

EXON

THE EXETER COLLEGE MAGAZINE ISSUE 21 AUTUMN 2018
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Face the future

Exploring innovation in a time of ever-accelerating change

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with news and
political events

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solutions to the
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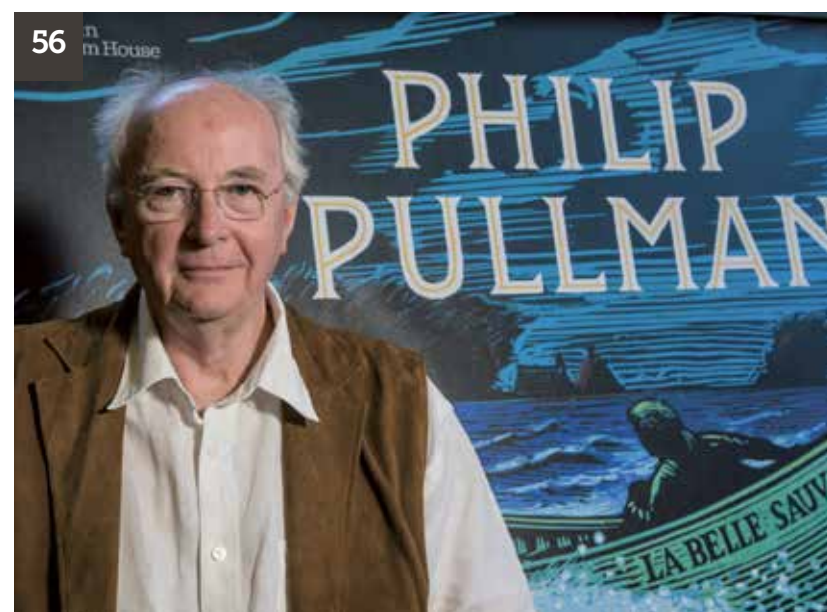
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Editorial

The new Health Secretary, Matt Hancock, points out in this edition of *Exon* that people talk about accelerating change, but one can look at it the other way round: we are currently living through the slowest rate of change that we are going to experience for the rest of our lives. What a thought! Both exciting and intimidating.

This year's *Exon* explores some of the demands and technologies driving change as we focus on the theme of innovation. Matt Hancock considers digital technologies and the future of jobs; Robert Moore, ITV News Washington Correspondent, discusses modern journalism; Akshat Rathi, science, energy and environment reporter for *Quartz*, uncovers some potential solutions to the world's energy and global warming crises; Jean Kitson, director at Kitson Press Associates, champions the importance of creativity in entrepreneurship; and Jon Gisby, chair of the British Screen Advisory Council, charts the exponential growth of on-demand video content.

We also reveal some of the innovation taking place within Exeter College. The College's inaugural Three-Minute Thesis competition gave Exeter graduate students the chance to present their research, including Rina Ariga's award-winning work to predict and treat Hypertrophic Cardiomyopathy; another graduate student, Shiri Heffetz, has produced an app that reunites refugees with lost relatives; undergraduate student Zerlina Vulliamy has created a radio programme that unearths music across different themes and genres; and Fellow in Physical Chemistry Professor Philipp Kukura is developing a spectrometric technology that has the potential to revolutionise the way we study biomolecules. Elsewhere in Oxford an exciting new student hub is nurturing future generations of entrepreneurs.

Of course innovation carries risks, and this edition of *Exon* looks in depth at two topical concerns: Professor of Philosophy and Ethics of Information, Luciano Floridi, reflects on fears, dangers and opportunities surrounding information and artificial intelligence; and Kevin Rudd, former Prime Minister of Australia, analyses emerging threats to liberal democracy.

My thanks to everyone who has contributed to *Exon*. It has been a pleasure to witness so many examples of innovation thriving throughout Exeter's community.

Matthew Baldwin, Communications Officer

Rector's review

Rector Professor Sir Rick Trainor looks at new opportunities being embraced in College and a triumphant year for Exeter's students

2017/18 was Exeter's first full year in possession of Cohen Quadrangle. Without detracting from the continued importance either of the historic Turl Street site or of Exeter House, Cohen Quad has injected yet more vitality into the College. Lectures, classes, symposia, Rector's Seminars, alumni events, the meetings of student societies and of the College's committees and Governing Body: along with innumerable informal chats in the Learning Commons, the Dakota Café and the Cairncross and McRae family kitchens, these gatherings embody an important new dimension of the renewed Exeter.

So too does the Exeter College Summer Programme (ECSP), running as I write (in early August) for its second year at Cohen Quad. For decades the College has hosted summer schools at Turl Street organised by others, notably by the University's Department of External Education. The College continues to do so, to great mutual benefit. But having Cohen Quad has allowed Exeter to organise its own summer school, with a diverse curriculum devised by the College, delivered by tutors (including our Fellows) engaged by Exeter. On both occasions so far ECSP has attracted dozens of talented, hard-working undergraduates from prestigious universities, mainly in North America and East Asia. One evening in 2017 the ECSP students' enthusiasm for arriving on time for one of the programme's special lectures prompted the students to *run* to Cohen Quad's FitzHugh Auditorium! ECSP helps to defray the running costs of Cohen Quad, and it is substantially enhancing the international reputation of the College. Mightily supported by William Jensen (Finance and Estates Bursar), Eleanor Burnett (College Accountant), Meena Rowland (Operations Manager at Cohen Quad) and student helpers, ECSP draws organisation and promotion from Greg Lewis and academic direction from Jeri Johnson (Peter Thompson Fellow in English).

Speaking of Fellows, Exeter's continued to achieve in other ways during 2017/18. Dame Carol Robinson (Dr Lee's Professor of Chemistry) gave the 2018 Mabel Fitzgerald Lecture, Professor Philipp Kukura (Chemistry) received one of the initial Blavatnik Awards for Young Scientists in the UK, Andrew Farmer (Professor of General Practice) was



re-designated a Senior Investigator in the National Institute for Health Research, Professor Ervin Fodor (Pathology) was announced as the 2019 winner of the AstraZeneca Award, and Dr Imogen Choi (Spanish) received the annual thesis award of her professional association.

It was also a good year for alumni, who provided eight of the College's new honorary fellows (see the separate article on pages 16-17 of this edition of *Exon*). Likewise, Matt Hancock (1996, PPE) in January became Exeter's first ever Cabinet minister (as Secretary of State for Digital, Culture, Media and Sport before being promoted in July to the post of Secretary of State for Health and Social Care).

It was highly fitting, therefore, that there were many alumni gatherings during 2017/18. These occurred in Miami, Hong Kong, Toronto, San Francisco, Washington DC, New York City and (three times) in London. Likewise there were the usual Gaudies in Oxford – for those who matriculated between 2005 and 2009 in September and for their counterparts of 1984-89 in the Grand Gaudy in June. Speaking of alumni, JRR Tolkien (1911, Classics and English) is the focus of a splendid exhibition (in the mounting of which Exeter Fellow Dr Christopher Fletcher played a key role) in the Bodleian's Weston Library, which gives appropriate emphasis to the famous author's formative undergraduate years at Exeter.

Exeter students also distinguished themselves during the past academic year. Several postgraduates participated creditably in the demanding format of Exeter's inaugural 'Three-Minute Thesis' competition (see page 24); two of the contestants gave a reprise of their presentations at City Drinks for alumni in London in June. As usual, postgraduates were very well represented



Cohen Quad has fast become an integral part of College life



Student volunteers run a charity bake sale for ExVac

among the speakers at the College's four annual 'subject family dinners', and attendance was excellent at the special dinners for postgraduates held in Hall each term. Postgraduates, partners and offspring also featured largely in the College's 'family friendly dinner' in the spring. Undergraduates, meanwhile, achieved 32 Firsts in Finals and 23 Distinctions and Firsts in First Public Examinations during a year when undergraduate-focused extracurricular success included a continuation of ExVac's

well-established programme of holidays for disadvantaged local children, the extension of the Turl Street Arts Festival to a fortnight, and the Choir's tour of Estonia. Postgraduates and undergraduates combined to give Exeter its best performance in Summer Eights this century. Exeter also won both badminton and sailing Cuppers – and runner-up status in the Rugby Cuppers Bowl. In addition, for a second year, a group of Exeter undergraduates paid an academic visit to Williams College in January, this time braving heavy snow.

Oxford had winter snow this year too, but many visiting speakers reached Exeter. There were 15 Rector's Seminars, including sparkling presentations from former Australian Prime Minister Kevin Rudd and Exeter alumnus Joseph Nye (1958, PPE). Alumni also loomed large in the annual Exeter symposium in November; Sir David Norgrove (1967, Modern History) and Fiona Boulton (1985, PGCE) joined Exeter Fellows Christina de Bellaigue (History) and Chris Ballinger (Academic Dean) in addressing 'Education and Equality'.



That theme was the focus of much press coverage when the University released its first annual report on admissions in May. The report included college-level as well as university-wide statistics; at both levels it was clear that, while significant progress has been made toward increasing diversity, much remains to be done. At Exeter the Governing Body decided, as part of a wide-ranging review of its outreach programme, to double its annual expenditure in this field, in which Exeter's work focuses on disadvantaged schools and under-represented groups.

Diversity looks likely to emerge as a prominent theme in the College's strategic plan, which will be the subject of a special Governing Body meeting in October. Academic and non-academic support of students are also likely to be prominent. These three themes drew greatest emphasis in a workshop in April, organised by Pamela Stephenson (Director of Development and Alumni Relations), focused on future fundraising priorities. The latter will include the long-postponed renovation of the Library at Turl Street, an urgently needed project central to enhancing the experience of Exeter's students in line with the 21st century facilities available at Cohen Quad.

Each academic year, of course, sees the final departure of Exonians as well as the arrival of the alumni



of the future. Among many deaths of distinguished Exonians during 2017/18, two stand out: those of Sir Roger Bannister CH, CBE (1946, Physiological Sciences) and Admiral Stansfield Turner (1947, PPE). Each gave credit to his time at Exeter for helping to shape the inquiring temperament, and the penchant for service, that characterised his subsequent career. It is fitting that these two products of the College were friends because friendship, and the coupling of service and distinction, are central features of the Exeter ethos. In these key aspects, as well as in innovation (the theme of this year's *Exon*), our memories of these two outstanding alumni provide inspiration for current – and future – Exonians.

Remembering Sir Roger Bannister, CH, CBE

Clive Bannister (1977, PPE) celebrates the life of his father, a record-breaker, exemplar and great man



My much loved Father died on Saturday, 3 March, 2018. As an Exonian (1946, Physiological Sciences), and an honorary fellow (appointed in 1979) he had a great love for both the College and Oxford. Indeed he was a Harmsworth Senior Scholar at Merton (1951) and the Master of Pembroke College, Oxford between 1984 and 1993.

Oxford provided the gateway to an entirely different life. He had been educated at Bath Grammar School and then University College School in Hampstead arriving, as a 17-year-old, in Oxford in October 1946. What is less well known is that he had been accepted originally by Cambridge, but the Senior Tutor of St John's College (Dr Howland) suggested, because of his age, that he should 'wait a year'; so he happily accepted an offer from Exeter College.

His first rooms were on the top floor of staircase 11 with a Scout called Dennis. As Father wrote in his autobiography (*Twin Tracks*), 'I had no understanding of the relationship between a student and his Scout. Certainly nobody had ever called me "Sir" before. Clothes rationing and food rationing was still in existence. Ration books were collected by the kitchen staff, who doled out the sparse dollops of sugar, butter and marmalade on named saucers for breakfast.' Father continues, 'I was delighted to be at this cheerful college in the Turl. There were only eight or ten Fellows at Exeter, and to their credit they were trying to re-establish the kind of relationship with undergraduates that had existed before the war: friendly and untroubled by disciplinary problems'.

Immediate post-war Oxford was a very unusual place full of ex-servicemen who 'after all the trials and war jumped at the chance to enjoy themselves and were unperturbed by academic crises. They were very tolerant of mere boys such as myself.'

Father noted that the youngest Fellow was Greig Barr, who as Rector in years to come, was to invite him to become an honorary fellow.

Father was already a runner when he came to Oxford. In his own words he was 'bursting with plans' to do more running. He rapidly went to the College sports ground where the Exeter Groundsman, having watched my Father practise, said to him, 'If I may say so, sir, you don't have the neat style that Lovelock had, perhaps running may not be your best sport'. Jack Lovelock (1931, Physiology) had won the 1500 metres Olympic gold in Berlin in 1936. From this inauspicious start Father went on to compete successfully. Starting with his victory in March 1947 (the day before his 18th birthday) at the White City Stadium against Cambridge, where he won the mile in a time of 4 minutes 30.8 seconds. That evening, as he noted in his diary, he met Harold Abrahams (to become Godfather to my sister, Erin Townsend) who had been the 100 metres champion in the Paris Olympics of 1924, made famous in the film *Chariots of Fire*.

Father's athletic success culminated with his sub-four-minute mile (3:59.4) at the AAA Championship at Iffley Road on 6 May 1954. Apparently on that afternoon at the Oxford Union, a member interrupted the debate to move the adjournment of the house for three minutes 59.4 seconds. Very Oxford.

Father ends in his own autobiography with the following observation, 'for the opportunities that Oxford opened up to me, I felt grateful to my parents who had worked from the outset for me to reach such a University. A chance they were both denied. I still recall the sense of fulfilment my Father (Ralph) quietly showed on one occasion when he was working near Oxford, and I could invite him to have lunch with me at Vincent's Club, and we sat together chatting, surrounded by the University's best sportsmen.'

Father's funeral was held at the University Church of St Mary the Virgin on 23 March. The Rector was present, and suggested that I should include in *Exon* an abridged version of the personal eulogy given that day.

Sir Roger (front, centre) and other members of the 1949 Exeter College Athletic Club



Breaking the four-minute mile



Personal eulogy

Today, 23 March, would have been Father's 89th birthday. And within spitting distance of his 63rd wedding anniversary to our Mother.

