

New values

Unlocking the power of
bitcoin technologies
for the benefit
of society

●●● CENTRE PAGES



DATA DESTINY
Student's
computing
prowess attracts
powerful friends
PAGE 12



**FAB FIFTH
FESTIVAL**
Imperial Festival
returns with a
chitty bang
PAGE 13 AND
BACK PAGE



FOND FAREWELL
Paying tribute
to the late
Professor Jane
Plant CBE
PAGE 14



EDITOR'S CORNER

Human technology

As a born gadget addict, I've always been drawn to new digital technologies like a moth to a flame. I've been lucky enough to travel widely and observe, test and write about them – first as a journalist now as Editor at Imperial. Yet, in spite of my love of shiny new things, the most interesting part of this process is always meeting the inventors and brains behind the tech; their **passion and belief** can be a really powerful thing to witness. And so it was when I met the three directors of Imperial's new Centre for Cryptocurrency Research and Engineering (centre pages). There's a real **maverick quality** to this diverse team that mirrors the disruptive nature of the technology it is trying to develop: there is Will, the gregarious professor; Cathy, the street-wise industry insider; and polymath Rob – not to mention the scores of enthusiastic students working on their own innovative projects and applications. What they all share is a belief not just in the technology itself but the potential it has to make society more **efficient and equitable** society.

ANDREW CZYZEWSKI, EDITOR

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World's biggest body scanning project to shed new light on major diseases

The world's largest health imaging study has been launched by the UK Biobank to create the biggest collection of scans of internal organs.

With funding from the Medical Research Council (MRC), Wellcome Trust, and the British Heart Foundation (BHF), the £43m study will involve imaging the brain, heart, bones, carotid arteries and abdominal fat of 100,000 current participants of UK Biobank.

Professor Paul Matthews, Head of the Division of Brain Sciences at Imperial, chairs the group of academic experts who have been supporting UK Biobank to create this additional resource.

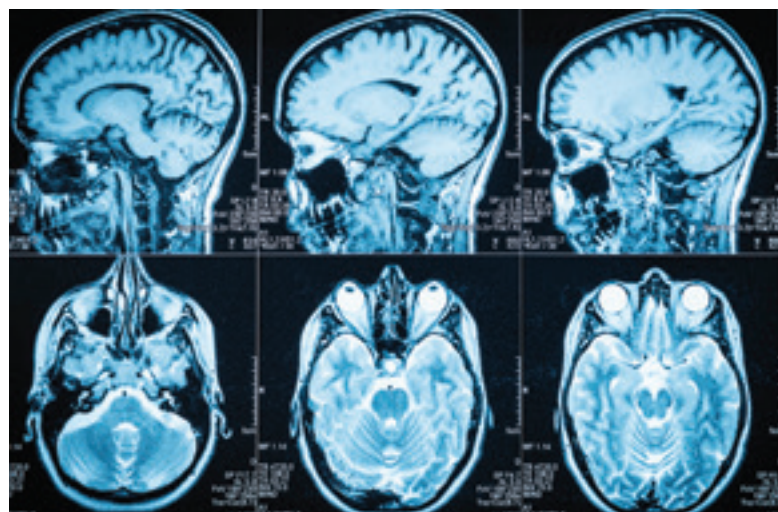
He said: "One of the crucial questions we can start to answer is, what happens in the brain years before dementia, stroke or other disorders are diagnosed? Can we

understand it and find new ways to treat or prevent the onset?"

The multi-organ scans will be analysed alongside the vast data already collected from UK Biobank participants. For the last ten years UK Biobank has gathered huge

quantities of data on its 500,000 participants – including their lifestyle, weight, height, diet, physical activity and cognitive function, as well as genetic data from blood samples.

—KERRY NOBLE, COMMUNICATIONS AND PUBLIC AFFAIRS



Diplomats and scientists explore the future of materials at Imperial

Imperial hosted diplomats and scientific representatives from scores of partner countries last week.

The London Diplomatic Science Club (LDSC), which brings together science attachés from London's embassies and high commissions, as well as the UK government, Royal Society, research councils and academic representatives, held its latest meeting at Imperial.

The Club last came to Imperial in 1997, when the College's then-Rector Lord Oxburgh used the occasion to urge scientists to take a more multidisciplinary approach to research – something that is now engrained into Imperial's work at all levels.

Introducing the event, Imperial's President Alice Gast said: "A core

feature of Imperial is that it's at the heart of a global community. Over 50% of our staff and students are from countries outside of the UK. In the past year, over three quarters of our research papers resulted from collaborations with co-authors from over 140 countries and 6,000 different universities, businesses and research organisations around the globe.

"As a result, we have become a trusted interface for government and industry, both informing policy makers and, crucially, translating our research into viable solutions."

During the event, a group of Imperial experts – including Professors Mary Ryan, Neil Alford, Robin Grimes and Natalie Stingelin – delivered fast-paced 'PechaKucha' presentations on the future of materials.

Professor Grimes, who also serves as the Foreign and Commonwealth Office's Chief Scientific Advisor, was instrumental in re-launching the LDSC following a dormant period, alongside current LDSC chair Aniko Dobi-Rozsa, who is Hungarian Science and Technology Attaché.

—ANDREW SCHEUBER, COMMUNICATIONS AND PUBLIC AFFAIRS



Professors Robin Grimes, Mary Ryan and Neil Alford

Wake up to a green fortune, UN chief climate diplomat tells Imperial audience

Christiana Figueres called for investors to take risks that benefit the environment and global poverty at the Grantham Institute annual lecture.

Investing in clean technologies and renewable energy will jump start the global economy and pull millions out of poverty, according to Ms Figueres, who is Executive Secretary of the UN Framework Convention on Climate Change (UNFCCC).

Speaking to a capacity audience of students, academics, charity and business representatives, she said that anybody with money to invest would be wise to consider the range of innovative, low-carbon technologies in development around the world.

“It is time for massive investment in low-carbon infrastructure that can get the global economy going again,” said Ms Figueres, who highlighted how infrastructure investment following the Second World War invigorated markets in Europe and around the world.

Ms Figueres’ lecture followed an afternoon visit to Imperial, which saw her participate in a roundtable session with questions about her views on climate policy put by Grantham Institute postgraduate students on the Science and Solutions for a Changing Planet Doctoral Training Programme.

She also heard pitches by the Imperial alumni behind low-carbon start-up companies GrowUp Urban Farms, Design by Sol and Featherfill, who demonstrated the commercial potential for such innovative ideas that are needed to solve the problems of climate change and low-carbon living.

Speaking at the lecture, Imperial’s Provost Professor James Stirling reinforced the College’s commitment to establishing a research centre at its White City Campus that will look into developing clean technologies.

—ALEXANDRA CHEUNG, GRANTHAM INSTITUTE FOR CLIMATE CHANGE

Watch a video of the lecture here: bit.ly/Grantham-16



Imperial community celebrates a special relationship in India

Alumni and friends of Imperial met President Alice Gast and other senior Imperial staff members in Delhi and Mumbai last month.

More than 250 guests including students, offer holders, parents, supporters and guests from industry heard the latest news from Imperial at receptions in the two cities.

President Gast said: “It’s wonderful to have had such a diverse gathering at the receptions, and to have the opportunity to not only meet alumni, but also to welcome our incoming students. We have a strong and enduring relationship with India, and we’re grateful to our alumni associations for all of the work they do.”

In Delhi, she made special mention of Jag Mohan Puri (Mechanical Engineering 1958), who founded the Imperial College Alumni Association of India in 1991 at the British Council in Kolkata. The Puri family shares a long-standing connection with Imperial: four generations and eight members of the family have studied at the College between 1929 and 2016.

During the visit, the senior team from Imperial also took the opportunity to meet up with the alumni association chapters in



India and explore with them the development of activities for the coming years.

Professor John Chambers (School of Public Health) shared fascinating insights into his last twenty years of epidemiology research into the prevalence of diabetes amongst South Asians, and its implications for policy. He recognised the contributions of academic partnerships, including several based in India and neighbouring Sri Lanka.

Prior to the main receptions in Delhi and Mumbai, a group of students with an offer to study at Imperial in the upcoming academic year heard a presentation from Hannah Dickinson (Global Summer School Manager) and had an opportunity to ask recent alumni questions about their time at the College and life in London.

—JESSICA ADAMS AND JENN BYWATER, ADVANCEMENT

in brief

News lead

The College has appointed Luke Blair as its first Vice-President (Communications and Public Affairs) from September 2016. Mr Blair’s new post, part of Imperial’s leadership team, will be responsible for leading and driving communications across the College to strengthen and enhance its position as one of the world’s top universities. Mr Blair is currently an equity partner and board director at London Communications Agency (LCA), where he leads



the agency’s health and transport work. A former political correspondent, Mr Blair spent 10 years in journalism, including nearly five years on the *Evening Standard*.

