



## Climate of hope

Imperial's climate policy experts  
reflect ahead of the UN summit  
in Paris ... **CENTRE PAGES**



### SERVICE TO SCIENCE

Marina Botto  
on overseeing  
animal care in  
research

PAGE 10



### NEW MONEY

Imperial centre  
will harness  
power of  
cryptocurrency  
technology

PAGE 3



### PRIME DIRECTIVE

Alyssa Gilbert  
on bridging  
climate science  
and policy

PAGE 11



EDITOR'S CORNER

## United in the cause

I had long planned for this issue of *Reporter* to have one eye looking towards Paris, ahead of the UN climate negotiations, which are taking place in the French capital next week (centre pages). Obviously, that focus has taken on a far more **tragic and poignant** tone following the terrorist attacks in the city. Imperial has significant links with France, including a thriving French student and staff population. Many of them gathered alongside colleagues and classmates from different nationalities and faiths at 11 am on 16 November at the Queen's Tower in South Kensington Campus, for a moment's silence. The period of mourning continues, but there does seem to be a clear air of **defiance and resilience** coming from France and elsewhere in not allowing hatred to compromise a tolerant and open way of life. The UN climate negotiations are perhaps the greatest embodiment of **international cooperation** and collaboration towards a common goal. It is fitting that they should continue and in so doing attempt to secure a planet that is liveable for all peoples of the world.

ANDREW CZYZEWSKI, EDITOR

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## Ben Bernanke talks financial crises with the Business School

Two of the world's top financial policy makers, Ben Bernanke and Mark Carney, spoke at an Imperial event last month.

Mr Carney, Governor of the Bank of England, introduced Dr Bernanke, who served as Chairman of the Federal Reserve under Presidents George W Bush and Barack Obama from 2006 to 2014 – including during the 2008 global financial crisis.

The Q&A session was held for the Brevan Howard Centre for Financial Analysis at Imperial College Business School, with Professor David Miles moderating.

The discussion was Dr Bernanke's first event outside the United States since the publication of his new book, *The Courage to Act*. In the book, Dr Bernanke argues that in 2007

and 2008 the world economy came startlingly close to collapse and it was only government action – led by the Federal Reserve in conjunction with other central banks and governments worldwide – that stopped an all out catastrophe.

A key objective of Imperial's Brevan Howard Centre is to understand and help prevent

future financial crises.

Reflecting on how his life has changed since leaving behind such pressured moments, Dr Bernanke said he was 'delighted to be a civilian again'. He added: "I like looking in the FT and thinking 'that's a serious problem, I hope someone deals with it.'"

—ANDREW SCHEUBER, COMMUNICATIONS AND PUBLIC AFFAIRS



Professor David Miles (right) interviews Ben Bernanke during a panel session

## Imperial to lead EU quest for HIV vaccine

Scientists have joined forces to accelerate the search for an effective HIV vaccine, following a €23 million initiative financed by the European Commission.

The Imperial-led European AIDS Vaccine Initiative (EAVI2020) is funded with an EU Horizon 2020 grant and brings together leading HIV researchers from public organisations and biotech companies from across Europe, Australia, Canada and the USA.

The consortium aims to develop protective and therapeutic HIV candidate vaccines that can be taken through to human trials within five years.

Although researchers have been working on developing a vaccine for 30 years, recent advances are helping to speed up their quest. Scientists have isolated antibodies that are able to block HIV infection in preclinical models, and there have been new developments in using synthetic biology to design better vaccines.

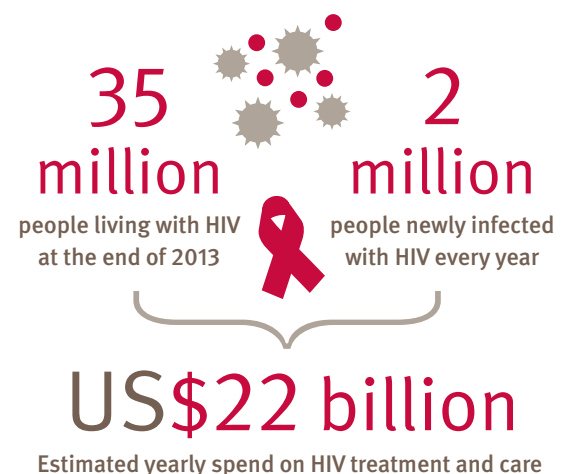
Professor Robin Shattock (Medicine), Coordinator of EAVI2020, said: "Creating an effective vaccine against HIV represents one of the greatest biological challenges of a generation. We now understand much more about how humans make protective immune responses and how to structure vaccine candidates.

"But it is impossible for one group or institution to create an HIV vaccine on its own. This new project

should enable us to move much more quickly by bringing together a multidisciplinary team of molecular biologists, immunologists, virologists, biotechnologists and clinicians to take discoveries in the lab through preclinical testing and manufacture, and into early human trials."

At Imperial, researchers will be looking at how healthy human volunteers' immune systems respond to potential vaccines, studying the antibodies that the volunteers produce.

—LAURA GALLAGHER, COMMUNICATIONS AND PUBLIC AFFAIRS



# Digital currency research set to transform global business

A new Imperial centre will harness the underpinning technologies behind cryptocurrencies for wider global benefit.

Cryptocurrencies such as Bitcoin are a form of digital money that support global transactions and alternative financial structures without the need for a bank.

Scientists at the new Imperial College Centre for Cryptocurrency Research and Engineering (IC3RE) will explore how the technology can have applications beyond digital currency, such as keeping track of property ownership and business agreements.

Professor William Knottenbelt, Director of the Centre, said: “We are on the brink of the next digital revolution. The College is in a unique position to harness the potential of the technology that currently powers cryptocurrencies. Just as the industrial revolution and the internet spawned innovation, so too will this technology, opening the doors for new business models.”

Cryptocurrencies are based on a distributed computerised ledger that acts like a digital book keeper and accountant rolled into one. They allow users who do not know or trust each other to automatically keep track of who owns what.

Dr Catherine Mulligan, Assistant Director of the Centre, added: “Cryptocurrencies have shown us that we do not need a third party – a middleman – to successfully process transactions between users. It can all be done digitally by a distributed computer network secured by cryptography, which makes transactions much more resistant to fraud.”

The Centre has received seed funding from Imperial’s Faculty of Engineering and Department of Computing. It also hosts a research grant from the Engineering and Physical Sciences Research Council.

—COLIN SMITH, COMMUNICATIONS AND PUBLIC AFFAIRS



## Seeing is believing with big data

A data observatory that allows people to visualise everything from cryptocurrency transactions to population migration patterns opened at Imperial this month as part of a long-term £20 million investment from KPMG.

The largest of its kind in Europe, the KPMG Data Observatory features an enveloping circular wall of 64 monitors with 313 degrees of surround vision, powered by 32 computers. It allows users to see data patterns up close that they would not be able to see on an ordinary computer screen.

Professor G ‘Anand’ Anandalingam, Dean of Imperial College Business School said: “Big data is changing the way everyone operates. By enabling researchers and businesses to visualise and make sense of complex data sets, the KPMG Data Observatory will prove vital in providing new insights into their markets, customers and services.”

The KPMG Data Observatory was designed, built by and housed within Imperial’s Data Science Institute (DSI), which aims to put the UK at the forefront of data science.

Professor Yike Guo, Director of the DSI said: “We appreciate KPMG’s commitment to supporting the construction of this facility; it enables academics and businesses alike to have a vivid dialogue with their data in a stimulating environment.”

The KPMG Data Observatory follows the launch of the KPMG Centre for Advanced Business Analytics in 2014 which aims to develop big data solutions to a variety of business needs, including fraud detection for banks and helping retailers better understand consumer behaviour.

—LAURA SINGLETON, COMMUNICATIONS AND PUBLIC AFFAIRS

### in brief

#### Bronze for Bioengineering

The Department of Bioengineering has been awarded its first Athena SWAN Bronze award, in recognition of its support for female academics. This latest round of awards means that 15 of the College’s 19 departments now hold Athena SWAN awards. The Athena SWAN Charter was established to encourage and recognise commitment to advancing the careers of women in science, technology, engineering, maths

and medicine (STEMM) employment in higher education and research, with each award lasting for three years.

#### Making an IMPACT

Last month saw the conclusion of this year’s talent development programme for Black, Asian and Minority Ethnic (BAME) staff. IMPACT, or Imperial Positive About Cultural Talent, is a four-month programme which includes specialised workshops and project work, as well as access to

mentoring and networking opportunities. Certificates were presented by Professor Anand Anandalingam, Dean of the Business School and the College’s Executive Sponsor for Imperial As One, an advisory group made up of BAME staff.

#### White City entrepreneurship hub

Imperial is to partner with China’s Zhejiang University (ZJU) on a new centre for transnational entrepreneurship in London. The Imperial-

ZJU Transnational Entrepreneurship Centre, to be situated on Imperial’s new White City Campus, will bring together academics from Imperial College Business School and ZJU’s School of Management with entrepreneurs and industry leaders. The new centre is expected to open in 2016–17. Both universities signed a letter of intent last month as President Xi Jinping visited Imperial.



“Space is the ultimate global commons. Everyone has rights of access. But reconciling this right with space being the high ground for military surveillance is a challenge yet to be resolved.”

