The Guardian*. They recreated the hit song Seven Nation Army by the White Stripes, using laboratory tools and equipment from the Imperial Blast Laboratory (now part of the Royal British Legion Centre for Blast Injury Studies) and some creative editing techniques. “We did this to communicate science. And it seems to have worked,” wrote Anna Perman (Humanities), one of the students who created the video. <http://bit.ly/scicomsvid>

BBC NEWS ▶ 23.2.2012

Bright spark

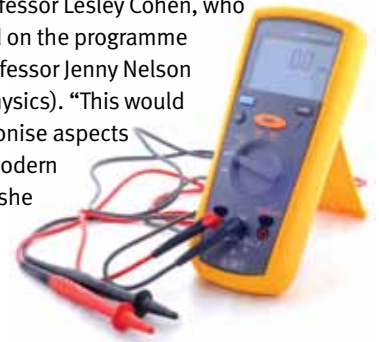


Royal College of Art graduate Min-Kyu Choi has created and launched a folding three-pin plug, reported *BBC News*. The prototype plug was first designed and displayed in 2009, after which its designer teamed up with Imperial MBA student Matthew Judkins (Business School), who helped turn the vision into a viable business, and a product that will soon go on sale at London’s Design Museum. The business partners are now thinking of creating an incubator for other young designers. Matthew told the BBC: “There is a void in this country between great design and then commercialisation. But especially of late, there is a great enthusiasm to start new ventures.”

BBC RADIO 4 ▶ 23.2.2012

A current discussion

Electrical conduction has been studied for several hundred years, some materials conduct electricity and others don’t, as a panel of experts recently discussed on BBC Radio 4’s *In Our Time*. However, only in the last century have scientists known about, and exploited, materials that have the properties of semiconductors, which have different conductivity at different temperatures. “If we could find a room temperature superconductor, a lot of the microelectronic industry and our computers would benefit from zero resistance elements and power could be transmitted without loss of energy,” said Professor Lesley Cohen, who featured on the programme with Professor Jenny Nelson (both Physics). “This would revolutionise aspects of our modern world,” she added.



awards and honours

MEDICINE

Mark Brennan prizewinners

Two Imperial medical undergraduates, Matt Rinaldi and Rory Hutchinson, won the Institute of Medical Ethics’ Mark Brennan Prize, presented at its conference on 10 February at the British Medical Association. Both had taken the medical humanities course at Imperial. Students were invited to submit innovative ideas on the use of video, visual art, photography, short stories and poetry to express their feelings towards ethical issues they had encountered on clinical placements. Matt won the video/spoken word prize

and Rory was co-winner of the visual arts prize. Another Imperial medical student, Rebecca Carey, was shortlisted.

NATURAL SCIENCES

New appointments for Wisden and Jaffe

Professor Bill Wisden (Life Sciences) has been appointed to the Medical Research Council’s Neurosciences and Mental Health Board and Professor Andrew Jaffe (Physics) has been appointed as a non-core member of the Science and Technology Facilities Council’s Science Board. The boards are responsible for overseeing aspects of the research councils’ research and education strategy and for making decisions on the funding awarded.

MEDICINE

Zabron’s hepatology fellowship

Dr Abigail Zabron (Medicine) has been awarded the Dame Sheila Sherlock Travelling Fellowship in Hepatology, administered by the Royal College of Physicians. Dr Zabron will spend one month at the Mayo Clinic, Rochester, USA, developing collaborative work on cholangiocarcinoma (bile duct cancer).

ENGINEERING

Student achievements in the field of hydrogen energy

A group of Imperial students running a student chapter of the International Association of

Hydrogen Energy (IAHE), have just received an official charter-ship of the chapter from IAHE, as well as the outstanding student and faculty service awards. This achievement highlights the contributions made by Imperial students working in hydrogen energy technologies, including solar hydrogen, clean production of hydrogen from hydrocarbons, and fuel cell technologies. The IAHE Chapter Official Chartership was formally presented to Professor Nigel Brandon, Director of the Imperial College Energy Futures Lab and the outstanding student and faculty service awards were given to the Chapter President Yousef Alshammari, Vice-President Chin Kin Ong and Faculty Liaison Dr Klaus Hellgardt (all Chemical Engineering).



Faulty fat sensor implicated in obesity and liver disease

Defects in a protein that functions as a dietary fat sensor may be a cause of obesity and liver disease, according to a study published in the journal *Nature* on 20 February 2012, led by researchers at Imperial.

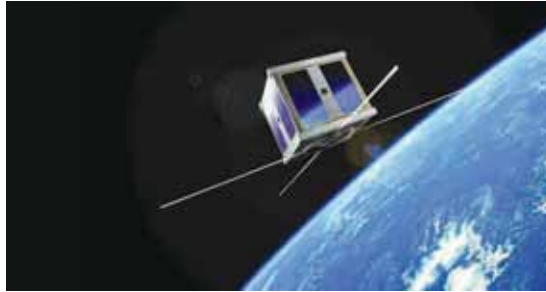
The protein GPR120 is found on the surface of cells in the gut, liver and fat tissue and allows cells to detect and respond to unsaturated fatty acids from the diet, especially the omega-3 fatty acids which are believed to have a beneficial impact on health. Scientists found that mice deficient in GPR120 were more prone to developing obesity and liver disease when fed a high-fat diet. They also found that people with a certain mutation in the gene encoding GPR120, which stops the protein from responding to omega-3 fatty acids, were significantly more likely to be obese.

When they were fed on a high-fat diet, mice that lacked GPR120 not only became obese but also had fatty livers, lower numbers of fat cells, and poor control of blood glucose. The researchers believe that mice that are deficient in GPR120 have difficulty storing excess fat in fat tissue. Instead, their bodies store fat in areas where it can cause health problems. In humans, this pattern of obesity is associated with type 2 diabetes and heart disease.

“Our study suggests that in both mice and humans, defects in GPR120 combined with a high fat diet greatly increase the risk of an unhealthy pattern of obesity, where fat is deposited around internal organs” said Professor Philippe Froguel (Public Health). “We think GPR120 could be a useful target for new drugs to treat obesity and liver diseases.”

—SAM WONG, COMMUNICATIONS AND DEVELOPMENT

Space Agency boost for tiny space tech



The UK Space Agency has announced the names of 16 space labs in the UK that will be funded to design missions and develop new technologies for tiny satellites called CubeSats, including one project led by a team in Imperial's Department of Physics.

CubeSats are tiny, low-cost spacecraft – weighing only a few kilos and about the size of a shoebox – which can be launched ‘piggy-back’ on larger spacecraft. Many are currently used to help students hone practical skills but, with advances in technology, they will soon be suitable for use in large-scale space science projects.

“Traditional satellites are too expensive to achieve this kind of simultaneous survey but CubeSats are simple and cheap”

Imperial's project CENTINEL, led by Dr Jonathan Eastwood (Physics), will scope a project to measure space weather in the magnetosphere (the magnetic bubble surrounding the Earth in space). Geomagnetic storms in the Earth's magnetosphere are a significant hazard for satellites, power grids, satellite navigation and other technologies.