All stories have a beginning and Father's character was forged by his Lancastrian born parents, Ralph and Alice. They imbued in both their children, my Father and Joyce his older sister, the values of hard work, academic endeavour and a love of exercise. The latter began in Bath when his parents gave him a second-hand BSA bicycle in 1942. Father would cycle around the West Country and regularly visit friends 110 miles away in London. No health and safety – just the sheer joy of being 13 years old, free to exercise and explore.

Grandfather Ralph was a runner. In 1909, aged 15, he won his school mile race. The small bronze medallion he received was Father's most valued trophy. It was Ralph who took our 16-year-old Father to see his first competitive mile race in the White City Stadium in 1945; it was this that inspired Father to take up that distance. Thus history was started.

Both his parents left school at 15. They were self-taught and passionate about what the Victorians called 'betterment'. And although Dad started in a primary school with 50 in his class, he remembered being brought up to Oxford, aged eight, and in his words 'imbibed' his parents' expectation that hard work would get him to the University. Nothing in my Father's life came for free.

Father was a patriot, with a small 'P'. He loved this country. He believed in British values of individual freedom, tolerance, plurality and decency. He wrote about this 'free and civilised' country and hoped that others 'were afforded similar opportunities for happiness and fulfilment', that he had enjoyed.

In the 1950s as a 'New Elizabethan', he believed in the post-war ethos of 'doing good and being better', typified by his lifelong love and support for the NHS; eschewing private practice for public service. A man of his era, the Mile and the

Carrying the Olympic torch in 2012



Lady Moyra and Sir Roger a month before their wedding in 1955



ascent of Everest made people feel better, and believe that the impossible was possible. He was principled and devoted to a concept of England, whose running vest he wore so often and in whose victories the Nation delighted.

As a doctor, none of us doubted his scholarship or hard work. Father's neurological eminence was never in question – but he did have some work style eccentricities. On Sunday mornings he would leave us children unsupervised to swim in the unheated St Mary's Hospital swimming pool, whilst he went upstairs to work in his laboratory. Sometimes he would bring his 'work home'. This meant driving around in our Morris Oxford Traveller with brain specimens 'sloshing' around in the back of the car, whose interior became suffused with the smell of formaldehyde. No wonder none of us became doctors!

A walk with Father was not a walk. It was always done at a quick canter. Our short versus his long legs. His sense of destination, and our enactment of bewildered meerkats. This took on an industrial scale with orienteering. The words 'ordnance survey map, compass, sense of direction and Father' did not comfortably fit into a sentence. He was an early adopter, with all of the dangers that this entailed, in the new sport of orienteering. And we, his children, were literally its cannon fodder.

Once, when orienteering on Salisbury plain, whilst we were searching for one of the small red checkpoints, my older sister Erin pointed out that there were men in combat fatigues carrying rifles. Father blithely dismissed this as 'perfectly normal'. In fact Father had managed to run us across a live firing zone, which was dominated by an enormous red flag that would have given pride to a Soviet battleship.

Retirement in Oxford was the happiest period in Father's life. Always interested in 'learning more' Father would peruse the University lecture lists and attend those that beguiled. And it wasn't as if Father would be a silent

witness to the knowledge of others. He would stick up his hand and ask questions. If he did not like the answer, he would recommend one of his own.

How many knew that he studied 'Computing for the Terrified'? Or that he completed a two-year creative writing course, securing a 2:1, when he was three times the average age of the other students? Retirement for him was just another platform upon which to live his very full life.

He believed in the Olympian motto of 'taking part' and his 14 grandchildren carry this DNA, evidenced by their paramotoring, rugby, rowing, golf, rock climbing and running. Literally the 'apples of his eyes' have not fallen far from his tree. Like a thread from his own parents, through him, his grandchildren have inherited his enthusiasm, energy, love of life, engagement with others and sense of optimism.

Without a doubt the most important element in Father's life was my Mother, his wife. They met in April 1954, two weeks before the four-minute mile race, and married 63 years ago in June 1955.

As Father wrote in his private book, *Letters to my Grandchildren*: 'it was my good fortune to meet Moyra and for us to marry. We had made a great decision of our lives and have delighted in each other's company ever since. With her companionship through everything, I have never lost an underlying faith in others, or optimism about the future'.

In conclusion, we can all agree with Kipling; Father not only filled his '60 seconds', but 89 years of 'distance run'. His energy, love of life and family, fellowship, hard work, integrity and athletic and scholastic achievements made him a giant. An exemplar.

He is loved, missed and celebrated by those who had the privilege to know him and were able to call him a friend. For his friends were 'his treasure' and he banked you in his heart.

Goodbye to our beloved Father. A truly great man.

Exploring threats to liberal democracy

Kevin Rudd, former Prime Minister of Australia, invites Exeter's students to take a stand against developing dangers facing democracy, writes **Archie Philipps** (2016, French and German)

On 16 May Exeter College was honoured to welcome Kevin Rudd for Trinity Term's flagship Rector's Seminar. The former Prime Minister of Australia is currently a DPhil student at Jesus College – Exeter's traditional rival, the Rector noted during his opening remarks – working on a thesis on the worldview of Chinese President Xi Jinping. We were privileged to hear an insightful talk and question and answer session, informed by Mr Rudd's many years working in politics combined with his impressive scholarship. He addressed the very pertinent question, 'How dangerous are current threats to liberal democracy?' beginning with a brief history of the idea and practice of democracy before identifying five 'cancers' which he believes currently threaten it.

Democracy as we know it is a relatively new concept: the Athenian *polis* was a patriarchal oligarchy, as were the Dutch and Venetian republics centuries later. In Britain women only got the vote a century ago – and even then with limits. With these observations in mind, Mr Rudd suggested that the idea of democracy, although in its current form relatively young, is the fruit of

centuries of developing awareness of the 'intrinsic worth of the human being.' However, events such as the Reign of Terror during the French Revolution and more recently the Arab Winter that followed the Arab Spring make clear how democratic change and idealism do not necessarily lead to peace, prosperity or even democracy: democracy is hard won and cannot ever be taken for granted. Mr Rudd also noted that Asia did not take the same democratic path as the West at the end of the 19th and beginning of the 20th centuries, and although several Asian countries such as Japan, South Korea, Indonesia, and Malaysia are now democracies, they have typically only been so for a few decades. The complex origins and relative infancy of democracy as a system of government make it imperative that we do not casually dismiss it as a '21st century luxury,' and instead do our utmost to defend it.

Mr Rudd then discussed the five 'cancers' which he feels threaten modern democracy, especially in America. Two of these he grouped together as 'structural cancers': unrestricted campaign financing and gerrymandering. The first, he argued,

places 'democracy for sale', while the second distorts electoral maps to create safe districts that parties can be assured of holding easily. Swing voters are deprived of a voice or impact in the electoral process, with some 85% of US electoral districts now considered safe Republican or Democrat strongholds. Furthermore, in these districts hard-line activists – such as those from the Tea Party movement – can take control of the party apparatus, causing bipartisanship to break down.

The third 'cancer' concerns the increasing disregard for objective truth. Policy proposals, Mr Rudd said, ought to be based on empirical evidence of their effects. He accepted that facts and opinion can – and should – be debated. However, he held that politicians such as President Trump had made 'fact and opinion constitute one part of the same reality' and through 'alternative facts' launched a war on objective truth, and detached policy decisions from evidence. In place of evidence-based policy, Mr Rudd argued, we are seeing 'the globalisation of superficiality' by elected officials who thrive by being entertaining or outrageous rather than pragmatic. This is dangerous when a serious mindset and considered policies are needed to tackle long-term problems such as climate change.

Clearly issues of such magnitude need mature and civil discussion, but here Mr Rudd identified a fourth

'cancer,' the decline of a public commons. Instead of a real public platform, he argued, we find a concentration of media power and influence. As an example, he pointed to the UK where Rupert Murdoch, coupled with populist politicians such as Boris Johnson, influenced public opinion during the 2016 referendum campaign. In Mr Rudd's eyes the Murdoch press became a mouthpiece of the Leave campaign, resulting in not only a skewed debate but an echo chamber of opinions replacing a genuine common public platform.

The final 'cancer' identified was the 'fracturing of the socioeconomic contract,' leading to a growing proportion of the population feeling alienated and powerless. When the hope created by politicians and political campaigns turns to disappointment, frustration and anger, support increases for demagogues who promise to stand up for the ordinary person – as seen in the 2016 US election. What will happen, Mr Rudd asked, if this contract is not repaired, noting that much of the violence of the French Revolution came from those who felt they had no stake in the system.

Mr Rudd then offered several suggestions for us to reflect upon. His main exhortation to us was our duty to 'reconstitute a new faith in democracy,' noting that some 40% of American under-35s would be happy to try alternative forms of government. Potential ways of doing this include breaking up media monopolies and encouraging debate. He asked us to rebuild the 'social contract' by making it as 'radical' and fresh today as it was when first proposed centuries ago. In doing so, he concluded what was an academic talk, yet one interspersed with humour; a warning from history, yet one providing hope for the future by inspiring us to 'be the change we wish to see in the world.'

A recording of Mr Rudd's talk at Exeter College is available to listen to at www.exeter.ox.ac.uk/kevinrudd



Kevin Rudd addresses Exonians in Cohen Quad's FitzHugh Auditorium



A bright future

From new study spaces bathed with light to prestigious new fellowships and student bursaries, **Pamela Stephenson**, Director of Development and Alumni Relations, reflects on the impact of fundraising on the Exeter community

This past year has been a fascinating one. By turns challenging, purposeful, and inspiring, it has, nonetheless, proved to be a turning point in Exeter's Development and Alumni Relations story. The close of a major fundraising campaign is always a catalyst for reflection and review, and offers a rare opportunity to take stock and look ahead to the next step of the journey.

We have spoken a great deal of the creation of Cohen Quad. Taking Exonians around this remarkable addition to their College, I never fail to be struck by your immediate reactions which are invariably positive, often blending joy at experiencing such an open, light-filled building with pride that your College had the vision to create it.

Now that it has been operational for a full academic year, we can begin to understand more about the impact that it has had not just on College life generally but on our students as individuals. Thanks to your overwhelming generosity, Cohen Quad has become a vibrant and vital aspect of Oxford life: the Learning Commons is a hub of intellectual endeavour as students work together to develop their knowledge of their chosen subject; the Dakota Café has become a meeting point where reception staff rub shoulders with Fellows and an integrated community has gelled; the reputation of the kitchen now extends beyond Cohen Quad's walls to inspire visitors from the Blavatnik School of Government to drop in for lunch; and our international student community experienced summer

at Cohen Quad for last year's inaugural Exeter College Summer Programme, bringing together a vibrant mix of nationalities from some of the world's leading universities.

Of course, Exeter Excelling was not just about Cohen Quad. Its impact has been felt across our renowned academic community with the creation of six prestigious fellowships; 23 vital student bursaries; and 17 new scholarships, six of which are endowed. In addition, many other enhanced aspects of College life – from preserving our architectural heritage to providing upgraded sports facilities – continue to shape the ways in which our students live and work.

Exeter's alumni live around the world so we understand that not everyone is able to visit us to experience Cohen Quad for themselves or to hear our students and Fellows share the effects that philanthropy has had. Our goal now is to share more of these stories with you, to tell you about the impact that you have had on the Exeter Family, and to celebrate the lives that you have helped to change through your generosity.

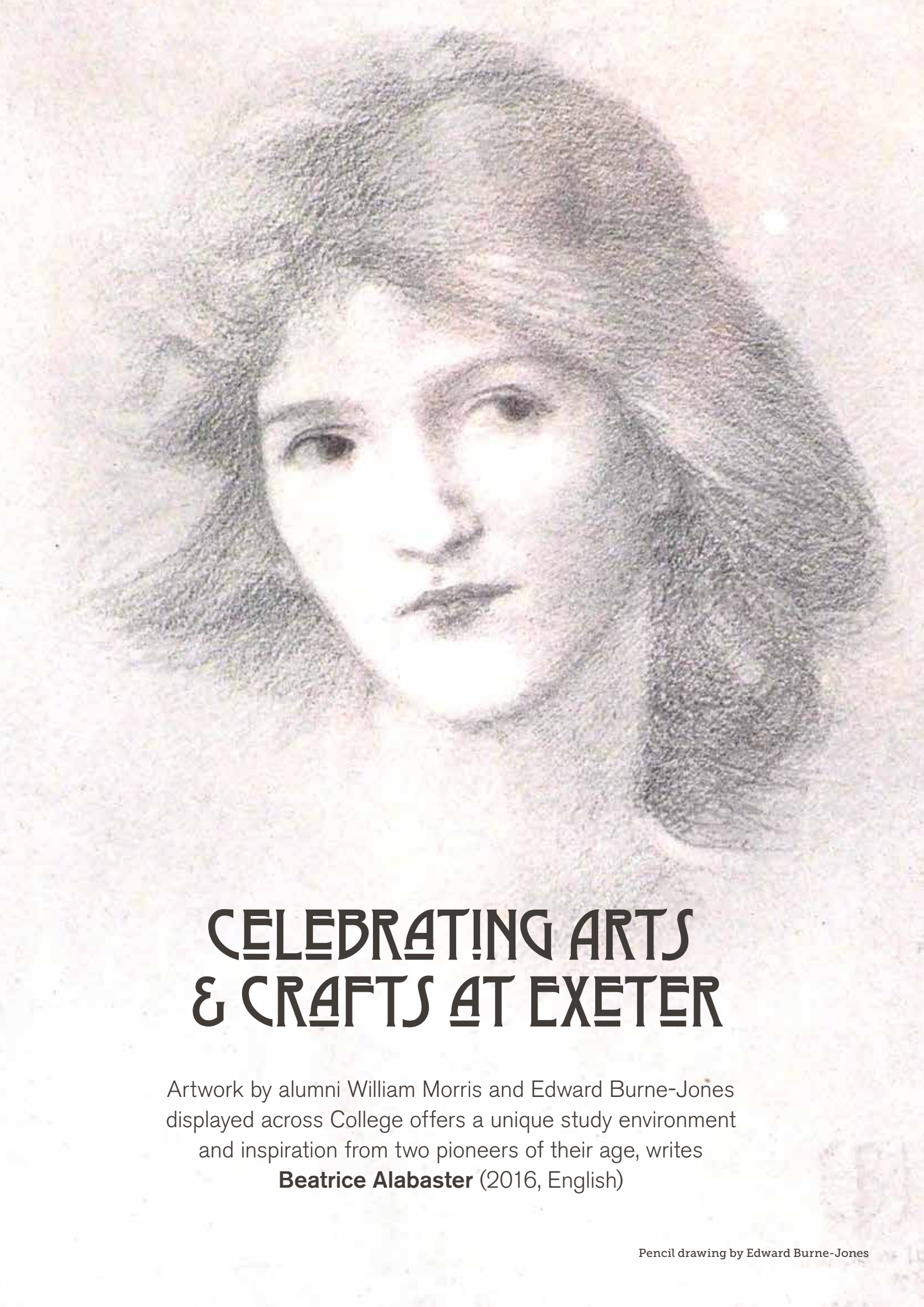
While we plan Exeter Excelling's successor, we have a perfect opportunity to build our alumni engagement programme further. We are excited to focus on our young alumni – those who have graduated within the past five years – and we are developing a dedicated programme for them, thanks to a project undertaken by Matthias Nicholls, one of this year's Finalists. His research has shown that the needs of young alumni are different from their older counterparts and that there is an appetite for informal events around the country, not just in Oxford and London.