FORMER UNIVERSITIES MINISTER DAVID WILLETTS GIVES THE INSTITUTE FOR SECURITY SCIENCE AND TECHNOLOGY’S ANNUAL LECTURE:  
[bit.ly/Willetts-Imperial](http://bit.ly/Willetts-Imperial)



## Generous donation creates new hardship fund for medical students

Medical students in financial need are to receive a helping hand, thanks to a gift made in honour of the memory of alumnus Dr Alex Stoker.

Launched in September 2015, the Alex Stoker Fund will award grants of up to £2,500 for medical students struggling with the cost of living and studying in London.

The fund was created through a generous gift of nearly £500,000, made in memory of Dr Alex Stoker, who studied medicine at Charing Cross and Westminster Medical School in the 1990s. It provides the Faculty of Medicine with a flexible resource that can be used to meet the emerging and diverse needs of its students.

Kelly J Mills, Head of Development for the Faculty of Medicine, said: “Even with careful budgeting, it can be a challenge to cope with the costs of studying in London. When a student is only just making ends meet, any unexpected change in their circumstances can tip them over into severe financial difficulty.”

An immediate priority for the scheme is to provide additional support for students in their fifth and sixth years of study, many of whom struggle to meet the costs of travelling to clinical placements in hospitals across London and the South East.

“Our goal is to ensure that no Imperial medical student should ever feel pressured to leave their studies because of lack of funds,” says Dr Michael Schachter, who leads on pastoral care in the Faculty of Medicine. “This act of immense generosity by Mr and Mrs Stoker will make a significant contribution to achieving that aim.”

After his studies, Dr Stoker went on to become a consultant in emergency medicine, working in South East England. He died in July 2013 at the age of 39.

—DANIEL MAPP, ADVANCEMENT

## Staff make a break for it

This month staff attended a range of events organised by the College as part of National Stress Awareness Day 2015.

As part of the nationwide ‘Reclaim your Lunch Break’ campaign, senior staff hosted a lunch for colleagues, to encourage staff to escape their desks. The campaign aims to raise awareness of the importance of taking a proper break for productivity, well-being, and team-building.

Among those present were staff who make a particular contribution to supporting others, including leaders of staff networks and Mental Health First Aiders. These are colleagues who are trained to recognise the signs and symptoms when members of the community are having problems, to provide initial help, and to signpost appropriate professional support.

Thanking colleagues for their support for others Steve Rathborn, Head of the Learning and Development Centre, said: “This event is a testament to the number of people across the College supporting the welfare of their colleagues. Looking after one another’s wellbeing as well as our own is an important responsibility for all of us.”

The day’s activities included workshops

on stress management, meditation and mindfulness before concluding with a lecture from Dr Ed Roberts (Medicine). The lecture focused on his research into how a change in hormone levels affect decision-making in the financial sector.

Dr Roberts said: “Uncertainty is often a key cause of stress, and so taking actions to reduce uncertainty is helpful – such as managers giving staff more control over their work.”

—ELIZABETH NIXON, COMMUNICATIONS AND PUBLIC AFFAIRS

*A range of courses focused on resilience and stress management are available to staff for free through the College’s Learning and Development Centre. Find out more: [bit.ly/stress-beating](http://bit.ly/stress-beating)*



## Imperial chemist receives WISE award for eco-plastics start-up

Professor Charlotte Williams has won an award for women in science, technology, engineering and maths, for founding and leading the start-up Eonic.

The award, in the Tech Start-Up category, recognises Professor Williams’ success as both a scientist and an entrepreneur. Professor Williams founded Eonic in 2011

to commercialise her research in Imperial’s Department of Chemistry.

Eonic uses catalysts to allow carbon dioxide to be used as a raw material in polymer production, making the process cheaper and more environmentally sustainable.

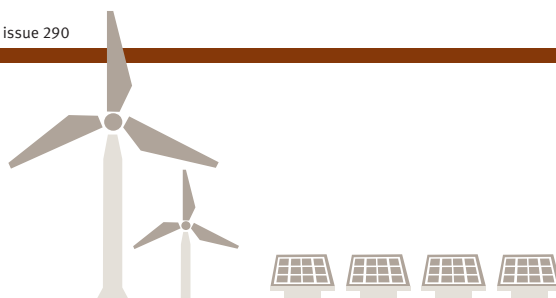
Professor Williams was handed her trophy by WISE’s patron, HRH The Princess Royal. “I am delighted by this honour, and it’s a lovely recognition of the work of many people over many years,” she said. “I hope it inspires other women to take the risk of starting a company and commercialising the great science they do.”

Imperial PhD student Clementine Chambon from the Department of Chemical Engineering was also nominated in the same category for her company Oorja, dedicated to delivering affordable electricity to rural communities in India.

—HAYLEY DUNNING, COMMUNICATIONS AND PUBLIC AFFAIRS



## media mentions



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### Science is vital – so is making the argument for it

THE GUARDIAN ▶ 05.11.2015

In a *Guardian* blog Professor Stephen Curry (Life Sciences), vice-chair of *Science is Vital*, talks about the group's continuing work in light of the Government's impending comprehensive spending review: "Campaigning is a strange game for scientists. To be politically effective, the message needs to be simple. But this doesn't sit well with our scientific training, which is all about detail and testing and re-testing the evidence. But that process cannot be confined to the laboratory. We also need to constantly review the evidence for the value of science in our society. Researchers cannot ignore the wider political landscape in which government has to operate. But nor should we shrink from making the case that investment in the research base is a valuable and vital way to plot a path for economic recovery."

### awards and honours



COLLEGE

#### Weizman honours Winston

Professor Lord Winston has been recognised with an honorary PhD by the Weizman Institute of Science in Israel. Lord Winston, Professor of Science and Society and Emeritus Professor of Fertility Studies, was chosen to receive the honour in recognition of his significant contribution to fertility research and for his championing of science education.

### Subsidy cuts mean UK misses out on cheaper electricity

BUSINESS GREEN ▶ 10.11.2015

The recent government cuts to subsidies for renewables mean the UK could miss out on falling wholesale electricity prices in the next five years, according to an Imperial-led analysis reported in *Business Green*. The researchers compared the progress towards delivering all renewable electricity supplies in several countries, including the UK and Germany. Based on recent growth rates Germany is heading towards having enough solar and wind for an all renewable electricity supply by 2020, they say. The analysis also detailed how sharp increases in renewable energy capacity has led to significant downward pressure on wholesale electricity prices there. "If we follow what Germany did seven years ago we will have by 2020 the amount of solar you need for an all renewable electricity supply, so the wholesale cost will go right down," said lead author Emeritus Professor Keith Barnham (Physics). "So we do need to keep that expansion going if you want the price to continue falling."



### Anglo-Indian links

THE TIMES ▶ 10.11.2015

Imperial's President, Professor Alice Gast, writes in a letter to *The Times*: "Sir, The UK must think carefully about the messages it sends to India's next generation or its relationship – and influence – with the world's largest democracy will wane. Recently, an Imperial College student, Malav Sanghavi, developed a low-cost baby incubator that could help to save millions of lives – singled out as one of the UK's most exciting start-up ideas. When I meet students in India, I am concerned that they will not follow in Malav's footsteps. They see the UK as less open to Indian entrepreneurship than the US. Although the number of Indian students remains steady at Imperial, there has been a sharp fall at other UK institutions, and many now turn to our US rivals. As Mr Cameron forges stronger ties during Indian PM Mr Modi's visit, he must make it clear that our universities welcome India's best and brightest."

Malav Sanghavi's 'Baby Lifebox' incubator secured third prize at the Duke of York's Pitch@Palace competition for entrepreneurs (see page 12)

COLLEGE

#### Repin' for the post-docs

Earlier in the summer Imperial's The Postdoc Development Centre (PDC) launched a new award scheme to recognise the work of the network of PDC reps. Spread across all College departments, the reps encourage the personal and professional development of their peers and act as a conduit for information from and to the

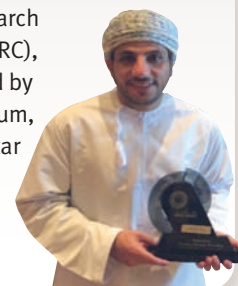
PDC. Forty-nine high quality nominations were whittled down to 5 finalists who each had 'excelled in their role as reps and brought about real cultural change within their department as a result of their work'. They were, Harriet Mills (School of Public Health) Maria Parkes (Mechanical Engineering) Loyal Hakim (Computing), Emma Bailey (Bioengineering), with Claire Morgan (Medicine) taking home the overall prize.



ENGINEERING

#### Lock-in for carbon project

Research Associate Dr Saif Al Ghafrri (Chemical Engineering) scooped best dissertation award at the 2015 Abu Dhabi International Petroleum Exhibition & Conference (ADIPEC). His PhD thesis was focussed on the design and operation of CO<sub>2</sub>-storage projects using deep saline aquifers or depleted oil fields. This research was performed as part of the Qatar Carbonates and Carbon Storage Research Centre (QCCSRC), jointly funded by Qatar Petroleum, Shell and Qatar Science and Technology Park.



## Brain inflammation may be a driver of schizophrenia

A new study has found that a type of immune cell is more active in the brains of people at risk of schizophrenia.