Early designs suggest CENTINEL will use an array of over 140 CubeSats to study the magnetosphere, taking magnetic snapshots around the whole of the Earth simultaneously. This will allow scientists to track

magnetic storms, and link events in space to measurements of their effects on the surface of the planet.

Dr Eastwood said: “We would like to be able to take pictures of geomagnetic storms, but they're invisible. The only solution is to take lots of local magnetic measurements simultaneously in the region where storms are born. Traditional satellites

are too expensive to achieve this kind of simultaneous survey but CubeSats are simple and cheap.”

—SIMON LEVEY, COMMUNICATIONS AND DEVELOPMENT

‘Popeye’ proteins help the heart adapt to stress

A family of proteins named after Popeye play an essential role in allowing the heart to respond to stress, according to a study published in late February in the *Journal of Clinical Investigation*. Imperial scientists led the research, which could help develop new treatments for abnormal heart rhythms.

Popeye domain containing proteins (Popdc for short) were discovered 10 years ago and so named because they are found in abundance in muscles, but until now their function has been unclear. The new study reveals that they help the heart to increase its rhythm in response to the hormone adrenaline, which is released in times of mental or physical stress.

The researchers studied mice that were deficient in Popdc

proteins. In healthy people and mice, the heart's natural pacemaker responds to adrenaline by making the heart beat faster in order to deliver more oxygen around the body. But in the mice that lacked Popdc, the heart rate slowed when they were put in stressful situations.

Many elderly people's heart rates slow down in a similar way in response to stress. These people may be diagnosed with a condition called sick sinus syndrome, which normally means they need to have an artificial pacemaker fitted. The researchers anticipate that the findings might lead to new treatments for this and other heart rhythm disorders that can be triggered by stress, such as arrhythmias, atrial fibrillation and sudden cardiac death.

Professor Thomas Brand



Popdc proteins stained red in the outer membrane of heart muscle cells.

(NHLI) said: “Studying these mice further will give us more clues about what goes wrong in the heart's pacemaker, and might help us develop new drugs for heart rhythm disorders.”

—SAM WONG, COMMUNICATIONS AND DEVELOPMENT

Scientists save energy by lubricating wood

A little bit of lubrication can make a big energy saving when manufacturing sustainable biofuels and bio-chemicals from timber, according to research published in the journal *Green Chemistry* this month.

Imperial scientists have demonstrated that a key part of biomass processing could be 80 per cent more energy efficient by taking advantage of the slippery properties of ionic fluids, which are salts in a liquid state.

The efficiency savings can be made during one of the energy intensive stages of the biomass manufacturing process, when solid timber chunks are turned into a 'soup' of fluids and fine wood

particles in an industrial grinder, which works in a similar way to a giant coffee grinder. The discovery paves the way to making biomass industry even greener.

Newly felled timber can be treated with ionic solvents that have previously been shown to help processing wood into biofuels and chemicals. While initially this effect was only attributed to the solvents' ability to partially weaken wood's tough, fibrous structure, this



new study suggests the energy savings are predominantly due to the way that these fluids lubricate the wood chips as they go around in the grinder.

Lead author of the study, Dr Agnieszka Brandt (Chemistry), said: "Tree wood is a mine of really valuable chemicals locked up in a safe that we need to unlock before we can use the different components.

Breaking down the timber into a fine powder helps us to access these chemicals, but it needs to be an energy efficient process to make it sustainable. Our previous work showed how the chemical action of ionic solvents was highly effective, but we were surprised to discover how much energy could be saved when we add the ionic liquids during the grinding process."

—SIMON LEVEY, COMMUNICATIONS AND DEVELOPMENT

“Tree wood is a mine of really valuable chemicals locked up in a safe that we need to unlock”

Study questions art therapy for schizophrenia

Referring people with schizophrenia to group art therapy does not improve their mental health or social functioning, finds a study published in the *British Medical Journal* on 29 February.

The findings challenge national treatment guidelines which recommend that doctors consider referring all people with schizophrenia for arts therapies.



Schizophrenia is a severe mental disorder which affects as many as one in 100 people at some point in their lives. While antipsychotic medication can reduce symptoms, many people continue to experience poor mental health and social functioning.

Art therapy has been used as an additional treatment for people with schizophrenia, and is recommended in national treatment guidelines, but few studies have examined its clinical effects.

A team of researchers led by Imperial set out to examine the impact of group art therapy for people with schizophrenia, compared with an active control treatment and standard care alone.

The study involved 417 people aged 18 or over with a diagnosis of schizophrenia. Participants were split into three groups: 12 months of weekly group art therapy plus standard care; 12 months of weekly activity groups plus standard care; or standard care alone.

Professor Mike Crawford (Medicine) said: "Severe mental illness can reduce people's confidence in their abilities and their relationships with others, and we need to find new ways to harness the arts to help people overcome these difficulties."

—ADAPTED FROM A NEWS RELEASE ISSUED BY THE BRITISH MEDICAL JOURNAL

Old antibiotic could be a new weapon

A cheap and safe antibiotic that is widely available in the developing world might have a new use as a tuberculosis (TB) treatment, according to new research led by Imperial scientists and published in the *American Journal of Respiratory and Critical Care Medicine* in February.

TB kills almost two million people a year worldwide and is increasingly becoming resistant to the antibiotics used to treat it, but there are few new drugs in the pipeline. Doxycycline was introduced in 1967 and is used to treat a wide range of

bacterial infections, but until now has not been recognised as effective against TB. The new study suggests that doxycycline might stop the bacteria from growing and also prevent the disease from damaging the lungs.

Last year, the researchers discovered that TB increases the production of an enzyme called MMP-1, and that this enzyme is responsible for destroying lung tissue.

Now they have found that doxycycline suppresses the production of the tissue-destroying enzyme in TB-infected human cells. They also found that doxycycline directly

inhibits the growth of the bacteria in guinea pigs – a surprising result since the drug has been widely used as an antibiotic for over 40 years but has not been considered effective against TB.

Dr Paul Elkington (Medicine) says "Because doxycycline is cheap, safe and widely available throughout the developing world, it may be

a useful new treatment for TB that can be used in resource-poor settings. Our results so far are promising but we have only looked at human cells and animal models. We hope to carry out a clinical trial soon to test whether doxycycline is effective at combating TB in patients."

—SAM WONG, COMMUNICATIONS AND DEVELOPMENT





Imagine a world where microscopic biological devices able to detect early signs of cancer float inside your body and where you fill your car with fuel made from garden waste. Welcome to the world of synthetic biology...

Synthetic revolution

Reporter speaks to Professors Paul Freemont (Life Sciences) and Richard Kitney (Bioengineering), who lead the EPSRC Centre for Synthetic Biology and Innovation (CSynBI) at Imperial, to learn what synthetic biology is and how Imperial is leading the way in using engineering and biological principles to systematically design new biological devices and systems.