Warmly welcome

President Alice Gast has used a visit to India (see above, right) to emphasise the UK’s openness to smart and entrepreneurial Indian students. In an interview with PTI, the country’s main news agency, Professor Gast said she wants to send out a message that Indian students would be “warmly welcome” in the UK. She said that Indian students should consider the UK’s entrepreneur visa, alongside other visa options. “It is something that has benefited the US greatly, with the entire

story of the Silicon Valley based on such a visa. The UK could benefit similarly,” she said

Marking out malaria

A research team has received \$1.45 million to investigate how malaria parasites move, with the aim of developing new drugs to combat the disease. Dr Jake Baum (Life Sciences) and collaborators from the US, Germany and France have been awarded a three-year grant from the Human Frontiers Science Program (HFSP).



“If you’re still putting your money into high carbon, I’m sorry, you’re going to lose it.”

CHRISTIANA FIGUERES, EXECUTIVE SECRETARY OF THE UN FRAMEWORK CONVENTION ON CLIMATE CHANGE (UNFCCC), ADDRESS AN IMPERIAL AUDIENCE (SEE STORY ABOVE, LEFT).

Money via mobile phones: digital finance from Kenya to Imperial

Staff, students and alumni gathered last month to discuss the opportunities and challenges in digital finance, with a keynote speech by Professor Njuguna Ndung'u, the former governor of the Central Bank of Kenya.

Professor Ndung'u outlined the surprising story of how Kenya, a developing country, has been at the forefront of digital currency since a mobile phone-based money transfer service called M-Pesa was launched there in 2007 by Vodafone.

The talk was followed by a panel discussion, moderated by Professor Franklin Allen, Executive Director of the Brevan Howard Centre for Financial Analysis, featuring the perspectives of leading experts in digital finance and technology including Imperial's Professor Andrei Kirilenko, Director of the new Centre for Global Finance and Technology at the Business School and Professor Tommaso Valletti.

Commenting on the event, Professor Kirilenko, said: "With London soon expected to become the hub of global fintech, this event was an ideal opportunity to address how digital finance is affecting consumers, businesses and the financial industry. At Imperial College Business School we recognise the need for greater understanding of digital finance and our new research centre aims to help foster a new generation of fintech experts to meet the evolving business landscape.

The event was organised by the Brevan Howard Centre for Financial Analysis and the new Centre for Global Finance and Technology, which aims to bring together leading academics to investigate the impact of technology on finance, business and society. This interdisciplinary, quantitative research will then feed into new courses and executive education programmes at the Business School and help foster a new generation of fintech experts as well as re-educate existing talent in new financial technologies. The Centre will also work on providing intellectual guidance to key policymakers and regulators.

—LAURA SINGLETON, COMMUNICATIONS AND PUBLIC AFFAIRS



'Risky' research projects get a boost

The first awards from the MIT-Imperial Seed Fund have been given to early-stage breakthrough projects spanning the two institutions.

The fund was set up to kick-start early-stage, risky and 'blue skies' research ideas that might not otherwise be pursued.

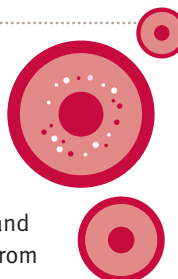
In its inaugural year, the MIT-Imperial College London Seed Fund selected three winning projects out of 30 applications (see text below). Each team was awarded £13,500 pounds by Imperial and an additional \$16,000 by MIT for 18-month project periods.

Professor Maggie Dallman, Associate Provost (Academic Partnerships) said: "It is really exciting to see the first round of projects funded through this award, which supports risky fundamental research, driven jointly by two world leading Institutions.

"The sums to kick-start these projects may seem modest, but they can make a world of difference in getting our academics and students together and helping ideas to take off. I look forward to watching these projects evolve over the next 18 months."

Building cell 'factories' to make new materials

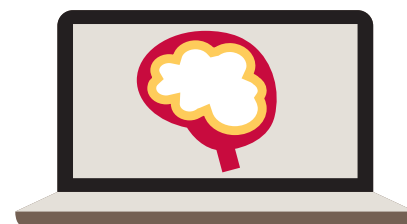
Pushing forward research in the field of synthetic biology will be the focus of research by Dr Tom Ellis (Bioengineering) and Professor Timothy Lu, from



MIT's Departments of Electrical Engineering and Computer Science. They are planning to re-program cells using re-engineered DNA to produce new multifunctional materials.

Making better batteries

Improving the performance and safety of lithium batteries will be the focus of research by Professor John Kilner and Dr Ainara Aguadero (both Materials) and Professor Bilge Yildiz from MIT. The team are aiming to develop solid state lithium-ion batteries (SLIBs) that store more energy, and may also be safer with a longer life-cycle.



Developing computers that 'think' differently

Professors Terence Rudolph (Physics) and Dirk Englund, an experimental physicist from MIT, are working on problems in quantum computing. Quantum computers could solve problems that conventional computers cannot handle, because they 'think' differently to both humans and our current computers.

—COLIN SMITH AND HAYLEY DUNNING, COMMUNICATIONS AND PUBLIC AFFAIRS

media mentions

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Health lessons from austere fashion

GUARDIAN ▶ 06.04.2016

Writing in the *Guardian*, Professor Ara Darzi (Director of the Institute of Global Health Innovation at Imperial) asks what can the NHS learn from the fashion industry.

“Quite a lot it turns out,” said Professor Darzi. “Just as the NHS is going through a period of unparalleled austerity today, the clothing industry experienced its own era of austerity during the second world war in the 1940s. Rationing was necessary to save resources, but the government feared shortages would lead to escalating prices. To protect the public it introduced the Civilian Clothing utility scheme to ensure clothes were available at reasonable cost. The idea was to bolster a frugal mentality focused on high efficiency and quality but that kept prices affordable – exactly what today’s NHS needs.”



Nuclear clean-up: UK faces £87bn bill

FINANCIAL TIMES ▶ 19.04.2016

When Queen Elizabeth opened Calder Hall, the UK’s first nuclear power station, in 1956, there was little public discussion about how it would eventually be shut down and what that would cost, the *FT* writes. Today, the expense looks enormous, because the location evolved into a huge and complex nuclear site involving another reactor and waste reprocessing plants. “When decommissioning was first being considered, people weren’t thinking about turning these plants back into greenfield sites, as is the policy now,” says Malcolm Grimston (Centre for Environmental Policy). “This was our first stab at nuclear power, and we are discovering bit by bit what the eventual costs are.”

Wonderwheels

BBC THE ONE SHOW ▶ 29.03.2016

Sophie Morgan presents a film for the BBC’s *The One Show* about an eye controlled wheelchair designed by Imperial’s Dr Aldo Faisal (Bioengineering). The film is available to view on the Youtube link: bit.ly/wonder-wheels

Lower drug prices in poorer countries

GUARDIAN ▶ 31.03.2016

GlaxoSmithKline is taking action to make medicines more affordable in developing countries, including waiving patent protection for new drugs in the world’s poorest nations – such as Afghanistan, Rwanda and Cambodia – allowing cheaper generic versions to come on the market without the threat of legal action. Professor Raymond Hill (Medicine), visiting professor at Imperial, welcomed the move as a ‘brave and positive step’ that sets a ‘precedent for other major multinational pharma companies to follow’. He added: “The impact of this move on the treatment of cancer and other diseases in each individual country will depend on whether there is a local adequate healthcare infrastructure that will allow the safe use of powerful new drugs.”



awards and honours

ENGINEERING

Brace of awards for Chemical Engineering

The Institution of Chemical Engineers (IChemE) has recognised four members of Imperial’s community in its annual 2016 awards, which celebrate excellence, innovation and achievement in the chemical, biochemical and process industries. Professor Costas Pantelides (Chemical Engineering), inset right, received the IChemE Sargent Medal in recognition of his major contribution to research in the area



of computer-aided product and process engineering. The award is named after Professor Roger Sargent, former President of IChemE and Courtauld’s Professor of Chemical Engineering at Imperial - widely regarded as the father of process systems engineering. Now retired, Professor Sargent also received the 2016 IChemE MM Sharma Medal in recognition of sustained outstanding research contributions across an individual’s career. Other Imperial winners were Professor Athanasios Mantalaris (Chemical Engineering) who received the Donald Medal and alumnus Ed Daniels, currently at Shell, who received the Council Medal.

NATURAL SCIENCES

Kim’s Korean honour

Professor Myungshik Kim (Physics) has won a prestigious award from his home country given to Koreans who have made outstanding contributions to the development of science, culture and enhancement of the welfare of mankind. The Ho-Am Prize in Science was established in 1990 by Kun-Hee Lee, the Chairman of Samsung, to honour the late Chairman, Byung-chull Lee, the founder of the company. Professor Kim is Head of the Quantum Optics and Laser Science (QOLS) group at Imperial and is Director of the Centre for Doctoral Training on Controlled Quantum Dynamics.

