



The real apprentice

New scheme to train skilled technicians... **CENTRE PAGES**



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get major
awards in New
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EDITOR'S CORNER

On the shop floor

I spent the beginning of January delving into one of the lesser known areas of College, namely the **workshops that support research** across the Faculty of Engineering and the Department of Physics. The technicians there make all manner of bespoke components for science experiments. Visiting the Physics workshop in the bowels of the Blackett Building, I was struck by the scale of it. It's almost like there's a **factory beneath College**, busily (but rather anonymously) running a production line. The Departments that rely on the workshops have recently launched a technician apprenticeship scheme to maintain the pipeline of new talent. Today, the popular image of an apprentice owes much to the BBC reality TV show of the same name. Of course, apprentices aren't traditionally anything like those frenzied dealers, but rather **practical craftspeople** who patiently learn a trade over many years. There will be more apprentices once the scheme is at capacity, so I'm pleased to put two in the spotlight for this issue (page 8).

ANDREW CZYZEWSKI, ACTING EDITOR

Reporter is published every three weeks during term time in print and online. The next publication day is 21 February. Contact Andrew Czyzewski: reporter@imperial.ac.uk

Imperial's first Provost appointed

Professor James Stirling CBE FRS has been named Provost of Imperial, and becomes the first person to occupy this new position.

Professor Stirling is an internationally renowned theoretical particle physicist and Head of Physics at the University of Cambridge. He will take up his role at Imperial by the beginning of August 2013.

The appointment follows changes to the College's governance, announced in April 2012. The Provost will be responsible for the



College's core academic mission – education, research and translation and will report to the President & Rector, Sir Keith O'Nions, who will, in future, give greater emphasis to the College's external affairs.

Sir Keith said Professor Stirling was "an individual who has an outstanding scientific mind as

well as a track record of leadership in universities".

Professor Stirling said: "I believe strongly in what Imperial has always valued. To me that means excellence in scholarship – both teaching and research – and excellence in innovation and taking our knowledge outwards to address big societal challenges".

Professor Stirling is married and has two adult children. Among his interests he is a proud supporter of the Ulster and Irish rugby teams and has formed and led a ceilidh band.

Look out for an in-depth interview with Professor Stirling in Reporter later in the year.

Hat trick of New Year Honours



While Britain's Olympic heroes may have been the focus of attention in the Queen's New Year Honours, the College was well represented by its science stars, with three academics scooping major awards.



Professor Joanna Haigh, Head of the Department of Physics, was awarded a CBE for her services to physics. Meanwhile OBEs were awarded to Professor Susan Gibson (Chemistry) for services to chemistry and science education, and to Professor David Hand (Mathematics) for services to research and innovation.



Professor Haigh joined Imperial in 1984 and has published widely in atmospheric science and climate modelling. On learning of the award she said: "It was a complete surprise when I came home after a particularly long day at work and found the letter – I still have no idea who nominated me! I am happy to acknowledge the great teams of people I have worked with closely over the years. I also feel proud to accept it as a member of the minority of female physicists."

Top to bottom; Professors Joanna Haigh, Susan Gibson and David Hand.

Professor Hand was recognised for services to research and innovation, in particular his work in applying statistics to medicine, psychology and finance. He has consulted organisations ranging from banks, through pharmaceutical companies, to governments.

Paying tribute to Professor Gibson's award, Head of the Department of Chemistry, Professor Tom Welton, said: "Sue has worked tirelessly to ensure that future generations of women scientists have the necessary opportunities available to them to have successful and fulfilling careers in chemistry."

—LUCY HANDFORD, COMMUNICATIONS AND DEVELOPMENT

Imperial College London

Complete the disability survey

Shape how the College caters for the needs of staff with disabilities.



All staff are invited to complete an online Disability Survey by Friday 8 February.

The departments with the highest response rates will be entered into a draw to receive a gourmet food hamper to share. The survey takes less than 10 minutes to complete and is anonymous.

Visit: <http://bit.ly/1olJqWA>



Students, have your say!

This year's National Student Survey (NSS) is now open, with final year undergraduates asked to assess a number of factors related to the student experience.

The nationwide survey compiles year on year comparative data for higher education institutions – covering everything from academic support and learning resources to assessment and feedback – with its results being made publicly available. Its closing date is 30 April 2013.

“Make sure you take this chance to have your say”, said Imperial College Union's Deputy President (Education) Doug Hunt. “We want to hear from as many eligible students as possible. The more final years who participate the more reliable and useful the survey will be, to us and the College.”

Professor Debra Humphris, the College's Pro Rector (Education), said: “Our final year students have a great deal of experience of life and studying at Imperial. The information they provide via the NSS is feedback we



take very seriously and which helps us identify changes that will benefit the students who follow them.”

Previous NSS responses have helped inform key College developments, including changes to student assessment to ensure more timely feed-

back. NSS responses also supported the introduction of Imperial Horizons, a series of courses rolled out to new undergraduates last term which allow students to study topics beyond their course and develop valuable transferrable skills.

Since 2011 the Union has also shaped the survey information into an official NSS response, including a series of recommendations to the College focused on education and student experience.

—JOHN-PAUL JONES, COMMUNICATIONS AND DEVELOPMENT

For more information see the Union's NSS webpages: <http://bit.ly/X1LyCd> and the survey site itself: www.thestudentsurvey.com

“The information they provide via the NSS is feedback we take very seriously”

€25m EU grant for College research

The College has been awarded over €25 million in the latest round of funding by the European Research Council (ERC), including two new Synergy Grants that promote partnerships in academic research.



The ERC received 710 applications for Synergy Grants and have funded only 11 ‘exceptional projects’ across the EU.

For one of the Imperial projects (awarded over €7 million) Professors Christofer Toumazou (Electrical and Electronic Engineering) and Sir Stephen Bloom (Medicine) will combine their expertise to create a device that mimics the response of the vagus nerve after eating, suppressing the appetite of a patient.

The second Synergy Grant was awarded to Professor Daniel Rueckert (Computing), in conjunction with colleagues at King's College London and the University of Oxford. This project will use MR imaging to track brain connectivity in foetuses and newborn children, providing insights into conditions such as autism.

The College also secured an additional €15 million in Starting and Advanced Grants.

Dr Michelle Moram (Materials), Dr Aimee Morgans (Aeronautics), Dr Toby Gee, (Mathematics), Dr Tom Bell (Life Sciences) and Dr Irene Miguel-Aliaga and Dr Till Bartke (both Clinical Sciences) were each awarded Starting Grants of over €1 million.

Professors Ed Hinds, (Physics), Christos Vassilicos (Aeronautics) and Peter Kohl (National Heart and Lung Institute), were each awarded Advanced Grants fund of over €2 million.

Pro Rector (Research), Professor Donal Bradley, said: “Our involvement in the ERC Synergy projects is a testament to the multidisciplinary research ethos that pervades the College and also emphasises the College's focus on the translation of research into practical solutions that address some of society's most pressing issues.”

For more information about the Synergy Grants visit: <http://bit.ly/WjtXf7>

in brief

Obama advisor visits Imperial



The College hosted the White House's most senior science advisor on 13 December, as Dr John P. Holdren, Assistant for Science and Technology to President Obama, delivered the Grantham Annual Lecture. Entitled *Coping with Climate Change: Issues*

in Science, Policy and Communication, Dr Holdren's lecture included a message for policy makers that unless money is invested to advance the science of forecasting and modelling climate, the cost of fixing the damage caused by extreme weather events will massively outweigh the cost of doing nothing.

Biotech revolution

The Business School hosted European partners at an event last month to plan a revolution in the application of biotech research in order to challenge the US stronghold. As part of the Effective Technology Transfer in Biotechnology (ETTBio) project, Business School academics shared legal, patenting and funding secrets for turning biotech research into lucrative companies and licences.

Green spaces mapped

More than half a million people were inspired to explore local wildlife over the past five years thanks to Imperial-led OPAL project. Over 25,000 sites across England have been mapped and the interim findings are published in *Community Environment Report* launched in the House of Lords on 21 January. The report reveals important data about biodiversity, including information about some places – particularly urban areas of deprivation – never sampled before by scientists.

“We're looking at ‘functional ingredients’ that we can add into foods that are commonly eaten, such as bread, that will make people feel full for that little bit longer”

PROFESSOR GARY FROST (MEDICINE), SPEAKING AT A FEAST FOR THE SCIENCES – AN EVENT HELD IN DECEMBER AS PART OF THE IMPERIAL FRINGE SERIES.



Southern hospitality

Imperial's newest undergraduate hall of residence in London's Southbank area, near Waterloo, was officially opened by Kate Hoey MP on 24 January.