The field of synthetic biology has been developing rapidly since the early 2000s, when the human genome was first sequenced. Paul (pictured above left) and Richard (above right) became interested in the potential that this offered for building biological devices and systems from scratch and, in 2003, heard from colleagues at Massachusetts Institute of Technology (MIT) that similar work had started under the title 'synthetic biology'. Paul explains: "With our incredibly strong engineering and life sciences departments at Imperial, we knew we had the potential to have a huge impact on the field and were excited that it would provide incredible opportunities for our students."

In synthetic biology, bacterial DNA is modified according to the function you want the cell to perform. The DNA is then placed in

a host cell to make a biological device that responds according to its engineered design. The ultimate aim of synthetic biology is to turn cells into programmable factories that can manufacture a wide range of products. These already include biofuels, leading to environmental benefits, and medical devices that save lives. "We believe we are on the cusp of a new revolution whose impact could be similar to the

industrial revolution of the nineteenth century," says Richard.

Traditionally, if scientists wanted a gene from an organism for research purposes, they had to grow the organism, extract its DNA, use polymerase chain reaction to copy the gene in huge quantities, then insert it into some carrier DNA and place it in the desired host cells.

Today, gene synthesis companies use the principle of synthetic biology to reduce the time

and effort required for this process, by providing DNA sequences to scientists to order.

At Imperial, synthetic biology has been gathering increased momentum since April 2010, when Richard and Paul set up CSynBI with just seven researchers and their PhD students. Today the Centre brings together over 60 researchers from the Departments of Life Sciences and Bioengineering, in addition to social scientists and ethicists from the London School of Economics and Political Science (LSE). The Centre also collaborates with smaller groups at the Universities of Cambridge, Newcastle and Edinburgh.

Biosensors

One of the key research areas in synthetic biology is the creation of biosensors – detection devices that can be used in the manufacturing and healthcare industries. Paul describes one of CSynBI's current projects, which he is leading: the development of a biosensor to

"We believe we are on the cusp of a new revolution whose impact could be similar to the industrial revolution of the nineteenth century"



prevent elderly people with urinary catheters from developing a severe bacterial infection. Catheter infections are normally caused by a build-up of bacteria on the outside of the catheter where they congregate into a pathogenic colony and spread up inside the device. The resulting infection in the bladder can lead to a high fever, that can be particularly serious for elderly patients. Under Paul and Richard's supervision, a team of undergraduates designed a simple biological sensing device that, when applied to the outside of a hospital catheter, glows red to alert doctors to early-stage infection. This basic design has now been developed so that it can, with small modifications, be used to detect other bacterial infections.

Lecturer Dr Karen Polizzi (Life Sciences) is another researcher working on biosensors within the Centre. Her team is using synthetic biology to understand how to optimise the metabolism of cells that fight cancer, using biosensors to monitor the cell's progress. "The biosensors are really useful because they give us a window into what is going on inside the cell and help us to detect any changes early on," she explains. Karen says she enjoys working in synthetic biology, as it feels like anything is possible. "There is so much potential to revolutionise biobased manufacturing, to develop new therapeutics, to solve a lot of 'grand challenges', and to do it quickly, which is really important. Traditional biology might eventually get there, but synthetic biology will be able to do it faster," she adds.

Biological computers

Another strand of synthetic biology research underway at the Centre involves translating electronic



engineering principles to biology, to develop biological logic gates. Led by Richard, the team, including Dr Baojun Wang (Bioengineering) and Professor Martin Buck (Life Sciences), last year successfully demonstrated that they could build the biological equivalents of AND and NAND logic gates – the basic building blocks of computers and microprocessors. "Synthetic biologists can now begin to develop the biological equivalents of electronic digital devices – biological versions for biological applications," Richard explains. Although still a long way off, he suggests that these biological logic gates could one day be used as the foundations of microscopic biological computers. Applications could include sensors that detect and destroy cancer cells inside the body, or which swim inside arteries, detecting the build-up of harmful plaque and rapidly delivering medications to the affected zone. The principles could be used in pollution monitors that can be deployed in the environment, detecting and neutralising dangerous toxins like arsenic.

Ethics

Working alongside the Imperial scientists and engineers who are pioneering the field of synthetic biology is a team of societal and ethical researchers from the LSE. This partnership between traditional and social science means that the ethics of manipulating biological cells is considered at every step, ensuring that any concerns about the risks of releasing genetically altered material or bioterrorism are minimised. "The LSE team consider how to make the discipline environmentally and socially acceptable, and work out how we can modify the design to overcome any issues or risks from the beginning," Paul says.

Student face

As a new field, synthetic biology offers students unique opportunities to contribute to cutting-edge research and the final year optional module for biochemistry, biomedical engineering and biology students is run by Paul and Richard, with colleagues in CSynBI. "Synthetic biology is a field driven by students," muses Paul. "It's very unusual to have a field with so much energy and youth behind it. I think it appeals to students as it really allows them to be creative."

Postgraduate student, James Field (Bioengineering) says: "I have always found living systems breathtaking but before taking the synthetic biology module, I never truly appreciated the extent to which they can be re-engineered to solve real-world problems." He describes how the students were plunged into a brave new world in which the lecturers challenged them to pick a problem and design a biological machine to solve it. "The next few weeks were spent stitching nature's DNA into devices and computationally modelling their performance," he says.

One of the activities that draws students to Paul and Richard's module is the chance to get involved in the annual International Genetically Engineered Machine (iGEM) competition, held at MIT in the USA, in which thousands of undergraduates from across the world attempt to build biological devices and systems from standard DNA parts and operate them in living cells. Imperial has an outstanding record of winning the top prizes each year. After competing in the iGEM project, many of the students remain in the synthetic biology community, going on to do MPhils and PhDs.

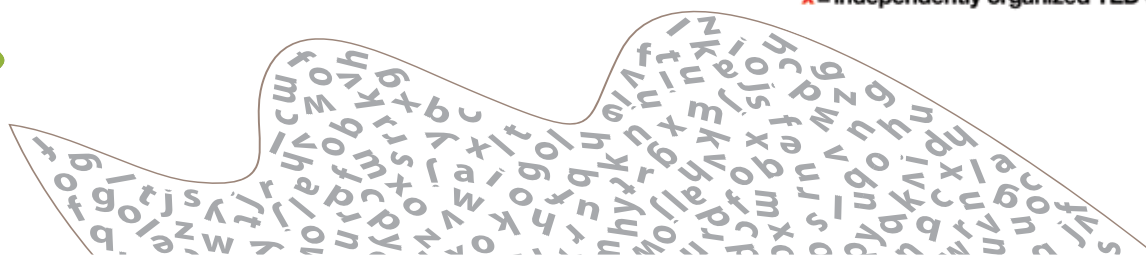
Future look

Paul and Richard hope the CSynBI will be at the heart of the synthetic biology revolution, as more and more researchers start applying the techniques and recognising its immense potential. There is clearly a lot of buzz around the field and, as James says: "If I have learnt anything, it's that the potential of synthetic biology is limited only by the human imagination."