Further afield, the year ahead promises to be just as fascinating as the past year has been and we will have many opportunities to share the impact of Exeter Excelling with our alumni around the world. For the first time, the University will hold its Meeting Minds alumni weekend in Tokyo, from 22 to 24 March, so we will work with Exonians in the region to ensure that Exeter is represented in force. There will also be University events in Boston, Toronto and Washington, DC from 10 to 13 April and we are currently planning Exeter's presence there. Look out for further details in the months ahead.

One of the greatest pleasures of my role is to welcome alumni, friends and donors to Exeter. Do let us know if you are planning a visit as we are always keen to catch up and hear about your news and successes. In doing so, you will ensure that we can look forward to another fascinating and inspiring year.

Images: Cohen Quad provides students with a variety of formal and informal study spaces, all of them light and spacious





CELEBRATING ARTS & CRAFTS AT EXETER

Artwork by alumni William Morris and Edward Burne-Jones displayed across College offers a unique study environment and inspiration from two pioneers of their age, writes
Beatrice Alabaster (2016, English)

Pencil drawing by Edward Burne-Jones

These days it's possible to buy William Morris printed stationery, mugs, scarves and a great variety of other collectables. I was even recently given a William Morris colouring book. Likewise, with Edward Burne-Jones, all it takes is a visit to Blackwell's Art Shop to encounter a wide range of posters and cards emblazoned with his drawings. With this in mind, it would be easy to become desensitised to the works of canonical artists such as Morris and Burne-Jones. Our response could become passive or disengaged, their designs growing almost predictable, hackneyed symbols of 'Fine Art', as we are bombarded with images. Such commodification and mass-production of art seems especially ironic when we consider that Morris's mission was to return to a more meaningful and individualised approach to work, before it was destroyed by the mechanisation and impersonality of industrialised labour.

It is for this reason that I consider Exeter's decision to preserve and display the works of Morris and Burne-Jones to be so important. Both artists came to Exeter in 1852, studying Classics and Theology respectively, and today a broad collection of their work is owned and displayed by College, including in the recently refurbished Morris Room and the newly built Cohen Quad, connecting the College's present with its heritage. When confronted with these works in and around College, it seems that the relationship between viewer and observer changes, as we are made to engage more actively with the art.

When attending classes or JCR meetings in the Morris Room, I am always struck by the art in a new way, encountering it as a part of everyday life. The room currently contains a copy of G F Watts's portrait of Morris, the contents of Morris's desk at his death, two of Burne-Jones's tapestries, *Pomona* and *Flora*, and several of his drawings. When observing these works, I feel a deeper sense of connection to the artists, heightened by the design of the room, which reflects Morris's approach to interior design with its red and blue colour scheme and carefully chosen fabrics. The Morris Room is a far more intimate space than an art gallery, more enduring than a piece of stationery; it is as if the influence of the artists is more deeply felt in this context, making the past feel more tangible and immediate.

In Cohen Quad, the experience of the works is in some ways antithetical to that of the Morris Room. Seeing the William Morris carpet or the Morris and Burne-Jones stained-glass windows amidst the modernity of Cohen Quad's architecture can be a surprising experience. Arrested by their beautiful vibrancy, as well as the boldness of design, we are asked to pause and engage more actively with the art in this context. What is clever about these installations is that, despite the potentially unexpected juxtaposition of old and new, the artworks are nonetheless harmonious with their surroundings, perhaps because of the influence of the Arts and Crafts



Pomona by Edward Burne-Jones

movement on the architecture of the building, resulting in a combination of innovation and heritage.

In Michaelmas term I had the opportunity to experience first-hand the exquisite beauty and craftsmanship of the Kelmscott Chaucer. Contained in the Neil Blair Special Collections Reading Room in Cohen Quad, the College has Morris's and Burne-Jones's personal copies of their richly illustrated edition of *The Canterbury Tales*. The Kelmscott Chaucer was the last great project of Morris's life and one of the crowning achievements of both their careers, once described by Burne-Jones in a letter to Morris as 'like a pocket cathedral – so full of design and I think Morris the greatest master of ornament in the world.' As I handled these books, I was struck once again by the privilege of being able to engage in such an intimate way with the works of two artists who pioneered such innovation and progress in their field.



Turner Prize winner Helen Marten

Exeter appoints new honorary fellows

A Turner Prize winner, an opera director and a BBC News journalist are among nine new honorary fellows, discovers **Thomas Hunt** (2016, PPE)

Last autumn, Exeter's Governing Body elected nine new honorary fellows. In accordance with the prescription in the College statutes that honorary fellowship is 'tenable by any distinguished person,' those elected were all accomplished figures. Also, each has a strong connection to Exeter.

Helen Marten (2005, Fine Art) is an acclaimed artist who, in 2016, received both the famous Turner Prize and the new Hepworth Prize for Contemporary Sculpture. Her work typically consists of meticulously arranged objects – many of which she crafts herself by hand – that force us to revise our preconceptions of what sculpture is. Counterintuitively, Ms Marten is hesitant to define herself as a sculptor, noting how her work has become bound up with 'other forms of creative making,' such as writing and screen printing. Writing in particular plays a role in the genesis of her works: before commencing work on a piece, she spends months reading – often without a predetermined focus in mind – before settling on a concept she would like to bring to life.

2018 is proving to be another busy year for Helen Marten: her work will be exhibited in Oslo, New York and Zurich; she has received a major commission from the Hepworth Wakefield; and she will contribute a piece to a sale in aid of the Cure Parkinson's Trust. She is joined as a new honorary fellow by a key figure in the performing arts, Pierre Audi (1975, Oriental Studies) who has, for the past 30 years, been Artistic Director of the Dutch National Opera. Once described by the *New York Times* as 'a

legend of the international culture scene,' Pierre Audi's career can be traced back to his time in Oxford, where he directed a student production of Shakespeare's *Timon of Athens*. During his time at the Dutch National Opera he has presided over productions of the works of Mozart, Monteverdi and Wagner to critical acclaim. In September Mr Audi will move onto a new challenge when he becomes general director of the Festival d'Aix-en-Provence, France.

A familiar face as a presenter of the BBC News, Reeta Chakrabarti came up to Exeter to read English and French in 1984. After graduating she began her journalism career on radio, reporting for BBC Radio 4 and BBC Radio 5 Live. Her career has seen her cover some of the biggest and most challenging stories of recent decades, from the Dunblane massacre, to the Damilola Taylor murder trial, to the Stephen Lawrence inquest. Between 1999 and 2011 she was a BBC political correspondent, covering a tumultuous period at Westminster which saw three elections, the Iraq War, and the MPs' expenses scandal. After a spell as the BBC's education correspondent, she was appointed UK affairs correspondent for the Corporation, and now frequently presents BBC One's *News at One*, *News at Six* and *News at Ten*.

For Professor Christopher Peacocke (1968, PPE), Exeter is the fifth Oxford college where he has been a fellow in some capacity. An expert on metaphysics, a branch of philosophy dealing with fundamental questions concerning knowledge and reality, he has had a long



BBC journalist Reeta Chakrabarti

and distinguished academic career culminating in his appointment as Johnsonian Professor of Philosophy, Columbia University. Professor Peacocke is also a Fellow of the British Academy.

Among Exeter's many business leaders, John Leighfield CBE (1958, Literae Humaniores) is among the most distinguished. After graduating, Mr Leighfield worked for Ford and then British Leyland, exploring the applications of the then novel technology of computers in business. Later he was Chairman of Research Machines. He also served as Pro-Chancellor and Chairman of the Council at Warwick University from 2002 to 2011.

There is also a strong contingent of Modern History alumni amongst the new honorary fellows. Sir David Norgrove (1967, Modern History) currently chairs the UK Statistics Authority, the body responsible for supervising government statistics across the UK. This is the latest posting in an illustrious career for Sir David, which has seen him chair the UK's Pensions Regulator and the Low Pay Commission. He also is completing a term as an external member of the Council of the University of Oxford.

Another Exeter history graduate to be made an honorary fellow is Professor Timothy Garton Ash (1974, Modern History), Professor of European Studies and Fellow of St Antony's College, Oxford. He has spent

the last three decades chronicling the transformation of Europe. After graduating he conducted research into German resistance to Hitler, often working in East Germany, where the Stasi identified him as a possible British agent. During the 1980s and 1990s he reported on the collapse of communism in Eastern Europe, a region he continues to follow closely. Professor Garton Ash, a passionate believer in a united Europe, was awarded the 2017 Charlemagne Prize for services to European unity in recognition of his writing. More recently his writing has called for the defence of liberal values in the face of a revanchist Russian state under President Putin's leadership and the emergence of authoritarian leaders, such as Hungary's Prime Minister Viktor Orbán, in Eastern Europe.

In doing so, Professor Garton Ash's writing mirrors a newly published novel by another honorary fellow appointed last autumn. General Sir Richard Shirreff KCB (1974, Modern History) is former NATO Deputy Supreme Allied Commander Europe. Upon his retirement, he also became a novelist, publishing *War With Russia: an urgent warning from senior*

military command. Part novel, part war-game write-up, General Shirreff's book is a story of the horrendous consequences that ensue when war breaks out between Russia and NATO.

Finally, Exeter's long-standing links with Williams College, Massachusetts were strengthened by the appointment to honorary fellow of Professor Adam Falk, Director of the Alfred P Sloan Foundation, who was President of Williams College from 2010 to 2017. As President he was a strong advocate of the Williams Exeter Programme at Oxford, welcoming the first cohort of Exeter students to Winter Study in Williamstown. Professor Falk is a physicist whose research focuses on elementary particle physics and quantum field theory. Of the nine new honorary fellows, he is the only one who did not attend Exeter as a student yet, unquestionably, he too has distinguished himself, as required by the College's statutes. He and his fellow cohort of new honorary fellows join an already illustrious group which includes Her Majesty Queen Sofía of Spain, Nobel laureate Sydney Brenner (1952, Biochemistry), Professor Joseph Nye (1958, PPE; former dean of Harvard's Kennedy School of Government), and the celebrated literary figures JK Rowling, Alan Bennett (1954, Modern History), Philip Pullman (1965, English) and Martin Amis (1968, English).



Shining new light on microscopic molecules

A new microscopy technology developed by Exeter Fellow in Physical Chemistry Professor Philipp Kukura is illuminating new paths to progress, writes **Charlotte Dibb** (2014, Chemistry)

The ability to observe interactions between molecules on a nanometre scale is invaluable to science, yielding the kind of knowledge that, among other things, is essential to the development of new drugs. Yet this also represents a challenge; individual molecules are often just a few billionths of a metre in size, necessitating the use of powerful microscopes. Professor Philipp Kukura, Fellow in Physical Chemistry at Exeter College, has played a leading role in developing a new microscopy technology that looks set to offer powerful advances.

Professor Kukura and his team collaborated with researchers in Germany, Sweden, Switzerland and the US to develop the new technique, which works by detecting light scattering instead of the conventional approach of detecting fluorescence. Their research was published in the 27 April edition of *Science*. Professor Kukura commented: 'This research has emerged from a decade of work which involved making an ever more sensitive light microscope.' By 2014 researchers were able to use light scattering to visualise individual proteins, although the quality of the images produced still lagged behind those from conventional fluorescent microscopes.

Commenting on the existing technology, Professor Kukura said: 'Single molecules have been observed in light microscopes since the late 1980s, but essentially all [current] optical techniques rely on fluorescence, which is the emission of light by a material after being "excited" by the absorption of electromagnetic radiation. As immensely powerful as that is, it is not universal.'

Fluorescent microscopy often requires the addition of a chemical marker to make molecules emit fluorescent light, which degrades over time. Once this has been done, the electromagnetic radiation needed to get the molecules to emit fluorescent light can also damage cells, hindering scientists' ability to study the molecules within. These difficulties prompted researchers to investigate a different approach. Instead of observing fluorescence, they would identify molecules by observing the light these molecules scattered, without damaging the samples. Light scattering occurs when molecules or particles deflect light, a phenomenon responsible for, among other things, the blue colour of the sky. By observing the light scattering, the researchers have shown that they can actually measure the mass of the molecules that produced the scattering. This strategy has been named interferometric scattering mass spectrometry, or iSCAMS.

Advances in recent years closed the gap between fluorescence and light scattering microscopy techniques,

opening the way to practical applications of the technology co-developed by Professor Kukura and his team. Professor Justin Benesch of Oxford's Department of Chemistry, an expert in mass measurement and co-author of the work, highlighted the benefits of iSCAMS: 'Our approach is therefore broadly applicable and, unlike traditional single-molecule microscopy, does not rely on the addition of labels to make molecules visible.' Potential applications include studies of protein-protein interactions and even diagnostics.