The building's first student occupants arrived last September, after a £9 million renovation by the charity Chapter 1, which owns and manages the property. The hall, which is close to the BFI IMAX cinema and the attractions of the Southbank, is named Xenia, which is Greek for hospitality.

The accommodation has a majority of *en suite* study bedrooms with some standard and twin rooms, and contains a variety of communal spaces including student lounges, games room, shared kitchens and a courtyard garden. The complex also offers a social programme and support network via its wardening team and Chapter 1 staff.

Rumy Neykova (Computing), a subwarden at the new hall, said: "As one mother recently posted on the Xenia facebook page, 'Halls have definitely improved in recent years!' The two lounges are comfortable places where Xenians can get together for chat and parties."

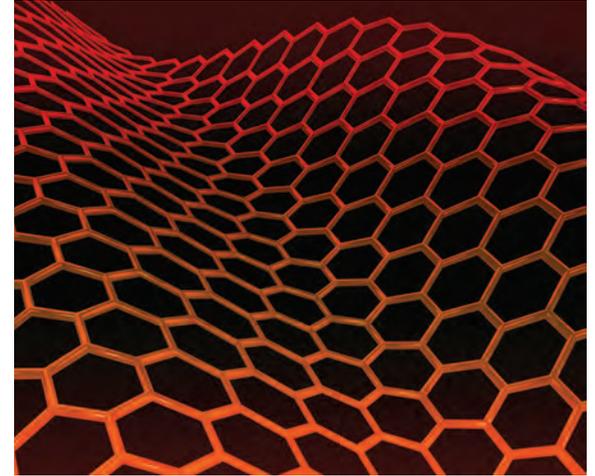
Xenia will help the College to meet its guarantee of accommodation to first year students, following the transfer of Orient House, a 150-bed residence near Imperial Wharf Station, to the GradPad portfolio. Wilson House in Paddington is closed for extensive renovation and is anticipated to re-open in September 2013.

Rooms at Xenia range from £110 per week for a twin to £200 per week for an *en suite* single.

Paul Noke, Head of Residential Services, said: "It's important that our students have access to high quality but affordable accommodation. The addition of Xenia means that there will be more choice of room types and rents available in zone one for Imperial students."

Chapter 1 will use proceeds from the contract with Imperial to support its core aims of providing accommodation and support for vulnerable people.

—CAROLINE PREW, COMMUNICATIONS AND DEVELOPMENT



Researchers take on 'super material' graphene

Imperial scientists have been awarded £4.5 million of public funds to try and unlock the potential of the 'super material' graphene, which could drive improvements in aeroplane structure, industrial processes and electronics.

On 27 December, the Chancellor of the Exchequer, George Osborne MP, announced £21.5 million of capital investment to commercialise graphene. The material is one of the thinnest, lightest, strongest and most conductive discovered to date, an advancement recognised through the award of the 2010 Nobel Prize in Physics.

Three research projects at Imperial will share the Engineering and Physical Sciences Research Council funding as part of a new programme with a number of industrial partners, including aeroplane manufacturer Airbus.

Professor Neil Alford, Deputy Principal for Research in the Faculty of Engineering, who is playing a key role in one of the new projects, said: "The new funding will enable us to bring graphene a step closer to useful applications, by helping us explore the physical and mechanical properties of this remarkable material, as well as its behaviour at high frequency."

To find out more about the graphene projects at Imperial visit: <http://bit.ly/ZESs8m>

Alumni gather from Mumbai to Bangalore

Imperial alumni across India gathered for receptions hosted by President & Rector Sir Keith O'Nions at the start of January.

At events in Mumbai, Delhi and Bangalore around 140 alumni met old and new friends and received updates from Sir Keith on the College's current and future priorities.

Giving guests a warm welcome at the first reunion in Mumbai on Monday 7 January he said: "Each time I visit India, I am struck by the

tremendous strength of the alumni network, and the close-knit community that our alumni have forged with one another."

During his week-long visit to the country Sir Keith also met with some of the College's key business and industry partners, delivered a keynote speech at a British Council/UNESCO global forum on maths and science teaching in schools, and took part in a climate change conference to which alumni were also welcomed.

Alumni attending the reunions across India

enjoyed sharing memories of their experiences at Imperial and updating each other on their achievements since graduation.

"As well as giving me the opportunity to catch up with my friends and peers, the event offers the chance to meet Imperial alumni across many generations, some of whom I see as potential mentors for me," said Priyanka Talwalkar, who completed an MSc from the Business School in 2008, at the Mumbai reception.

—BETH PARRY, PRESIDENT & RECTOR'S OFFICE

media mentions

—LUCY HANDFORD, COMMUNICATIONS AND DEVELOPMENT



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Big decisions

THE INDEPENDENT ▶ 11.1.2013



It can be a real challenge these days for prospective students to pick a course that's right for them. Increasingly, universities are offering programmes that straddle various disciplines and in some cases have links to industry, *The Independent* noted. While these links may enhance graduates' employment prospects, the exact approach taken by individual universities varies. The type of course most likely to benefit students will be one with industry connections that have "depth, duration, influence and sophistication," said Alison Ahearn, Principal Teaching Fellow in the Department of Civil and Environmental Engineering.

Smartphone app launched for scientists

NEW SCIENTIST ▶ 9.1.2013

Digital tools, such as smartphones and the applications they run, have had a significant impact on our day-to-day lives, from managing monthly budgets to finding a good restaurant. Now a new app could change the way that science is done. According to Dr Sarah Butcher (Molecular Biosciences), researchers have "a very clear idea of how they generate data, but they don't necessarily have the means to analyse it or to share it in a way that makes it usable." Epicollect, an app developed by Dr Butcher and her team, which collates information into a web based database, could go some way to addressing the issue, reported *New Scientist*.

Give us a hand

THE SUNDAYTIMES ▶ 7.1.2013

British doctors performed many of the early heart, liver and kidney transplants in the 1960s and 1970s, but they have been slower to push the boundaries in other body transplant areas. "The possibility of hand transplants was first talked about in Britain around 2000, but there was a lot of resistance among surgeons, and it has taken all this time to change minds," Dr Shehan Hettiaratchy (Surgery and Cancer) told *The Sunday Times*. "Many thought the risk-benefit balance was not right," he noted. This will become less of a problem in future as scientists

develop ways to 're-educate' the body's immune system to accept a foreign organ or limb using fewer or no drugs.

Smoothed by science

FINANCIAL TIMES ▶ 4.1.2013

Cosmetics companies are now turning to real science to meet beauty challenges such as frizzy hair and wrinkles. One new anti-frizz product uses polyfluoroester, a substance that is currently used to coat contact lenses. The product was created by 'tweaking' the molecule and mixing it with other ingredients to make it more suitable for applying to hair. However, Dr Matthew Fuchter (Chemistry) told the *Financial Times* that creating a molecule that can interfere with the body's biochemical pathways crosses beyond cosmetics into 'drug territory,' and could result in "costly and extensive clinical trials in the same way pharmaceutical companies do. No beauty brand wants that, so they are walking a fine line."

awards and honours

NATURAL SCIENCES Prize for Higgs researchers

Three Imperial physicists will receive a share of a new \$3 million prize, awarded for their part in identifying a Higgs-like boson at the Large Hadron Collider particle accelerator at CERN. The Fundamental Physics Prize Foundation will honour a total of seven scientists for their leadership. The prizewinners include Professor Tejinder (Jim) Virdee, Visiting Professor Dr Lyn Evans and Senior Research Investigator Dr Michel Della Negra,

who all hold positions in the Department of Physics. The prizes will be given at a ceremony at CERN on 20 March.

POSTDOC DEVELOPMENT CENTRE Postdoc centre gets badge of excellence

The College's Postdoc Development Centre has received a coveted European award that recognises its efforts in supporting researchers in terms of working practices and training opportunities. The European Commission's 'HR Excellence in Research' badge is given to institutions that have aligned both with the European Charter for Researchers and Code of Conduct for their Recruitment and the Concordat.



ENGINEERING Maser glory

Work by an Imperial professor in developing a radio laser or 'maser' that works at room temperature has been recognised as one of the top 10 science breakthroughs of 2012 by *Physics World*. Until now, masers have needed to be chilled to extremely low temperatures using liquid helium in order to work –

making them impractical for most commercial applications. Professor Neil Alford (Materials) and colleagues were able to get a maser to operate at room temperature, paving the way for a wide range of applications in telecommunications and imaging.

MEDICINE New charity grant

Scientists from the Division of Cell and Molecular Biology have been awarded new funding from the charity Leukaemia and Lymphoma Research. Drs Cristina Lo Celso and Edwin Hawkins will begin a three year project to explore how some cancer cells use 'hiding places' in the body to avoid chemotherapy drugs.