—EMILY ROSS-JOANNOU, COMMUNICATIONS AND DEVELOPMENT



Biological devices are cultured inside bacteria on agar jelly (top); a robot which can perform multiple experiments with a high level of accuracy (middle); testing and measuring the activity of proteins (bottom).



TEDx
ImperialCollege
x = independently organized TED event

Ideas worth spreading

Across the College – in lecture theatres, in hallways and in common rooms – ideas flow like oxygen. Imperial staff and students believe in the power of ideas to benefit society; a vision shared by the founders of the not-for-profit organisation TED (Technology, Entertainment and Design), which is the driving force behind the first TEDxImperialCollege event to be held on 24 March.

TED was formed in 1984 to disseminate ‘ideas worth spreading’, in the shape of conferences bringing together people with a passion for technology, entertainment and design. Since then, its scope has broadened and today TED is renowned for being an incredible online archive of short lectures, covering a wide range of topics from molecular science to marriage and magic.

Late last year, a group of Imperial students came up with the idea to organise a TEDx event, applying for a licence from TED to showcase a number of TED talks, in addition to short lectures from academics across the College and beyond.

One of the organisers is postgraduate Gilead Amit (Humanities), a self-confessed TED addict, who often consumes four or five TED talks during a lunch break. “We are all excited by the prospect of giving our fellow students the opportunity to attend,” he

explains. “The aim is to disseminate ideas in an accessible manner and stimulate discussion between students, academics and the public which will ultimately lead to completely new ideas,” he adds.

So far, confirmed speakers from Imperial include Dr Manel Torres (Chemical Engineering), whose instant spray-on fabric aims to bridge the gap between science and fashion; Professor Maja Pantic (Computing), one of the world’s leading experts in machine

recognition of human behaviour, and Dr Aldo Faisal (Bio-engineering), a lecturer in neurotechnology. Student

presentations include one on Racing Green, the College’s student-led project to design and build hydrogen fuel cell racing vehicles.

The event has also attracted a number of external speakers, including John Graham-Cumming, who will be presenting on his project to build Charles Babbage’s analytical engine – the world’s first modern computer – from the original nineteenth century plans.

The student organisers, Rudy Benfredj (Computing), Wikum Jayatunga (Medicine), Bhavesh Patel (Medicine), Kadhim

Shubber (Physics), Asanka Wijendra (Medicine) and Gilead have chosen the Great Exhibition of 1851 as the theme for the event. “South Kensington today owes an enormous debt to the Great Exhibition, which laid the foundations for the museums and universities,” explains Gilead.

Kadhim notes that the reaction to TEDxImperialCollege has been overwhelmingly positive so far, especially among the student community at Imperial. “Over 1,200 people have already registered online, including a group of

A-level students, and we have received encouraging tweets from colleagues at the Science Museum and the Victoria and Albert Museum.”

The team is keen for TEDxImperialCollege to become a regular event.

“Imperial has access to great facilities and a large, enthusiastic audience, so there’s no reason why we shouldn’t be seeing many more such student-led events over the coming years,” says Kadhim.

Although registration for the event has closed the team are offering a pair of free tickets to two lucky staff members. For your chance to win send 50 words on your favourite TED talk to tedx@imperial.ac.uk by 16 March.

To access talks from some of the world’s best minds visit: <http://www.ted.com/talks>

For more information visit: <http://tedximperialcollege.com>

“From a literal point of view a TEDx event is quite simply an exhibition of great ideas”



Speaker profile

Dr Aldo Faisal talks about how he got involved and his hopes for the event.

“I immediately agreed to help make TEDx happen, as the event is a fantastic opportunity to approach the public with novel, ingenious and intriguing ideas that may have a far-reaching impact on our daily lives, and are at the core of our research activities here at Imperial. Moreover, as a student-led event it gives them an amazing opportunity to learn unique skills and give the audience a fresh view on things. I will be speaking about neurotechnology, or how learning from the human brain can help us to develop better technology, which in turn can help with neurological conditions. TED and TEDx events are great for disseminating information in an insightful, accessible and fun manner. Usually people talk about these for months to come at dinner parties and at work.”

inside*

story

mini profile

David Sharp

Dr David Sharp (Medicine) was awarded a professorial fellowship from the National Institute for Health Research in February. He tells *Reporter* how he aims to help people with traumatic brain injury through his research.



When did you become interested in brain injury?

It was when I was training at the National Hospital for Neurology and Neurosurgery.

I witnessed the devastating effects that head trauma, caused by events like road traffic accidents and assaults, can have on patients' lives. I was frustrated by

how little we had to offer these patients and that motivated me to carry out research in the area.

How do the injuries affect people?

Often the main long-term problems are cognitive and psychiatric, such as difficulties with memory and attention. Patients often can't do the jobs that they did before and may also develop disabling psychiatric problems, such as depression and anxiety.

What is the focus of your research?

One of the major difficulties in managing these patients is that issues such as memory impairment can have a whole

range of causes. It's a real challenge to accurately diagnose the cause for these problems.

My research focuses on using advanced brain imaging to diagnose subgroups of patients more accurately, which will allow us to identify patients who will respond best to a particular treatment.

What studies are you working on at the moment?

We've shown recently that inflammation is present in the brain a long time after an injury. We plan to test if treating this could improve cognitive and neuropsychiatric problems many years after an injury. We're also looking at the effect of blast injury in soldiers returning from Afghanistan. It's not clear how exposure to blasts affects the brain, and we're investigating whether this type of injury has a particular 'signature' that could be used to diagnose soldiers at risk of recovering less well.

—SAM WONG, COMMUNICATIONS AND DEVELOPMENT

Experiences of Pegasus

Sherry Morris has been a PA in the Department of Primary Care and Public Health for six years, supporting a small team of researchers at the Dr Foster Unit as they analyse hospital data and focus on patient safety. She shares her experiences of being involved with Imperial's Pegasus talent development programme.



I haven't yet got my team throwing fish around the office and singing, but I'm working on it! I also took up a part-time secondment at the Business School

"I decided to get involved with Pegasus, as I was keen to move to a higher level of responsibility. I also

thought it would be a good way to become more involved in the Imperial community. The Pegasus programme includes various training days, mentoring, and coaching. I particularly enjoyed working with a coach and the training day that focused on customer service. As

part of this, we watched a video about fishmongers in Seattle – not an obvious training tool. The company turned itself into a highly successful business and a major tourist attraction by getting staff to embrace a positive attitude, focus on making a difference to their customers and having fun at work.

“ [I got] involved in high profile events like *The Guardian's* Tech City talks, where I rubbed shoulders with MPs, VIPs and rock stars”

and was suddenly immersed in the world of the Digital Economy Lab – three words I'd never strung together in my life, let alone worked in. But the manager was fantastic and involved me in high profile events like *The Guardian's* Tech City talks, where I rubbed shoulders

with MPs, VIPs and rock stars. The high point of the programme for me, though, was to get to know such a fabulous, supportive group of people working at Imperial. I now have 'Pegasus pals' on each of the campuses!”