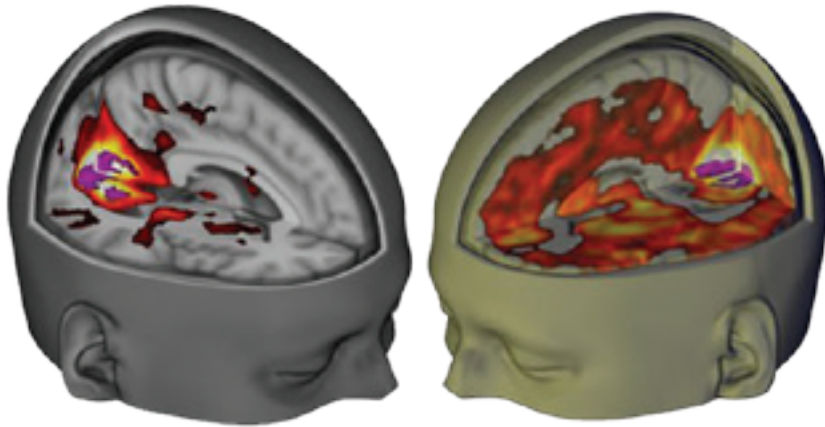
ENGINEERING

Wind in the sails

Imperial has announced a donation of \$250K from Sanjay and Leslie Patel that will create a new wind tunnel for high-speed air flow research. The gift was made in honour of Mr Patel’s father, Dr Hiralal N Patel (Mechanical Engineering 1941, Aeronautics PhD 1945), a pioneer of the plastics industry in India. The gift was announced at the conclusion of President Gast’s visit to India in April (see page 3), where she met with Dr Patel and presented him with a copy of his original PhD thesis from 1945.



The brain on LSD revealed: first scans show how the drug affects the brain



The areas that contributed to vision were more active under LSD (right), which was linked to hallucinations

Researchers from Imperial, working with the Beckley Foundation, have for the first time visualised the effects of LSD on the brain.

In a series of experiments, the team administered LSD (Lysergic acid diethylamide) to 20 healthy volunteers in a specialist research centre and used various leading-edge and complementary brain scanning techniques to probe brain changes.

A major finding of the research is the discovery of what happens in the brain when people experience complex dreamlike hallucinations under LSD. Under normal conditions, information from our eyes is processed in a part of the brain at the back of the head called the visual cortex. However, when the volunteers took LSD, many additional brain areas – not just the visual cortex – contributed to visual processing.

The study also revealed what happens in the brain when people report a fundamental change in the quality of their consciousness under LSD.

Study lead Dr Robin Carhart-Harris (Medicine) said: “Normally our brain consists of independent

networks that perform separate specialised functions, such as vision, movement and hearing – as well as more complex things like attention. However, under LSD the separateness of these networks breaks down and instead you see a more integrated or unified brain

“Our results suggest that this effect underlies the profound altered state of consciousness that people often describe during an LSD experience, which is sometimes framed in a religious or spiritual way – and seems to be associated with improvements in well-being after the drug’s effects have subsided.”

In a second study, the researchers found altered visual cortex activity under the drug, and that the combination of LSD and music caused this region to receive more information.

PhD student Mendel Kaelen (Medicine) who was lead author of the music paper, said: “This is the first time we have witnessed the interaction of a psychedelic compound and music with the brain’s biology.”

—KATE WIGHTON, COMMUNICATIONS AND PUBLIC AFFAIRS

Mind-blowing research

Over 200,000 people read about the LSD study on Imperial’s site and many more through media outlets like *the Guardian* and *Wired*. It engendered great debate amongst readers – here’s what they had to say:

Mitch

“I’m excited about this study, and I am a proponent of LSD use for spiritual exploration. I do however have my doubts, and anxieties about the use of LSD. I have seen LSD shatter a friend’s mental health before my eyes.”

Mike

“It is obviously a very interesting study. However, it is quite questionable whether researchers providing LSD in a series of experiments to listen to music should pass an ethics committee.”

Dr Z

“This is ethical, safe, bountiful research that has provided results previously unseen since popular culture discovered LSD over a half century ago. As it turns out, the true discovery doesn’t even seem to be about LSD so much as about the nature of our own consciousness! How profound.”

Greg

“At 18 years old, I am so fortunate that the current ethical and political climate surrounding psychedelic research is a progressive one. For the past three years, I’ve dreamed of pursuing research in the field of neuropsychopharmacology. Now, as a freshman at UC Berkeley, my ambition is reinvigorated.”

HEALTH STATS ROUND UP

Data taken from the world’s largest study of diabetes and obesity led by Imperial under Professor Majid Ezzati (Public Health).



For more info and visualizations visit: ncdrisc.org

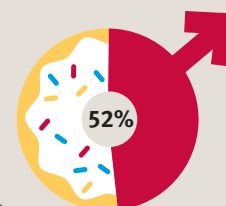
Global obesity rates



Lightest population
Bangladesh
(26% are underweight)

Each decade, the world’s population has become heavier by
1.5 kg
since 1975

Heaviest population
American Samoa
(58% are overweight)



increase in male diabetes from 1980 (4.3%) to 2014 (9%)

US\$825 billion
Current global cost of diabetes per year



700 million
adults are predicted to be affected by diabetes by 2025

Hair raising

Dr Claire Higgins (Bioengineering) carries out research to understand the mechanisms behind how tissue develops and regenerates. Some of Dr Higgins's work focuses on hair follicles, as she believes that unravelling the mysteries behind their ability to regenerate could ultimately lead to new ways of healing the body. Colin Smith (Communications and Public Affairs) reports.

Why are hair follicles useful to study?

When the body is recovering from disease or injury it heals itself, but this causes scarring. We think of a scar as something on the skin because it is visual. However, scars form in all tissues after injury and this affects how they function. For example, after a heart attack, cells called cardiomyocytes, which produce heart muscle, get replaced by scar fibroblasts, and this impairs how the heart beats.

Interestingly, some parts of our body opt not to heal and instead undergo a regeneration process leaving no scarring – such as the liver and hair follicles. Since the latter are much easier to access and explore we hope to use the insights from our research to promote scar free healing, or perhaps engineer follicles in situations after a burn, following a skin graft, or even improve hair transplantations.

What do you think is the future of hair transplantation?

There is a small cluster of cells at the base of the follicle that are capable of instructing growth of a new follicle, and if they are removed and placed into non-hairy skin they will induce growth of a new follicle in this location. Theoretically, these cells could be removed from a single follicle, expanded in number, and then used to instruct growth of multiple follicles in a new location.

We're interested in exploring this as an alternative to the kinds of hair transplants that occur now, which require enough donor follicles to be present for transplant in the first place, and which require removal of follicles from the back of the scalp, which is a painful procedure.

On a slightly different note, how do follicles affect hair type?

Hair curl is defined by the curvature of the hair follicle beneath the skin surface. There is a strong genetic component to hair shape, given that in sub-Saharan Africa only curly hair, not straight hair is observed.

Straight hair appears to be a relatively new trait in humans. It is thought to have evolved in the past 65,000 years, specifically when people were migrating from Africa to Asia and later into Europe – perhaps conferring an advantage of greater warmth in cold climates, since flat hair can pack more densely.

“We're interested in exploring an alternative to painful hair transplants.”



Gushing praise

Professor Omar Matar (Chemical Engineering) and team have won one of five top places in this year's National Science Photography competition, organised by the EPSRC. His team took the image above as part of their research into liquid jets, which are common in a range of industrial and daily-life scenarios, from crop irrigation systems, to aerosols, and engine fuel injection systems for cars and trucks. Researchers around the world are investigating these liquid jets to understand their dynamics, so that improvements can be made to maximise their performance.



New values

Last month, news surfaced about one of the biggest data leaks in corporate history, which included details of more than 214,000 offshore companies listed by a law firm in Panama. Irrespective of the moral implications of what was revealed and who was in the list, the leak gave a glimpse of the scale of this hidden world – with some estimates suggesting that half of all global trade flows through so-called tax havens.

It's a topic on the minds of the three founding Directors of the Imperial College Centre for Cryptocurrency Research and Engineering (IC3RE) when we meet. While the offshore economic model is founded on absolute secrecy, cryptocurrencies and the blockchain technology that underpins them aspire to complete openness (see box, opposite page).

"Blockchains are tools for ultimate transparency and auditability, playing into the figurative concept of a glass bank, which dates back to the 1930s as a real idea," says Centre Director Professor William Knottenbelt (Computing). "In the same vein, this technology could be especially useful in the philanthropy sector as a way for donors to see exactly where their money is going and how it is being spent. You'd know whether you invested in a worthy project somewhere or helped to fund the CEO's car."

In fact, Dr Catherine Mulligan, Associate Director of the IC3RE, recently helped to prepare a report for the UK government exploring how distributed ledger technology can revolutionise services, both in public and the private sector. The IC3RE is also running a project looking at how distributed ledgers could make governments more transparent and bring citizens into the decision making process for tenders and contracts in order to reduce cost and potential for fraud.

"There are plenty of people thinking about these questions but it's actually less of a technology issue and more of a regulatory issue – there are still a lot of people who would resist this," says Catherine. "I for one though would love to



“I would love to record all of my financial transactions on the blockchain and just click a single button to send my tax return.”

record every single one of my financial transactions on the blockchain because then I could just click a single button to send my tax return!"

Genesis of an idea

Like many good ideas in the technology sector, the IC3RE started life over a cup of strong coffee. Will, who is Professor of Applied Quantitative Analysis in Imperial's Department of Computing, and Dyson Fellow Dr Rob Learney realised they shared a mutual interest in bitcoin and cryptocurrencies and hatched a plan to set up some pilot projects in the area. They also established the Imperial Bitcoin Forum as a way of bringing together interested parties across the College and put on a launch event with keynote speakers.

"We were really pleased with the response; we had people attending from Mathematics, Physics, the Business School, Bioengineering – all showing great enthusiasm. There was clearly potential to do more with this."