The research, which also revealed that the immune cells are highly active in people already diagnosed with schizophrenia, opens up new avenues for improving diagnosis and treatment.

Schizophrenia is a severe mental illness that affects around one in 100 people in the UK. It is one of the leading causes of disability in adults and sufferers die, on average, 20 years early, compared with those who do not have the disease. Symptoms include hallucinations, thoughts that are not based in reality and paranoia, alongside depression and social withdrawal.

In the study, researchers used a type of brain scan called a positron emission tomography (PET) scan to measure immune system activity, also known as inflammation, focussing on a particular type of immune cell called microglia (see box).

The study team tested a group of 56 people. From this group, 14 were classified as at high-risk of schizophrenia (they may have been experiencing depression and anxiety, and occasional hallucinations), and 14 had been diagnosed with schizophrenia. The remainder of patients were healthy controls.

The researchers found that the level of inflammation marker in the brain increased according to the severity of schizophrenia symptoms.

Lead author Peter Bloomfield (Institute of Clinical Sciences) said: “Our findings are particularly exciting

because it was previously unknown whether these cells become active before or after onset of the disease. Now we have shown this early involvement, mechanisms of the disease and new medications can hopefully be uncovered.”

Supervising researcher Dr Oliver Howes, (Institute of Clinical Sciences), added: “Schizophrenia is a potentially devastating disorder and we desperately need new treatments to help sufferers.

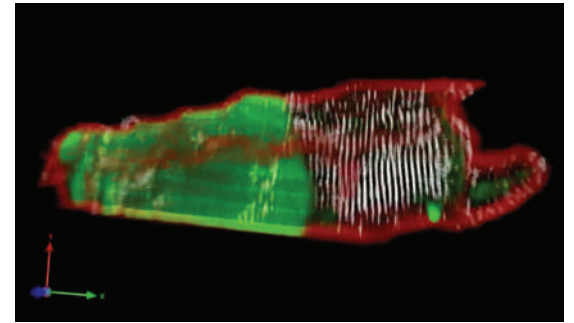
“This study suggests that inflammation may lead to schizophrenia and other psychotic disorders. We now aim to test whether anti-inflammatory treatments can target these.”

—KATE WIGHTON, COMMUNICATIONS AND PUBLIC AFFAIRS



### Proper pruning

The team were tracking a type of immune cell called microglia, which responds to damage and infection in the brain. They are also responsible for a process known as pruning – where connections between the brain cells are rearranged to enable the cells to work as well as possible. Earlier studies have suggested that these cells may be involved in schizophrenia. One theory is that the cells make errors in their pruning, and make inappropriate connections between cells. Other studies have also implicated microglia in other brain conditions, including Alzheimer’s and depression. In the present study the researchers found that activity levels of microglia in the brain increased according to the severity of schizophrenia symptoms.



## Rogue heart waves tracked in real time

A pioneering 3D imaging method has been applied to heart cells for the first time, allowing researchers to trace waves that can cause arrhythmia.

Rising levels of calcium in heart muscle cells cause contraction of the muscle, helping to regulate the beating of the heart. The rise in calcium levels is usually uniform, but sometimes there is a spontaneous release of calcium from isolated regions of the cells, creating a wave of calcium.

These waves can cause arrhythmia, the irregular beating of the heart. Arrhythmia accounts for approximately 50 percent of deaths in patients with heart failure.

However, how and why calcium waves originate has been difficult to study with conventional microscopy techniques. Now, researchers from Physics and the National Heart and Lung Institute (NHLI) have collaborated to shine a new kind of light on the problem.

Surprisingly their results suggest that calcium waves originate from healthy parts of heart muscle cells, and not degraded regions as the researchers had expected.

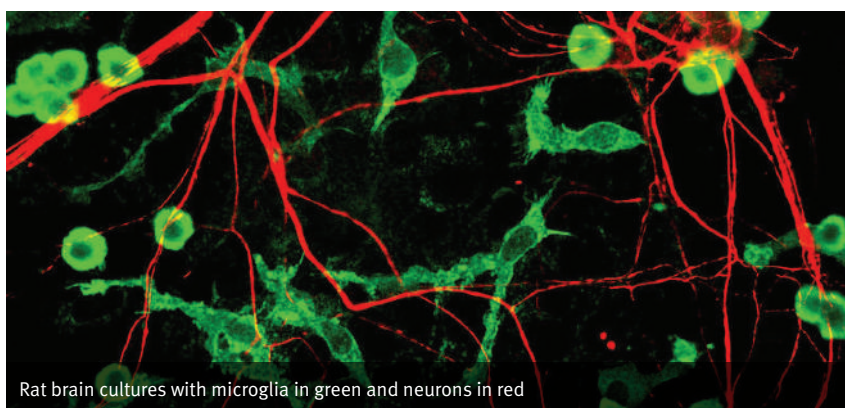
The technique, called oblique plane microscopy (OPM), was invented by physicists in Imperial’s Photonics group. OPM looks at a layer of the sample at a time instead of a point, and combines this with a method to rapidly sweep the layer being imaged through the specimen.

This allows video-rate 3D imaging of features at the sub-cellular scale. This is particularly important for looking at calcium waves, since they are rare events and their point of origin within the cell is not known before it happens.

Using this technique, researchers at the NHLI investigated single heart muscle cells isolated from a rat model of heart failure. Lead researcher Dr Chris Dunsby (Physics) said: “Now we have proven OPM can give real insights into these processes, we hope to apply it to many more problems in biology in the future, such as signalling in neurons and rapid 3D imaging of large arrays of samples, for example for drug screening.”

—HAYLEY DUNNING, COMMUNICATIONS AND PUBLIC AFFAIRS

Watch a video of the cells here: [bit.ly/heart-wave](http://bit.ly/heart-wave)



Rat brain cultures with microglia in green and neurons in red



## Rising CO2 is double edged sword Down Under

Plants in semi-arid areas receive a boom from rising CO2 levels, but the extra plants use more water, meaning less reaches rivers.

Professor Colin Prentice (Life Sciences), AXA Chair in Biosphere and Climate Impacts and one of the study's authors, said that the results mean river flows will continue to decrease in regions that are already water-stressed.

The researchers examined river flow and climate records in Australia going back more than 30 years, and compared them with satellite images of changing vegetation cover during the same period. This is the first large-scale study of its kind to show the effect of carbon dioxide (CO2) levels both on plant cover and on water flows.

"I think people will be surprised that we have demonstrated so clearly that there is an effect on such a large scale it can be seen from space and measured in streams and rivers," said Professor Prentice.

This surprising finding was made possible because of the exceptionally high quality of water data available in Australia, allowing the researchers to pick apart the various possible influences on river flows and factor out the large year-to-year variations in precipitation that are typical of this dry continent.

"It's good for the plants that higher CO2 concentrations mean greenness is increasing, but they use more water, meaning there's less for rivers and less for us," said Professor Prentice.

—HAYLEY DUNNING, COMMUNICATIONS AND PUBLIC AFFAIRS



### Thirsty work

Plants have small openings in their leaves called stomata, which take in CO2 and let out water vapour. As the levels of CO2 in the atmosphere rise, the stomata partially close. This is because the plants need to take in less air to get the same amount of CO2, also enabling them to use water more efficiently. With rising CO2 some researchers have suggested that when plants use water more efficiently there would be more water reaching rivers. However, this new study has shown the opposite. Although individual plants use less water, more plants are able to grow consuming more water overall, leading to less runoff of water into rivers. This effect is only observed in semi-arid and sub-humid regions of Australia, since in wetter areas there is always plenty of water available.

## Having children linked to reduced risk of death

Scientists have found an association between reproductive factors such as having children and breastfeeding and a woman's risk of death.

The study also found that starting menstruation later in life (above the age of 15), and using oral contraceptives, were linked with a reduced risk of death.

The international team behind the work – led by Dr Melissa Merritt (School of Public Health), say the insights may help scientists develop strategies to improve women's health.

The scientists analysed data from 322,972 women across 10



countries (including the UK, France, Germany and Sweden), with an average age of 50.

After completing questionnaires and interviews about diet, lifestyle characteristics

and medical history, each woman was followed for an average of 12.9 years. In this time there were 14,383 deaths overall.

The team found that women who had given birth had a 20 per cent reduced risk of death than those who had not.

Among the mothers, women who gave birth between the ages of 26 and 30 years had a lower mortality risk than those who had given birth earlier or later in life. It was also found that there was a reduced risk of death (8 per cent) in women who had breastfed compared to those who did not.

Dr Merritt said: "Hormonal mechanisms may explain the lower

risk of death that we observed with breastfeeding, having given birth and using oral contraceptives, as these factors are associated with changes in hormone levels.

"Because this was an observational study, the research does not show that these factors (such as breastfeeding and childbirth) directly reduce the risk of death. Rather, the research suggests that there may be a relationship between these factors and risk of death. Further studies are needed to explore this relationship, and the mechanisms that may link these risks."