<http://bit.ly/pegasusinfo>

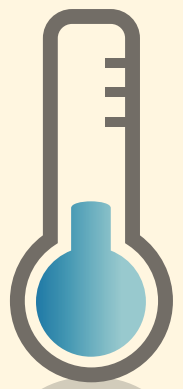


SCIENCE FROM SCRATCH

Supercooling

explained by Antonio Torrissi, MSc Science Communication

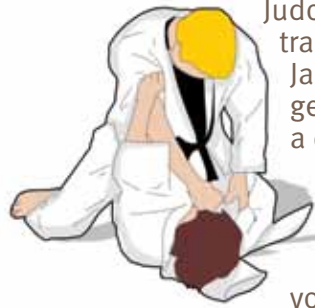
From causing planes to crash, to creating the perfect slush puppie, supercooling can be both a negative and positive phenomenon. Supercooling keeps liquids in the same state, even at incredibly low temperatures when they would normally become solid. Molecules are sticky; when they move quickly, they bounce off each other, but slow them down and they start to stick together to form liquids, or even solids if slowed enough. This happens as the temperature of a liquid drops and is helped by the presence of tiny particles, called crystal nuclei, which start the solidifying process. In a pure liquid, such as distilled water, these particles are missing, meaning that it can be supercooled down to -42°C . Supercooled liquid is unstable and will freeze in seconds on contact with tiny particles. This phenomenon can be seen in action in some freezers that cool drinks to a supercooled level, so when you open the can, you get a slush puppie. It can also affect aeroplanes, if supercooled drops of water congregate on the wings and suddenly freeze due to the low temperature at high altitude.



IMPERIAL STUDENTS SHARE THEIR EXPERIENCES OF LIFE AT THE COLLEGE ON THE STUDENT BLOGGERS WEBSITE.

Student blogger Reuben on taking up judo:

“There are a number of strangles you can do from this position” are somewhat ominous words. It’s apparently all good fun though, since this is strangling in the name of sport!



Judo, roughly translated from Japanese, means gentle way. It’s a competitive fighting sport, where the aim is either to throw your opponent from their feet so that they land on their back, hold them down with their back to the ground, or force their submission with an arm lock, choke or strangle. *Gentle* indeed. This year, the sport for me has been a source of satisfaction, exhaustion and pain.”

www.imperial.ac.uk/campus_life/studentblogs

blog SPOT

How scientists changed Elsevier’s views

Dr Paula Salgado, Research Associate in the Centre for Molecular Microbiology and Infection (Life Sciences), explains why she has taken a stand against scientific publisher, Elsevier.

“The last two months have seen an increasing number of scientists join a campaign to boycott Elsevier publications in protest against their recent support to the Research Works Act (RWA) in the US Senate. This legislation was seeking to stop access to research published in private-sector journals without the consent of the publishers, even after a reasonable ‘proprietary’ period. This would have been the case even if the research

had been funded publicly and despite the fact that most funding bodies, both in US and UK, require open access to results.

Like many others, I found Elsevier’s support for this legislation detrimental to the advancement of science and research. This boycott and widespread criticism has led Elsevier to withdraw its support for the RWA and the legislative bill will not proceed through to the Senate.

It was not an easy decision to support the boycott, since many of Elsevier’s publications are highly ranked, and signing it could have a serious impact on the careers of less established scientists. However, I believe it is time to discuss alternative ways



The boycott of Elsevier publications has led to the withdrawal of the RWA legislative bill.

to publish research and explore new models, more in tune with the new technologies available today.

This boycott has not only had the direct effect of the withdrawal of the RWA, it has also got many more people involved in the debate about open access and wide dissemination of research, and what publication models can and should have.”

▶ TIME OUT

Cinema club

From blockbuster screenings to all-night movieathons for die hard fans, many staff and students on the South Kensington Campus get a regular dose of cinematic magic thanks to the ICU Cinema Club.

The club, which runs the cinema on the second floor of the Student Union Building in Beit Quad, show films twice a week to members and non-members at affordable prices. From mainstream fare, like *Inception*, which recently screened to a sold-out house of 220, to more independent pictures, like *The Skin I Live in*, there is something for all film fans.

The club’s Cinema All Nighter

evenings are infamous amongst members; they show six films back-to-back from 18.00 to 06.00. These marathons usually begin with at least 100 eager filmgoers but, as ICU Cinema Chair George Goldberg (Electrical and Electronic Engineering) puts it: “Towards the end the numbers do dwindle a bit. We try and keep people’s eyelids open by selling hot dogs and toasties, and of course, lots of tea and coffee!”

The club has existed in some form or another since 1927, and many of the past members have gone on to have careers in film. Club Secretary Adam Ladds (Electrical and Electronic Engineering) says: “I joined the club because I like the technical stuff. We’re operating on a shoestring budget, so we spend a lot of time fixing things ourselves, tinkering away with the engineering and building new equipment.”

For Mark Bruggemann (Civil and



Above: a recent screening of *The Rocky Horror Picture Show*. Left: Mark Bruggemann shows his cinema club loyalty card.

Environmental Engineering), the cinema’s main projectionist, it was the chance to get his hands on actual film: “I remember finding out that real 35mm film was used, which you can actually pick up and hold in your hands, and I knew that it was something I wanted to be involved with.”

—JESSICA ADAMS, COMMUNICATIONS AND DEVELOPMENT

Highlights

- **Meeting times:** Films shown most Tuesdays and Thursdays
- **Society size:** 135 members
- **Experience required:** None, and new members always welcome
- **More information:** www.icucinema.co.uk or search ‘Imperial College Union Cinema’ on Facebook



INVENTOR'S CORNER

Pressure precision

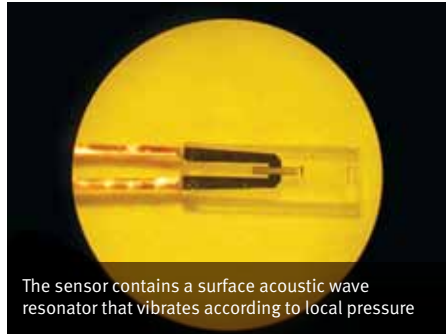
Dr Chris McLeod joined Imperial in 2006 and is Principal Research Fellow in Cardiovascular Instrumentation (Electrical and Electronic Engineering). He is working on a Wellcome Trust project to develop surface acoustic wave (SAW) technology to provide 24-hour monitoring for patients suffering from chronic heart conditions.

What have you developed?

We've developed an implantable pressure sensor, designed to produce accurate pressure readings from anywhere in the cardiovascular system. Measurements from the pulmonary circulation will particularly help patients suffering from heart failure and pulmonary hypertension.

Where did the idea for this technology come from?