Possible cause of repeat miscarriages pinpointed

Researchers have identified molecular signals that control whether embryos are accepted by the womb – something that appears to be awry in women who have suffered repeated miscarriages.

The research, carried out at Imperial and the University of Warwick, suggests these signals could be targets for drugs that would help prevent miscarriage in women who are particularly vulnerable.

At the start of pregnancy, the fertilised embryo must embed itself in the lining of the uterus. The uterus is only receptive to embryos for a few days in each menstrual cycle, ensuring that embryos can only implant at the right stage of development. Currently scientists know only a few details about the biological processes that control this.

In the latest study, researchers examined chemical signals produced by human cells taken from the lining of the uterus and grown in the lab. They identified a key role for a molecule called IL-33, which the cells secrete during the receptive phase.

Normally, the effects of IL-33 in the lining of the womb are short-lived, which helps to ensure that a woman can only conceive during a narrow window. In cells from women who had suffered three or more miscarriages, however, high levels of IL-33 continued to be secreted for 10 days, suggesting that the receptivity of the uterus was not being controlled properly.

Study co-author Dr Madhuri Salker (Surgery and Cancer) said: “This might mean they can become pregnant with poor quality embryos or that the embryo implants in an unsupportive environment, which would seriously compromise the chances of a successful pregnancy.”

—SAM WONG, COMMUNICATIONS AND DEVELOPMENT

Wind in the willows boosts biofuel production

Willow trees cultivated for ‘green energy’ can yield up to five times more biofuel if they grow diagonally, compared with those that are allowed to grow naturally up towards the sky, Imperial scientists have shown.

This effect had been observed in the wild and in plantations around the UK, but scientists were previously unable to explain why some willows produced more biofuel than others.

Dr Nicholas Brereton and Dr Michael Ray (both Life Sciences) identified a genetic trait that causes this effect and is activated in some trees when they sense they are at an angle.

The effect creates an excess of strengthening sugar molecules in the willows’ stems, which attempt to straighten the plant upwards. These high-energy sugars are fermented into biofuels when the trees are harvested in a process that currently needs to be more efficient before it can rival the production of fossil fuels.

Willow is cultivated widely across the UK, destined to become biofuels for motor vehicles, heating systems and industry.

Dr Brereton said: “We’ve known for some time that environmental stresses can cause trees to naturally develop a slightly modified



‘reaction wood’ and that it can be easier to release sugars from this wood. This is an important breakthrough and could well be the key to unlocking the future for sustainable bioenergy from willow.”

Trials were performed at the Gro-dome facility at South Kensington Campus and Orkney Island, off the northern-most coast of Scotland, where winds are regularly so strong that the trees are constantly bent over at severe angles. That work was supported by researchers at Rothamsted Research, and the University of the Highlands and Islands’ Agronomy Institute (at Orkney College UHI).

—SIMON LEVEY, COMMUNICATIONS AND DEVELOPMENT

Compact scanner will improve imaging of joints

Researchers at Imperial are developing a new compact magnetic resonance imaging (MRI) scanner for hospitals that will improve the way joints are scanned.

Ultimately it could help doctors to make more informed decisions about surgery, improving outcomes and recovery times for patients.

The team led by Dr Mihailo Ristic (Mechanical Engineering) say the finished MRI instrument will be the size of a coffee table, fitting neatly around the knee thereby representing cost and space savings from the standard MRI machines, which can be the size

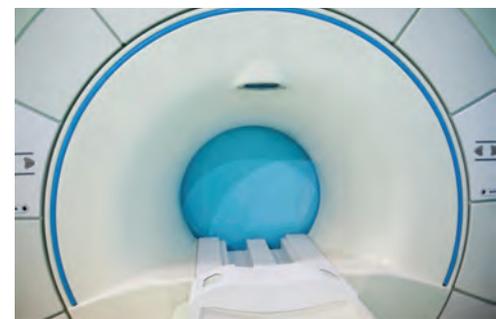
of a small car with a price tag of around £900,000.

Each year the NHS carries out more than 70,000 knee replacement surgeries in the UK. However, it is difficult for doctors to image parts of the body that have high collagen content – such as ligaments and tendons in knees and

elbows – using standard MRI technology. As a result doctors are often unsure of how robust joints really are, so opt for a full replacement to ensure the end result is a working knee. This can increase healthcare costs and affect patient recovery times.

Dr Ristic’s team will design a completely new magnet that will be moveable and the field it produces

“The potential for this technology is tremendous. We believe every hospital would want to have one”



will be oriented at various angles to the patient’s body.

Though designed specifically for knees, the system could also be used to image a wide variety of body parts. Dr Ristic concludes: “The potential for this technology is tremendous. We believe that every hospital would want to have one.”

By the end of the project, the team aims to collaborate with industrial partners to produce a commercial product.

—BY JOSHUA HOWGEGO FOR COMMUNICATIONS AND DEVELOPMENT

Video game designer ANGELINA steps up a level

ANGELINA, an artificial intelligence system that can design its own video games, has come up with new complex level designs and game mechanics, used recently in the festive platform game *A Puzzling Present*.

Originally conceived by Imperial PhD student Michael Cook (Computing) in 2010, ANGELINA has been designing her own simple games for around two years.

But while previous games required considerable input from Cook to give it a 'set of rules', ANGELINA is now able to design more independently, coming up with games almost from scratch. That's thanks to a new set of algorithms called Mechanic Miner that Cook has built for ANGELINA, allowing her to find and test new game possibilities like reversing gravity, high-jumping and teleportation.

Released in December 2012, *A Puzzling Present* sees Santa Claus sucked into a Christmas present with the player's goal being to help Santa collect gifts in the 30 Christmas-themed lands, which are filled with deadly holly and other obstacles.

"I've written video games my whole life and I am interested in how to get computers to be creative on their own," said Cook. "I wanted to know if you can get a computer to design video games. In many ways she is like Photoshop or Microsoft Word but when ANGELINA starts running, instead of waiting for me to do stuff, she works on her own."

In 2013 Cook hopes to get ANGELINA to generate the final few remaining design aspects that still come from him, including the artwork. This will mean equipping her with a tool for automatically grabbing, shrinking, cutting and recolouring images from the web into sprite-sized graphics ready for use in games.

To find out more about ANGELINA visit: www.gamesbyangelina.org



Blood pressure and smoking biggest health risks globally

A global health analysis has found that the risk factors behind chronic diseases have become bigger causes of disease than child hunger.

Over nine million people died as a consequence of high blood pressure in 2010, making it the health risk factor with the greatest toll worldwide, according to a study estimating the disease burden attributable to 43 risk factors in 1990 and 2010. Smoking and alcohol use have also overtaken child hunger in the last two decades to become the second and third leading risks globally.

"Overall we're seeing a growing burden of risk factors that lead to chronic diseases in adults, such as cancer, heart disease and diabetes, and a decreasing burden for risks associated with infectious diseases in children," said Professor Majid Ezzati (Public Health), one of the study's senior authors. "But this global picture disguises the starkly different trends across regions. The risks associated with poverty have come down in most places, like Asia and Latin America, but they remain the leading issues in sub-Saharan Africa."

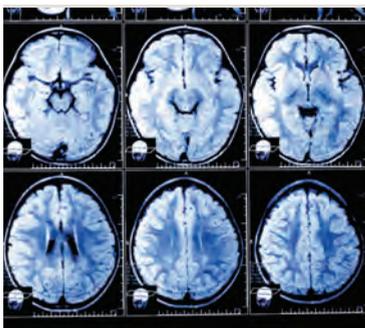
The risk factor with the greatest increase in health burden was high body mass index, which was ranked 10th in 1990 and sixth in 2010. More than three million deaths in 2010 were attributable to excess body weight – more than three times as many as undernutrition.

"The good news is there are lots of things we can do to reduce disease risk," Professor Ezzati said. "To bring down high blood pressure, we need to regulate the salt content of food, provide easier access to fresh fruits and vegetables, and strengthen primary healthcare services."

—SAM WONG, COMMUNICATIONS AND DEVELOPMENT

To see a video interview with Prof Ezzati visit: bit.ly/VAoVWF

New service promises early warning of Alzheimer's



A new high tech early dementia assessment service that could slash the time it takes for doctors to diagnose Alzheimer's disease from 18 months to three months is being developed, thanks to underpinning research at Imperial.

The assessment service integrates several cognitive tests with computerised analysis of magnetic resonance imaging (MRI) brain scans. At the heart of the assessment service's software is an algorithm created by Dr Robin Wolz and Professor Daniel Rueckert (both Computing).

The researchers say the 15 months of diagnosis time the new system could save are critical to the treatment of diseases such as Alzheimer's, since available drugs are most effective in earliest stages of disease.