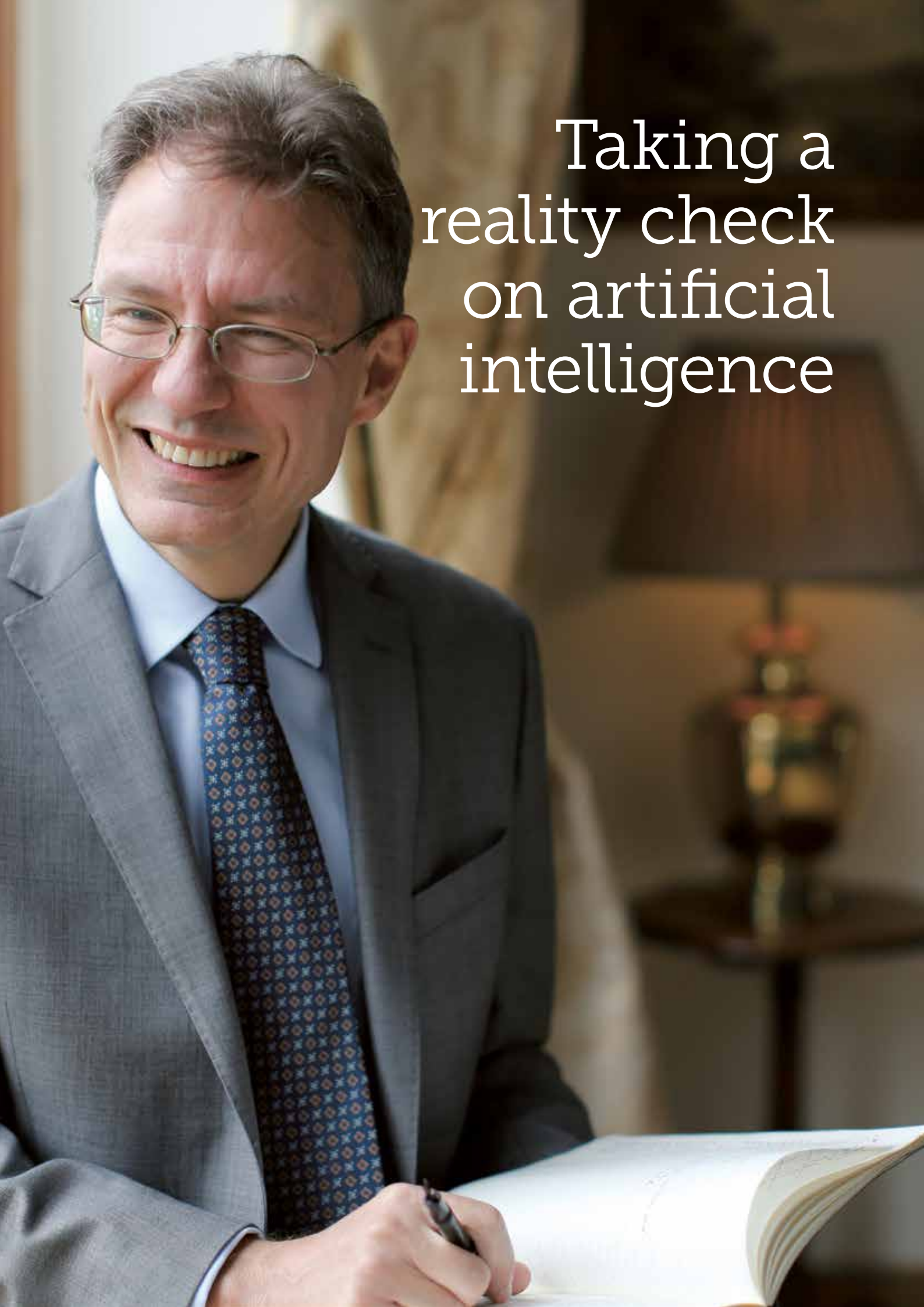
Compared to existing technologies iSCAMS offers greater practicality. Professor Kukura said: 'It measures mass with an accuracy close to that of state-of-the-art mass spectrometry, which is expensive and operates in vacuum – not necessarily representative of biological systems – whereas iSCAMS does so with only a very small volume of sample and works in essentially any aqueous environment.'

As most physiological and pathological processes occur in solution, being able to observe molecules interact in aqueous environments has potential to give invaluable and realistic insights to scientists. Professor Benesch added: 'This enables a lot of the things that researchers want to quantify: do certain molecules interact and, if yes, how tightly? What is the composition of the protein in terms of how many pieces it contains, and how does it grow or fall apart?'

As further acknowledgement of the technology's significance, Professor Kukura was recently named a finalist in the 2018 Blavatnik Awards for Young Scientists in the United Kingdom, a scheme established to help young scientists early in their careers when the need for their work to receive recognition and funding is often greatest. Professor Kukura was one of only nine academics to be recognised by the scheme in its inaugural year in the UK and will receive \$30,000 in unrestricted funds to support his pioneering research. Speaking on his achievement, Professor Kukura said: 'I am incredibly honoured to be part of the first cohort of Blavatnik awardees in the UK. It's a unique acknowledgment of our science in a way that traditionally only happens much later in a scientific career, if at all, making it particularly special.'

The team is currently working on commercialising the technology so that more scientists can take advantage of its potential. It is hoped this innovative technique will revolutionise the way we study biomolecules.

The full paper, 'Quantitative mass imaging of single biological macromolecules', can be found in the journal *Science*, Vol. 360, Issue 6387, pp. 423-427.



Taking a reality check on artificial intelligence

Adam Jobling (2015, PPE) talks to Exeter College Fellow Professor Luciano Floridi about his ground-breaking work exploring and advising on the philosophy and ethics of information

Listening to certain high-profile members of the tech industry, one can get the feeling that our deepest sci-fi fears are about to be realised. Elon Musk has repeatedly voiced concerns that super-intelligent artificial intelligence could be created which would lead to 'an immortal dictator from which we could never escape.' Bill Gates agrees, and even Stephen Hawking said that AI could 'spell the end of the human race.'

Professor Luciano Floridi, Professor of Philosophy and Ethics of Information at the Oxford Internet Institute, Exeter College Fellow by Special Election, and newly appointed member of the European Union Commission High-Level Expert Group on Artificial Intelligence, takes a dim view of these worries: 'I find some of the literature that discusses so called super-intelligent AI to be an irresponsible distraction.' He does not deny that such AI *might* be developed, but points out there are plenty of things that might happen. 'If we mean "it might happen" in the same way that I might win the lottery every time I buy a ticket, well then it's just a joke. Whereas if we're talking about "it might happen" in the same way that I might miss the flight I've booked tomorrow, well that's a different story.' The former is merely a logical possibility, whereas the latter is a genuine possibility. Ordering a superyacht before your Lotto numbers are drawn would be irresponsible, whereas planning your journey to the airport in advance would be prudent. Similarly it would only be responsible to treat super-intelligent AI as a genuine possibility if there is evidence we may create it, but Professor Floridi believes the probability is 'negligible insofar as anything we understand about computer science is relevant.'

Meanwhile, he says, 'there are real problems about AI concerning the delegation of decisions and processes with which we should deal now. The impact of AI on jobs, on health, on security. There's plenty to be worried about, just not what some people have claimed.' Professor Floridi is content to focus on more serious concerns in digital ethics and leave such science fiction issues 'to Hollywood and rich kids.'

On these concerns, Professor Floridi is an especially important theorist. He received this year's IBM Thinker Award for his work in digital ethics, and has been appointed chair of the advisory board for the UK's new Parliamentary Commission on Technology Ethics. He also chairs the scientific advisory board of AI4People, the first global forum in Europe on the social impact of AI.

'Nudge theory' is one area he feels needs better regulation. Practised by many corporations online, nudge theory is used to alter people's behaviour through subtle shifts in their environment. For example, Amazon recommends products based on our purchase history, affecting how much we spend and on what. Netflix invites us to watch movies suggested by its algorithms on the basis of our profiled preferences. This may seem quite benign. If I like a certain author or director, receiving recommendations for other work they have produced, or work similar to theirs, seems to my benefit. But Professor Floridi is concerned we are far more 'fragile, pliable, and influenceable' than we care to admit. While individual nudges may have minor effects, the situation is radically different over an extended period of time. 'Imagine a child, the nudging starts and by the time that child is 25 or 30, consider how much has happened so that you never decided to go on a certain kind of holiday. You always went skiing, because that's what was reinforced. You've never changed, say, your music habits, because you're nudged into more of the same. It traps us in a bubble. In the end, the forces that naturally push in different directions in the analogue world, in the digital, they don't. They shape us to make sure we're in the comfort zone, reducing challenges and hence opportunities to learn and change.'

The philosophy of information has always been with us, it's just that in the past it was like Cinderella: working hard but invisibly, in the background

Professor Floridi prefers to leave science fiction to 'Hollywood and rich kids'

There are real problems about the impact of AI on jobs, on health, on security. There's plenty to be worried about, just not what some people have claimed

If we're to avoid this, Professor Floridi thinks legislation is important. 'Companies are rational agents. They're not evil, they're just playing by the rules. If you don't like what they're doing, change the rules.' He sees the recent legislation on plastic bag charges as a good example of how legislation on digital matters should be developed. 'Everybody wanted to do it,' he says, 'the supermarkets and the customers, but no one could do it first, because it would have been such a competitive disadvantage. What you need is society to say "one, two, three, jump!" This means legislation. As of day X, everyone will pay for plastic bags. Suppose we want to regulate more carefully online advertising. We already regulate advertising, with cigarettes and alcohol for example. We can be even more careful.' He suggests that 'we might decide that as of day X, you cannot send the same advertisement more than X number of times to the same individual. This is just a taste of how rules might change behaviour.'

Although he is best known outside of academia for his work on digital ethics, Professor Floridi quips that most of his work 'is of the philosophical kind that nobody reads.' He sees digital ethics as 'the tip of the iceberg,' and notes that 'if you want to have the tip of the iceberg, you need to have the rest of the iceberg.' For Professor Floridi, the rest of the iceberg is a daunting multi-volume series published by Oxford University Press on the philosophy of information – a discipline he pioneered – including *The Philosophy of Information* (2011) and *The Ethics of Information* (2013), with *The Logic of Information* set for release in 2019. He is now working on the fourth volume, *The Politics of Information*. He notes in his preface he is 'painfully aware that this is not an easy book to read.' Anyone wanting a more accessible starting point may

prefer his *Information: A Very Short Introduction* (OUP, 2010) or *The Fourth Revolution – How the Infosphere is Reshaping Human Reality* (OUP, 2014).

Professor Floridi has developed a theory of reality that holds that the world can be fruitfully conceptualised as being made up of information, with humans as informational organisms. His ideas are underpinned by the Kantian notion that we cannot really know the intrinsic nature of reality (the noumenal world), only our perception of it (the phenomenal world). 'The noumenal world is out there, anchoring as a source of our perception and representation of the world. An analogy would be radio: the radio signals we receive are not *about* the radio. When I read the world what I get are the data from the world, and the data look the way they do because of the kind of entity I am biologically, socially, linguistically, culturally.' He is not trying to provide the correct account of the 'reality' of the noumenal world, but attempting to design a system which helps us properly conceptualise our experience, the phenomenal world.

Understanding the world in terms of information allows us to tackle better the problems we face surrounding information and technology. Professor Floridi is confident this approach will continue to be vital philosophically. 'For me, asking whether that will disappear is like asking whether the study of knowledge will disappear, or beauty, or right and wrong. Do you think we're really going to live in a world where information is not a big issue? No. It always has been, and will be. The philosophy of information has always been with us, it's just that in the past it was like Cinderella: working hard but invisibly, in the background. Today, I hope she can gain the respect she deserves, given the crucial importance of the topics with which she deals.'

Shiri speaking at VHacks



Refugees reunited

Exeter student Shiri Heffetz has created an app that could reunite refugees with lost relatives, reports **Matthew Baldwin**, Communications Officer

In March Exeter graduate Shiri Heffetz (2017, Mathematics and Foundations of Computer Science) took part in the first ever 'hackathon at the Vatican', creating an app that could help reunite refugees with lost loved ones.

Hackathons bring together large numbers of people to engage in collaborative computer programming. The March event, VHacks, was organised by students from Harvard and MIT, with support from the OPTIC Network, the Vatican, Microsoft, Google, and other organisations. It united 120 students from 60 universities and 28 countries for a 36-hour hackathon, during which they worked in teams to tackle some of the most difficult issues of our time: social inclusion, interfaith dialogue, and migrant and refugee crises.

Shiri's team focused on the last of these and set about creating software that could help refugees. They designed Vinculum, a multi-platform application that allows users to input pictures of their missing relatives and returns the top matches of similar looking missing people, as currently recorded by NGO databases. Images can be submitted via a website, a custom Facebook chatbot or SMS. Importantly, the app places a relatively low burden on internet bandwidth, which is often very limited at refugee camps and strained by high demand. Vinculum also has potential to help victims of human trafficking and could be used to locate children who have run away or been taken from their families.

The Vinculum team presented their project at VHacks and were awarded third place in the Migrants and Refugees category by a panel of technology professionals and Vatican staff. They were also voted winners, across all three categories, of the Audience Choice Award.

Reflecting on the event, Shiri said: 'I was incredibly lucky to be working with a truly diverse team. The strong sense of purpose behind our project reflected in a great energy throughout the event. It has opened my eyes to the endless possibilities a team of motivated minds can pursue. Leveraging technology for the upcoming refugee crisis is a critical endeavour which we intend to contribute to.'

First place in the migrant and refugee category went to Credit/Ability, a 'credibility scoring application' that provides refugees with a way to collate their employment history and demonstrate their reliability, making it easier to obtain jobs and housing. Second place was awarded to Sajal, an app that enables healthcare professionals in different countries to view comprehensive medical histories of migrants and refugees using unique QR codes.

With so many potential solutions to serious problems developed in just 36 hours, as well as a new global network of talented, altruistic minds, VHacks was a tremendous success and paves the way for more life-changing hackathons in the future.