One of our lead investigators, Professor Sir Magdi Yacoub (NHLI), came to us with the problem of measuring pressure in his heart transplant patients. We initially sought to solve that problem, but it became clear that a larger patient population could benefit from this technology. The idea of making pressure measurements from a SAW device came from its use in the automotive industry in wireless tyre pressure monitoring systems. We send its energy as a radio signal; the sensor vibrates at a rate which varies with the local pressure and



The sensor contains a surface acoustic wave resonator that vibrates according to local pressure

an external reader detects these vibrations as a radio signal and translates them into precise measurements.

What are the benefits of using SAW technology?

The only current way to monitor pulmonary circulation pressure is by catheterisation, an invasive, in-patient procedure, which carries some risk of clot generation or damage to the artery. The small battery-free implant runs for the duration of a patient's life meaning that they don't have to actively do anything to progress their treatment. It allows doctors to obtain continuous, objective information in a safe way, providing real evidence for tuning personalised drug therapy. This should result in optimal treatment, a more efficient drug regime and reduced need for hospital stays and, consequently, substantial cost savings.

—KAILEY NOLAN, IMPERIAL INNOVATIONS



The benefits of continuous learning

Dr Annette Mahon is a lecturer in educational development, based in the Educational Development

Unit. Over the past year she has been developing a new Postgraduate Certificate in University Learning and Teaching (PG-Cert ULT), which the first cohort of students has just completed. She explains the reason behind its development.

"This is an interesting time to be working in higher education. The rise in Home/EU undergraduate fees, increasing student expectations about the university experience, coupled with added demands on teaching and research productivity, are enough to keep anyone busy.

In this environment, it can be hard for teachers to find time for their own teaching development. The PG Cert ULT has been designed for Imperial academics and encourages them to focus on topics or issues relevant to them. The topics include: assessment and feedback, ethics, research supervision and public engagement. Feedback on teaching through a series of teaching observations is a key, non-assessed part of the programme. Our aim is to give academics a greater understanding of their role as teachers and help them to develop skills that will make life as a teacher easier, more interesting and more enjoyable for both academics and students.

Applications for September 2012 entry to the PG Cert ULT will open in late March. For more information go to: <http://bit.ly/PGCERT>

Book review

The Sense of an Ending by Julian Barnes, reviewed by Paula Evans, Principal Library Assistant, Business and Humanities (Central Library).

"I had never read anything by Julian Barnes before, but this 2011 Man Booker Prize-winning novella drew me in. I have to say I was impressed; the writing is beautiful and I was absorbed after the first few pages.

The first part of the story focuses on Tony and his school friends, mainly the dashing and remarkably intelligent, yet dark and mysterious, Adrian. As the boys grow up, a girl called Veronica causes problems. Barnes makes it clear that this girl is trouble, as even Veronica's mother warns, and they split up fairly quickly.

Time passes and Tony's life is filled with travel and exploration and eventually marriage. The story picks up Tony's life much later on in his life when he is amicably divorced and retired. He receives news that Veronica's mother has passed away and left him Adrian's diary in her will, forcing him to revisit the past. Tony must face not only Veronica but a crushing secret which unravels slowly before the reader's eyes.

This is the story of one boy's journey through a fairly ordinary life, and how the folly of youth can have more of an impact than one would anticipate as an adult. A riveting tale with a true 'sense' of an ending!



Pick up *The Sense of an Ending* from the Central Library, level 5, 800 BAR.

Getting patients back on their feet

Last April, Sport Imperial took over the running of the gym in the basement of the Cambridge Wing at St Mary's Campus and rebranded it as Energia. *Reporter* spoke to senior fitness and exercise practitioner Hayley Osborn, who manages the gym, to find out how the facility also provides an important resource for the hospital's patients.

Who is the gym for?

As well as catering for Imperial staff, students and some members of the public, the gym also encourages patients from St Mary's Hospital to stick to an exercise plan after treatment. The gym has members with a variety of conditions including diabetes, cardiac disease, HIV, obesity, depression and sports injuries. The overall aim is to make exercise attractive to everyone despite any health limitations.

How does it work?

Patients are referred to us by different departments in the hospital, from ante-natal to psychology. Each patient is assessed individually to ensure they achieve their individual goals, and classes are available at set times for patients who prefer working in a group.

How does it help to have the gym connected to the hospital?

It helps patients trust the gym instructors here and realise that they are equipped to help them, as they tend to trust the nurse who referred them.

Can you tell me about your qualifications?

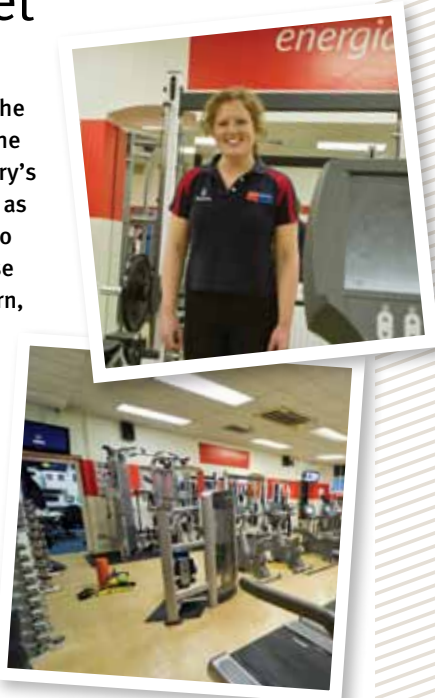
I have a BSc in Sport and Exercise Science and I am also qualified to teach exercises to help patients with lung disease recuperate.

What equipment does the gym have?

The gym is equipped with cardiovascular and resistance equipment including treadmills, recumbent bikes, cross trainers, steppers, free weights, power plates and gym balls.

What is the most rewarding part of your job?

I really enjoy working with elderly people and seeing how basic exercises make such a big difference to their quality of life. I teach them progressive stretching techniques which enable them to get up from a sitting position or from the floor, and in and out of the bath.



Fields of gold

In December, the Postdoc Development Centre (PDC) asked postdocs to send in photos representing their lives as postdocs. The Centre received over 100 entries – including abstract, landscape, scientific and artistic interpretations – and chose the picture above, taken by Research Associate Dr Cristina Canova (NHLI), pictured above, as the winner. The picture was featured in the PDC's calendar, sent to all postdocs in January 2012. Cristina took the photograph at the WWT London Wetland Centre in Barnes. "Early summer is like the postdoc stage in an academic career. The flower in the centre represents the postdoc developing their field of research. Since we live in London, this photograph shows how readily we can find a haven of peace in this bustling metropolis," she comments.

For more information on the PDC visit: www.imperial.ac.uk/staffdevelopment/postdocs

Long server memories



On 13 February, staff who marked 20, 25 and 30 years of service to Imperial in 2011 attended a reception hosted by the Deputy Rector, Professor Stephen Richardson. Principal Research Fellow Alison Ahearn (Civil and Environmental Engineering), pictured, who started at the College in 1991, attended the event at 170 Queen's Gate and shares her story of joining Imperial.