—KATE WIGHTON, COMMUNICATIONS AND PUBLIC AFFAIRS

# Action for change

Since the first UN Earth Summit in 1992, governments have been trying to encourage sound environmental management in tandem with economic growth and social welfare. From 30 November – 11 December, delegates from more than 190 nations will meet at the 21st annual Conference of Parties (COP 21) in Paris. This year's meeting is geared towards forming a legally binding agreement on limiting climate change, the first of its kind since the 1997 Kyoto Protocol. *Reporter* took a look at some Imperial projects that are having an impact at COP 21 and beyond.



## Accountability

In the run-up to the Paris talks, countries have been submitting their plans to curb greenhouse gas emissions after 2020. Using this data, researchers from Imperial and collaborators at the international network Climate-KIC, have created a Climate Calculator to assess just how effective the changes will be. In partnership with the *Financial Times*, the Calculator has been turned into an interactive graphic with funding from the Grantham Institute.

Their calculations predict that even with the proposed cuts, global warming could still reach up to four degrees Celsius (4°C) of warming by 2100, overshooting the 2°C warming threshold that could spell 'dangerous and irreversible' climate change.

A 'business as usual' scenario where countries do nothing to limit their emissions would likely cause a global temperature rise up to 6°C or more.

"It is imperative the Paris agreement includes a system requiring countries to drastically ramp

up emissions cuts beyond their current promises," said Dr Jeremy Woods, from Imperial's Centre for Environmental Policy and a collaborator on the Calculator.

The FT Climate Calculator allows users to pick apart the contributions of different regions and their respective plans. Users can also change the plans to see what level of action would be needed to reach the 2°C warming goal.

"What is clear from our analysis is that no country is doing enough but some countries are doing far less than they are capable of doing," said Dr Rajiv Chaturvedi of the Indian Institute of Science in Bangalore, a collaborator on the Calculator's data.

For example, Russia has tabled plans to cut emissions by 30 percent of 1990 levels by 2030. However, its emissions in 2030 will be similar to those of 2010. The researchers suggest that to make a meaningful contribution to limiting climate

“... no country is doing enough but some countries are doing far less than they are capable of doing.”

change, Russia needs to cut its emissions by up to 40 percent of 2010 levels.

Countries also need more long-term plans beyond 2030, which is as far as many promises extend – deeper cuts are needed that can be sustained until 2100.

"Our analysis clearly highlights that we can meet our 2°C target while maintaining good lifestyles and a prosperous economy – but to be successful the world needs to act now and transform the technologies, knowledge base and fuels we use and make smarter use of our land," said Jeremy.

"Declarations ahead of COP 21 in Paris are an important first step along the wider review path. We hope that the clarity of the task ahead will enable negotiators at COP 21 to ensure a firm process is put in place to increase the ambition of country pledges beyond 2020."



## Market force

Many economists believe that emissions trading schemes (ETS) are of central importance in achieving global reductions in carbon emissions whilst maintaining economic growth.

Dr Mirabelle Muûls (inset, right) is a lecturer at the Grantham Institute and an Assistant Professor in Economics at the Business School, whose work is focused on the European ETS.

First implemented in 2005, it aims to reduce total greenhouse gas emissions from EU member states. It operates by setting a cap on total emissions and allowing participants to buy and sell emissions permits or 'carbon credits'. Covering 12,000 industrial and power plants in 31 countries, it was the first large scale emissions trading scheme of its kind when it launched.

As with any economic policy, especially one so new and radical, it can have unintended consequences and loopholes that can be exploited. For example, faced with environmental regulations and associated costs, companies can be tempted to relocate emissions-generating activities and jobs to a different country without equivalent emissions policies, rather than stopping them.

"We call this 'carbon leakage'," says Mirabelle, who along with international collaborators is helping to design more effective schemes and recently won the Erik Kempe award, a top environmental economics prize, for her work.

To try and prevent carbon leakage companies can be compensated for indirect carbon costs by being given free permits. However, allocating just the right amount of compensation is a delicate balancing act – too little and firms relocate, shifting carbon emissions and jobs outside the EU; too much and the scheme not only wastes money but rewards polluters for the harm they do to the environment.

In order to be as effective as possible, free permits should be offered first to those firms most likely to help deliver the government's objectives – namely those firms keeping jobs, taxable profits and emissions in the country. This is different from the current usual practice of compensating the firms with the highest propensity to relocate. "You want to give permits to the firms



**“I would expect COP 21 to include new climate finance schemes, such as support to developing nations.”**

to whom it will make the biggest difference," explains Mirabelle, who hopes to build on this experience to inform new global trading schemes.

At present China plans to spread its carbon-trading system from major cities to the whole country in the next five years. President Obama's Clean Power Plan, announced in August, introduces the prospect of US states using emissions trading systems in future.

However, Mirabelle does not expect trading schemes to be central to Paris COP 21. She says: "These systems are mainly national and it would be difficult to establish a global carbon market at this time. I would expect a key element of COP 21 to include talks of new climate finance schemes, such as financial support to developing nations."

Mirabelle is also looking to the future by training a new generation of leaders with both scientific knowledge and business skills, in her role as the programme director of Imperial's new MSc in Climate Change, Management & Finance.

## Intelligent action

AVOID 2 is a UK government programme involving a multi-disciplinary consortium of UK research organisations, led by the Met Office with the Grantham Institute as a core partner. The aim is to provide government analysts and climate negotiating teams in both the UK and internationally with the science needed to inform their decisions, leading up to Paris 2015.

The AVOID 2 research programme provides evidence under three main themes: 'climate system', which includes plausible emissions trajectories associated with different levels of warming; 'climate impacts', which aims to understand the consequences of emissions trajectories such as ocean acidification as well economic shocks; and finally 'climate mitigation', which examines deployment of new technologies and realistically achievable behavioural and social change.

"AVOID 2 analysis has highlighted how important it is to begin coordinated

global decarbonisation by 2020," says the programme's lead at Imperial, Grantham Senior Research Fellow Ajay Gambhir (inset, below). "We need to use energy more efficiently, increasingly electrify our energy systems and produce electricity without greenhouse gas emissions. We are feeding these messages to policy makers ahead of COP 21 in Paris."

AVOID 2 analysis has been made possible by TIAM-Grantham, a computer model that calculates the most cost-effective ways to change an energy system reliant on fossil fuels, into a low-carbon system, based on a wider variety of technologies. Grantham Affiliate Dr Adam Hawkes (inset, below), who is Deputy Director at Imperial's Sustainable Gas Institute, leads the development of the model.

"We draw on the technological and economic expertise from across the College to create the most robust representation of energy futures for the whole world up to the year 2100," he says. "The insights of the Faculty of Engineering and the Business School allow us to investigate the impact of game-changing developments such as solar. The Institute brings all this expertise together to create a tool that can have significant impact on policy."



WARMING LEVELS  
PREDICTED FOR  
2100 AD



**+2°C**

Increase beyond  
which climate change  
could be irreversible

**+4°C**

Actual global warming  
predicted for 2100



# In service to science



“Being an academic I know how important it is to create the right environment for my colleagues and for the animals we work with.”

**Imperial has appointed Professor Marina Botto as its first Director of Bioservices to oversee animal care and animal research strategy at the College.**

As a Professor in Imperial’s Department of Medicine and a Consultant Rheumatologist at the Imperial Academic Health Science Centre, Marina Botto has been working with animals in research for more than 15 years.

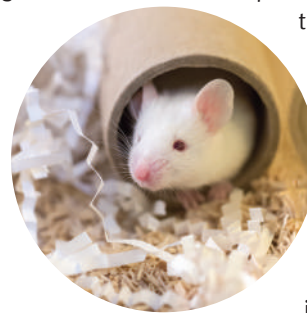
One of her primary focuses is trying to understand how the autoimmune condition called lupus develops – with the help of mice models of the disease.

“My academic career is underpinned by this work,” says Marina. “In taking on this role, I have the opportunity to give something back to the animal research community and I am fully committed to do so.

“Being an academic I know how important it is to create the right environment for my colleagues and for the animals we work with.”

Throughout Marina’s career at Imperial she has always taken a great interest in the way the College carries out research involving animals – contributing to committees and more recently championing the College’s Action Plan.

The new post was announced as a key element of the College’s Action Plan for animal research at the beginning of 2014.



The Action Plan was developed to support the high standards of animal care already in place at Imperial, and to continue to improve the management of animal research at the College.

Alongside creating the post of Director of Bioservices, the plan aims to promote stronger links between CBS staff who look after animals day-to-day and the scientific community. It also aims to help implement best practice in the ethical review process, increase communication, and promote the refinement, reduction and replacement of animals in research (the 3Rs).

Reflecting on her new role, Marina said: “As Imperial’s animal research community, we have already made so much progress with implementing the Action Plan and I am very proud to have contributed, at least in part, to the changes. The thing that has impressed me so far is the high level of professionalism and collaboration by all people involved in animal research – from the staff who care for the animals to the academics who use animals in their research and the College leadership.”