Stop the clock: graduates shine at Three-Minute Thesis

A new competition gave graduate students the chance to share their cutting-edge research and prove just how well they cope under pressure, writes **Amelia Crosse**, Alumni Relations and Events Officer

In April Cohen Quad's FitzHugh Auditorium was the stage for Exeter College's inaugural Three-Minute Thesis© competition. Conceived by the University of Queensland in 2008, the concept is simple: three minutes to present your thesis in layman's terms, without props, gimmicks or extensions. It quickly caught the attention of other universities across Australia, and its popularity has led to international competitions. The University of Oxford ran a competition in 2016 but, to our knowledge, Exeter is the first Oxford college to invite its students to take up the challenge.

The idea was put forward by postgraduate student Joe Bluck, the then MCR President, as a way to celebrate the work of postgraduate students and increase the MCR's event programme. We jumped at the suggestion, as we knew that alumni would love the opportunity to hear first-hand what our MCR members are up to, in a digestible form and part of a fun, competitive event. Pamela Stephenson, Director of Development and Alumni Relations, said: 'The ethos of the Three-Minute Thesis is not about playing down or trivialising research, but challenging students to consolidate their ideas and discoveries so they can be presented concisely to a non-specialist audience – developing skills that could be invaluable throughout their careers.'

The contestants' only aids are their extensive knowledge, a single infographic, and a 10-second warning. Anyone still speaking at the bell is disqualified. No pressure!

Six graduate students accepted the challenge, describing their research to an audience of their peers, Fellows and alumni. Topics ranged from the history of English typefaces to the modern banking system. They all revealed some remarkable research being conducted at Exeter College, and delivered brilliant, interesting, and highly condensed talks.

A judging panel made up of Jeri Johnson (Peter Thompson Fellow and Tutor in English), Professor Garret Cotter (Fellow and Lecturer in Physics) and alumnus Bill Westwater (1986, Modern History) chose the winner and runner-up, while the audience voted for the 'People's Choice' award.

The judging panel's winner and the recipient of the People's Choice award was Rina Ariga, DPhil in Cardiovascular Medicine, whose talk about Hypertrophic Cardiomyopathy and ways of identifying people with this life-threatening condition was superbly delivered. You can read a transcript of her talk on the opposite page, or listen to the talks online at www.exeter.ox.ac.uk/3MT.

We look forward to building on the success of this inaugural event, as it is such a marvellous platform to show off Exeter's research stars of the future and demonstrate the phenomenal support that our postgraduate students receive. Next year's competition will be held on 9 May. Keep a look out for further details if you would like to participate or attend.

Predicting risk with a heavy heart

Rina Ariga (2012, Cardiovascular Medicine) shares her prize-winning presentation from the College's inaugural Three-Minute Thesis competition

They say a heavy heart can bring you down. Your heart keeps you alive. It beats 100,000 times in a day without any breaks. But it's only the size of your fist, and it weighs less than a small loaf of bread.

One in 500 of us has a heavy heart, and a heavy heart can stop suddenly. We hear the tragic news of teenagers, footballers, actors dying suddenly in the prime of life and at post-mortem they all have exceptionally heavy hearts which are thicker than normal.

This disease is called Hypertrophic Cardiomyopathy, which is Greek for abnormal overgrowth of the heart muscle, and it is the number one cause of sudden cardiac death in the young worldwide.

The good news is that we can abort sudden cardiac death by implanting a device to kick start the heart. But only 10% ever receive an appropriate shock, and you are much more likely to have a device complication. So we need better ways to identify who really needs a device.

The hallmark of these hearts among patients who have died suddenly is fibre disarray. Under the microscope, the muscle fibres are bizarrely arranged and disordered, providing a perfect focus for an abnormal rhythm to stop the heart. But of course, we can't use disarray to assess risk because it is only seen at post-mortem.

My DPhil research has been about finding a way to measure disarray in living people. I have done it by borrowing a magnetic resonance imaging (MRI) technique from neuroscience, which is used to map the path of nerve fibres in the brain.

But it is easy in the brain because the brain does not move. We have to deal with the heart which beats constantly. We have modified the technique and we are now able to measure reliably fibre alignment in the heart. What I found was that people with disorganised muscle fibres in the heart had a two-and-a-half-fold increase in dangerous heart rhythms that can lead to sudden death.

This is an important finding which could potentially improve assessment and survival in this common yet heart-breaking disease.





Behind the classics

Zerlina Vulliamy (2017, Music) has been challenging listeners' preconceptions about 'classical' music – and interviewing some big names – with her new radio programme

I have always been someone who advocates listening to all kinds of music, whether it be classical, jazz, rock, pop; the list goes on. In today's world, it takes mere seconds to access all the music you could ever want on streaming services like Spotify, yet we still get into a rut of listening to the same type of music all the time. Whilst there is nothing wrong with knowing what you like to listen to, I often find myself bridging a large gap between Beethoven purists and funk fanatics, with one group believing their taste is more 'legitimate' than the other's.

This, along with my interest in broadcasting, is ultimately what led me to set up my own radio show, *Behind the Classics*, which is broadcast every Sunday morning on Oxide Radio. The aim of the show is to play 'classics' from every genre, as well as music related to the 'classics', and provide background on the tracks. Interestingly, despite always taking an eclectic approach to the music choices, I discovered that the best format was to give each episode a theme, for example 'greatest intros' or 'best love songs', as well as occasion-based themes such as International Women's Day. In doing this, a huge variety of music can be incorporated under one simple banner.

The reception from listeners has been fantastic, with classical purists declaring to me their newfound interest in hip hop and pop fans asking me personally to send them classical music recommendations.

After the ninth episode of the show I thought it might be interesting to vary the format, which led to my interview with the renowned pianist, Joanna MacGregor OBE. She has somewhat strayed from a traditional career, recording everything from Bach to jazz to electric music, hence my interest in interviewing her. She was an absolute delight, sharing details about her career but also insightful opinions on the future of the music industry, especially for young people. This was certainly a step up for *Behind the Classics*, as the interview was unscripted yet we managed to focus on the brilliantly diverse recordings Joanna has made.

After recording 14 episodes, I am still looking to introduce my listeners to new music, whilst playing some old favourites. It has been a pleasure to make the show and I look forward to its third season, where hopefully I will talk to some more special guests and, as ever, look behind the classics.

To listen to *Behind the Classics* visit www.oxideradio.live/behind-the-classics.



A chorus of approval

A new album, a tour of Estonia and a performance at St Paul's Cathedral are among the year's highlights for Exeter's choir and **James Short** (2017, Music), Organ Scholar

Exeter College Chapel Choir continues to thrive and cement its position as one of the leading collegiate mixed-voice choirs in the country. Much of our work this year has focussed on the production of an album featuring a variety of music by composers from Eastern Europe and the Baltic States. A Mass for female voices is included, paying tribute to the two decades or so the choir has been mixed.

For many in the choir, recording an album was a new experience, yet the intense recording schedule in the week before Hilary Term did not stop them from singing to the best of their ability. The theme of the album inspired our 2018 summer tour to Estonia, where the choir performed in the churches and cathedrals of Tartu and Tallinn during a week-long visit.

Other highlights of the year included a Festival Evensong in October to celebrate the Quincentenary of Luther's 95 Theses; the choir performed one of JS Bach's most joyful cantatas, *Nun danket alle Gott* with the

renowned Oxford Bach Soloists. In May, the choir performed a candlelit concert of French choral greats to a packed chapel (despite the poor weather), led by our outgoing Parry-Wood Organ Scholar Bartosz Thiede (2015, Music), and accompanied by myself, as Junior Organ Scholar. In August the choir sang Evensong at St Paul's Cathedral: a challenging, but amazing experience considering it is over five times the length of the College Chapel!

All those involved with the choir recognise the huge contribution Bartosz has made during his tenure as Senior Organ Scholar, and the quality of music making throughout the year has reflected this – we wish him all the best. We look forward to next term, where our celebration of CHH Parry, Exeter alumnus and composer of some of the best-loved works in the British choral repertoire, continues. The choir will travel to Harrogate to perform a selection of Parry's works alongside local orchestras and choirs to mark the 100th anniversary of Parry's death.

FitzHugh Auditorium stages its first student production

From *Punk Rock* in the Chapel to *Psychos* in Cohen Quad, the creative arts are flourishing at Exeter, reports **Natacha Lee** (2016, French), JCR Music, Arts and Drama rep

The exceptional enthusiasm and talent of Exeter's students made acting as their Music, Arts and Drama (MAD) representative this year particularly enjoyable. Students participated keenly in artistic activities such as sketching in the Fellows' Garden and arts and crafts workshops organised in conjunction with Exeter's welfare rep, Kyra Birkett. They also shared their musical talents at open mic nights, including an international music night organised with charities rep Emily Balkwill in aid of the British Heart Foundation, and at a chamber music recital in the Rector's drawing room.

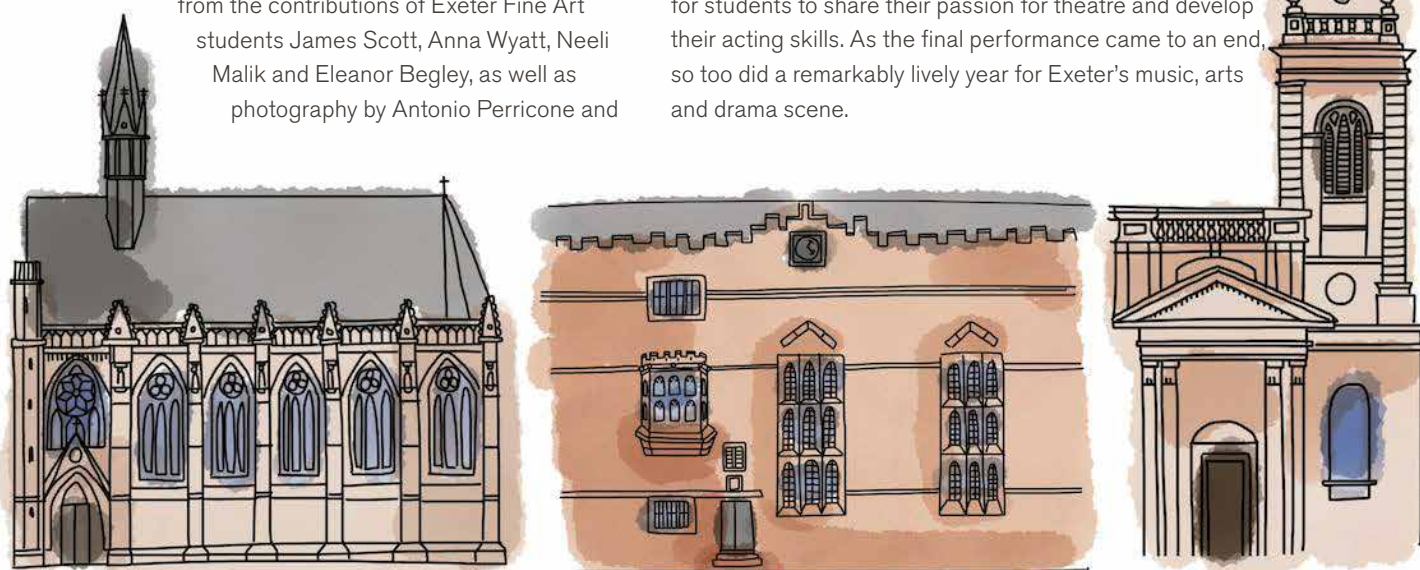
In Hilary, Exeter collaborated with Lincoln and Jesus colleges to stage this year's Turl Street Arts Festival – the first to span two weeks – with a wide range of music, visual art, dance, drama and literature events. At Exeter, we organised a tour of the College's Pre-Raphaelite heritage, which made the Chapel and the newly-refurbished Morris Room open to the public, and a speed-drawing workshop in the bar. Exeter's Chapel was also the venue for a production of the play *Punk Rock*, organised by Abby McCann, and a rendition of Mozart's *Requiem* at the festival's opening ceremony, organised by the music team which included Exeter students Francesco Galvanetto and Emily Boyle.

The festival's general exhibition benefitted from the contributions of Exeter Fine Art students James Scott, Anna Wyatt, Neeli Malik and Eleanor Begley, as well as photography by Antonio Perricone and

The FitzHugh Auditorium provides a marvellous stage for students to share their passion for theatre

paintings by Alice O'Neill. Meanwhile Exeter's literature team, including Bea Alabaster and Adam Takar, delivered a script writing workshop and a 'collective zine' workshop, during which students collaborated to produce a magazine of artwork in response to the theme of 'the new year'.

In Trinity the Turl Street Arts Society delivered its main event of the year: the production of a short play – a thriller called *Psychos Inc.* – written and directed by Vanessa Lee and starring Exeter's incoming MAD rep, Joshua Clarke, as well as Exeter students Emily Balkwill, Alice Wilson and Adam Takar. This was the first student theatrical production to benefit from the amazing performance space offered by the FitzHugh Auditorium in Cohen Quad, a marvellous stage for students to share their passion for theatre and develop their acting skills. As the final performance came to an end, so too did a remarkably lively year for Exeter's music, arts and drama scene.



The Turl Street Arts Festival brings together students from Exeter, Jesus and Lincoln colleges



The team's camaraderie helped drive them to success

Women's football team secures promotion at first attempt

Exeter's women's football team went from crushing defeat to sweet success in the space of their first season, reports **Lina Cox** (2016, Chemistry)

At the start of this year, with only four members, it would have been easy to fear the worst for Exeter's newly formed women's football team following their split from St Hugh's last year. A frantic recruitment drive ahead of the opening fixture against a combined Christ Church-Oriel eleven ensured a full team was assembled, mostly complete novices.

Despite a spirited performance, inexperience led to a crushing 10-0 defeat. Bearing in mind that forfeiting the game by failing to field a team would have been recorded as a 5-0 loss, this was not a great start to the season!

Nevertheless, the team spirit, sense of fun and slim glimmers of quality football were enough to spur us on. Training sessions and the developing camaraderie amongst the team helped to improve performances on the pitch, with margins of defeat reducing every week.