"I started at Imperial as a research assistant and promptly fell in love with civil engineering. Of course, being a forthright Aussie, I also started voicing my opinion on things to improve. A professor tried to persuade me that Imperial "really is quite famous, you know!" I would retort: "In Australia, I'd heard of MIT, I'd heard of LSE, but I'd never heard of Imperial". But then, in 1993, a university league table was published: Oxbridge, then Imperial, then LSE. Imperial outranked LSE? I recall reading that newspaper article round-eyed with my jaw dropping. But by then it was too late to get overawed, so I started teaching and making changes for my beloved engineers. I don't much like league tables, but that first one I saw made me laugh, at myself and with delight that the rest of the world likes Imperial in the same way as I do."

To see a slideshow of photos from the long server event visit: www.imperial.ac.uk/reporter

Welcome new starters

Ms Inger Abma, Business School
 Ms Tufool Al-Nuaimi, Business School
 Mr Jeffrey Armstrong, Chemistry
 Mr Azhaar Ashraf, Medicine
 Mr Sanjay Bilakhia, Computing
 Dr Amy Birch, Medicine
 Dr Chitvan Bochiwal, Life Sciences
 Dr Paul Boldrin, ESE
 Mr Michael Breza, Computing
 Mr Joao Carvalho da Purificacao Rocha, NHLI
 Miss Rebecca Cavallaro, Surgery and Cancer
 Dr Alexandros Chremos, Chemical Engineering
 Dr Rodney Coleman, Mathematics
 Ms Zoe Cotton, Faculty of Medicine
 Dr Humberto Couto Fernandes, Life Sciences
 Ms Astrid Cox, Public Health
 Mr Anthony Crowther, Imperial College Union
 Dr Sarah Cubaynes, Life Sciences
 Dr Abigail Culshaw, Medicine
 Dr Mark Daniels, Public Health
 Mr James Dobson, Physics
 Ms Bianca Donges, NHLI
 Mr Warren Elder, Physics
 Dr Shona Falconer, Clinical Sciences
 Miss Laura Fellows, Imperial College Union
 Dr Rene Gaudoin, Public Health
 Ms Jessica Geldart, Business School
 Miss Sara Giesz, NHLI
 Dr Efstathios Giotis, Medicine
 Miss Charlotte Graham, Medicine
 Mr Daniel Gray, Medicine
 Ms Louise Greathead, Medicine
 Mr Khilan Gudka, Computing
 Dr Jonathan Gulley, Physics
 Mr Thomas Haddow, Computing
 Dr David Hodson, Medicine
 Dr Boris Houska, Chemical Engineering
 Dr Tao Huang, Business School
 Dr Roy Jacobs, Mathematics

Miss Karishma Jivraj, Medicine
 Dr Agnieszka Jozwik, NHLI
 Dr Salwa Kamourieh, Medicine
 Dr Kiang Kho, Physics
 Dr Marina Kravtsova, Mathematics
 Ms Nicole Kudla, Civil and Environmental Engineering
 Dr Mark Larsen, Public Health
 Miss Rosie Lees, Medicine
 Miss Mavis Machirori, Surgery and Cancer
 Dr Monica Marinescu, ESE
 Mr Hassan Masood, Humanities
 Miss Daniella McManamon, Estates Division
 Dr Ummezeinab Mulla, NHLI
 Dr Mani Narayanan, Life Sciences
 Miss Ioana Nascu, Chemical Engineering
 Mr Vance Naughton, Medicine
 Mr Christopher Neill, Faculty of Medicine
 Mr Jack Nicholls, Environmental Policy
 Mr Bang Nong, Faculty of Medicine
 Mr Katsuya Norita, NHLI
 Ms Despoina Noula, Corporate Partnerships
 Dr Linda Oude Griep, Public Health
 Mr Michele Palladino, EEE
 Mrs Celia Pearce, Business School
 Dr Marion Pfeifer, Life Sciences
 Ms Thi Phan, EEE
 Mr Iain Pierce, NHLI
 Dr Louisa Pollock, Medicine
 Dr Simon Pooley, Humanities
 Dr Apostolos Psyllos, Physics
 Miss Rachael Quinlan, Surgery and Cancer
 Miss Ann-Kathrin Reuschl, NHLI
 Mr William Rimington, Life Sciences
 Dr Livia Rocha Dos Santos, Materials
 Miss Nung Rudarakanchana, Surgery and Cancer
 Mr Abdus Salam, Business School
 Dr Nadine Schur, Public Health
 Mr Daniel Seaton, Chemical Engineering
 Miss Miranda Seymour, Communications and Development
 Ms Meliz Shahuri Arisoylu, Medicine
 Mr Dmitry Sharapov, Business School

Mr Evangelos Spyrou, Computing
 Dr Iain Staffell, Business School
 Dr Zoltan Takats, Surgery and Cancer
 Mr Rudolph Thompson, Security Services
 Mr Tommaso Tufarelli, Physics
 Miss Maria Urjanheimo, Medicine
 Dr Graham Wallace, Life Sciences
 Dr Simon Waschke, Physics
 Ms Grace Williams, Life Sciences
 Miss Amanda Wilson, Bioengineering
 Dr Mingyang Yang, Mechanical Engineering

Farewell moving on

Dr Louis Atallah, Computing (6 years)
 Mrs Elizabeth Atkinson, Surgery and Cancer
 Mr Nicholas Badham, NHLI
 Mr Thomas Barbanneau, Humanities
 Dr Gareth Barnes, Medicine
 Mrs Claire Bellone, Surgery and Cancer
 Ms Rosemary Brownhill, Library
 Dr Raffa Carzaniga, Medicine (5 years)
 Dr Ramon Casero Canas, NHLI
 Miss Michelle Cashin-Cox, Medicine
 Dr Flaminia Catteruccia, Life Sciences (12 years)
 Dr Su Chen, Chemical Engineering
 Dr Sangwon Chung, Materials
 Dr Daniel Credgington, Chemistry
 Miss Victoria Crome, Medicine
 Mrs Reiko Daigaku, NHLI
 Mr Meirion Davies, NHLI
 Dr Jane De Lance-Holmes, Public Health (13 years)
 Miss Ruth Dixon, Public Health
 Mrs Frederique Dunnill, Business School (9 years)
 Mr Rajiv Edward, Business School
 Dr Lina Eliasson, Medicine
 Dr Gavin Elliott, ESE
 Mr Alexander Finch, Physics
 Dr Renee Germack, NHLI
 Dr Jiebin Gu, EEE
 Dr Andrea Guerra, Medicine