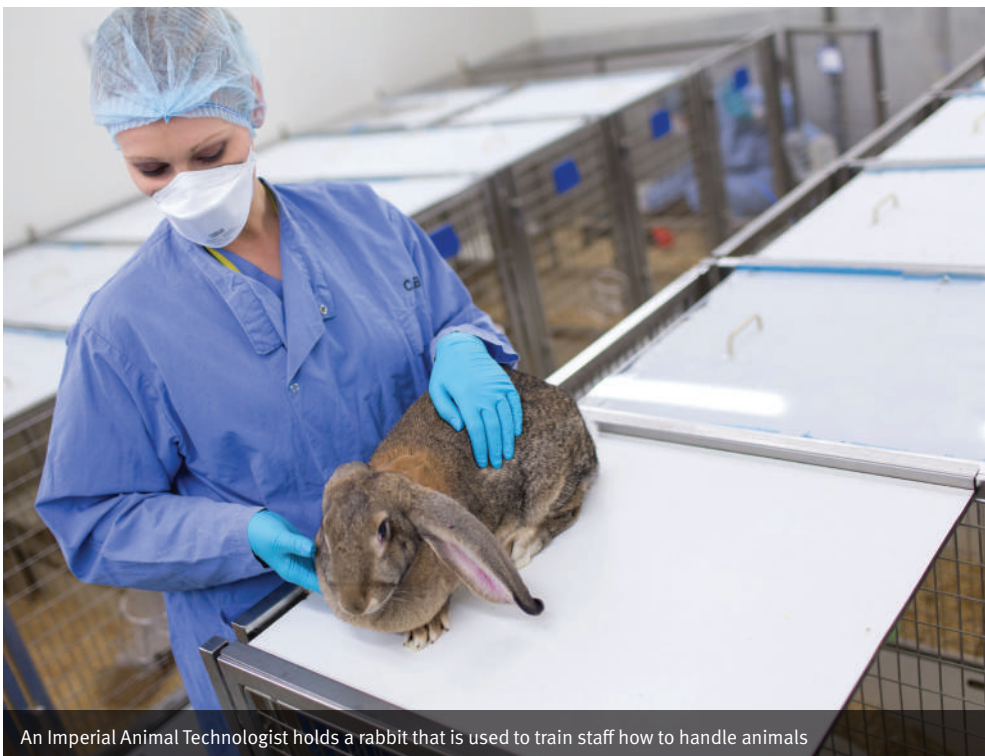
With a new governance structure for animal research already in place, Marina sees her role as building on what has already been achieved to embed the ideas set out in the Action Plan into working practice.

“We are making gains in terms of the 3Rs and I am strongly committed to support and encourage this. We are fully dedicated to the best use of animal models of disease, for example by using the most advanced imaging technology such as MRI.”

Looking ahead, Marina is working on a long-term strategy for animal research at Imperial to ensure that the College’s facilities remain of a very high standard and fit for purpose. She emphasises that this work isn’t something that will ever be complete, but rather, a continuous process that evolves as best practice and the nature of research changes. Ultimately the indicators of success will be in continuing to provide facilities that have the best standards of welfare for animals and can deliver the best science for researchers.

Finally, Marina adds: “I will also be judged on openness. It’s been a year since we signed up to the UK Concordat on openness in animal research and, with the help and encouragement of our communications staff we have already been more open in digital and face-to-face communications. If we achieve the best standards in animal research then my colleagues can be open with the public about their work without fear, because they will have nothing to hide.”

—KERRY NOBLE, COMMUNICATIONS AND PUBLIC AFFAIRS



An Imperial Animal Technologist holds a rabbit that is used to train staff how to handle animals

# inside\*

## story

### mini profile

## Alyssa Gilbert

Alyssa Gilbert joined Imperial in April, as Head of Policy and Translation at the Grantham Institute. She talks here about the forthcoming United Nations Climate Change Conference (COP 21) in Paris later this month



### Tell me a bit about the Institute and your role

The Grantham Institute is one of the global institutes at Imperial which brings together College departments around a particular theme – in this case the environment and climate change. We try to make sure that our research has an impact on policy makers and businesses. It is my job to provide the bridge from academia to those groups.

### What are your personal hopes for negotiations at COP 21?

In my view, the most important thing is unity between respective global leaders. It is extremely important that these leaders get a deal out of the negotiations; the deal in itself is an endorsement that the issue is important and that countries are doing something to manage it. If there isn't a deal in Paris, then the whole international system set up to fight climate change is broken in a major way. Fortunately, though, I think that success is likely and there is every

reason to be hopeful. Countries have already made reduction commitments and targets – so it's important that they sign up to these (from 2020 onwards), then stick to them and improve them as time goes on.

### Does Imperial have a presence at COP 21?

Yes, there is representation from both the Grantham Institute and the Centre for Environmental Policy. As well as the central negotiations, the event is an opportunity for leaders in climate change research to share ideas and information within their community by hosting official side events and exhibition stands. The Imperial team are exhibiting in collaboration with the Walker Institute, University of Reading. We are also hosting a programme of official side events focussed on solutions – looking across the next 15 years and asking what technology we need to have in place to achieve the aspirations of Paris.

—HARRY PETTIT, FOR COMMUNICATIONS AND PUBLIC AFFAIRS

## A story for the ages

Scientists and science communicators have been trying to get across the message about the need for action on climate change to politicians and policy makers for decades now.

Arguably just as important – and challenging – a task is to get the public at large on board, often in the face of scepticism and apathy.

To that end, new research suggests that people need to feel part of a narrative about climate change and its solutions before they get involved with concerted global action.

According to a team of researchers from Imperial and King's College London, disjointed messages about climate change confuse people, leaving them unsure what they can do.

In a new article published in *Nature Climate Change*, they call for a strong, coherent storyline that paints a picture of the valuable role people can play in achieving the shared goals of avoiding dangerous climate change, and unites ordinary people with policymakers, business and industry leaders.

"We need to engage everyone in tackling climate change and make it part of their story," says Simon Bushell of Imperial's Energy Futures Lab, one of the paper's authors. "A great example is the cleaner working at NASA in the 1960s, who explained to President Kennedy 'I'm helping put a man on the moon.'"

It is human nature to make sense of complex issues by building narratives that link events, actions and facts, which might otherwise seem unconnected.

According to the article, a strategic narrative around climate change could create a sense of unity, inspire key actors to work towards a shared goal and act as a driving force for behavioural change as well as effective policy action.

"Climate change is a real and present danger and the world seems unable to form a coherent approach to tackling it," says Bushell, "We believe that unless we can create a compelling, global, plan of action we risk alienating the public and compounding problems for future generations."

Developing a strategic narrative would require input from a wide range of people in government, industry and society. While these groups might all have different motivations for preventing climate change, they all can contribute to the creation of a coherent, unifying message.

"This is not a case of pulling everyone into a big room, bashing out an agreement and hey presto we're done," says Bushell "This is a long term iterative process based on common principles but with constantly evolving activities."

"Climate change is a real and present danger and the world seems unable to form a coherent approach to tackling it."



## By royal appointment

Imperial entrepreneurs came out top at the Duke of York's Pitch@Palace competition this month – with an alumnus claiming top spot for a 3D-printed knitwear start up and a current student taking third place for his low-cost baby incubator invention.

Pitch@Palace is an initiative which aims to support entrepreneurs by connecting them with potential supporters and investors. The two Imperial teams battled it out Dragons' Den style for the top spots against 13 other startups at St James's Palace yesterday, pitching their ideas in front of an audience of industry experts, CEOs, and investors.

Winning startup Unmade is the brainchild of Hal Watts and Ben Alun-Jones, both former Innovation Design Engineering students. Their idea was to turn industrial knitting machines into the equivalent of 3D printers for clothes, enabling its clients to digitally design and customize their own knitwear.

Hal explains: "Today's fast-fashion is the second most

polluting industry in the world and relies heavily on cheap labour. Clothes are designed for everyone and made for no one. Unmade aims to change this, by creating clothes which involve the customer in the design and are then manufactured on-demand."

Meanwhile postgraduate student Malav Sanghavi (Mechanical Engineering) took home third prize for BabyLifebox – a low-cost baby incubator, intended for use in the developing world, that provides the basic functions necessary for a child's survival in their first days of life. Made from cardboard, the bottom part of the incubator can be given to the parent of the child after birth as a make-shift cot.

"300 million children die every year, just in their first week of life. BabyLifebox provides basic facilities – like warmth, monitoring and a germ free environment – to provide essential neonatal care at a grassroots level in places where these facilities might otherwise not be available," he explained.

Malav is now looking for



The Duke of York with the Pitch@Palace winners. The inventions of Hal Watts (right) and Malav Sanhavi (left) won first and third places respectively.

investment to take BabyLifeBox for testing and clinical trials, having already received a £500 grant from Imperial College Advance Hackspace to develop the prototype.

The St James's Palace final follows Pitch@Palace Bootcamp, where 40 start-up came to Imperial to pitch their ideas on Wednesday 14 October.

—DEBORAH EVANSON, COMMUNICATIONS AND PUBLIC AFFAIRS

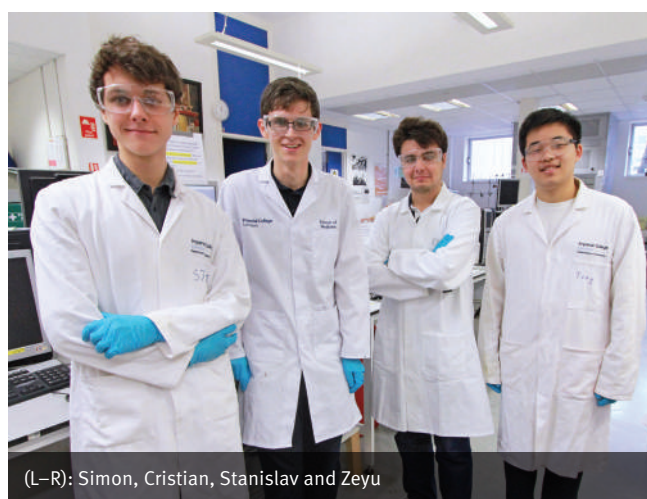
## A+ for innovation

A group of Imperial undergraduate students have developed an innovative, low-cost test to determine a person's blood type.