Dr Wolz explained that parts of the brain important for memory such as the hippocampus and amygdala steadily shrink as Alzheimer's progresses. Doctors use this as an indicator of how far the disease has progressed.

"Our automated technology can provide information to all doctors, seamlessly integrated into current processes"

Dr Wolz explained that parts of the brain important for memory such as the hippocampus and amygdala steadily shrink as Alzheimer's progresses. Doctors use this as an indicator of how far the disease has progressed.

"Our automated technology can provide this information to all

doctors, seamlessly integrated into current processes, and by adding information and increasing confidence, speed up the diagnosis process. This could lead to quicker treatments for patients to improve

their quality of life," he said.

As part of the project, GPs will test the memory of patients who potentially have dementia. Those with abnormal scores will receive an MRI brain scan. The scans will run through a computer program that uses Dr Wolz's algorithms. The results will be combined with an assessment of blood vessel damage in the brain and given to the GP who will decide on further treatment.

The project is a collaboration between Cambridge Cognition and IXICO Ltd – an Imperial spin-out company founded in 2004.

—ROSEMARY PETERS FOR COMMUNICATIONS AND DEVELOPMENT



Left to right: Giovanni Marinaro, Russell Stracey and Robert Sherer.



Workshop wizardry

Scientific research today is nearly always a team effort – and is becoming increasingly collaborative and multidisciplinary. The popular image of a ‘lone genius’ working completely independently, usually in some isolated lab or shed, must surely be confined to the realms of fiction. Major discoveries are more likely to be the work of research groups which, in the case of genome projects and high energy physics programmes, may include hundreds of collaborators.

But even after acknowledging the immediate group of scientists, there is also an extended network of supporting players

behind the scenes who work hard to make it all possible.

For the Faculty of Engineering and Department of Physics at Imperial, this includes a team of dedicated and skilled workshop technicians who manufacture all manner of bespoke equipment and parts for use in experiments. This can include casings for spacecraft destined for far-flung regions of the solar system; rigs to test how prosthetic limbs respond to forces; precision micrometre parts for laser experiments; and even outreach exhibits that tour science festivals and events around the country.

So it's vital that technician talent is

recruited and nurtured, as Deputy Rector (and former Principal of the Faculty of Engineering and Head of the Department of Chemical Engineering) Professor Stephen Richardson points out:

“I know from experience that if it weren't for two or three technicians, a whole line of work that I did in Chemical Engineering back then simply wouldn't have been possible – you just can't do it. If you can't make kit that's good enough you can't do the experiments.

“If we stopped doing experimental work with top technicians who have learned their trade properly, we would be moving down the university rankings. We've just got to do this, and on a bigger scale than we are doing now.”

A couple of years ago Stephen was at a meeting of the College Court with two senior workshop supervisors, Paul Brown (Physics) and Russell Stracey (Materials), when they began to discuss the idea of a technician apprenticeship scheme.

“We need such a diverse, skilled, sort of technician, that it makes sense to grow your own,” Paul says. “Of course, we've also recruited successfully from outside the College but this should be alongside growing your own talent.”

A technician apprenticeship scheme had run at Imperial until the early 1990s, but was wound down, partly because skilled technicians made redundant by manufacturing companies in the south east were becoming available. Also during the 1990s, school leavers with good grades were increasingly opting to go to university, so apprenticeships became somewhat unfashionable.

That has all changed now and apprentices are very much in demand again from both the public and private sector, owing in part to an increased emphasis on ‘advanced manufacturing’ in the UK.

“Looking around at some of our more experienced technicians I think it's fair to say



we're not getting any younger, so we identified a fairly pressing need," says Russell.

Paul and Russell then fleshed out the details of the scheme in consultation with Human Resources and eight College departments: Aeronautics, Bioengineering, Chemical Engineering, Civil and Environmental Engineering, Earth Science and Engineering, Materials, Mechanical Engineering and Physics.

The idea was that apprentices would study for one year at Kingston College in Surrey – where apprentices from major UK companies such as BAA, Thames Water and TfL also come to study – then come back to Imperial to do six-month rotation placements around the different workshops.

"My vision was that they would come back to us 'workshop safe' so we wouldn't then be giving them basic health and safety training but actually start teaching them their craft," says Paul.

After setting up a steering group to put "some weight behind the scheme" they eventually recruited two apprentices in September 2011: Giovanni Marinaro and Robert Sherer.

On completing their first year at Kingston College in September 2012 the two began their workshop placements at Imperial in September last year.

“We need such a diverse, skilled, sort of technician, that it makes sense to grow your own”



"I always have been very hands-on; at school and college my favourite subjects were resistant materials and product design," says Giovanni.

"At college the main talk was about going to university, and I did look down that route, but I wasn't 100 per cent sure, so I finished college and took a gap year. I then started an electrical installation apprenticeship with my uncle's firm, which I enjoyed but I didn't feel like I was quite pushing myself enough. So I then researched apprenticeships in more depth and found the Imperial scheme which looked like a really interesting challenge."

During the course of the autumn term, Giovanni spent time in the Physics workshop in the basement of the Blackett Building, getting to know the machines and also a little about the research that the Department gets up to.

"I've been to a few labs upstairs now, and every time it's just blown my mind. I don't fully understand all the science behind it – but you get a real sense of some of the exciting work they're doing."

One project he particularly enjoyed involved working with PhD student Jessica Wade (Physics). The research group in which Jessica is based (under the supervision of Dr Ji-Seon Kim) builds electrical and optical devices such as advanced LEDs, transistors and solar cells. The group decided that they needed a rig with which they could test these devices to see how well they operated under strict experimental conditions.

"Giovanni is building us a chamber which can be filled with nitrogen and allows our samples to be mounted and electrically contacted. The unique design of Giovanni's chamber allows us to easily move between different devices," Jessica says.

Meanwhile, Robert spent his first six months at Imperial in the Aeronautics work-

shop making components on the machines and also working on some of the wind tunnels and highly specialised facilities the Department of Aeronautics uses.

He even made some components that were fired together at high velocity and vaporised in the Institute of Shock Physics' gas gun, a facility that helps to understand how materials cope under extreme forces.

"The tolerances they have to work within there are extremely fine, because obviously these parts are eventually destined for critical applications in aircraft or cars for example," he says.

When the technician apprenticeship scheme is 'fully loaded' there will be eight trainee technicians at any one time at various stages of their four-year training programme (two in each year).

Stephen Richardson is keen to stress that the scheme is not only about what the apprentices can offer Imperial, but what the scheme can offer them in terms of career development.

"It's good for us and good for them, because they get experience of very up-to-date, precision machinery and computer control software – it's an investment across the board," he says.

During their time at Kingston College and the Imperial workshops, the apprentices work towards qualifications at various levels including the National Vocational Qualification (NVQ); BTEC; Higher National Certificate (HNC); and Higher National Diploma (HND).

"At the end of the four years, the apprentices will have to find jobs, but they'll be well known around the Departments and so if there's a role going they will hopefully be in a very strong position," says Russell.

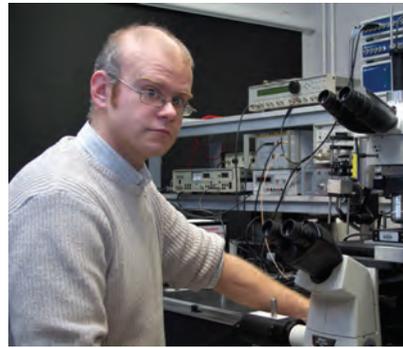
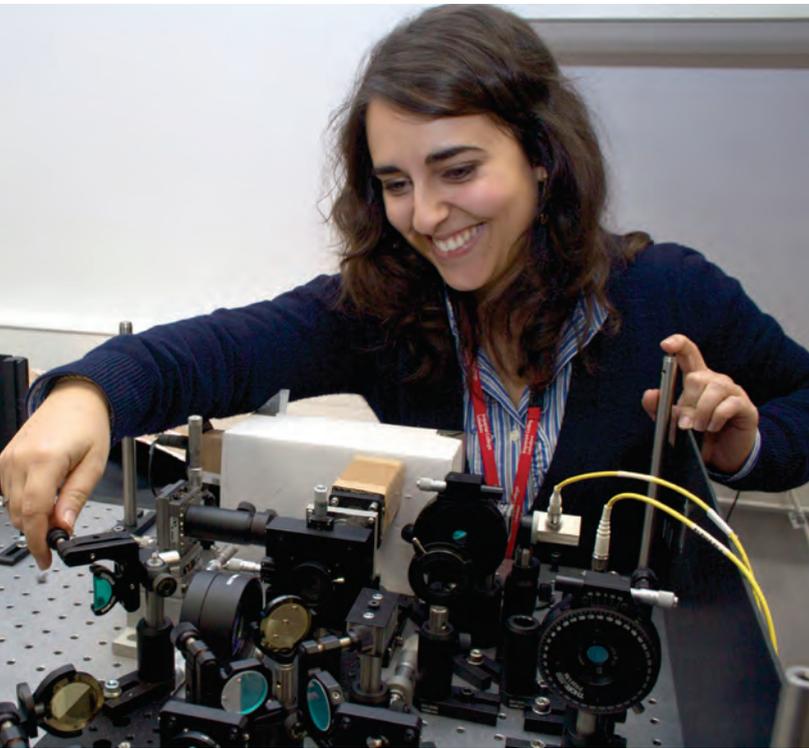
Technicians can go on to do degrees, as did senior technician Guljar Singh (Mechanical Engineering). He went through an apprenticeship at Imperial as part of the original scheme back in the 1990s, and then did a part-time degree in Mechanical Engineering while working as a technician.