It was then that Dr Cathy Mulligan, an expert in telecommunications and a Business School Research Fellow,



(L-R) Dr Catherine Mulligan, Dr Rob Learney and Professor William Knottenbelt

was tempted back from a senior industry job to help Will and Rob formally set up the IC3RE, which officially launched in November 2015.

In its initial phase, the Centre received seed funding from both the Faculty of Engineering and Department of Computing and is now actively looking at funding sources in the private and public sectors – having recently secured a grant from the EPSRC, while awaiting outcomes on several EU Horizon 2020 bids.

With banks and financial institutions now getting involved in cryptocurrency start-ups in a big way (after initially being very wary), Will believes that there is great potential for Imperial in pursuing non-financial industry applications for blockchain technology.

“The advantage of being in an academic environment is that you’ve got the ability to take a wider look at the applications and consider those with a benefit to society rather than simply focusing on business efficiency and profit.”

Real-world value

Several projects running at the IC3RE have already caught the attention of the wider world with their innovative real-world applications for the blockchain and distributed ledgers.

For example, a team of third year Computing students has come up with an idea to verify academic qualifications using the transactional mechanisms inherent in the blockchain. The concept features custom QR codes which can be embedded in CVs for instant verification by employers and a Chrome browser extension for LinkedIn integration.

Will is particularly excited about the potential of another project that seeks to validate the authenticity of the products and components used in supply chains – something of great interest to many different industries from defence manufacturing to food.

The concept leverages the combined power of both blockchain and near-field communication (NFC) technology. NFC tags attached to products or packaging would be scanned every time a component or ingredient arrives at a point of

processing and that data would then be incorporated into the blockchain for perpetuity. The upshot is that anyone can scan the package to find out about all the ingredients or components and their history all the way back through the supply chain. An additional advantage is that regulatory authorities get a top down view of what’s going on across the entire ecosystem, as Will explains.

“If a consumer complains of becoming ill after eating a sandwich or salad, the regulator can very quickly trace it to say a contaminated batch of tomatoes and immediately alert every distributor or retailer who has scanned a product containing that ingredient,” says Will.

As well as individual projects like these, the Centre is carrying out more conventional academic research into the underpinning technology and protocols that make the blockchain and other distributed ledgers work. “There are so many weird and wonderful combinations of different types of consensus mechanism, different degrees of decentralisation and different kinds of cryptographic methods that you can use to secure the system. No one knows which of those is best in any particular scenario.”

Will sees the next five to ten years as the point at which the technology will really take off and begin to be deployed – and hopefully Imperial will have made a significant contribution. Although as with many truly transformative technologies, the best examples are likely to be the ones that we don’t notice and improve our quality of life in unobtrusive ways.



What is bitcoin and the blockchain?

Many people first heard about bitcoin and cryptocurrencies around the same time they heard of entities like the Dark Web and the Silk Road – which we were led believe were using bitcoins to trade all manner of illicit drugs and other contraband. This was computer money for web geeks and cyber criminals who were looking to bypass the rules and centralised control of traditional power bases such as banks and national mints.

That was also the first impression held by Dr Rob Learney, now Associate Director of Imperial’s Centre for Cryptocurrency Research and Engineering.

“It was around 2010 when I heard of bitcoin. At the time I was completing an MSc at Imperial in the very different field of Biomedical Engineering and just thought this is money you make yourself on the computer. But after the price spiked in around 2013 I read a bit more into it and realised that actually there’s a very cunning idea underlying all of it – a way for people who don’t trust each other to come to a common point of agreement, creating a consensus mechanism for something as powerful as currency. I wanted to know more and go deeper.”

The technology that underpins bitcoin and other cryptocurrencies is called the blockchain. It is in essence a public database; in the case of bitcoin a sort of accounts ledger that contains the entire transaction history of every bitcoin in circulation. There are many copies of the ledger distributed across nodes around the world and no single person or institution controls it. Changes to the blockchain, such as a simple payment, must go through several cryptographic ‘hash’ steps before they are added to the chain across all the different global nodes. Because of the hash, the process is irreversible and you can’t just tamper with a single node, as all must be in agreement.

Crucially, it doesn’t have to just involve monetary transactions – it can be used to issue ‘smart contracts’, which automatically enforce an agreement between two parties.

That is why many people are touting distributed ledger technologies as the ‘internet of value’.



From McDonald's to the DSI: My bitcoin experience

By Harry Pettit, MSc Science Communications

When I set out on a journey to find out more about cryptocurrencies, I hadn't envisioned myself meeting a complete stranger outside McDonald's on Camden High Street. For all of the misgivings I had in the lead up to our 'deal', Daniel looked entirely normal and shook my hand with a warm, friendly smile.

"Right, shall we head inside?"

We'd arranged the meet-up via popular trading website LocalBitcoins, where sellers post an ad with a price per bitcoin. The site has a traffic light system for reputation; Daniel boasted an excellent rating of 96% positive reviews. Yet my stomach tensed as I slid the cash across our small, plastic table.

I gave Daniel my 33-digit bitcoin 'wallet code' – a digital address that people can send bitcoins to – and he transferred the amount via a laptop he had brought with him. A poultry 0.165BTC (around £50) popped into my digital wallet almost instantly, which I was able to track via an app on my phone.

The transfer was done.

As we parted ways, I couldn't shake the feeling that the 'deal' had left me with far more questions than answers...



"I couldn't shake the feeling that the 'deal' had left me with far more questions than answers..."

A wall of 32 large computer screens, curved into a horseshoe in the centre of the room, looms before us. Reams of short lines dance complex geometric shapes across them, each representing a real-time bitcoin transaction somewhere in the world.

"The reason bitcoin works is that every transaction is public," Dan explains as my eyes gather in the tangle of data before me. "Transactions are organised into 'blocks' of data that are laid bare for everyone to see, a consensus can then be reached as to whether each transaction actually happened and this stops people claiming they sent bitcoin when they didn't."

The wall of screens splits into several segments, each looking at bitcoin trades in different ways.

"The point of the project was to shed light on new ways of reading intricate data," Dan explains, "we wanted to create patterns where you would otherwise have an illegible, Matrix-style stream of figures."

Each transaction is shown as a line between a 'buyer' and 'seller', with large traders sprouting multiple lines at a time across the globe. Visualisations such as these can reveal

which of these trades were 'human', and which trades were automated (via a computer programme) by the shapes they produce.

Defensive position

I'm drawn to one particular segment, in which thousands of small transaction lines twist and wind over one another into a serpentine, spinal column of data.

"This represents a massive spam attack on the bitcoin system that occurred last year," Dan reveals. "It's attacks like this, in which a lot of money can be lost, that serve to undermine the currency's awesome potential."

The bitcoin system is limited to three to seven transactions per second – low compared to other financial systems. If you create an algorithm to overload the system, then the whole thing breaks down and transactions can take 12–14 hours to complete. This gives the attackers a perfect window to help themselves to bitcoins in digital wallets with weak passwords.

Using data visualisation systems such as Dan's, we can compare attacks like this to 'normal' trades and spot key visual differences.

Yet despite attacks such as these, Dan is optimistic.

"I truly believe that cryptocurrencies like bitcoin are the future of economics."

Seeing is believing

A couple of weeks later I visited Imperial's Data Science Institute, housing one of the most advanced data visualisation platforms in the world – which, amongst many other applications, is being used to navigate the digital labyrinth of bitcoin transactions.

Imperial graduate Dan McGinn, who masterminded the project during his MSc in Computing Science last year, showed me around.

"Bitcoin has really gathered pace, with even big companies like Microsoft trading in it," he explains as we enter the demo room. "It's decentralised, there are no bank charges; it's the first truly global currency."



A public tour of the DSI facilities during the recent Imperial fringe exhibition, 'Cities of the future'

inside*

story

mini profile

Séverine Maréchal

Research Associate Séverine Maréchal works at the Centre for Transport Study (CTS) based in the Department of Civil and Environmental Engineering. She has also been a Graduate Teaching Assistant for different courses in the Department.

Tell me about your research

Four million people travel on the Tube every day alone, and I'm investigating the link between how commuters look at travel information, and how this affects their travel decisions during disruption, particularly on their commute in Greater London. There's a variety of sources out there from companies bringing travel information to the public, but we don't know how the travellers use these to make decisions.

It's perhaps bit unexpected to find this research in this Department, but it really fits here. By determining peoples' preference parameters, travel behaviour can be modelled in such a way as to help predict the future of travel demand and plan for the needs of network, roadways, and public transport capacity.

You recently submitted a prize-winning research paper. What were some of the major findings?

I have identified many factors influencing the type of



information source a commuter consults during travel disruptions. The demographics, commute complexity, and level of information-gathering experience play a substantial role in the final travel route. I found that education level and age have a significant effect on the choice of information source. For instance, well-educated commuters are more likely to use Google Maps, but less likely to check it alongside phone apps. For this work I won the SMEED Prize at the Annual University Transport Studies Group (UTSG) Conference.

What next for you?

I'm still exploring possibilities to develop my research further. There's all this new technology that I want to look at, and take into account new ways of looking for travel information. What will come after smartphones? Google glass? Who knows?