Freshers began to make a name for themselves, with consistently strong performances from stalwart defender Ashleigh Morgan and tenacious winger Vicky Matthews. Visiting students from Williams College also had a huge impact. Evelyn Elgart was a constant creative presence and Lina Velcheva – a University Blues team player – added an extra touch of class.

With Maddy Tomlin bravely laying herself on the line to protect Exeter's goal, the side's first victory seemed inevitable. It came, eventually, in a hard-fought 4-2 win against Magdalen.

Victories against a combined Balliol-Regent's side and Emmanuel College, Cambridge, in our Varsity trip, built up great momentum for the season's final fixture against St Hugh's, our old teammates. A win would guarantee promotion.

Exeter scored first, but St Hugh's quickly equalised. Within the final few minutes a penalty for Exeter

was converted to secure victory and promotion at the first attempt for Exeter's ever-improving side.

The ecstatic celebrations that followed demonstrated clearly that Exeter's women have not only grown into a force to be reckoned with in college football but a great social club and a welcoming group for anyone who wants to try something new.

The men's football teams have also had good seasons, with all teams successfully maintaining their top-flight status. Sean Gleeson captained the first team to the Cuppers semi-final, the second team came runners-up in the Reserves First Division, and the MCR team finished fourth in the MCR First Division. This year the club will lose many valued members, not least former captain and this year's Blues' captain Alex Urwin. However, with many strong second and first years ready to step up, the future looks positive for all branches of Exeter College AFC.

Battling the 'Beast from the East'

Sub-zero temperatures couldn't stop Exeter's rowers enjoying one of their most successful seasons in years, writes

Matt Holyoak (2015, History)

Exeter College Boat Club continued its excellent run into 2017-18. An impressive intake of freshers in Michaelmas set the tone for the year, and success began with the men's squad seizing a victory at Nephthys regatta, closing with a win by two thirds of a length against a strong Corpus Christi boat.

The most dramatic period of the season coincided with Torpids, the second biggest event of the calendar. The 'Beast from the East' struck in the middle of the regatta, and biting temperatures of minus 10 degrees forced the cancellation of racing on the second and third days. This was particularly unfortunate for Exeter,

who had enjoyed a promising start to the week. All three crews had bumped on the opening day for the first time in decades. The men's first boat still managed to do astonishingly well in the truncated event, moving up five places, the biggest rise of any crew on the river.

Trinity term saw more pleasant conditions for Eights. We entered four crews: two from each gender. A strong women's first eight, with returning lightweight Blue Grace Hanna, managed to hold their position over the week. Meanwhile the women's second boat was locked in a see-saw battle with Magdalen III for three days and was extremely unfortunate to suffer a medical

crisis on the Saturday that saw them overbumped by St Catherine's II.

The men's first boat was unlucky to miss out on blades, denied a bump on day two by a weak Brasenose boat succumbing to Merton. Special mention, however, must go to the long-suffering Exeter men's second eight, who achieved their first bump since 2010, ending their undesired reign as the most unsuccessful crew on the river.

The future looks bright for Exeter's rowing programme, and the impressive attendance of past crews at the annual Eights dinner is testament to the strong connections the club retains with its members.



The women's first boat



The Cuppers finalists

Promotion for men's rugby team

Ravi Ghosh (2015, English) reports on a successful season for the men's and women's rugby teams

This year, for the first time, women's rugby Cuppers was played over a whole term, prompting the establishment of Turl Street RFC, a historic development resultant from the tireless work of Exeter Blues winger Lucy Fenwick. Success followed against Keble and

Emmanuel College, Cambridge in an impressive opening campaign in which Jess Quirke was the standout performer.

In the men's club, a series of strong performances secured promotion from Fourth to Third Division, with the team sheet

revealing the strength of competition running through Exeter. Fresher DPhil candidate Ollie Beeke provided fearsome strength in the backline whilst undergraduate freshers Messrs Talbot, Willoughby, Osborne, Anderton and Hopkins bolstered the team.

An early Cuppers victory against Oriel and a pulsating encounter against new neighbours Worcester set up perhaps the moment of the season in a semi-final against Balliol, in which Exeter sport's ubiquitous Giles Dibden kicked a penalty at the death to send Exeter into the Cuppers Bowl final. Although unfortunate to lose to our old rivals Pembroke in a close final, the season was an undoubted success overall and bodes well for the future of Exeter rugby.

Sports round-up

By **Seb Talbot** (2017, Chemistry)

In Hilary around 80 Exonians braved an early start to travel to our sister college in Cambridge, Emmanuel, for the annual 'Varsity' sports day. The day began with a narrow loss at netball, despite the best efforts of Exeter's Will Dobbs, who used his near-mythical height to pluck balls out of the sky.

Unfortunately Exeter's losing streak continued in men's rugby, hockey and football. Thankfully all was not lost: Exeter's women were victorious at football, largely thanks to Vicky Matthews's heroic hat-trick. Combined with a win in women's touch rugby and draws in squash and

lacrosse, Exeter's battered pride was salvaged even as Emmanuel retained the trophy.

In the spirit of the day, people tried their hands at sports they had never played before, and afterwards members of both colleges celebrated the occasion.

Elsewhere in the Exeter sporting year Cuppers wins in sailing and badminton, and successes in football, rugby and rowing, show that Exeter remains a college with sporting talent and spirit.

ĦĖRĖ bĖ DRĂGONS

Will Bearcroft (2016, Classical Archaeology and Ancient History) experiences the 'Tolkien: Maker of Middle-earth' exhibition at the Bodleian

Exeter alumnus JRR Tolkien created a world in which, when reading of its landscapes and peoples, it is easy to lose oneself. The Bodleian Library's exhibition 'Tolkien: Maker of Middle-earth' is a testament to the astonishing realism and vivacity with which Middle-earth was dreamt, its detail and scope.

The exhibition's great achievement is the insight it provides into Tolkien's creative process. When creating Middle-earth, he found it useful to produce watercolours and sketches, as well as written words, to bring his fantasy world to life. One of Tolkien's maps of this fictional landscape is on display which, loyal to the precision of his imagination, he referred to frequently as shown by its tears, creases and a burn mark from his pipe. A three-dimensional version of this map stands at the centre of the gallery, across which the epic journey of the hobbits Sam and Frodo has been carefully charted, their steps even dated, obeying every contour of Tolkien's terrain.

Integral then to the plotting of his stories was Tolkien's attention to detail, enabling him to fit a fantasy narrative within a universe meticulously defined. Lining one side of the room are watercolours of the fearsome dragon, Smaug, a hobbit drifting along a river aboard a wine barrel, and a giant eagle standing guard over a hobbit next to a precipice. Displayed on the opposite wall is what is, for me, the most appealing element of detail added by Tolkien to Middle-earth: the 'Book of Mazarbul'. The book describes an historic battle between dwarfs and orcs and, years after it was written, is found by Frodo and his companions inside the Chamber of Mazarbul during events set out in *The Lord of the Rings*. To increase its verisimilitude Tolkien hand-wrote fragments of the book using runes from a variety of his invented languages, then ripped, burnt and stained the pages so that only part of it is legible. I noted then that Tolkien not only created a world of detail, but also one of mystery.

Using his knowledge as a medievalist he erased parts of Middle-earth's history in much the same way that lost or severely damaged ancient texts in our world can darken our

understanding of the past. More exciting even than a wealth of fantastical details was the tantalising notion of a history just as fascinating, but largely lost.

I left the exhibition half believing in Middle-earth's existence, such was the care with which it was constructed. Tolkien penned entire languages and summoned cultures into being (I was particularly amused to see his doodling on a newspaper cutting, which he later incorporated into his legendarium and ascribed to artefacts from the Númenorean civilisation from Middle-earth's Second Age). From the accumulation of these creative details the enduring popularity of his works is easy to understand, with their extraordinary richness

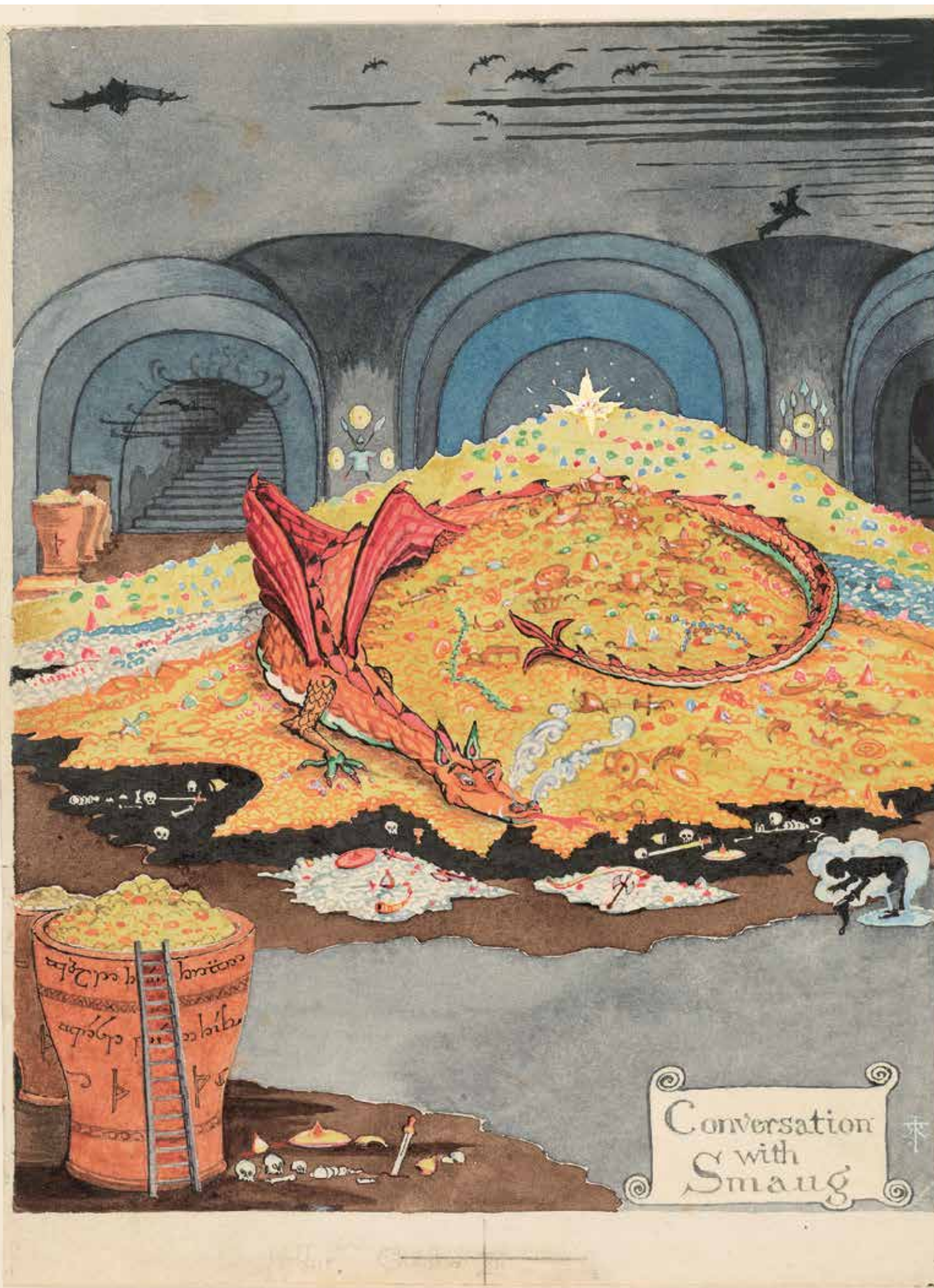
and texture. Amazon Studios is hoping to benefit from that popularity by creating a television series – predicted to be the most expensive ever created – which will depict events in Middle-earth preceding those described in *The Lord of the Rings*. Though sceptical of this at first, the

I found myself wishing Middle-earth truly existed, save perhaps for its giant spiders

exhibition gave me reason to think there are parts of Middle-earth and its history worth visiting that are yet to be explored on screen. The forthcoming biopic of Tolkien's life starring Nicholas Hoult promises to provide further insight into Tolkien's life and mind, and will feature scenes filmed in Exeter College. I was able to observe a scene between Hoult and Derek Jacobi being filmed in the front quad. Despite straining to hear Hoult's dialogue I could only catch the word 'symbolism', so I look forward to seeing the film's treatment of Tolkien when it is released.

The imaginative capacity of Tolkien had impressed me before my visit to 'Tolkien: Maker of Middle-earth', and amazed me afterwards. As I left the exhibition I found myself wishing Middle-earth truly existed, save perhaps for its giant spiders.

Tolkien: Maker of Middle-earth is free to visit at the Bodleian until 28 October 2018. To pre-book tickets visit tolkien.bodleian.ox.ac.uk.





Nicholas Stern, Martin Scorsese, David Neuberger, Helga Nowotny, Mary Beard, Robert Putnam and Matthew Bourne

Goodfella honoured

Legendary film director Martin Scorsese, renowned classicist Professor Mary Beard and celebrated choreographer Sir Matthew Bourne were among the University's distinguished honorands this year, reports **Shreyus Ganesh** (2017, Economics and Management)

Encaenia, from the Greek for 'festival of renewal', is the ceremony in June at which the University awards honorary degrees and commemorates its benefactors. Distinguished University officials, honorands, and their guests assemble in full academic dress for Lord Crewe's benefaction in Exeter's Fellows' Garden, before a formal procession to the Sheldonian Theatre for the ceremony itself.

This year the seven honorands represented an eclectic cross-section of human endeavour, from renowned classicist Professor Mary Beard to Lord David Neuberger, former President of the UK Supreme Court. The social sciences were represented by leading economist Lord Nicholas Stern, political scientist Professor Robert Putnam and sociologist Professor Helga Nowotny. Prolific film-maker Martin Scorsese and choreographer Sir Matthew Bourne were also awarded honorary degrees.