Technicians can also specialise in various different workshop areas, such as machine tooling, design and electronics to name a few. Peter Savage (Physics), a Project Engineer for the High Energy Physics Group, works extremely closely with scientists and is currently involved in the design of a proton accelerator at the Rutherford Appleton Laboratories in Oxford.

Indeed, much of the scientific research we hear about so often in the media is made possible thanks to the behind-the-scenes work of the technicians, even if it's seldom acknowledged.

Whichever path the apprentices ultimately decide to take, they will no doubt contribute to the discoveries and technologies of the not too distant future.

—ANDREW CZYZEWSKI, COMMUNICATIONS AND DEVELOPMENT



Left to right: PhD student Giuliana Di Martino and Research Fellow Dr Yannick Sonnefraud, both the nanoplasmonics group.

Light reading

The Department of Physics' nanoplasmonics group

Stefan Maier's nanoplasmonics group started five years ago with just one other member. It is now a 30-strong team which last year produced 40 publications, almost all in high impact journals, including *Nature* journals and *Science*. Reporter met with Stefan and the group.

Some scientists work mostly with chemicals, others with cells, and some with metals. For Professor Stefan Maier (Physics) and his team their currency is light. They try to understand it at a fundamental level, capture it, channel it at the tiniest scale and use it to perform an array of useful technological functions.

Working in experimental physics is challenging to say the least. But the Maier group balances that with bouts of squash and generous helpings of tiramisu – leaving them refreshed and ready for the real work.

“Plasmonics is the study of how light interacts with metallic nanostructures”, explains Dr Yannick Sonnefraud, the first and longest-serving member of Maier's group and now a research fellow.

“Light waves couple with the oscillating waves of electrons inside the metal,” adds research fellow Dr Antonio Fernandez-Dominguez. “They interact to form a new entity that has the properties of the two – light waves and electron waves. It is this entity that we call a plasmon.”

This is, in some ways, similar to what happens in a radio antenna. Radio waves create a current in the metal aerial, which is integrated with the electronics and converted into the sound we hear.

But scientists would really like to make an antenna to convert visible light into a plasmon. This could lead to a range of diverse applications such as

extremely fast information processing devices for the telecommunications industry; high-density data storage; and super sensitive chemical detectors that could spot just a couple of molecules of explosive in a liquid sample.

Dr Tyler Roschuk, who has been a post-doc in the group for three years, looks at ways to integrate photonic components such as fibre optics and laser diodes with much smaller micro-electronic features.

“We could focus the light down with a nanoplasmonic antenna. Then instead of metal wires between electronic components, we would have plasmonic wires. This would lead to faster devices because multiple packets of information could be sent down the same wire at the same time, much like how several hundred telephone calls can be sent down the same fibre optic cable,” he says.

Meanwhile postdoc Dr Heykel Aouani is trying to make nanoantennas that can handle a much broader range of wavelengths, which could lead to powerful sensors for biological applications and security.

“A liquid sample of interest would be wiped over a chip and light would be reflected off this and examined. The use of nanoantennas would indicate whether certain chemicals, such as TNT, are present in the sample. This technology could therefore be useful in airport security scanning in the future,” he says.

Some of the PhD students enjoy the benefits of working across two different groups such as Krystallo Hadjicosti, who is co-supervised by Stefan and Dr Katya Shamonina (Electrical and Electronic Engineering).

“Working in this area requires knowledge and experience in both

electronics and physics. Collaboration is essential to establish the theory and apply it. Besides, networking in science is very important and being able to meet people from both fields triggers new ideas,” she says.

Her situation is not unique, however, and is indicative of the Maier group's philosophy on collaboration.

“Key to the success of our group is that we have been able to collaborate so widely,” says Stefan who points to work they've done with Professors Sir John Pendry, Ortwin Hess, Lesley Cohen, and Drs Ned Ekins-Daukes and Paul Stavrinou in Physics, Professor Neil Alford in Materials and Katya in Electrical and Electronic Engineering, in addition to international collaborators.

But the group's success also owes a lot to its friendly environment. “We have a squash ladder tournament whilst Friday beers are also an important event in the group,” says research fellow Dr Vincenzo Giannini.

“Our members come from all over the world and we try to mix our knowledge.”

“We sometimes compete to see who can make the best version of each other's national meals,” adds PhD student Giuliana Di Martino. “Yannick made a very good tiramisu recently. But there's

a few of us Italians in the group and we weren't going to go as far as admitting that a Frenchman knows how to make a better tiramisu than an Italian!”

As the group moves forward into 2013 there are plenty of exciting challenges to come. Two post docs in the group have recently been awarded Junior Research Fellowships and two alumni have gone on to professorships at overseas universities. It's probably fair to say that in the years to come, the group as a whole will continue to drive advances in the field of nanoplasmonics, which will have an increasing impact on business and consumer technology worldwide.

—SAM TRACEY FOR COMMUNICATIONS AND DEVELOPMENT

“Key to the success of our group is that we have been able to collaborate so widely”

inside*

story

mini profile

Tony Cass

Professor Tony Cass (Chemistry) celebrates his 30th year at the College in 2013, having worked across numerous departments and centres – some now extinct, and others that have evolved into groups such as the Institute for Biomedical Engineering, for which Tony serves as Deputy Director.



which takes time. It would be much better if the patient could take their prescription drugs along with a simple home-use sensor, then results could potentially be sent to their mobile phone and onto their GP, who could monitor treatment.

What changes have you seen at the College?

It's interesting, because I came to Imperial to help establish a new Centre for Biotechnology, when some of the hot topics included microbial production of biofuels from agricultural waste. Projects running in the early 1980s trying to do that have now come back into vogue (see 'Science Roundup', page 6). My own work is mostly in diagnostics and sensing, which is also enjoying a revival.

What are the current priorities for personalised treatment?

We'd like to be able to see at an early stage in treatment how a patient is responding to a drug. Do they need an increased or decreased dose, or should they switch to a different drug altogether? Currently such personalisation, if done at all, requires blood samples to be sent to hospital laboratories,

You were part of the team that pioneered the first electronic glucose monitoring finger stick around 30 years ago. Is that an area that you are still active in?

It is, yes. There's been a steady improvement in the technology – blood samples have got smaller and response times are faster. But it still suffers from the limitation that glucose changes so quickly you can miss the highs and lows, even if you sample five times a day. What you'd like to be able to do is measure glucose continuously. We're working on a small patch that would do just that. It has tiny sensors that sit just under the skin. It's bloodless and painless.

“We're working on a small patch that can measure glucose continuously... It's bloodless and painless”

Getting media savvy

Dehydys Pimentel De Lamo (Mechanical Engineering), a PhD student and keen blogger, attended a new course – *Communication and Impact for Female Early Career Researchers* – on 4–6 January, which was developed by SciConnect and the University of Warwick, with tutoring from Imperial's Gareth Mitchell (Co-Curricular Studies).



“I was interested in the course because the outline addressed some key issues and problems in communicating science, including posture, body language and appearance; how to grab your audience's attention; being credible and incredible; the relationship between science, the public and the media; and what journalism is and how it applies to your science.

The course was interactive and overall, lots of fun. We used special equipment for radio and video recording and learned how to communicate research topics and findings effectively.

“We recorded in the BBC studios at Broadcasting House”

For the final day we had to create a radio programme of around 15–20 minutes in the BBC studios at Broadcasting House. My group decided to talk about financial cuts in academia.

It was an incredible experience. I was one of the presenters of the show and had to do the introduction when the green light appeared; I was nervous yet excited at this unique opportunity. I think we all did a good job and we certainly had a great

time during the recording.”

To find out about similar courses running in the future visit: <http://bit.ly/UEOowF>



▶ SCIENCE FROM SCRATCH

As explained by Stephanie McClellan, MSc Science Communication

Why do I get the sniffles each winter?