—MELANIE HARGREAVES, CIVIL AND ENVIRONMENTAL ENGINEERING



MP spends a day in the life of a scientist at Imperial

Victoria Borwick MP took a walk in the shoes of an Imperial academic last month as part of the Royal Society's pairing scheme for scientists and MPs.

Ms Borwick, MP for Kensington, paired up with Sian Harding, Professor of Cardiac Pharmacology (National Heart & Lung Institute) for the scheme, which aims to build bridges between parliamentarians and some of the UK's leading scientists.

During her time shadowing Professor Harding, Ms Borwick spent time with a multidisciplinary team of researchers and clinicians who are working to solve problems of heart rhythm disturbances.

As part of the visit, she donned a lab coat and took part in a hands-on experiment, observing the effects of cardiac stimulants on a single heart cell to understand the way that they disrupt heart rhythm.

The local MP also had the chance to meet with Imperial students and young researchers to hear their ideas and concerns.

Ms Borwick said: "It's a great honour to be MP for area which includes a world leading institution.

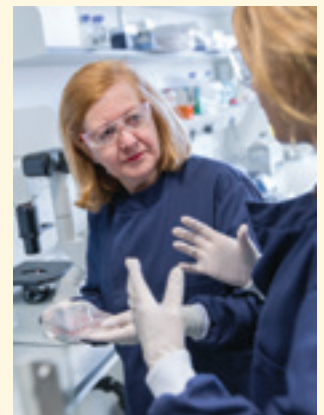
"If I'm to truly promote the area that I represent it's really important that I understand what's going on within it. You can't talk about something you know nothing about."

The visit comes after Professor Harding spent a week in Westminster shadowing Ms Borwick in November last year.

Professor Sian Harding said: "It has been very enlightening and eye-opening to understand more about the pressure and scrutiny that MPs are under. I feel that we have gained a true understanding of each other's work during the reciprocal shadowing visits, and that this will be the basis for a really helpful partnership into the future.

"One unexpected thing I discovered was how much science there is in the parliamentary process. The Government and Parliamentary Offices of Science and Technology, and institutions such as the National Physical Laboratory and the UK Stem Cell Bank have many talented scientists doing exciting, rigorous science. We tend to think that the work they're doing is routine, but actually that's not true. There are a lot of opportunities there to make a difference."

—DEBORAH EVANSON, COMMUNICATIONS AND PUBLIC AFFAIRS



From Hong Kong to the City of London via Imperial

Student Bryan Liu has been recognized for his computing prowess by a trade association that has roots in the middle ages.

“My Imperial journey started when I was at high school in Hong Kong and had the chance to come over to London to attend a two-week Space Science Summer School hosted at the College. It included mini courses and projects in robotics and maths – for example looking at autonomous control in the context of robotic space exploration. I was really inspired by the impact that the academic study of maths and other subjects can have.

I’m now in my fourth year of a joint Mathematics and Computer Science MEng degree; it is extremely tough and extremely time-demanding but immensely rewarding.

When I first found out that I’d won the Outstanding Student Prize from the Worshipful Company of Information Technologists (WCITs) I didn’t know much about this strange and archaic-sounding organisation. I was surprised to find that the Livery Companies of the City of London (of which WCIT is one) date back to around 1515. Some are granted charters



(L–R): Master: Alderman Sir David Wootton, Bryan Liu, Master educator John Leighfield CBE

and other freeman privileges – for example The Worshipful Company of Woolmen were granted the right to transport sheep across Tower Bridge!

The award from WCIT recognises academic achievement; volunteering work and entrepreneurial activity. I think the latter category is especially important to the organisation given its enterprising roots – and also when you consider the list of WCIT members which includes internet



“ We developed a web app that delivers a count down timer telling you when the tube is actually coming in real time.”

pioneer Sir Tim Berners-Lee and Microsoft founder Bill Gates. While I haven’t achieved anything close to those computing giants I was recently involved in a hackathon competition whilst completing a summer internship at Bloomberg.

We were tasked with coming up with software solutions using publicly available datasets and decided to focus on Transport for London (TfL), which publishes real-time data on arrivals and delays. Our basic premise was that status updates often aren’t actually up to date. So we developed a web app that grabs the data and displays it to deliver a very nice second-by-second count-down timer telling you when the tube is actually coming in real time. Our aim was to count down from 1 minute 20 seconds. In the end we successfully demonstrated it on multiple occasions.”



Student blogger Lorna: Life and death

“So this week the biggest challenge was being confronted with death. Sounds strange, but I hadn’t expected it that morning, so I was hit hard.

Of course I’ve seen death before in medical school – the cadavers we use for dissection, old patients on the ward who pass away quietly in their sleep and death certification. This however was different as it was unexpected – someone younger who yesterday was walking around fine, then suddenly today they have gone. It wasn’t predicted or even suspected.

Other than the suddenness of it all, I was also struck by the sadness as the team slowly realised they had done all they possibly could but that it simply wasn’t enough.

Later in the week I watched the post-mortem of the patient (every unexpected or unexplained death has to be investigated by the coroner). It was very humbling to reflect on the fragility of life and realise how much I take the air I breath, the beating of my heart and the perfusion of my brain for granted.”

More from Lorna and our other student bloggers: www.imperial.ac.uk/utills/sites/studentblogs/

All set for a fabulous fifth Imperial Festival

Imperial Festival returns on the weekend of 7–8 May to celebrate the College’s world-leading research alongside music, dance and more.

The highlight of this year’s Festival is a new Transport Zone, which will recreate London’s very first motor show exactly 120 years after it kick-started Britain’s motor industry. Bringing together a unique collection of ‘horseless carriages’, the exhibition will include some of the earliest motor cars, powered by steam, electricity and petrol.

As part of the Zone visitors will also have the opportunity to witness the spectacle of Victorian motoring on the roads of South Kensington, before exploring Imperial’s cutting edge research into the future of transport.

The Festival will also see the launch of a range of new, cutting-edge research from Imperial (see boxes).

Festival Director, Katie Weeks (Advancement), said, “The Imperial Festival is the one weekend a year where we put on our ‘exhibition’, throwing our doors open and giving the public an opportunity to go behind-the-scenes and explore some of the ground-breaking



research that takes place here.

“With over 500 researchers showcasing their work and many opening their labs and facilities to the public exclusively for the Festival, this year’s event is set to be the biggest and most exciting yet.”

Katie urges visitors to join the conversation on social media via the hashtag #impfest by sharing their favourite photos over the weekend.

—KERRY NOBLE, COMMUNICATIONS AND PUBLIC AFFAIRS

Support the Festival by registering for a volunteer role: bit.ly/Impfest-help

★ FESTIVAL SNEAK PEEK ★

Work and play

A group of Imperial researchers have introduced a new Science Toy Award to recognise those manufacturers whose toys trigger curiosity and research skills in primary school children. This award, supported by the Institute of Physics, and the British Science Association and the Science Museum, will be launched at the Festival, alongside a toy testing zone for kids to help the judges decide on the winners.



Feel the beat

Earlier this year the Royal College of Music showed that choir-singing boosts the immune system of cancer patients, and group drumming could reduce both depression and anxiety. Now, Professor Aaron Williamson (Surgery and Cancer) is exploring how music affects the behaviour of the general public; visitors to the Festival will take part in a real-time experiment, listening to either rock or classical music while playing board games.



“We hope that this collection proves to be as beneficial to the students at LKCMedicine as our museum collection is to the students in London.”

Precious gifts of learning

Medical students in Singapore have received a gift of a most unusual kind: human pathology and anatomy specimens, donated by Imperial’s Pathology Museum.

The Museum has gifted more than 180 human anatomical and pathological specimens to the Lee Kong Chian School of Medicine (LKCMedicine) in Singapore to benefit medical education there.

Each carefully wrapped in protective film, the specimens are surgical resections and post-mortem specimens from the collections of Imperial’s former constituent medical schools – making donation a unique logistical challenge.

The recipient, LKCMedicine, opened as a collaboration between Singapore’s Nanyang Technological University and Imperial in 2013, and the gifted specimens will be housed in a new building at LKCMedicine’s Novena campus, establishing the School’s own collection.

LKCMedicine provides its students the very latest learning technology, including an Anatomage Table which displays life-sized 3D images of full body anatomy. Anatomical specimens, however, have been studied for medical knowledge for hundreds of years, and this donation will supplement the modern anatomy resources available.

Dr Mike Barrett, Head of Learning Resources in Imperial’s School of Medicine, said: “It has been a big undertaking, cataloguing and packing the specimens, but with the great support of the Human Anatomy Unit, we waved the specimens off at the beginning of March. LKCMedicine laboratory assistant manager Darren Lim received them in Singapore and is now organising for them to be re-potted into brand new display cases ready to be put on view.”

—BEN CAMPION, FACULTY OF MEDICINE CENTRE

obituaries



JANE PLANT

Jane Plant, Emeritus Professor of Applied Geochemistry at the Department of Earth Science and Engineering, died on 4 March 2016, aged 71 years. Her colleague Dr Nick Voulvoulis (Centre for Environmental Policy) pays tribute.