The ceremony acquired its current form in the 18th century, when Lord Crewe, a former Rector of Lincoln College, left money in his will to fund it. Inside the Sheldonian, honorands are introduced with an address by the University's Public Orator in Latin. As the English language has accumulated neologisms, writing the address

has surely become more of an art: this year the phrases 'blog', 'career mobster', 'Goodfellas' (one of Mr Scorsese's films) and 'Sleeping Beauty' (a play choreographed by Sir Matthew) were among those rendered into Latin.

First to receive their honorary degree was Lord Neuberger, 'a brilliant legal authority, a friend of Justice and of the people who respect her'. Lord Neuberger was awarded the honorary degree of Doctor of Civil Law in recognition of his distinguished career in the judiciary, culminating in his presidency of the UK Supreme Court. He was praised for rulings that 'defy political labelling, yet clearly show his respect for human rights and a detestation of tyranny': surely some of the highest praise that can be bestowed upon anyone in the legal profession in these politically polarising times.

The next recipient, Professor Mary Beard, was lauded as 'our country's best-known classicist,' whose publications are 'wonderfully numerous and multifarious' and admitted to the honorary degree of Doctor of Letters. She is Professor of Classics at Cambridge University, a Fellow of Newnham College, Cambridge, and combines her academic duties with the role of Classics Editor for the *Times Literary*

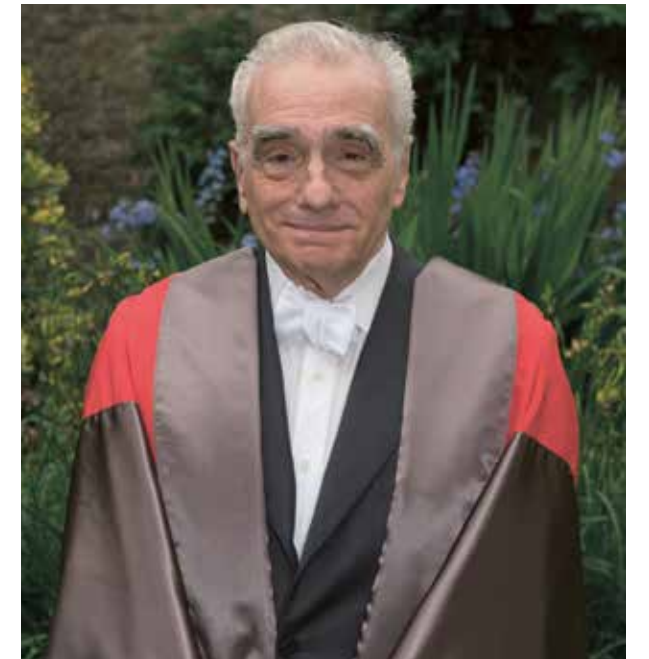
Supplement. Professor Beard's expertise is internationally acknowledged; her work on humour in Roman literature has generated a new field of enquiry for scholars. Fortunately the Latin speeches by the Public Orator appear to have passed muster; on her *TLS* blog Professor Beard remarked that 'the speeches in Latin about each of the honorands are appropriately witty'. Professor Beard engages with complex themes and research – but also with the general public. Her books are popular, as are the numerous television series she has presented on the ancient world.

While Professor Beard has specialised in bringing the ancient world to life, other honorands have dedicated themselves to the analysis of the modern world. Professor Helga Nowotny was described as a 'voice of international importance' in the Social Sciences – and one who cannot be easily pigeonholed into a single discipline. As a founding member, and then president, of the European Research Council, as well as chair of the European Research Advisory Board of the European Commission, she has explored the relationship between intellectual exploration and social utility in scientific research, and provided advice to the EU and many national governments on innovation policy.

Political science was represented by another honorand, Professor Robert Putnam, now Professor of Public Policy at Harvard. After a Fulbright fellowship at Balliol College, Professor Putnam conducted research into social capital. His influential 1995 book *Bowling Alone: The Collapse and Revival of American Community* argued that the decreasing membership of mass social organisations, such as the titular bowling leagues, was a key factor in the declining effectiveness of American democracy. He argues that 'liberty and fraternity are mutually supportive,' and that to improve participation in democracy, it is necessary to once again see Americans involved in public life.

Turning to the creative side of human endeavour, Sir Matthew Bourne, 'a peerless artist and nurturer of theatre,' was admitted to the honorary degree of Doctor of Letters for his choreography of ballet and musical theatre. Sir Matthew came to dance at a comparatively late age, starting formal training in ballet aged 22. After dancing professionally for 14 years he now choreographs productions. Sir Matthew has been the creative force behind productions of *Nutcracker*, *Swan Lake*, *Mary Poppins* and *Sleeping Beauty*, among many others. Already a seven-time Olivier Award winner, Sir Matthew is also the only British director to have won Tony Awards for Best Choreography and Best Direction of a Musical.

Perhaps the most renowned of this year's honorands, admittedly in a highly competitive field, is Martin Scorsese. An American film-maker with a career spanning six decades, Mr Scorsese's output is prolific. He has directed films such as *Taxi Driver* (1976), *Raging Bull* (1980), and *Goodfellas* (1990), which have become acknowledged landmarks in cinematic history. Rather than simply providing entertainment, Mr Scorsese has, the Public Orator related,



Martin Scorsese ahead of Encaenia

used film as 'a means of understanding and eventually expressing, what is precious and fragile in the world around him'. His films explore the themes of 'misplaced self-belief, trust and loyalty'. Mr Scorsese has also turned his attention to preserving the works of others: in 1990, in partnership with fellow film-makers, he co-founded the Film Foundation, which has since restored over 800 films from different eras and genres.

The final recipient, Lord Stern, had a distinguished career as an economist, serving as Chief Economist at the World Bank and producing the Stern Report, a landmark review of the economics of climate change. Lord Stern has also taught at a wide range of universities, including Oxford and MIT, he has been President of the British Academy, and is now chair of the Grantham Research Institute at LSE. As such, Encaenia concluded by admitting to the honorary degree of Doctor of Letters a 'scholar and great practitioner in the great tradition of economists' whose work looked towards the challenges of future decades.

While Encaenia appears to be simply another atavistic ceremony in a university known for its veneration of tradition, the list of honorands this year, and that from previous years, shows us that it is far from an irrelevant custom. Rather, while the achievements of the recipients range from film-making to economics, from ancient to modern societies, they are united in their magnitude and, more importantly, their relevance. Encaenia seeks not only to commend achievement, but more importantly, to show respect to great minds who have chosen to give back to society with creativity and with wisdom. This is perhaps the most important message from the event: in times of growing mistrust and anti-intellectualism, it is crucial that we continue to celebrate those brilliant minds who have, each in their own way, made the world a slightly better place.

One giant leap for innovation



The Oxford Foundry provides a space for entrepreneurial students to share ideas and be inspired



Evan Sharp, co-founder of Pinterest, shares his experiences with students

Thomas Hunt (2016, PPE) visits a ground-breaking student hub where new entrepreneurs are nurtured and the world's most successful ones welcomed

Exposed brickwork, leather sofas and a 'start-up accelerator' are not the typical contents of a University of Oxford building. Yet these can all be found at the University's new entrepreneurship hub, the Oxford Foundry, which opened its doors for the first time in October.

Located in a converted factory on Hythe Bridge Street, equidistant from Nuffield College and the Saïd Business School, the Foundry is at the heart of the city (recent alumni may remember the Foundry's building from its previous incarnation as the Wahoo nightclub). Speaking at its launch event, the Vice-Chancellor Professor Louise Richardson noted the contrast between the Foundry's aesthetic and that of Oxford's traditional colleges. But, she continued, in substance the Foundry is continuing the work of realising the University's aims of educating the next generation and advancing society. By encouraging entrepreneurship, the Foundry sits within Oxford's tradition of providing education and innovations that impact society.

The Foundry has set itself the ambitious goal of helping the University's 23,000 students become more entrepreneurial. They can attend workshops on anything from public relations to blockchain technology, or take

part in an 'accelerator' scheme (open to companies that have been founded or co-founded by an Oxford student, alumnus or member of staff), which connects start-ups with advisors and investors to aid their expansion. Networking opportunities and chance encounters can also spur entrepreneurship, so the Foundry building incorporates a café and other social spaces.

Entrepreneurship will not develop in a vacuum, so a key aspect of the Foundry's efforts to date has been arranging speaker events with successful business leaders. Tim Cook, CEO of Apple, spoke at the Foundry's launch event and Evan Sharp, chief product officer and co-founder of Pinterest, an online bookmarking service, was interviewed in front of a substantial audience in June by Ana Bakshi, Oxford Foundry Director, and Esther Agbolade, President of the Oxford African and Caribbean Society.

Upon hearing Tim Cook and Evan Sharp speak I was struck by the similarities between the experiences they described and the lessons their experiences offered. Cook joined Apple when the company was at its nadir in the late 1990s, encumbered with an antiquated operating system and falling revenues. His decision to join Apple was

a case of following his intuition rather than logic, given that many contemporary observers expected the business to fold imminently. Sharp gave up a job at Facebook, with the concomitant loss of a secure income, to found Pinterest in 2009. He too acknowledged that this was a risky move: the global recession had severely curtailed tech companies' ability to raise capital and Pinterest's future revenue stream was uncertain. While economic rationality may have counted against becoming an entrepreneur, Sharp said he was motivated by his 'love' of designing Pinterest, which had begun the previous year as a hobby project.

If their career decisions stemmed from being prepared to follow their intuition over economic rationality, this appears to be symptomatic of a broader ambition that both men share. They are both driven by the satisfaction that comes from, in Cook's words, 'serving humanity'. In Cook's case this drive stems in part from seeing his father, a shipbuilder, go to work at a job he disliked but needed to support his family. For Sharp, Pinterest's aim is to connect people with their passions and interests. A cynic might question whether this is entirely true, given Apple and Pinterest's buoyant revenues, but for Cook and Sharp the idea that their innovations benefit society has always been integral to their vision. Both spoke of the satisfaction they derive from customers using their products, with Cook admitting that he begins most days by reading customers' emails. It is experiences like these – interactions with customers – that sustain Cook and provide him with 'unbelievable medicine'.

Both men argued that success requires resilience in the face of adversity. Sharp recounted Pinterest's struggles to raise any capital from external backers in its first years of operation. In the end funding was only secured after a fellow co-founder resorted to following venture capitalists around the New York subway and accosting them. When asked about his attitude to failure, Cook shared his belief that failures, while inevitably painful, are also learning opportunities.

While resilience in the face of adversity may make a person successful, both men suggested that it is diversity that makes teams successful. For Cook, successful teams emerge when people from disparate backgrounds are united by a common goal to change the world. That belief is echoed by a key aspiration of the Foundry: it not only aims to promote entrepreneurship amongst Oxford students, but also to improve female participation in start-ups and leadership



Students collaborate on their business ideas

roles. The figures at present are dire: less than 20% of venture capital backed start-ups have any female founders, a statistic that has remained stubbornly consistent since the early 2010s. Ms Bakshi attributes this underrepresentation to, amongst other issues, societal expectations about how women should behave and a lack of role models for women to follow. To help remedy this, the Foundry runs workshops for female founders and is establishing a network of female entrepreneurs to provide mentorship.

Start-ups that have entered the Foundry's accelerator scheme include Util, a technology company that measures the financial and non-financial value companies create and erode, enabling asset managers to make more responsible investment decisions; enRecover, which uses smartphone technology to help patients with postoperative physiotherapy and medical care; Scoodle, an app that connects students with tutors so they can receive the best possible tuition no matter where they are; BreatheOx, which is developing a home monitoring system to predict and prevent asthma attacks; and EcoSync, co-founded by Exonian Yoav Gross (2016, Environmental Change and Management), which integrates software and hardware solutions to reduce the energy consumption of organisations such as schools and businesses. Through support for start-ups like these, as well as education and engagement opportunities for students who want to become more entrepreneurial, the Oxford Foundry is helping the University in its aims to educate and advance society. It is already possible to imagine that a future generation of acclaimed entrepreneurs will have been inspired and nurtured within the Foundry's exposed brickwork walls.



THE REVOLUTION WILL NOT (JUST) BE TELEVISIED

Jon Gisby (1987, Modern History), Chair of the British Screen Advisory Council and MD of WildBrain, one of the world’s leading digital distributors of children’s content, contemplates the meteoric rise of on-demand video and a perfect storm encircling traditional broadcasters

The CEO of Ofcom, speaking to the Oxford Media Convention in 2011, memorably declared that ‘television is becoming the cockroach of the internet apocalypse...its resilience is conspicuous at a time of turbulent change.’ His opinion reflected the perception that while other content industries such as music and publishing had been transformed by disruptive innovation, broadcast television had remained robustly unchanged. The impact of new technology on TV broadcasters had largely focused on making their content and channels more available, their visual and audio quality a little better, and opening up new revenue streams from subscriptions.

Fast forward a mere seven years and things look very different, with some dramatic shifts in viewing behaviour. Younger audiences are the canaries in the broadcasting coal-mine, with linear viewing declining by 40 percent in the last five years. Meanwhile subscription video services have grown from their launch in 2012 to be in almost 40 percent of UK households, and ‘Netflix’ has almost become a category defining word like ‘Hoover’ and ‘Xerox’ were a generation ago. YouTube is now the world’s second biggest search engine and a more recognised brand for some younger audiences than the BBC or ITV. As one ad agency CEO recently put it to me, ‘Broadcasters have been deluding themselves that people have been watching television...they’ve been watching video on a screen, and they can now get it from a whole range of new sources and services.’

The underlying technological enablers to these changes have been around for a while, but their cumulative and collective impact has only become significant in the last five years. Ubiquitous broadband and cloud computing

have made content securely available, everywhere, and at increasingly low cost. Tablets and smartphones have dramatically increased the number of available screens and changed viewing from being a shared experience to an increasingly fragmented and personal one. Machine learning has transformed the way that insights about audience behaviour are gathered, used and monetised with commissioning, investment and editorial decisions becoming increasingly influenced by data. Artificial intelligence is starting to change the way that content is created, with algorithms already being used to generate experimental versions of cartoons such as *The Flintstones*, and services such as London based JukeDeck creating original music without needing composers. Finally, social media has enabled audiences to discover and share content at scale, with viewers increasingly getting recommendations from their taste-makers and friends alongside schedulers, editors and critics.