No winter season passes without its characteristic sniffles and sneezes. Why is it that every year cold and flu viruses return in full force? Well, these coughs and sneezes help spread airborne particles containing the infectious viruses. Millions of people each year contract colds and flu, and in the case of the latter, between 250,000 and 500,000 cases are fatal.

Unlike diseases such as tetanus or hepatitis B that can be successfully treated with vaccines, there is no universal vaccine for influenza. Existing vaccinations 'train' your immune system to identify the surface proteins of a low dose of virus. Unfortunately, the high mutation rate of the flu virus means that new proteins evolve each season. The World Health Organisation predicts what strains of the virus are most likely to circulate in the next year and supply appropriate vaccinations. It takes pharmaceutical manufacturers about six months to create a vaccine. However, it's entirely possible that an overlooked strain may become prominent, making a vaccination useless for the next flu season.

Scientists are busy working on a 'universal' vaccine for flu; but until it arrives most of us are probably better off getting some rest and maybe sipping on a 'hot toddy'.

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

Student blogger Fi on being

Driven to distraction:

“Because I don’t like doing anything the easy way, I’m currently learning how to cox and how to drive, both at the same time.



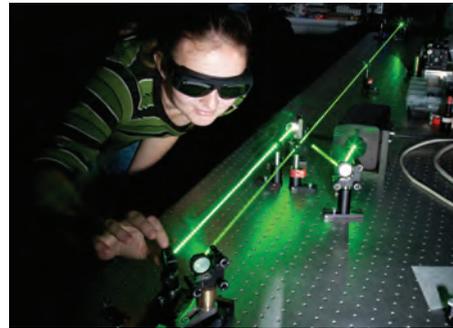
For those not in the know a cox is the person who sits at the front of a

rowing boat and tells the rowers what to do, and steers the boat. As a small, loud and bossy person, this suits me down to the ground, and I find it really fun. I’m not a big fan of driving or any good at it. But learning these two skills at the same time is pretty interesting actually, I’ve found they definitely influence each other, at least in my head.”

www.imperial.ac.uk/campus_life/studentblogs

blog
SPOT

Planning a science comeback



Getting back into postdoctoral research after taking a career break can be difficult – a particular issue for female scientists who have decided to start a family. In fact most who take breaks don’t return.

Professor Daphne Jackson, who graduated in physics from Imperial in 1958, going on to serve as Dean of the Faculty of Science at the University of Surrey, branded this an “appalling waste of talent”. She formed a fellowship scheme for returning scientists, which evolved into the eponymous Trust after her death in 1992. The Trust now awards 30–35 fellowships a year that enable returners to work part-time for two years on a project.

Dr Liz Elvidge (Human Resources) heads the College’s Postdoc Development Centre and has recently been appointed to the awards panel of the Daphne Jackson Trust. It puts her in a unique position to advise potential fellows as well as supervisors who might consider taking on a fellow.

“Identify a project that’s feasible; if it’s something that’s going to require five years to complete and a big team, it’s probably not suitable,” Liz advises. “A supervisor who understands the importance of this scheme is likely to be more supportive.”

Once fellowships have been awarded, Liz points out that a big part of the Trust’s support is about “retraining, getting fellows’ toes back in the water and up-skilling”.

Nevertheless, science returners can offer some unique transferable skills of their own: “If you’ve had a career break, and you’ve got kids, you actually become incredibly organised and achieve that efficiency level where you don’t necessarily need to be in the lab for 12 hours – you can balance it.”

To find out more about the Trust visit: www.daphnejackson.org

Gastro grub

Eating cricket kebabs, collecting insects with local villagers and extending our knowledge of the species eaten in Benin, West Africa – these were all on the menu for a two-month trip funded by the Exploration Board and led by two Imperial students before Christmas.

Rudi Verspoor and Laura Riggi were both studying for Master’s degrees in the Division of Ecology and Evolution last year when they became aware of entomophagy (the consumption of insects). As alternative food sources, they saw that insects could offer an environmentally friendly, highly efficient way of transferring

plant material into animal protein, as well as avoiding many of the disease risks associated with eating farmyard animals.

In planning and coordinating the expedition, the students benefited from the advice, and financial and material support, of the College’s Exploration Board.

Reflecting on the trip Rudi says: “I think there was a lot of curiosity and excitement on both sides:

it was great to learn more not only about insects and how they fit into their lifestyles and traditions, but also about their environment and their culture in a wider sense.”

But it wasn’t just about expanding culinary horizons; the team’s research was highly



successful. The goal had been to create an inventory of the insects traditionally eaten by the Wama people of Benin, and to document and film how the insects were collected, prepared, cooked, and which members of families mostly ate them.

Having returned to the relatively mundane culinary life of the UK, they each plan to maintain

their entomological connections, with Rudi pursuing a PhD in evolutionary biology and Laura hoping to work or study in pest management. They also plan to continue eating insects – although ordering online remains slightly more expensive than collecting them on the ground in Africa!

— ANTHONY WILKINSON FOR COMMUNICATIONS AND DEVELOPMENT



INVENTOR'S CORNER

Games workshop

After graduating from Imperial with an MSci in Mathematics in 2012, Thomas Matcham launched his technology start-up CoAdjoint, aiming to transform the video gaming experience through design software that allows characters far more interaction with their virtual environment.

Why did you get into the gaming market?

Computer games played a big part in my life when I was growing up, but I started to become dissatisfied with the experience; the industry, for me, became quite stagnant in its development. In most modern gaming systems, everything is fixed in the sense that one action leads to a specific outcome. I wanted to offer developers the opportunity to make a different variety of games where, rather than linear storytelling, user interaction shaped the direction of the game more fully to create individually tailored experiences.

How have you achieved this?

I thought about how we develop as people when learning new skills, such as a language or sport, and applied a mathematical model to this process. Using this model, I've developed gaming software where the character adapts and improves, based solely upon the gamer's performance. We also want to make experiences more



A demo video game that used Tom's model.

interactive for different types of software – for example, we could apply this model to educational software such as financial trading games.

What pushed you to take this idea down the entrepreneurial route?

Confidence was a big issue for me and I didn't know if my idea had any worth. So when I heard about ICStartup+ (an initiative led by the College and Imperial Innovations which provides funding, mentorship and office space to promising tech start-ups) I signed up. As well as the practical help I received, it was useful interacting with like-minded people in similar situations, sharing ideas and getting good, constructive feedback.

—KAILEY NOLAN, IMPERIAL INNOVATIONS

For support to get your software into the real world see: www.icstartup.com/vc



Nutrition myth busting

Lending a helping hand with those New Year's resolutions, Sport Imperial put on a Healthy Living Week from 14–18 January with a series of free sports activities, healthy food offers at selected catering outlets and a talk by nutritionist Martin MacDonald – attended by Caroline Prew (Communications and Development).

“This January I am trying to make a healthy start by cutting out alcohol and by going swimming regularly. I attended the seminar to find out if my diet needed an overhaul too. I expected to discover that I had a pretty good understanding of what it meant to have a balanced diet. How wrong I was. According to Martin, red meat does not promote heart disease, salt does not significantly affect blood pressure, you can consume as many eggs as you like, there's not much wrong with your morning cup of tea and in general, if the label says low-fat – avoid! This last is because the products are usually packed with sugar, whereas a little fat is actually fine. This means I'm saying goodbye to sweet chilli, fruit smoothies and pain au chocolat. However, according to Martin, I can still happily have plenty of delicious meats, fish, avocado and, my favourite, coconut.”

“I thought I had a pretty good understanding of what it meant to have a balanced diet. How wrong I was!”

Good management



Gerry George is Professor of Innovation and Entrepreneurship at the Business School and Director of its Rajiv Gandhi Centre which helps connect Imperial with Indian corporates and institutions. Gerry was recently appointed Editor-in-chief of the number one journal in management – the *Academy of Management Journal* – the first time the position has gone to an academic at a non-US institution.

“Management scholarship is not the same as management consulting where there are ‘hot’ topics with buzz words. If we think of management scholarship quite broadly, we are looking for new insights into what makes employees, stakeholders and organisations perform better. Within that rubric, there are many interesting areas such as how employees adjust to stressful work environments in the current economy or how businesses are rethinking social responsibility and engagement in a global community.

In many ways, management scholarship doesn't prescribe solutions to managers (like a doctor telling you which medicine to take). Instead, it guides managers to think about the principles by which decisions could be improved.

I would like to believe that management research helps business school professors to teach their students how to think rather than tell them to focus on a fad or what they should be thinking!”