As one of Britain's most distinguished scientists, Professor Jane Plant served as a Chief Scientist at the British Geological Survey and was the first female President of the Institute of Mining and Metallurgy. A member of the Royal Commission on Environmental Pollution, Jane chaired the UK government's Advisory Committee on Hazardous Substances and Chemical Stakeholder Forum, and was made a Fellow of the Royal Society of Edinburgh and the Royal Academy of Engineering. In 1997 she was awarded a CBE for services to science.

Being an international expert on chemicals in the environment, especially naturally occurring radionuclides such as uranium and the trace elements arsenic and selenium, she was recognised as one of the leading geochemists in the world. She developed the BGS Geochemical Baseline of the Environment (G-BASE) programme, a high resolution baseline geochemical dataset with many applications of

economic, environmental and social benefit for the UK – methods that have been adopted and adapted around the globe as standard for undertaking geochemical surveys.

Jane's legacy extended beyond her scientific outputs – her leadership, with a firm commitment to creating and supporting opportunities for the development and progression of early-career scientists, also made a lasting impact. Having battled numerous recurrences of breast cancer over a 30 year period, Jane became a vocal advocate, writing about her own experiences and giving dietary tips for other sufferers in blogs and published books. Since 2003, Jane worked at both the Centre for Environmental Policy and the Department of Earth Sciences at Imperial. Her outstanding work on reducing risks from hazardous substances, both to human health and the environment, and her nurturing personality, have had a major impact on the development of numerous students and staff in both departments.

Jane was a generous, caring, and passionate individual, and a great mentor to many of us. She was an inspiring woman and an exceptional role model, and her contribution to so many different disciplines has been remarkable.

long service

Staff featured in this column have given many years of service to the College. Staff listed celebrate anniversaries during the period 1 February – 31 March 2016. The data are supplied by HR and correct at the time of going to press.

20 years

- Professor Alessandro Astolfi, Professor of Non-Linear Control Theory, Electrical and Electronic Engineering
- Dr Peter Bain, Reader in Clinical Neurological Medicine, Medicine
- Professor Nicky Best, Visiting Professor, School of Public Health
- Professor Paul Farrell, Professor of Tumour Virology, Medicine
- Damien Finucane, Assistant Chef de Partie, Catering Services
- Professor Frances Gotch, Emeritus Professor of Immunology, Medicine
- Leroy Grey, Technician, Mechanical Engineering
- Professor Mark Griffiths, Professor of Critical Care Medicine, National Heart & Lung Institute
- Professor Eric Lam, Professor of Molecular Oncology, Medicine
- Kenneth Legg, HIV Research Manager, Medicine
- Professor Armand Leroi, Professor of Evolutionary Developmental Biology, Centre for Environmental Policy
- Dr Pasquale Malacaria, Visiting Researcher, Institute for Security Science & Technology
- Professor David Miles, Professor of Financial Economics, Business School

- Rosemond Nyarko, HR Adviser, Natural Sciences
- Kieran O'Dea, Senior Research Fellow, Surgery & Cancer
- Alidz Pambakian, Honorary Clinical Senior Lecturer, Faculty of Medicine Centre
- Elizabeth Sullivan, Deputy Practice Manager, Health Centre
- Professor Lidija Zdravkovic, Professor of Computational Geomechanics, Civil and Environmental Engineering

30 years

- Dr Jane Cox, Honorary Lecturer, Surgery & Cancer
- Richard Dickins, Director of Music and the Blyth Centre, Education Office
- Professor Sophia Drossopoulou, Professor of Programming Languages, Computing
- Doris Pappoe, Postgraduate Administrator, Chemistry
- Silvana Zappacosta, Database Coordinator/Tutorial Support Coordinator, Computing,

40 years

- Professor Morris Sloman, Professor of Distributed Systems Management, Computing

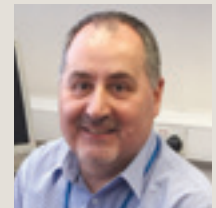
SPOTLIGHT

Kenneth Legg, HIV Research Manager, Medicine
20 years

I started as an HIV research nurse at St Mary's Medical School in 1996 before it became part of Imperial – joining a team of three other nurses and one nurse manager who have all now moved on. In around 1998, I became manager and have been in the role since then. We currently have a team of eight research nurses, two clinical trials assistants and a senior research nurse.

In the early days, to set up a clinical trial we typed out two forms and submitted one to the ethics committee and one to the Medicines and Healthcare Products Regulatory Agency (MHRA) and once they approved it we could start the trial. But the system has grown ever more complex with national, regional and local approval needed. Every stakeholder involved in the study has to give their approval and only once they are all in place can a trial start. Things are now changing again to the new Health Research Authority (HRA) system which in theory will speed the process up.

Over the years there have been many staff who have come and gone but they have all made a great contribution to the improvement in HIV treatment and the search for an effective HIV vaccine.



Welcome

new starters

Mr Kyrillos-Fokion Adesina-Georgiadis, Surgery & Cancer
 Ms Yvonne Aftyka, Clinical Science
 Dr Ehsan Ahmad, Chemistry
 Dr Adam Ainley, NHLI
 Dr Osama Albazde, Surgery & Cancer
 Dr Andrew Aldersley, Life Sciences (Silwood Park)
 Miss Rheeda Ali, NHLI
 Dr Julio Amador Diaz Lopez, Business School
 Dr Elsa Angelini, Surgery & Cancer
 Mr Santosh Atanur, Medicine
 Miss Isabel Baker, Medicine
 Dr Artem Bakulin, Chemistry
 Mr Dimitrios Batsalas, Faculty of Engineering
 Dr Werner Bauer, Mathematics
 Miss Rhiannon Beard, Chemistry
 Miss Asta Beisyte, Residential Services
 Miss Lucy Bell, NHLI
 Mr Yuri Beltrikov, ICT
 Miss Nadia Ben Meriem, Public Health
 Mr Clinton Bennett, Estates Division
 Mr Sanjay Bilakhia, Computing
 Dr Louise Blakemore, NHLI
 Ms Renee Boling, Student Recruitment & Outreach
 Mr Christopher Booth, Civil and Environmental Engineering
 Dr Johan Borg, Physics
 Mr Pierre Boufflet, Chemistry
 Mrs Nikki Boyd, School of Professional Development
 Miss Anna-Rita Boydell, Surgery & Cancer
 Ms Claire Brewer, ICT
 Dr Lucy Brooks, Clinical Science
 Ms Rachel Burrell-Murphy, Education Office
 Ms Godhuli Chaudhuri, Design Engineering
 Dr Max Chen, Medicine
 Dr Sung Chin, Surgery & Cancer
 Dr Paul Christie, Faculty of Medicine Centre
 Mr Athanasios Christodoulas, Mechanical Engineering
 Dr Simone Claudiani, Medicine
 Miss Laura Coates, Surgery & Cancer
 Mr Colin Cottle, Estates Division
 Miss Winifred Coyne, Estates Division
 Miss Emma Curties, Business School
 Mr Isaac Day Weber, Medicine
 Mr Marco De Corato, Chemical Engineering
 Dr Maneka De Silva, Public Health
 Dr Tiziana Denaro, Chemistry
 Mr Robert Denning, Physics
 Ms Serena Ding, Clinical Science
 Dr Sarah Dodd, ESE
 Ms Anne Dooley, Residential Services
 Mr Mouhamed Drabo, Life Sciences (Silwood Park)
 Mr Richard Drea, Estates Division
 Miss Kimberley Dunk, Advancement
 Mr Patrick Dunne, Physics
 Dr Sarah Dwyer, NHLI
 Miss Caitlin Dyde, Finance
 Miss Somaya Ebrahim, Business School
 Mr Alwyn Elliott, EEE
 Miss Ana Fajardo Puerta, Surgery & Cancer
 Dr Rhys Farrer, Public Health
 Dr Giulia Fiorani, Chemistry
 Mr Shane Fleming, EEE
 Mr Jonathan Fletcher, Finance
 Dr Gregory Forrest, Materials
 Mr Zafeirios Fountas, Computing