Ms Jennifer Haas, NHLI (5 years)
 Dr Jie Hao, Surgery and Cancer
 Dr Nicholas Harrigan, Physics
 Dr Suzie Hingley-Wilson, NHLI (8 years)
 Dr Christine-Maria Horejs, Materials
 Professor Lane Hughston, Mathematics
 Mr Asif Hussain, Bioengineering
 Dr Gajendran Kandasamy, Business School
 Dr Dhiren Kara, Physics
 Dr Julius Klein, Bioengineering
 Dr Artemis Kosta, Life Sciences
 Dr Bianca Kuehler, Surgery and Cancer
 Dr Daniel Langer, Medicine
 Mrs Pari Macdonald, Surgery and Cancer
 Dr Carlos Macias-Romero, Physics
 Dr Oleg Makarenkov, Mathematics
 Mr Kevin Maringer, Medicine
 Mr Rafal Marszalek, Chemistry
 Dr Daniel Mason, Physics (6 years)
 Mr Rory Maxwell, Civil and Environmental Engineering
 Mr Alejandro Melendez Calderon, Bioengineering
 Dr Gargi Meur, Medicine
 Ms Genoveva Mihaylova, Life Sciences
 Miss Kate Miles, Surgery and Cancer (5 years)
 Miss Jo Monger, Surgery and Cancer
 Dr Isao Nambu, Bioengineering
 Dr Mohamed Nejmeddine, Medicine (9 years)
 Professor Geoffrey New, Physics
 Dr Michelle Osmond, Computing
 Mr Wayne Peirce, ICT (13 years)
 Dr Albert Phillimore, Life Sciences
 Miss Stephanie Plant, Medicine
 Ms Claire Puddephatt, Faculty of Medicine (8 years)
 Dr Javier Rodriguez Perez, Chemical Engineering
 Ms Kelly Savin, Bioengineering
 Dr Nikos Savva, Chemical Engineering
 Dr Ravindra Singh, EEE (5 years)
 Ms Tracey Stead, Clinical Sciences

Dr Daniel Stuckey, Clinical Sciences
 Ms Anne Thesenvitz, Accommodation
 Dr Muhunthan Thillai, NHLI
 Dr Catherine Thomas, NHLI
 Dr Mohammed Tirech, Surgery and Cancer
 Da Silva Vieira, ESE
 Dr Konstantina Vogiatzaki, Mechanical Engineering
 Ms Amanda Welford, Chemistry
 Dr Hazel Williams, Life Sciences
 Mr Julian Zarfahs, Registry (12 years)
 Miss Justine Zhang, Library
 Mr Shou-Han Zhou, Bioengineering

retirements

Professor Peter Barnes, NHLI (26 years)
 Professor David Begg, Business School (8 years)
 Dr David Norminton, Occupational Health Service (34 years)

This data is supplied by HR and covers the period 30 January –19 February. 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

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

Speak out

Story ideas?

We welcome contributions from across the College. The next publication day is 29 March. *Reporter* is published every three weeks during term time in print and online at www.imperial.ac.uk/reporter

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 ✉ reporter@imperial.ac.uk
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19 MARCH ▶ PUBLIC LECTURE

More sustainable power generation technologies

The world faces many big challenges: financial crisis, population density, resource constraints, long term prosperity and climate change. Power generation is both a measure and a

driver of these challenges. The changes that have already been made to meet these challenges are impressive and expensive, but the infrastructure and technology implications are still not fully understood. Charles Soothill, Chief Technology Officer of Alstom Power, addresses some of the possible scenarios and how the energy industry is preparing for them in the 2012 Energy Futures Lab annual lecture.



13 MARCH ▶ PUBLIC LECTURE

The construction of London 2012: on time, under budget, how?

Olympic fever has reached London. With only four months to go, the Chairman of the Olympic Delivery Authority, Sir John Armit, talks about

his experiences in preparing the capital for its most high-profile event of the century so far in an Imperial College Business School guest lecture. Hear the stories behind the challenges in budgets, planning, stakeholder relations, engineering and construction that were overcome to deliver the London 2012 Olympics on time and within budget, as well as ensuring the economic legacy of the Olympic Park.

take note

New ATM machines on South Kensington Campus

Two new ATM machines have been installed on the South Kensington Campus, for cash withdrawals with no associated charges. They are located in the ground floor lobby of Beit Quad, and on the second floor lobby of the Mechanical

Engineering Building. The extra machines aim to ease the congestion around the machines in the Sheffield Building which get extremely busy during the day.



9 MARCH ▶ PUBLIC LECTURE

Ig Nobel Awards Tour

'Improbable' researchers



12 MARCH ▶ SEMINAR

Computational analysis of next generation sequencing

Dr Mario Caccamo, Genome Analysis Centre

14 MARCH ▶ SEMINAR

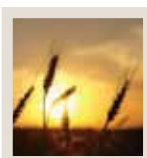
Computers + fluids = engineering success

Professor David Gosman (Mechanical Engineering)

14 MARCH ▶ PUBLIC LECTURE

Attitudes in America to investing, resource limitations and global warming

Jeremy Grantham, founder of the Grantham Institute



15 MARCH ▶ MUSIC

Lunchtime concert

Noriko Ogawa (piano)

15 MARCH ▶ PUBLIC LECTURE

Where does life come from?

Dr Zita Martins (Earth Science and Engineering)

20 MARCH ▶ SEMINAR

The life of Sir Alec Wesley Skempton

Anne Barrett, College Archivist

20 MARCH ▶ SEMINAR

New insights into China's energy future

Dr Yang Yufeng, NDRC China



21 MARCH ▶ PUBLIC LECTURE

Molecular mechanisms and future therapies in heart failure

Professor Ralph Knöll (NHLI)

21 MARCH ▶ SEMINAR

Frontiers in climate risk management

Dr Thomas Downing, CEO, Global Climate Adaptation Partnership

21 MARCH ▶ PUBLIC LECTURE

Polio: the challenge of making it history

Professor Sir Liam Donaldson (Global Health Innovation)



22 MARCH ▶ MUSIC

Lunchtime concert

Badke Quartet

22 MARCH ▶ SEMINAR

Critical transitions in nature and society

Professor Marten Scheffer, Wageningen University, The Netherlands

24 MARCH ▶ PUBLIC LECTURE

TEDx ImperialCollege

Speakers from Imperial and beyond



27 MARCH ▶ PUBLIC LECTURE

Organised chaos: building the start-up team

Panel includes Dr Jonathan Pinto (Business School)

MEET THE READER



Rajandeep Singh, International Officer

What are you doing in the picture?

I am with one of the Rector's Ambassadors, Kavita Aggarwal (Medicine), who joined me for a student recruitment fair in Cyprus. I met a lot of students with seven A-levels who were worried that they didn't have enough work experience to study at Imperial!

What would you do if you were editor of Reporter for a day?

I'd create a column about the preconceptions prospective international students have about life at Imperial.

Who would be your cover star?

I'd like to highlight Imperial's links with the arts via the Royal College of Music and the Royal College of Art. Design London, an Imperial and RCA collaboration, has resulted in some viable business proposals. The Loowatt, a waterless toilet system that converts human waste into fertiliser and natural gas for heating and cooking, would be my cover star.

Want to be the next reader featured in Reporter? Send in a picture of yourself with a copy of Reporter in your location of choice to: reporter@imperial.ac.uk

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