To see the full interview with Gerry George visit: <http://bit.ly/YjFRpN>

obituaries



FELIX WEINBERG

Felix Weinberg, Emeritus Professor of Combustion Physics (Chemical Engineering) died on 5 December 2012, aged 84. Professors Hans Michels and Rafael Kandiyoti pay tribute to their colleague.

“Although many people were aware that Felix had survived the Nazi concentration camps as a boy, his ability to rise to the heights with such a weight on his shoulders was rarely discussed.

In his forthcoming memoir, drafted just before his passing, he revisits those painful memories. But the story of his survival is ultimately

one of hope and the triumph of one young man over barbarism.

At the end of the war, he was reunited with his father in the UK. He had had no schooling since he was 12, but soon caught up, eventually gaining a place at the University of London to study general science.

Felix joined the College in 1951 as a Research Assistant in Chemical Engineering, rapidly rising through the ranks. His research interest was mainly focused on the structure of flames, for which he was recognised with Fellowships of the Royal Society, the Institute of Physics and the Institute of Energy.

For all his reputation, Felix always came across as a modest, unassuming man who was dedicated to his students.

Indeed, he once came to the rescue of a postgraduate publicly criticised by an outspoken professor, with a riposte from Chinese philosophy “not to stamp on flowers if one wants them to grow”.

To us, lives the memory of a brilliant scientist and above all, a decent and good man. We will miss him; we already do.”

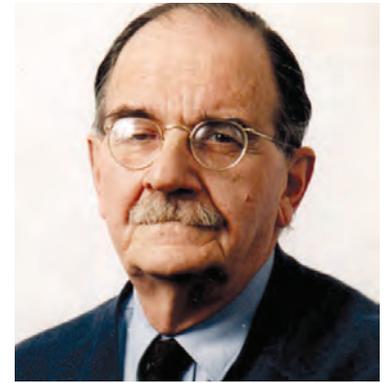
NICHOLAS AMBRASEYS

Nicholas Ambraseys, Emeritus Professor in the Department of Civil and Environmental Engineering, died peacefully at his home in Putney on 28 December 2012 at the age of 83, after a short illness.

Nick first came to Imperial to study for a PhD, awarded in 1958. He spent the first three years of his academic career as a lecturer at the College, followed by a spell in Greece and the USA, returning to Imperial in 1964, where he remained until his death. He served as Head of the Engineering Seismology Section from 1971 to 1994 and remained active until the end, holding grants, supervising PhD students and publishing papers.

Nick’s research covered earthquakes and their effects on the ground, structures and populations. Perhaps his greatest contribution was in studying historical accounts of earthquakes, particularly those occurring in the eastern Mediterranean.

His approach was influenced by knowledge and insight gained during dozens of post-earthquake



field missions he attended in various parts of the world. These missions led to a series of reports that ultimately influenced the reconstruction of the earthquake-damaged cities, in particular Skopje in Macedonia, for which he was awarded freedom of the city in 1998. His great ability with languages was an important factor in sustaining good relations with people of many nationalities.

Nick’s contributions to engineering seismology and earthquake engineering were immense, wide-ranging and covered almost 60 years. The worldwide communities in these fields owe him a debt and he will be greatly missed. He is survived by his wife, Xenia.

Physics hits the West End

Science is no stranger to cinema, being a regular staple of Hollywood blockbusters ever since *Star Wars* in the 1970s. But it has rarely found its way onto the stage in major theatre productions. Now a West End play, *Constellations*, helps to redress the balance, by tackling ideas of multiple universes.

Playwright Nick Payne took inspiration from a 2003 US documentary, *The Theory of Everything*, in which Professor Mike Duff (Physics) made an appearance.

However, the first Mike heard of the play was when he received a call from Nick asking him to come to rehearsals and give a presentation on physics to the actors, and to write an introduction in the

programme for theatregoers.

“I was delighted; I don’t often get involved in the arts and theatre, so I went along and met the lead actors Sally Hawkins and Rafe Spall.

It’s a boy meets girl story with a twist, in that they meet over and over again in different universes, so the same scene is played out but with subtly different outcomes; in one universe she’s unfaithful to him and in another universe he’s unfaithful to her.

He’s a beekeeper, and she’s a quantum physicist, so when she describes to her boyfriend what she does, Nick and the crew wanted to make sure that the script made sense – would a quantum cosmologist actually say that? And for the most part, they got it right.”



Mike then went onto see the play in full at the Duke of York’s Theatre.

“I’d read the script and wondered if it could really work on stage, but in fact the production and the way they’ve put it together – it’s wonderful. There are many scene changes to mark the switch to different universes, which they handle with lights, balloons and stagecraft.”

Constellations ran from 9 November to 5 January and scooped best play of 2012 in the Evening Standard Theatre Awards. It will now move to New York. To read Mike’s programme piece visit: <http://bit.ly/WSLfu6>

Farewell moving on

Mr Edo Abraham, EEE

Dr Juan Acosta Cobacho, Clinical Sciences

Ms Alison Adderkin (14 years), Public Health

Dr Hind AL-Khayat, NHLI

Mr Charles Arber, Clinical Sciences

Dr Tomoki Arichi, Clinical Sciences

Mr Richard Arkless (11 years), ICT

Ms Emma Arrowsmith, Public Health

Mr Mark Baker, NHLI

Dr Jens Balzer, Physics

Mr Kevin Barnes (5 years), Estates Division

Dr Claudia Battistelli, EEE

Dr Lucie Baudino, Medicine

Mr James Blake, Library

Professor David Blane (38 years), Public Health

Ms Anne-Marie Boland (5 years), Medicine

Dr Antonia Booth, NHLI

Ms Helen Booth, Faculty of Medicine

Dr Bernadette Brent, Medicine

Mr Richard Browning, Clinical Sciences

Mr Martyn Casey, Human Resources

Dr Manuel Castro, EEE

Mr Benjamin Cauchi, EEE

Dr Jian Chai (6 years), Medicine

Miss Joanna Chamiola, Accommodation

Dr Anil Chandrashekran, Surgery and Cancer

Mr Yao Chen, EEE

Ms Yi Choong, NHLI

Professor Tim Coulson (8 years), Life Sciences

Dr Sarah Cubaynes, Life Sciences

Miss Michelle Cussell, Sport and Leisure

Mr Peter Damerell, Life Sciences

Dr Mayeul d'Avezac de Castera, Chemistry

Mr Kieran Dee, Medicine

Mr Jacques Deere (5 years), Life Sciences

Mrs Susan Diggines, NHLI

Mr Lucky Dube, Medicine

Mr Nick East, NHLI

Mrs Jennifer Eastwood (20 years), Environmental Policy

Dr Ash Ederies, Medicine

Dr Mark Fenwick (5 years), Surgery and Cancer

Dr Brian Ferguson, Medicine

Dr Luca Fossati, Computing

Miss Sarah Foster, Medicine

Dr Loic Fourel, ESE

Dr Felix Frank, Physics

Dr Valentina Gallo (5 years), Public Health

Mr Pablo Garcia Ulloa, Catering

Professor Geoffrey Garnett (12 years), Public Health

Dr Nicole Gennet (6 years), Clinical Sciences

Dr Dana Gheorghe, Life Sciences

Mr Martin Gill (45 years), ESE

Professor Stephen Glaister, Civil and Environmental Engineering (15 years)