Miss Zoe Frazer, Surgery & Cancer
 Miss Christina Gatsiou, Chemical Engineering
 Dr Lubna Ghani, Faculty of Medicine Centre
 Dr Imogen Gingell, Physics
 Miss Emelia Gobbe, College Headquarters
 Mr Lee Greatorex, ICT
 Mr Alastair Gregory, Mathematics
 Mr Grigorios Grigoriadis, Bioengineering
 Dr Carol Halsall, ESE
 Mr Francisco Hernandez Heras, Bioengineering
 Mr Antonio Hewitt, Security Services
 Ms Elizabeth Hollenberg, Public Health
 Dr Sam Hughes, Surgery & Cancer
 Dr Michael Hurley, Public Health
 Miss Yvette Ighorue, Medicine
 Miss Natalie Ilsley, ICU
 Ms Natsuko Imai, Public Health
 Dr Michelle Jackson, Life Sciences (Silwood Park)
 Miss Fran Jackson, Surgery & Cancer
 Ms Amie Jaye, Life Sciences
 Professor Nick Jennings, College Headquarters
 Dr Kathryn Jones, Public Health
 Miss Lisa Joss, Chemical Engineering
 Mr Martin Kaiser, Chemistry
 Mrs Katerina Kanteraki, Research Office
 Dr Artem Kashubin, Mechanical Engineering
 Dr Zoltan Kekecs, Surgery & Cancer
 Professor Paul Kellam, Medicine
 Miss Rachel Kerr, Surgery & Cancer
 Mr Jemil Kewfi, Estates Division
 Mr Mustafa Khanbhai, Surgery & Cancer
 Dr Shirin Khanjani, Surgery & Cancer
 Mr Torben Kimhofer, Surgery & Cancer
 Mrs Peta-Ann King, Faculty of Medicine Centre
 Dr Chrysoula Konstantinidou, Medicine
 Mr Benjamin Krikler, Physics
 Mrs Valentina Kskhafa, Faculty of Medicine Centre
 Mr An La, ICT
 Mr Keith Lacey, Mechanical Engineering
 Dr Sara Lamas Oliveira Marques, Life Sciences
 Miss Pui Law, Medicine
 Dr James Lawrence, Civil and Environmental Engineering
 Miss Wei Lee, Chemical Engineering
 Miss Claudia Leiba, Registry
 Miss Kate Lewis, Faculty of Natural Sciences
 Dr Reuben Litchfield, Physics
 Dr Alejandro Lopez Lopez, Life Sciences (Silwood Park)
 Dr Toby Maher, NHLI
 Miss Severine Marechal, Civil and Environmental Engineering
 Mr Matt Martys, Education Office
 Mr Giovanni Matrone, Materials
 Mr Scott McCracken, Library
 Mr Dan McGinn, Computing
 Mr Stefans Mezulis, Life Sciences
 Mrs Ausra Mieliauskaitė Rodrigues, Catering Services
 Mr Matt Moderate, Health and Safety
 Mr Rabih Mohsen, Computing
 Miss Shorok Mombrikotb, Life Sciences
 Mr Luigi Montibeller, Medicine
 Mr John Murphy, Physics
 Dr Aiman Nazki, Chemical Engineering
 Ms Thuy-Tien Nguyen, Physics
 Dr Ali Niknejad, Civil and Environmental Engineering

Mrs Lydia Noa, NHLI
 Ms Iro Ntonia, School of Professional Development
 Ms Ronke Ogundipe, Catering Services
 Ms Sophie Oliver-Styller, Medicine
 Dr David Owen, Medicine
 Mrs Sharon Palmer, Faculty of Medicine Centre
 Dr Andres Parra Puerto, Chemistry
 Ms Ksenija Parsikova, Mathematics
 Mr Mihajlo Pavloski, EEE
 Dr Monika Pazio, School of Professional Development
 Mr Iskren Peev, Residential Services
 Dr Francesca Pietra, Enterprise
 Mrs Maria Piggini, Public Health
 Dr Richard Pinder, Public Health
 Miss Dilkushi Poovendran, Surgery & Cancer
 Mr Dan Poulton, Student Recruitment & Outreach
 Dr Franz Puttur, NHLI
 Dr Mousumi Rahman, Public Health
 Mrs Baldeesh Rai, Medicine
 Ms Nikita Rajani, Public Health
 Dr Sumesh Raman Kureppadathu, Chemistry
 Mrs Sarah Ranchev-Hale, Business School
 Ms Mia Roberts, Advancement
 Dr Oliver Robinson, Public Health
 Mr Fernando Sanchez-Roman Teran, Life Sciences
 Dr Matthew Saunders, Medicine
 Mr Linus Schumacher, Life Sciences
 Dr Richard Sequeira, Medicine
 Dr Gilberto Serrano de Almeida, Surgery & Cancer
 Miss Nisha Shah, Surgery & Cancer
 Dr Fariya Sharmeen, Civil and Environmental Engineering
 Dr Amiral Shirazibeheshti, EEE
 Mr Alessio Signoriello, Catering Services
 Mr Jamie Silman, Catering Services
 Mrs Carla Siniscalchi, Life Sciences
 Mr Patrick Snape, Computing
 Dr Mohamed Somai, Public Health
 Dr Hugh Sparks, Physics
 Mr Ecco Staller, Medicine
 Mr Nicholas Stuart, Physics
 Dr Milena Studic, Civil and Environmental Engineering
 Mr Nerijus Sukuris, Catering Services
 Mr Steven Swan, Life Sciences
 Miss Anthea Thipaharan, Medicine
 Mr Paul Thomson, Computing
 Miss Emma Titchen, Registry
 Dr Fani Tsitouroudi, Bioengineering
 Dr Grigoris Tsolkas, Bioengineering
 Dr Sina Tureli, Mathematics
 Mr Daniel Walke, Physics
 Dr Dominic Walker, Library
 Dr Christina Warboys, Bioengineering
 Mr Isaac Weber, Medicine
 Miss Lazenya Weekes, Public Health
 Ms Lauren Welch, Advancement
 Miss Claire Weston, Chemistry
 Dr Luke Whiley, Surgery & Cancer
 Miss Gemma Wicks, Advancement
 Mr Anatole Wiik, Surgery & Cancer
 Ms Angela Williams, Estates Division
 Ms Sue Williams, Education Office
 Dr Fuzhou Ye, Medicine
 Dr Sladana Zagorac, Surgery & Cancer

✉ 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.

This data is supplied by HR and covers staff joining the College during the period 14 March – 22 April 2016. This data was correct at the time of going to press.

Farewell

moving on

Dr Lucy Abrahams, Public Health
 Ms Tomike Adenekan, Finance
 Miss Adulis Afowerki, Life Sciences
 Dr Sriranganath Akavarapu, Medicine
 Dr Amin Alamshah, Medicine
 Mr Jemelle Alexander, ICT
 Dr Rehiana Ali, Medicine
 Dr Athanasios Angelis-Dimakis, Centre for Environmental Policy
 Miss Anna Antoniou, Materials
 Dr Hussain Anwar, Physics
 Dr Jeffrey Armstrong, Chemistry
 Dr Perviz Asaria, Public Health (5 years)
 Dr Shahid Ashraf, Chemistry (6 years)
 Mr Dimitrios Athanasiou, Bioengineering
 Dr Elisabetta Aurino, Public Health
 Dr Helene Autefage, Materials (6 years)
 Ms Rani Badhan, NHLI
 Dr Jayashree Bagchi Chakraborty, Medicine
 Mr Carlo Bagnato, Bioengineering
 Dr Jamie Banks, Physics (5 years)
 Dr Toby Basey-Fisher, Materials
 Professor Carol Baxter, Public Health
 Dr Francesco Benini, Physics
 Emeritus Professor Peter Beverley, NHLI
 Dr Amy Birch, Bioengineering
 Dr Ariadna Blanca Romero, Chemistry
 Dr Julius Bonart, Mathematics
 Dr Matteo Bonini, NHLI
 Dr Simon Brill, NHLI
 Dr Matthew Brown, Bioengineering
 Mrs Jennifer Brown, Estates Division
 Dr Daniel Bryant, Chemistry
 Miss Ashley Campbell, Surgery & Cancer
 Miss Rebecca Cavallaro, Surgery & Cancer
 Dr Fatima Chami, Chemistry
 Mr Jake Clements, Public Health
 Miss Laura Coates, Surgery & Cancer
 Dr Xavier Companyo Montaner, Chemistry
 Dr Joanna Cook, Surgery & Cancer
 Mr Charles Cotton, Life Sciences
 Dr Yuefeng Cui, Aeronautics
 Mr Timothy D'Alessandri, Medicine
 Miss Angela de Manzanos Guinot, Chemistry
 Dr Angela Del Giudice, Medicine
 Mr Clement Doire, EEE
 Dr Moez Draief, EEE (9 years)
 Dr Ignacio Duran, Aeronautics
 Miss Zoe Durrant, Registry
 Dr Abdulkadir Farah, Physics
 Ms Ornella Forte, Chemical Engineering
 Ms Eftychia Fotiadou, Computing
 Mr Simon Fraser-Attewell, ICT
 Dr Gemma Freeman, Chemistry
 Mr Enrico Fuschi, Catering Services
 Mr Iain Gardiner, Public Health (5 years)
 Miss Alice Gautreau, Surgery & Cancer
 Ms Tian Geng, Life Sciences
 Dr Marie-Odile Gerval, Surgery & Cancer