The team, known as Hidden Gens, includes Stanislav Piletsky, Zeyu Yang and Cristian Zagar (all Chemistry) and Simon Rabinowicz (Medicine). They took home top prize at the Faculty of Natural Science's Make a Difference competition - launched last year to encourage undergraduates in the Faculty to develop low-cost technology that could bring benefits to society.

Standard blood-type tests rely on the use of antibodies, which are expensive and have a limited shelf life. Hidden Gens created a test which does not require antibodies - instead using nanoparticles called Molecularly Imprinted Polymers (MIPs), which are significantly cheaper, easier to produce, and last for much longer.

Team member Stanislav Piletsky said: "We began considering applications of MIP



(L-R): Simon, Cristian, Stanislav and Zeyu

technology, which we knew was versatile but underdeveloped, and settled on blood antigens as a target molecule.

"The test we designed is the world's first antibody-free blood test - it can be made in minutes using inexpensive chemicals."

Hidden Gens were one of three finalists, all of whom were given access to funds and

facilities to develop their project to a proof-of-concept stage over eight weeks this summer.

The team has now submitted a patent with the help of Imperial Innovations, and is currently exploring the process of commercialising the technology, which could also be targeted to other molecules to create simple, cheap, 'home testing' kits for diseases that currently require lab analysis.

Professor Tom Welton, Dean of the Faculty of Natural Sciences, said: "Hidden Gens should be incredibly proud of their achievement. Reaching the

stage where you are applying for a patent is a great achievement for anyone, but for a group of undergraduates it is exceptional. Their idea is game-changing, and a testament to their skill, innovation, and drive. I look forward to hearing of their future success."

—DEBORAH EVANSON, COMMUNICATIONS AND PUBLIC AFFAIRS

## Market leaders

MBA students sold their wares at a pop-up market at Imperial at the end of October, as part of a challenge designed to test business skills.

The students enticed other students, staff and the general public to buy their goods at the pop-up market on Queen's Lawn – which included Halloween face-painting kits and masks, power banks for charging electronic devices and eco-friendly water bottles that easily fit into people's pockets.

The aim of the 360 Challenge is to help MBA students gain a 360 degree view of setting up a business, applying the theory learned on their MBA programme to help increase self-awareness and gain a better understanding of their abilities across core leadership areas.

Commenting on the challenge, MBA student Saleem Anwar said: "This challenge has been a great experience. It's almost like a mini MBA in terms of getting you to apply the theory you learn in the classroom to a real business



environment. It's been great to work with new people and bring together everyone's skills and ideas to create a fun pop-up market stall."

Earlier in the week, the nine student teams pitched their ideas to a panel of industry experts, who acted as investors, allocating budgets ranging from £200–£400 to enable the students to source and buy products for their market stall.

At the end of the event, the profits made by each team were added up – the winning group being the one with the highest return

on their investment (ROI).

The winning team was 'Party SOS' selling goods to avoid common challenges on a night out on the town. They achieved an ROI of 152%; the runner's up were Mostly Ghostly achieving an ROI of 133%. Altogether the teams raised £1,630+ in profit and which will be donated to a charity of the winning team's choice.

Their prize was a dinner with Diane Morgan, Associate Dean of Programmes at the Business School, and a group of alumni.

—LAURA SINGLETON, COMMUNICATIONS AND PUBLIC AFFAIRS



## Student crowdfunding campaign hits \$1.6m

Imperial student start-up BLOCKS has raised over \$1.6 million through its crowdfunding campaign.

Users can build a smartwatch that suits their lifestyle by combining modules for different purposes, such as GPS or heart rate monitoring. These modules sit around the wrist, instead of a standard watch strap.

Imperial graduate, Alireza Tahmaseb, co-founder of BLOCKS, said: "You would need to buy a new smartwatch each year just to keep up with the evolving technology. BLOCKS beats other smartwatches by being future-proof. You can upgrade your watch by adding new features, module by module, as they become available."

The team met their original funding target of \$250,000 worth of pre-orders in just 56 minutes.

The team has worked in partnership with two of the world's largest manufacturers, Compal Electronics and Qualcomm, to bring the watch to market. They hope to ship the first orders of BLOCKS in May 2016.

—JON NARCROSS, COMMUNICATIONS AND PUBLIC AFFAIRS

## Hackers come together to combat respiratory illnesses

Coders, patients, medics and innovators came together recently to develop devices that could assist people with Chronic Obstructive Pulmonary Disease.

In the UK, COPD affects around one in ten adults over the age of 40 and it kills more women than breast cancer. It causes the airways to become narrowed, leading to shortness of breath.

The 'BREATHE' Respiratory Hackathon, organised by Imperial College Advanced Hackspace, developed innovations and devices to improve the lives of millions worldwide who suffer from COPD and other respiratory diseases.

"We really need to raise public awareness and find solutions for dealing with chronic lung diseases and particularly COPD," said Professor Peter John Barnes (National Heart & Lung Institute) who is the mostly highly cited researcher in the world of respiratory medicine.

During the two-day event, patients shared their experiences of living with COPD. The hackers split into teams to develop new hybrid health devices made from existing technology donated from industry.

Team Pro-Lung Experience was nominated by a panel of judges at the Hackathon as the best concept developed at the event. The team created a game for young children who are vulnerable and susceptible to begin a smoking habit.

Watch a video about the event here: [bit.ly/hack-copd](http://bit.ly/hack-copd)

# Follow the stars this Christmas

Landing on a speeding comet, as the Rosetta mission did last year, is a tough act to follow. But 2015 is also shaping up to be a real cracker for space-related activities – for example with the New Horizons mission visiting Pluto and sending back incredible images of its seemingly geologically-active surface.

It's been an exciting one too for Imperial's own 'space community,' with alumnus Dr Andreas Mogensen becoming the first Dane in space when he travelled to the International Space Station (ISS) in September. That was followed by the news in October that Dr Helen Sharman (the first Brit in space back in 1988) was joining Imperial's Chemistry Department.

We've had to endure a long wait for the next Brit in space, but ESA astronaut Major Tim Peake has stepped up to the plate, and will be making up for lost time, by spending a whole 6 months in orbit on the ISS.



▲ Dr Andreas Mogensen returns to Earth on completing a visit to the International Space Station



▼ Dr Helen Sharman joins Imperial

▼ Major Tim Peake prepares for 6 months in orbit



DEC  
15

## Ground control to Major Tim

15 December 2015 is blast-off time for Tim Peake – and there'll be an opportunity to watch the launch live at the Science Museum's Energy Hall from 10.30 to 11.30, with a video link from Russia's Baikonur cosmodrome in Kazakhstan. In the evening there'll be a special Lates event at the Science Museum run in partnership with Discover South Kensington. This celebration for adults will include guest appearances from past and present astronauts amongst over 50 space-themed activities.

Activities include:

### IMPACT EARTH

Recreate meteorite crashes, search for fragments on the surface of Antarctica, and get up close and personal with real life rocky visitors from space.



### SPACE GRUB

Algae has the potential to provide life support functions on other planets, including as a food source. Taste test algal food and find out what else can be done with it.



### THE £100 SPACECRAFT

Build your own pocket-sized spacecraft and hear about the latest low-cost route to space exploration.



**TWO SPACE THEMED EVENTS WILL BE TAKING PLACE IN SOUTH KENSINGTON IN DECEMBER:**

## Fringe fun

Kicking off celebrations for Tim on 3 December, will be an Imperial Fringe event – 'It is rocket science' – providing a unique opportunity to discover how Imperial researchers and some of the College's Exhibition Road neighbours are uncovering the secrets beyond Earth's orbit.

Activities include:

### POP UP PLANETARIUM

Journey through the solar system without ever leaving South Kensington in our inflatable tour guide to the stars.



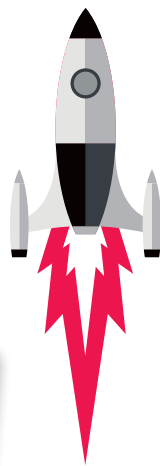
### LIFE ON MARS?

Test for organic life and explore what the changing geology of Mars can tell us about the potential for life on the red planet.



### ROCKET POWER

Meet Imperial's Rocket Society and get your hands on real life examples that are capable of breaking the sound barrier.