Professor Vivette Glover (18 years), Surgery and Cancer

Dr Silvia Goldoni, Materials

Dr Jefferson Gomes (6 years), ESE

Ms Joana Goncalves, Computing

Dr Lisa Grover, Research Office

Dr Jonathan Gulley, Physics

Dr Rui Guo (6 years), Chemistry

Dr Hamza Hamouchene, Surgery and Cancer

Dr Ulrich Harder (12 years), Computing

Dr Louise Harrington (5 years), NHLI

Mrs Lesley Harris (10 years), Life Sciences

Miss Rosie Hart, Human Resources

Dr Paul Hiron, NHLI

Dr James Hislop, Medicine

Dr Yvonne Ho (7 years), Mathematics

Dr Deirdre Hollingsworth (9 years), Public Health

Ms Laura Hopkins, Catering

Mr Alexander Hulme, Public Health

Professor Gary Hunt (12 years), Civil and Environmental Engineering

Dr Michael Hurley, Medicine

Dr Ehi Idahosa-Taylor, Medicine

Dr Henry Ip, Bioengineering

Miss Ines Jaeger, Clinical Sciences

Dr Jessica Janiczek, Clinical Sciences

Dr Simon Jeffs (10 years), Medicine

Dr Richard Jesik (11 years), Physics

Dr Anne-Lise Jourdan, ESE

Dr Manuja Kaluarachchi, Surgery and Cancer

Dr Ravinder Kanda, Life Sciences

Miss Alexandra Kareh, NHLI

Miss Anna Kazarian, NHLI

Mr Robert Kemp (33 years), Finance

Miss Julia Kettlewell, Business School

Dr Colin Keyworth, Chemistry

Dr Satoshi Kimura, ESE

Mr Angus King, Life Sciences

Miss Nicole King, Surgery and Cancer

Dr Caroline Knapp, Chemistry

Ms Astrid Korin, Public Health

Mr Dimitrios Kouzapas, Computing

Ms Nikki Krol, Medicine

Miss Wendy Kuo, Chemistry

Mr Julius Labao, Medicine

Mr Massimiliano Lamedica, Catering

Dr Cher Li, Business School

Mr Phill Liley, Finance

Mrs Alicia Lithgow (24 years), Chemical Engineering

Dr Nadine Lossi, Life Sciences

Dr Elizabeth Lucek (19 years), Physics

Dr Karine Macritchie, Medicine

Dr Alexandr Malijevsky, Chemical Engineering

Dr Aurelio Malo, Life Sciences

Miss Severine Marechal, Civil and Environmental Engineering

Mr Jared Marklew, Chemistry

Dr Eduard Maron, Medicine

Mrs April McGowan (5 years), NHLI

Miss Laura McMinn (5 years), Surgery and Cancer

Miss Ellen Mcsheedy, NHLI

Dr Robert Menzel, Chemistry

Miss Carina Mill, Bioengineering

Miss Anisha Mistry, Medicine

Dr John Molitor (6 years), Public Health

Dr Marta Moretti, Medicine

Ms Sian Morriss, Medicine

Mr Andrew Murphy (7 years), Finance

Dr Saira Naeem, Chemistry

Dr Priyanka Narang, NHLI

Dr Mani Narayanan, Life Sciences

Dr Gopal Netuveli (9 years), Public Health

Mr Richard Newcombe, Computing

Mr Chun Ng, Computing

Dr Dmitri Novikov (9 years), Physics

Dr Yuji Odaka, Mathematics

Mr Michael O'Shea, EEE

Mr Mike Owens, Educational Quality

Dr Sophie Pagoon, Life Sciences

Mrs Deborah Papadopoulou, Medicine

Dr Nazima Pathan (5 years), NHLI

Dr Praveen Paul (5 years), Medicine

Dr Maxence Paul, ESE

Dr Ricardo Pereira, Environmental Policy

Dr Apostolos Pesiridis, Mechanical Engineering

Dr Jasmine Pham, Life Sciences

Dr Jitka Pikhartova, Public Health

Dr Michele Pioppi, Physics

Dr John Plummer, Materials

Dr Emmanuelle Porcher, Life Sciences

Dr Elizabeth Powell, Medicine

Miss Sam Price, Medicine

Dr Mateusz Pucek, Medicine

Miss Hayley Pye, Chemistry

Mr Juan Ramirez Beiruty, Catering

Ms Claire Rees (5 years), Careers Advisory Service

Dr Nicholas Roach, Bioengineering

Dr Roger Robinson (7 years), Mechanical Engineering

Miss Sarah Rowell (5 years), Registry

Dr Agnieszka Rutkowska, Chemistry

Dr Erik Santiso Borrazas, Chemical Engineering

Dr Tara Sathyamoorthy, Medicine

Mr Karl Schafer, Surgery and Cancer

Dr Stefan Scheel (9 years), Physics

Dr Susanne Schindler, Life Sciences

Mr Mansoor Shah, Faculty of Medicine

Mr Khavi Shaik, ICT

Dr John Shaw, Chemistry

Dr Sandra Shefelbine (7 years), Bioengineering

Mr Guillaume Sherlock (6 years), Registry

Dr Andrey Sheshenev, Chemistry

Mrs Deborah Shorley (5 years), Library

Dr Isabel Smallegange, Life Sciences

Dr Evan Spadafora, Chemistry

Dr Joachim Steinke (16 years), Chemistry

Dr Kate Stringaris, Medicine

Dr Dilveer Sually, Public Health

Miss Morgan Todd, NHLI

Mr Johannes Totz, Computing

Mr Eddie Vanderloot, ICT

Mr Tommaso Vannocci, Medicine

Mr Laimonas Vazgys, Catering

Ms Sueli Vieira (7 years), Medicine

Professor Henning Walczak (5 years), Medicine

Mr Simon Watts, Communications and Development

Dr Elizabeth Webb, Public Health

Dr Sebastien Weber, Physics

Mrs Wendy Weston, Surgery and Cancer

Mr Dennis Wildman (19 years), Life Sciences

Miss Michelle Willows, Aeronautics

Dr Jason Woolford, Chemistry

Dr Katie-Jane Wynne (5 years), Medicine

Ms Wei Xun, Public Health

Ms Weizhen Yang, Computing

Dr Minghao Zhang, Life Sciences

This data is supplied by HR and covers staff leaving the College during the period 19 November–10 January. This data was correct at the time of going to press.

For Moving In, visit the online supplement at www.imperial.ac.uk/reporter

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.



5 FEBRUARY ▶ PUBLIC LECTURE

Reinventing rail for the twenty-first century

The construction of new high speed rail networks in the UK – which supporters say will revolutionise travel in the country – is forging ahead, despite considerable controversy. The

38th annual Paviers' lecture is given by Professor Andrew McNaughton, Chief Engineer and Technical Director of High Speed Two Ltd, and the person responsible for the principles, network and route design for UK high speed rail. He explores the need for and challenges behind the next generation of railway as well as what it will mean for the relationships between cities in the coming century.



27 FEBRUARY ▶ PUBLIC LECTURE

Nature, nurture or neither? What we do not know about genetics

Until relatively recently, most of us were likely to meet our end through external influences and agents such as starvation, cholera and filthy air.

Now that heritable diseases such as cancer and diabetes are becoming more significant, it might seem that our fate resides in DNA. But genes always work within an environmental context, and the relative importance of the two is often impossible to separate. At the sixth Peter Lindsay Memorial Lecture, UCL Professor Steve Jones explores the importance of the environment in the question of nature and nurture.

take note

From science to start-up

ICStartup has launched the Venture Catalyst Challenge 2013, which is open to any scientist with an outstanding idea, business plan or piece of research with commercial potential. There is support and funding available from £500 right up to £250,000. Applicants must register by 28 January with a deadline for submissions on 25 February.

www.icstartup.com/vc



24 JANUARY ▶ PUBLIC LECTURE

Additive manufacturing

Professor Phill Dickens, Loughborough University



11 FEBRUARY ▶ PUBLIC LECTURE

The future of urban energy systems – a global energy assessment

Professor Arnulf Grubler, IIASA

12 FEBRUARY ▶ MUSIC

Evening concert

Belcea Quartet

12 FEBRUARY ▶ PUBLIC LECTURE

The life of Roderic Hill

Anne Barrett (Archives and Corporate Records)



13 FEBRUARY ▶ PUBLIC LECTURE

It's not oil gone

Professor Ann Mugeridge (Earth Science and Engineering)

13 FEBRUARY ▶ OPEN DAY

Medicine open day

For undergraduate courses

14 FEBRUARY ▶ MUSIC

Lunchtime concert

Colin Lawson (clarinet)



20 FEBRUARY ▶ PUBLIC LECTURE

What's missing? Searching for dark matter and the Higgs boson

Professor Gavin Davies (Physics)

20 FEBRUARY ▶ PUBLIC LECTURE

The origin of our species

Professor Chris Stringer, Merit Researcher at the Natural History Museum

21 FEBRUARY ▶ PUBLIC LECTURE

The arts experiment

The Fringe series returns for 2013



29 JANUARY ▶ MUSIC

Lunchtime concert

David Malusa (piano)

30 JANUARY ▶ SEMINAR

Fuel and aviation: economics vs efficiency

Alex Walker (Centre for Environmental Policy)

31 JANUARY ▶ MUSIC

Lunchtime concert

Primrose Piano Quartet



7 FEBRUARY ▶ MUSIC

Lunchtime concert

Coull Quartet

MEET THE READER



Elizabeth Hauke, Senior Teaching Fellow, Imperial Horizons

What are you doing in the picture?

This is me in full 'online mode' – waving from the webcam and reading my copy of Reporter online. I'm also moderating student contributions for the Global Challenges Horizons Programme using Blackboard. I encourage Horizons students to explore a variety of learning methods, including virtual learning environments. My students have really taken to Blackboard. With thousands of posts per week, I have plenty of work to get on with!

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

I would feature every person who makes my job possible – from senior academic advisers to support staff to the person who serves me lunch in the SCR.

Who would be your cover star?

I would go behind the scenes in ICT. They fix Blackboard when I break it about 20 times a day, so they definitely deserve recognition.

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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