Dr James Glover, Mechanical Engineering
 Dr Ana Gomes, Surgery & Cancer
 Miss Victoria Gould, Medicine
 Mr Carlos Hahn Borrego, ICT
 Miss Camilla Halewood, Mechanical Engineering (5 years)
 Ms Erika Helms, International Relations Office
 Dr Quentin Herreros, Mechanical Engineering
 Mrs Julia Hetherington, Faculty of Medicine Centre (7 years)
 Mr Peter Hill, Clinical Science
 Mr Darren Holdaway, ICT
 Ms Bryony Hooper, Central Secretariat
 Dr Simon Hu, Civil and Environmental Engineering
 Dr Jony Hudson, Physics (13 years)
 Dr Michael Hurley, Medicine
 Mr Stanislav Ivanov, Catering Services
 Mr Miroslav Janatka, Computing
 Mr Vipul Jindal, College Headquarters
 Mr Gareth Jones, Surgery & Cancer
 Dr Peter Jourdan, Public Health
 Dr Christos Kamperidis, Physics
 Miss Niovi Karathodorou, Civil and Environmental Engineering
 Ms Abiola Kazeem, Advancement
 Miss Natasha Kerr, Business School
 Miss Nawal Kinany, Bioengineering
 Mrs Emily Kinchin, NHLI
 Dr Dominic King, Surgery & Cancer (7 years)
 Mr Harry Kkoufou, Public Health
 Miss Sarah Knox, Estates Division (6 years)
 Mr Nicolas Kyllilis, Medicine
 Dr Anne Laybourne, Public Health
 Dr Fanny Lebosse, Surgery & Cancer
 Miss Josephine Lewis, ICT
 Dr Bo Lindberg, Life Sciences
 Mr Andrew Machen, EEE
 Mr Fernando Madrazo Aguirre, Civil and Environmental Engineering
 Dr Lea Maitre, Surgery & Cancer
 Dr Julia Makinde, Medicine
 Dr Victoria Manning, Surgery & Cancer
 Mr Stuart Marchant, Mechanical Engineering (5 years)
 Dr Kazunobu Maruyoshi, Physics
 Dr Richard Matthewman, ESE
 Mr Joshua Mayers, Chemical Engineering
 Miss Elizabeth McCormack, Estates Division
 Mrs Erika McGovern, Faculty of Medicine Centre (10 years)
 Dr Victoria Militis, Medicine
 Mrs Marie Miller, Surgery & Cancer (12 years)
 Miss Katerina Misthou, Public Health
 Dr Luke Moore, Medicine
 Dr Anastasia Mylona, Medicine
 Miss Lenka Navratilova, NHLI
 Miss Hanna Nicholas, Surgery & Cancer
 Dr Christian Nielsen, Chemistry (5 years)
 Dr Hongxing Niu, Chemical Engineering
 Mr Andreas Nold, Chemical Engineering
 Mr Richard Oberdieck, Computing
 Dr Kerry O'Donnolly Weaver, Chemistry
 Dr Patrick Owen, Physics
 Ms Grace P J A Williams, Medicine
 Dr Ioannis Pandis, Computing
 Mr Theodoros Papadopoulos, ESE
 Mrs Virginie Papadopoulou, Medicine
 Dr Jeremy Parker, NHLI

Dr Yasmin Pasha, Surgery & Cancer
 Dr Monica Patel, Chemistry
 Dr George Pelios, NHLI
 Dr Bharat Penumathsa, Chemical Engineering
 Dr Remi Peyronnet, NHLI
 Miss Tegan Pickles, Sport and Leisure
 Dr Franze Progatzy, Life Sciences
 Dr Bethan Psaila, Medicine
 Dr Aikaterini Pylarinou, Centre for Environmental Policy
 Dr Neela Rambaruth, Life Sciences
 Ms Lindsay Ramsbottom, Faculty of Medicine Centre (11 years)
 Miss Monika Rancovaite, Catering Services
 Miss Priya Raniga, Surgery & Cancer
 Miss Ann-Kathrin Reuschl, NHLI
 Miss Susana Ricardo Vitorino, Surgery & Cancer
 Dr Charles Riviere, Surgery & Cancer
 Dr Neesha Rockwood, Medicine
 Ms Lisa Rose, Business School
 Dr Fouzia Sadiq, Surgery & Cancer
 Miss Jonata Sakalauskaite, Catering Services
 Ms Renata Samulnik, Surgery & Cancer
 Dr Natalie Sanders, Life Sciences (Silwood Park)
 Dr Pauline Scheelbeek, Civil and Environmental Engineering
 Mrs Urvi Shah, Surgery & Cancer (5 years)
 Dr Yuri Shitov, Physics (9 years)
 Mrs Deborah Shorley, College Headquarters
 Dr Caroline Small, Medicine
 Dr Paul Stavrinou, Physics (18 years)
 Miss Lauren Stephens, Medicine
 Dr Roland Stumpf, ESE
 Ms Maria Symeonaki, Surgery & Cancer
 Dr Jonathan Tandy, Physics
 Dr Stephen Tate, Chemical Engineering
 Dr Matthew Taylor, Physics
 Dr Serena Tommasini Ghelfi, Surgery & Cancer
 Dr Matthias Van Ginneken, ESE
 Mr Jonas Van Hove, Business School
 Dr Dennis Veselkov, Surgery & Cancer
 Dr Sann Wai, Surgery & Cancer
 Mrs Sue Webb, Registry
 Miss Ke Wen, Medicine
 Miss Jennifer Wilson, Research Office
 Dr Ernie Wong, NHLI
 Dr Zhentao Wu, Chemical Engineering (9 years)
 Dr Hua Zhang, Surgery & Cancer

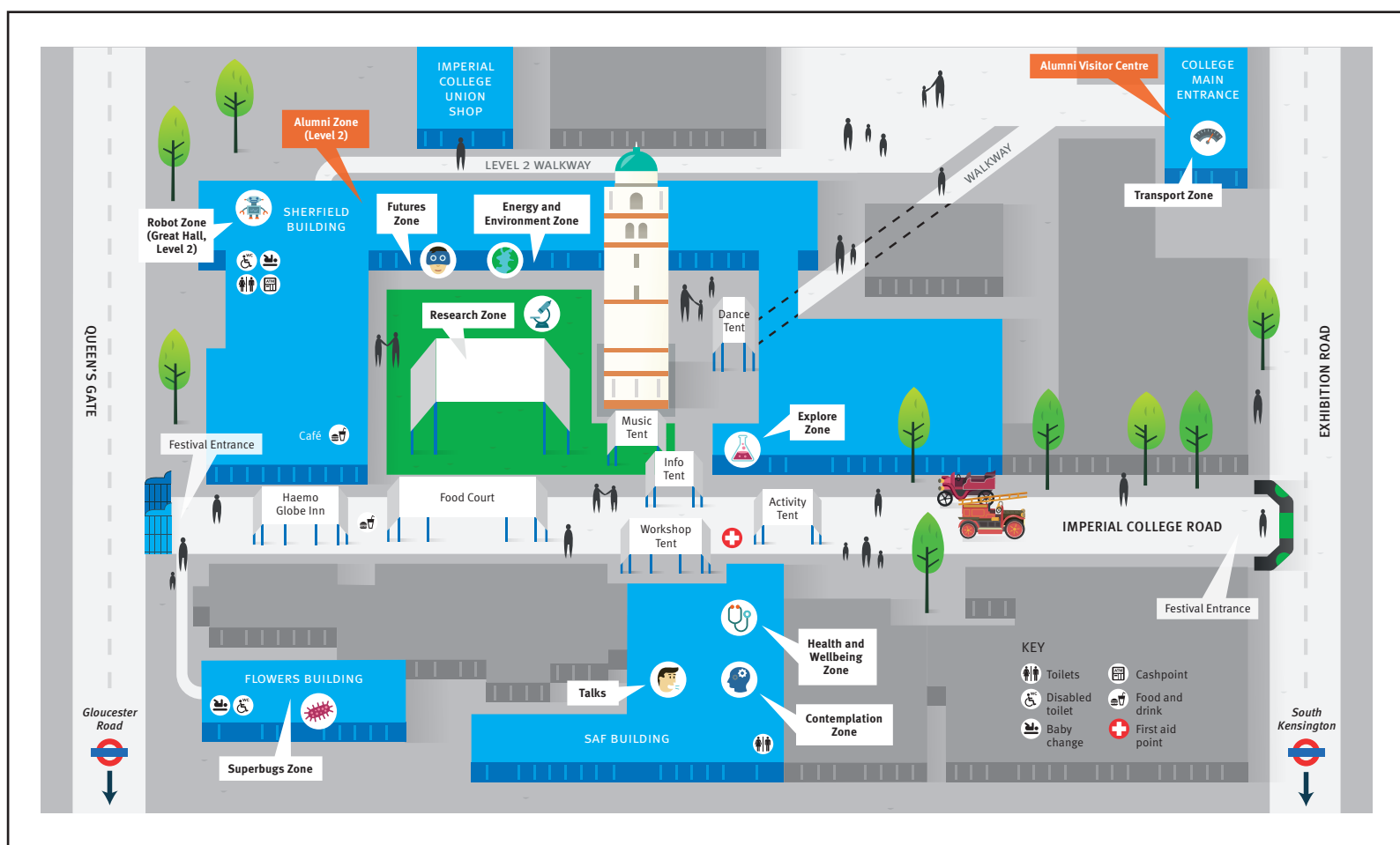
Retirement

Mr David Allman, Education Office (19 years)
 Professor Andrew Amis, Mechanical Engineering (36 years)
 Ms Lynda Chandler, Registry
 Mr Kenneth Emmett, Catering Services (6 years)
 Mr Stephen Maine, Physics (7 years)
 Professor Sunil Shaunak, Medicine (24 years)
 Mr Chris Sisson, Mathematics (12 years)
 Professor Sue Smith, NHLI (31 years)
 Professor Nina Thornhill, Chemical Engineering (8 years)
 Mr David Williams, EEE (26 years)

IMPERIAL FESTIVAL

SAT 7 MAY 12.00–18.00 | SUN 8 MAY 12.00–17.00

Explore the unexpected side of science with a weekend full of hands-on research activities, talks, music and dance for all ages



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