## Welcome new starters

Miss Humayra Ahmed, Business School  
 Dr Jasmini Alagaratnam, Medicine  
 Mr Gemelle Alexander, ICT  
 Ms Kritibha Amatya, Public Health  
 Ms Olia Archangelidi, NHLI  
 Mr Paladd Asavarut, Medicine  
 Dr Sebastiana Atzori, Surgery & Cancer  
 Dr Fernando Avila Rencoret, Surgery & Cancer  
 Dr Peter Bain, Medicine  
 Dr Clare Bakewell, Chemistry  
 Miss Ioanna Bakogianni, HR  
 Mr Jonathan Barnes, ICT  
 Miss Laura Baynton, NHLI  
 Mr Leo Beacroft, Public Health  
 Dr Antonio Berlanga, Public Health  
 Dr Maedeh Borhani, Bioengineering  
 Miss Sophie Bowlzer, Medicine  
 Ms Geraldine Brennan, Centre for Environmental Policy  
 Miss Vicky Brightman, College Headquarters  
 Mr Benjamin Brittain, Sport and Leisure  
 Mrs Aoife Cameron, NHLI  
 Dr Francesco Carpi, Life Sciences  
 Dr Emilie Cauet, Surgery & Cancer  
 Mr Justin Chung, Materials  
 Mrs Agne Cicenaitė, Catering Services  
 Ms Isabella Cingolani, Surgery & Cancer  
 Dr Sophie Clarke, Medicine  
 Mr Coby Clarke, Chemical Engineering  
 Dr Lucas Coelho Ambrozio, Mathematics  
 Dr Arianna Colosio, Clinical Science  
 Mr Lee Cooper, Clinical Science  
 Mr Samuel Cooper, ESE  
 Mr Oscar Criado Domenech, Civil and Environmental Engineering  
 Mr Wenjie Cui, Civil and Environmental Engineering  
 Mr Antoine Cully, EEE  
 Dr Ronnie Cunningham, Faculty of Medicine Centre  
 Mr Michele D Aliessi, Faculty of Engineering  
 Miss Jacyra Da Silva Baptista, Public Health  
 Mr John Daniels, EEE  
 Ms Luzia De Almeida, Faculty of Medicine Centre  
 Dr Reza Drikvandi, Mathematics  
 Mr Joseph Duncan, Catering Services  
 Dr Fadlalla Elfadaly, NHLI  
 Mr Dennis Estrada, Estates Division  
 Dr Chiara Fabbro, Chemistry  
 Mr Richard Favell, ICT  
 Dr Antonio Filieri, Computing  
 Ms Kurstin Finch Gnehm, Advancement  
 Dr Pedro Fonseca Rodrigues, EEE  
 Dr Edwin Garcia Castano, Physics

Mrs Timea Gavalki, Catering Services  
 Mr Anderson Gavioli Dos Santos, Sport and Leisure  
 Ms Amber Gibney, Medicine  
 Miss Rosanna Gillespie, Advancement  
 Miss Seona Granville, Public Health  
 Dr Natalie Green, Faculty of Medicine Centre  
 Mr Andrea Gregori Marchegiani, Catering Services  
 Ms Kay Griffiths, Library  
 Mr Daniel Grigsby, Catering Services  
 Ms Khamis Gsour, Public Health  
 Miss Nafia Guljar, Surgery & Cancer  
 Dr Yanping Guo, NHLI  
 Mr Carlos Hahn Borrego, ICT  
 Dr Amir Hakim, Medicine  
 Dr Ankur Handa, Computing  
 Mr Michael Hartl, Mathematics  
 Dr Benedict Hayhoe, Public Health  
 Mr Josh Henman, Estates Division  
 Mr Mike Horner, ICT  
 Dr Sile Hu, Computing  
 Dr Axel Huerre, Chemical Engineering  
 Mr Brad Hughan, Estates Division  
 Miss Catherine Hughes, Physics  
 Mr Md. Islam, ICT  
 Miss Olga Ivanova, ICU  
 Dr Michiyoi Iwami, Medicine  
 Dr Jua Iwasaki, NHLI  
 Mr Niklas Jahm, Chemical Engineering  
 Mr Miroslav Janatka, Computing  
 Mrs Valerie Johnson, College Headquarters  
 Dr Christopher Jones, ESE  
 Dr Ola Kamala, Bioengineering  
 Miss Nawal Kinany, Bioengineering  
 Mr James Kinross, Surgery & Cancer  
 Dr Paula Kirby, Surgery & Cancer  
 Mr Michail Klontzas, Chemical Engineering  
 Mr Harris Konnaris, Bioengineering  
 Mr Dimitrios Kontopoulos, Life Sciences (Silwood Park)  
 Mrs Jennifer Landmann, Public Health  
 Ms Nova Larch, Library  
 Dr Damien Leach, Surgery & Cancer  
 Mrs Rebecca Lee, Education Office  
 Dr Yi Li, Physics  
 Mr Jianxun Li, Business School  
 Miss Dixi Liu, EEE  
 Miss Taylor Lura, Life Sciences  
 Mrs Asmik Magakian Kamarian, Business School  
 Dr Indiana Magdalou, Clinical Science  
 Dr Ryan Maginn, Faculty of Medicine Centre  
 Mrs Denise Maines, HR  
 Miss Avneet Manghera, NHLI  
 Ms Shelagh Markey, Registry  
 Dr Joachim Marti, Institute of Global Health  
 Dr Ishita Marwah, NHLI  
 Mr Nigel Marx, Mechanical Engineering

Dr Luca Mastrolorenzo, Physics  
 Dr Stefan Matthies, Chemistry  
 Dr Despoina Mavridou, Life Sciences  
 Ms Sophie McKenna, Life Sciences  
 Mr Dario Meacci, Life Sciences  
 Miss Andrea Merciar, Library  
 Miss Katerina Misthou, Public Health  
 Ms Giulia Morselli, Life Sciences  
 Mr Ronan Murphy, NHLI  
 Dr Anika Nagelkerke, Materials  
 Mr Julian Newman, Mathematics  
 Dr Katherine Nixon, Surgery & Cancer  
 Dr Ashley Nordsletten, Public Health  
 Mr Stephen Obuba, ThinkSpace  
 Mr Conor O'Donovan, Physics  
 Miss Eadaoin O'Halloran, Faculty of Medicine Centre  
 Mrs Bolatito Olumuyiwa, Catering Services  
 Miss Sue Otterwell, Registry  
 Miss Alison Ower, Public Health  
 Mr Adam Page, Physics  
 Mr Thomas Palmer, Public Health  
 Dr Gloria Palou Marin, Clinical Science  
 Dr Brandon Parkes, Public Health  
 Mr Ernest Pastor Hernandez, Chemistry  
 Mr Pranav Patel, Surgery & Cancer  
 Mr Vinaykumar Patel, Estates Division  
 Mr Richard Patterson, Public Health  
 Mr Niklas Jahm, Chemical Engineering  
 Dr Eliana Pires Barrenho, Business School  
 Ms Dominika Pocsova, Mechanical Engineering  
 Mr David Poirier-Quinot, Design Engineering  
 Mr Georgios Pothoulakis, Bioengineering  
 Dr Julia Prague, Medicine  
 Mr Cezary Rapinczuk, ICT  
 Dr Srikanth Ravipati, Chemical Engineering  
 Miss Mariana Reis Wunderlich, Life Sciences  
 Dr Alberto Riera Sanchez, Clinical Science  
 Dr Charles Riviere, Surgery & Cancer  
 Mr Mark Robinson, Surgery & Cancer  
 Miss Faye Rodgers, Life Sciences  
 Mr Ethan Rowland, Bioengineering  
 Dr David Ruano Gallego, Life Sciences  
 Miss Milagros Ruiz, Public Health  
 Miss Keerthi Sannareddy, Medicine  
 Dr Ben Sessa, Medicine  
 Miss Yining Shi, Business School  
 Miss Darya Shirobokova, ICU  
 Mr Debabrata Sikdar, Chemistry  
 Miss Ameze Simbo-Nomayo, NHLI  
 Dr Antonio Simoes Monteiro de Marvao, Clinical Science  
 Dr Igor Siveroni, Public Health  
 Dr Daniel Skodlerack, Mathematics  
 Miss Rebecca Smith, Surgery & Cancer  
 Mr Ernest So, Life Sciences  
 Mr Arnold Sogbodjor, ICT

Ms Eleonora Spanudakis, Medicine  
 Ms Lottie Stables, Faculty of Medicine Centre  
 Mr Nicolai Stawinoga, Computing  
 Professor David Stuckey, Chemical Engineering  
 Mr Graham Stutter, Physics  
 Mr Ali Sulaiman, Physics  
 Dr Giacomo Tarroni, Computing  
 Mr Garry Tew, Catering Services  
 Miss Anuja Thapa, Faculty of Medicine Centre  
 Miss Louise Thomas, Advancement  
 Mr Ryan Thwaites, NHLI  
 Mr Akis Tsiotsios, Computing  
 Mr Jonathan Tustain, School of Professional Development  
 Mr Francisco Villegas Ruiz, Estates Division  
 Mr Alexander von Roon, Surgery & Cancer  
 Dr Achilles Vortselas, Mechanical Engineering  
 Mr Andrew Ward, Sport and Leisure  
 Mr Tim Weenink, Bioengineering  
 Mr Richard Wheeler, ThinkSpace  
 Miss Maria White, Estates Division  
 Ms Katherine Wilson, Public Health  
 Miss Kate Wilson-Heyworth, Business School  
 Mr Thilo Wrona, ESE  
 Ms Lingzhi Wu, Surgery & Cancer  
 Mr Yilun Xu, Mechanical Engineering  
 Mrs Shirin Yooosofah, Aeronautics  
 Dr Qiyuan Zhao, Life Sciences

**Farewell**

moving on

Dr Trevor Almeida, ESE  
 Dr Anna Andreou, Surgery & Cancer  
 Mr James Arram, Computing  
 Dr Eskindir Asmare, Computing  
 Dr Giovanni Barontini, Physics  
 Ms Nisha Barot, Registry  
 Mr Marco Benozzi, Student Recruitment & Outreach  
 Mr Ashley Blake, Faculty of Medicine Centre  
 Dr Neville Boon, Bioengineering  
 Dr Leonardo Bottolo, Mathematics  
 Mr George Bouras, Surgery & Cancer  
 Ms Cristina Budau, Catering Services  
 Ms Ellen Clegg, Medicine  
 Ms Zoe Cotton, Medicine  
 Mrs Ghazaleh Cousin, Faculty of Engineering  
 Miss Winifred Coyne, Accommodation  
 Dr Katrina Curtis, NHLI  
 Mr Paulo De Nobrega, Finance (10 years)  
 Dr Gerhard-Paul Diller, NHLI  
 Dr Robert Doran, Chemistry  
 Dr Laurence Doyle, Chemistry  
 Ms Nadia Drews, Education Office

Dr Shane Duggan, Medicine  
 Miss Stephanie Fadahuni, Faculty of Engineering  
 Mr Claudio Ferraro, Materials  
 Dr Richard Ferrier, ESE  
 Dr James Foadi, Life Sciences (8 years)  
 Dr Debbie Garside, Surgery & Cancer  
 Dr Adam Gilbertson, Physics (7 years)  
 Miss Nicolle Grace, Surgery & Cancer  
 Miss Whitney Grossett, Aeronautics  
 Miss Fiona Henderson, Climate KIC (8 years)  
 Miss Sarah Henderson, Surgery & Cancer  
 Dr Carmelo Herdes Moreno, Chemical Engineering  
 Miss Laura Heseltine, School of Professional Development  
 Mr Tony Hewitt, Business School (7 years)  
 Professor Jenny Higham, Faculty of Medicine Centre (18 years)  
 Mr Tom Hoehn, Business School  
 Dr Robert Horton, Materials  
 Dr Simon Hu, Civil and Environmental Engineering  
 Dr Eddie Hung, Computing  
 Mr Damian Johnson, Medicine  
 Dr Worawut Khunsin, Physics  
 Dr Sahir Khurshid, Surgery & Cancer (7 years)  
 Dr Paul Kinsler, Physics  
 Dr Sarah Knowles, Life Sciences (Silwood Park)  
 Ms Anna Lal, Physics  
 Dr Maialen Lasa, Medicine  
 Mrs Misha Levi-Samper, ICU  
 Mr Yang Lu, EEE  
 Mr Gil Machado, Materials  
 Dr Sarah Maher, NHLI (7 years)  
 Ms Kiruthika Manivannan, Medicine  
 Mr Karikaran Manoharan, NHLI  
 Miss Bozena Marchelewicz, Finance (7 years)  
 Ms Siobhan McKenna, Medicine (5 years)  
 Ms Fiona McLean, Public Health  
 Dr Katalin Mecseki, Physics  
 Mr Carlos Merchan, Estates Division (8 years)  
 Dr Claire Mitchell, Physics  
 Dr Brian Mitchell, Computing  
 Mr Miroslav Mladenov, Medicine  
 Dr Gareth Morgan, ESE  
 Mr Neil Mosley, Sport and Leisure (15 years)  
 Mr Pariwarta Nepal, Catering Services  
 Miss Olivia Ogle, Surgery & Cancer  
 Dr Harriet Palfreyman, Surgery & Cancer  
 Dr Niranjana Patra, Materials  
 Mrs Valeria Perciany David, Mathematics  
 Mrs Clara Pereira, Medicine (15 years)  
 Mr Alberto Perez Martinez, Catering Services  
 Mr Duccio Piovani, Mathematics  
 Dr Stefan Pszczolkowski Parraguez, Computing  
 Dr Petar Radanliev, Centre for Environmental Policy

Miss Hedyeh Rafii-Tari, Computing  
 Ms Ria Rana, Campus Services  
 Miss Andia Redpath, NHLI  
 Dr Mark Reglinski, Medicine  
 Miss Carlyn Samuel, Life Sciences (Silwood Park)  
 Miss Ana Santos Silva, Life Sciences  
 Dr Antonio Scalfari, Medicine  
 Dr Afshan Siddiq, Public Health (9 years)  
 Dr Alona Sosinsky, Medicine  
 Mr Michael Staite, Estates Division (36 years)  
 Dr Joanna Stephen, Mechanical Engineering  
 Dr Euan Stronach, Surgery & Cancer (11 years)  
 Dr Dilveer Sualy, Medicine  
 Dr Llewellyn Thomas, Business School  
 Dr Tong Tong, Computing  
 Mr Jonathan Tottle, Physics  
 Dr Laura Turner, Surgery & Cancer (11 years)  
 Dr Junjuda Unruangsri, Chemistry  
 Dr Ivelin Valkov, Chemical Engineering (8 years)  
 Mr Mihai-Dorian Vidrighin, Physics  
 Miss Catherine Watkinson, Physics  
 Mr Trevor Watt, Estates Division (9 years)  
 Dr Margot Wenzel, Chemistry  
 Mr Dean Woodhouse, ICU  
 Mr Ismail Yildiran, Catering Services  
 Ms Nabila Youssouf, Medicine  
 Dr Xiaotian Zhang, EEE  
 Mr Guangyu Zhou, EEE

## retirement

Mr Brian Carnell, Life Sciences (12 years)  
 Dr Shaun Crofton, Mechanical Engineering (39 years)  
 Miss Mary Crossey, Surgery & Cancer  
 Professor Glenda Gillies, Medicine  
 Mrs Shamim Mirza, Campus Services (15 years)  
 Mr Manuel Quinteiro, Catering Services (11 years)

This data is supplied by HR and covers staff joining the College during the period 21 October – 23 November. This data was correct at the time of going to press.

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

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



3 DECEMBER 2015, 17.00

## Imperial Fringe: It is rocket science

Imperial Fringe: It is rocket science Journey to the stars with space scientists and astronomers at Imperial's December Fringe. This evening provides a unique opportunity to discover how Imperial researchers and some of its

Exhibition Road neighbours are uncovering the secrets beyond Earth's orbit. For those with young ones, the evening will also include the Children's Christmas lecture with astrobiologist Dr Zita Martin's looking at whether we are alone in the Universe (see page 14).



15 DECEMBER 2015, 18.00

## Principia launch Late: Celebrating Tim Peake's journey to the International Space Station

On 15 December Tim Peake, the European Space Agency's first British astronaut, will launch to the International Space Station (ISS) for a six-month mission. Imperial space

scientists and astronomers will join Exhibition Road neighbours for an evening celebration at the Science Museum. Run in partnership with Discover South Kensington (see page 14).

# IMPERIAL TODAY

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27 NOVEMBER 2015, 12.00

## Energy Seminar: Future of Urban Road Transport and Mobility

Dr Chris Mazur of Chemical Engineering presents on his research at the Energy Futures Lab weekly seminar.



01 DECEMBER 2015, 14.00

## A circular economy won't work unless...

Ken Webster, Head of Innovation at the Ellen MacArthur Foundation, discusses whether the idea and practice of a circular economy finally can fit in with the real world, creating wealth that flows and new avenues for innovation.

02 DECEMBER 2015, 17.30

## Choral Evensong with Imperial College Chamber Choir

Whatever your faith tradition, or world view, enjoy the beautiful space of Holy Trinity and let yourself be surrounded by glorious music at this service brought to you by the Chamber Choir, the Chaplaincy Multi-Faith Team, and Holy Trinity Church.



02 DECEMBER 2015, 17.30

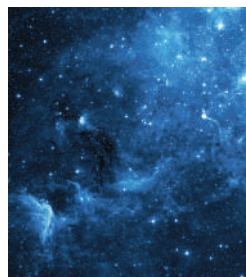
## The Athena SWAN Lecture

Surgery and Cancer's first Athena SWAN Lecture will be delivered by Miss Clare Marx, the first female President of the Royal College of Surgeons.

03 DECEMBER 2015, 19.00

## A perfect theory: a biography of General Relativity

Astrophysicist Professor Pedro Ferreira from the University of Oxford, takes a look at a century of General Relativity.



03 DECEMBER 2015, 17.30

## Process systems engineering at crossroads

Professor Venkat Venkatasubramanian will deliver the 22nd annual Professor Roger Sargent Lecture looking at the challenges and opportunities in the era of IBM's Watson supercomputer.

03 DECEMBER 2015, 12.45

## Exploring the controls on earthquakes and tectonics

The University of Cambridge's Dr Alex Copley discusses observations of active deformation (using seismology, InSAR, observations of geomorphology...etc) and numerical modelling.

04 DECEMBER 2015, 17.30

## 2015 T. H. Huxley Lecture

Dr. Franklin M. Orr, Under Secretary for Science & Energy, U.S. Dept. of Energy will discuss the challenge of creating a clean energy future as part of the ESE's prestigious annual lecture.



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