The rapid adoption of these technologies has created a perfect storm for traditional broadcasters. Their scope, scale and business models have historically been constrained by the laws of physics that determine the airwaves, and by the usually well-intentioned interventions of politicians and regulators. But traditional broadcasters are now facing a period of rapid challenge and change characterised by the fact that while most of these old rules still constrain them, they are not applicable to the new range of innovators they compete with. Netflix has been commissioning and acquiring shows in the UK with budgets that local broadcasters cannot match, but unlike traditional terrestrial broadcasters it has no regulatory

requirements to invest in certain types of programmes, nor ensure that its shows are either made in the UK or are representative of its culture. Amazon’s video services are now estimated to be in four million UK households, and they are commissioning shows (*The Grand Tour*, formerly *Top Gear*) and acquiring sports rights (the US Open tennis) that would previously have been broadcast. YouTube is increasingly the go-to destination for whole categories of traditional TV content for



The ‘Hold the World’ app from Sky uses virtual reality to transport viewers to London’s Natural History Museum

example for school-age children, music fans and lovers of niche sports. Facebook and Apple are working on video services that will have similar global scale and are already competing for the best new content creators and ideas, and the rights to the best archive shows and movies. And their global scale ensures that they can invest far more in the productions they commission, raising the expectations of audiences and the prices of suppliers in parallel.

At the other end of the scale, new niche services are sprouting that focus on specific audience groups, many of them based in the UK. History buffs can subscribe to Dan Snow’s HistoryHit.tv, documentary fans to Docsville, parents of preschool children to Hopster or Highbrow and die-hard royalists to TrueRoyalty.tv. HQ Trivia has exploded into the UK and US markets, gathering live audiences of millions to an interactive, hosted quiz show that can only be played on a smartphone. It was created by entrepreneurs rather than TV execs, and there is at least one group of current Oxford students that has won thousands of pounds by pooling their collective knowledge every night in their JCR. Augmented reality, where content is superimposed on the real world via an overlay on a tablet or smartphone, is rapidly coming of age, with some forecasts suggesting there will be more than three billion devices this year (you’ve got one, in your pocket) and with one recently launched AR app reaching \$500 million in revenue within 60 days of launch. Virtual reality is developing more slowly because of hardware constraints, but it is becoming more widely used by content creators. Mainstream journalists at the BBC, Sky, *The Guardian* and the *New York Times* are capturing VR footage in the field. MelodyVR has launched with a global library of thousands of live performances from mainstream artists. And the astonishing and engaging storytelling of David Attenborough’s ‘Hold The World’ app on the Sky VR store shows what’s now possible in factual and education.

Our diet of audio-visual content used to be shaped by a handful of individuals who ran major TV and radio stations, and they still have a powerful role to play. But anyone following the investigations by journalists and the Commons

Digital, Culture, Media and Sport Committee into ‘fake news’ will know that the content presented to us is now shaped by powerful technology whose influence can be difficult to spot. Visits to websites are tagged and tracked by dozens of third parties who are recording and analysing our behaviour and preferences to ensure advertising and other content can be better targeted (try Ghostery if you don’t believe me). Our Netflix viewing is analysed in detail so that we can be presented with content selections from the (at least) 80,000 categories defined in its catalogue. Every YouTube video view will trigger a suggestion for videos based on a complicated and opaque combination of preferences, recommendations and filters. And an online advertiser can now create thousands of versions of the same advert, in real time, and target them at individual consumers.

The significance of the innovation and disruption facing traditional broadcasters is a debate that is reminiscent of climate change. If you go to Greenland and stand on a mile of ice it’s perfectly easy to imagine that climate change is not yet having much impact. But if you listen hard enough the torrent of meltwater is easy enough to detect. The financial markets are in no doubt: the global market value of the world’s major media and telecoms companies rose by about five percent between 2014 and early this year, while the S&P 500 rose by 51 percent. Meanwhile the combined value of Facebook, Apple, Amazon, Google and Netflix rose by an astonishing 153 percent over the same period, with their total value surpassing the combined value of all the other players by 50 percent.

As someone who cares passionately about the content available for UK viewers, and the creative economy that produces it, I’m undecided if the current waves of innovation are a net benefit. On the one hand the range and quality of content that is now available has never been surpassed. But as audiences and business models fragment, and the impact of global players intensifies, I wonder if we will miss the days when we relied on a handful of local broadcasters for the programmes that shaped our culture, our politics and our national conversation.





Reporting on Donald Trump's White House is like drinking from a fire hydrant, as Americans might put it. You can barely drink without drowning. The quantity of stories is overwhelming. In fact, the daily decision I face is not whether to file a story for ITV News bulletins, but *which* story.

Even once I'm working on a specific report for *News at Ten* – whether it's child separations along the Mexican border, another incendiary comment from the President, or a foreign policy decision that appears to challenge the world order – the story rarely stays the same throughout the day.

and reaction, there is no time to assess, little scope to evaluate, and barely space to think. In fact, while allegations of 'fake news' are largely spurious, there is a smarter charge to be made against us: that we are victims of impossible deadlines.

So – aware that one theme of this issue of *Exon* is innovation – we need to recognise there is a cost as well as a benefit to the rapid changes that are overtaking journalism.

My first years at ITN, straight after leaving Exeter College in 1985, involved reporting inside the USSR. In those days there were significantly less pressures on foreign correspondents. I was allowed to

today we parachute into a war zone or arrive at a humanitarian disaster and we are expected to file our story within hours, to blog within minutes, and to analyse the situation instantly.

I travelled to Singapore with President Trump earlier this year for his meeting with Kim Jong-un. The opaque nature of North Korean decision-making was lost amid the battle to be the first journalist to file a report from the summit venue. Was it a genuine diplomatic breakthrough or an act of pure theatre? There was no time to assess that key question.

The technical advances in television news are liberating, such as the ability to broadcast live from anywhere in the

Drinking from a fire hydrant

For journalists – despite the assault on their profession from the White House – these are the best of times, says **Robert Moore** (1982, PPE), Washington Correspondent for ITV News

A tweet from @realDonaldTrump, a presidential briefing by Sarah Sanders, a Facebook posting by a local journalist, or a video uploaded onto YouTube by an activist, can suddenly change the news agenda.

That is both the beauty and the curse of reporting in this age of populist tumult. Not only are stories coming at us from all directions, but they are breaking on a wide range of social media platforms. For journalists in Washington, despite the assault on our profession from the occupant of the White House, these are the best of times. Never has quality investigative reporting mattered more.

There is, however, a clear danger. For although journalists are now blessed with instant access to a dizzying array of information

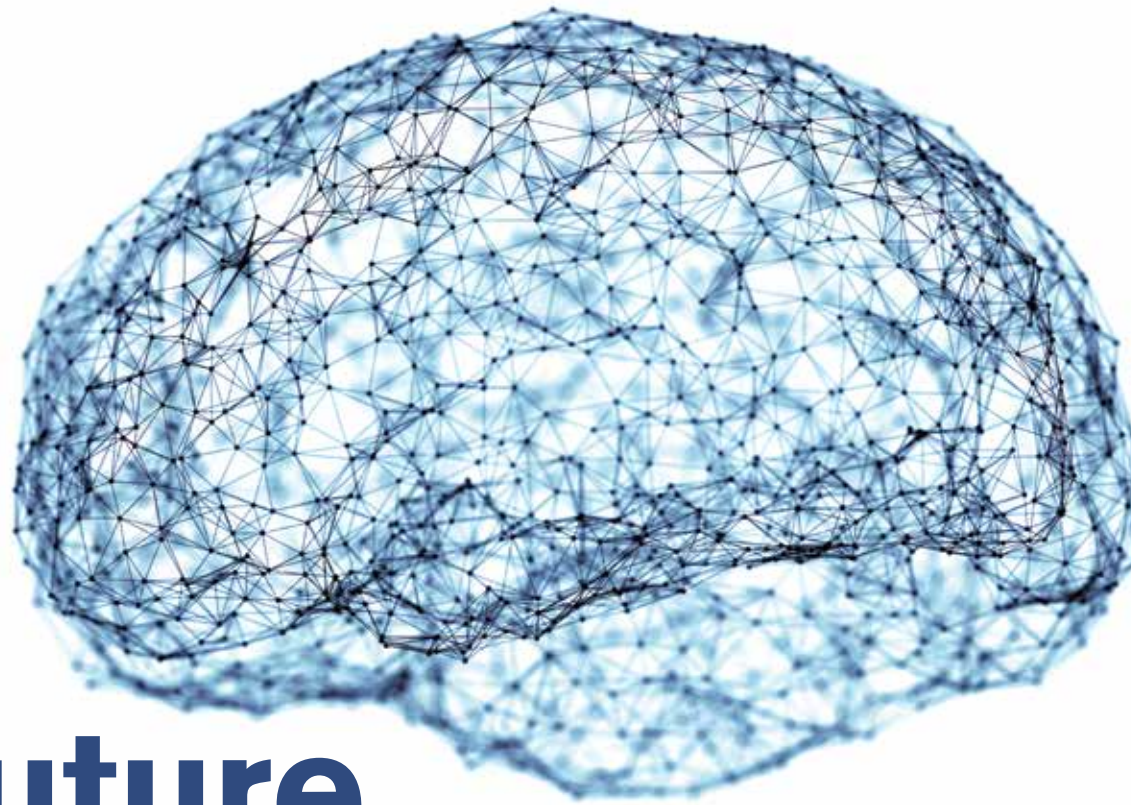
roam the mining towns of the Urals and western Siberia looking for stories. My editors gave me the freedom to investigate the radioactive legacy of Chernobyl, and to explore the ethnic and economic tensions that would soon doom the Soviet Union. There were deadlines to meet, of course, but none of the urgency that drives today's relentless and unforgiving news cycle.

I remember in the late 1980s being assigned to report on the ethnic strife in Moldova, only for my editor to belatedly realise he had despatched me to Mongolia by mistake. No worries, he said apologetically in a telex, perhaps you'll find a story in Ulan Bator in any case.

Back then, there was time to reflect before passing judgement. In contrast,

world with minimal extra equipment. We are more agile than ever before, working with leaner teams and smaller cameras. But the tsunami of unverified information that is circulating threatens to overwhelm us. Twitter has become such a double-edged sword that some of America's best-known political journalists are rejecting it as a tool.

The challenge is to embrace the exciting innovations of this era, especially social media platforms, but to have the courage to acknowledge that we don't have instant answers and to ensure that we carve out enough time to investigate each story. Only then will we have a measured response to the disdain and scorn that the American President expresses towards the 'mainstream media' at every turn.



The future of work

Artificial intelligence will disrupt the workplace, increase prosperity and have a bigger impact than almost any technology yet invented, but it's human creativity and interaction that make life worth living, argues Health Secretary **Matt Hancock** (1996, PPE)

The UK is the biggest destination for tech investment outside of the USA and China. We doubled tech investment in the last year alone. But whilst the enthusiasm for the potential that tech has is unambiguous and is very strong, we also must ensure that we harness it for the betterment of society.

The question of the future of work and the impact of technology on work is a very live one, and I think that it's important that tech companies, big and small, are addressing it. Firstly, we think that the exponential nature of artificial intelligence means that by its nature, by the fact that it learns for itself, it has the potential to have a bigger impact than

almost any technology yet invented. As I like to put it, people talk about accelerating change. I like to think of it the other way round: we are currently living through the slowest rate of change that we're going to experience for the rest of our lives.

At the same time, we are living in an era of record levels of employment, both in the UK and around the world. Recent figures show employment at record levels, both in absolute and percentage terms, women's employment at a new record high, and real disposable income at record levels.

So the labour market performance in the UK is very, very

strong. Similarly, around the world there are record employment levels in many different countries. This is happening at the same time as an understandable concern about the impact of technology and a sense that people don't feel this very positive economic performance for a complicated set of reasons.

So we need to understand it properly, not just with the 'lump of labour fallacy' that the robots are trying to take the existing jobs and therefore people will have nothing to do. I think that view is static and wrong and it misses the point of human ingenuity – that it is people who create jobs and that the technology itself is creating jobs too.

But it seems to be that the risk is not that we adopt new technologies that will change jobs. That is not the risk, because that's going to happen whether we choose for it to happen or not, because that is the nature of business. I think the risk comes from not adopting new technologies and from failing to create jobs of the future.

That means we have this difficult balance between the need to support the disrupters who are creating new technologies, creating the new jobs and ultimately generating productivity growth, and at the same time supporting those who are disrupted. Because whilst in the long term improvements in technology improve productivity, we live our lives in the short term and it's no good having a job in the long term if you don't have one in the short term. We need to make sure that we support those who are disrupted, as well as supporting the disruption itself. We want to see redeployment not unemployment, by creating the jobs of the future and making sure people have the skills and capabilities to excel to accept them and generate them.

The nature of work is also changing as part of this. The mundane tasks and some of the dangerous tasks are going and this is a good thing. Take the mining

People talk about accelerating change. I like to think of it the other way round: we are currently living through the slowest rate of change that we're going to experience for the rest of our lives

industry, which has far fewer people underground than they ever have before around the world.

At the same time capabilities and human skills like empathy will be more important than ever before. I'm an optimist for human nature. I think there are things that human beings can do that machines will never be able to do, like connecting between people and having creative sparks that make life worth living.

Greater productivity has a big potential upside, not only in terms of prosperity but also in terms of work-life balance. People throughout time have always worried about the impact on employment, but the advantage of greater prosperity is also an improvement in work-life balance.

Since the Industrial Revolution the amount of work that anyone has had to do on average in the UK, in order to feed themselves or feed their family and live a decent life, has collapsed, in terms of the number of hours. Even over the last couple of decades this has continued. In 1995, Britons worked on average 39 hours a week and now it's 37.5 hours a week.

In my view that is using some of the increase in prosperity of the last few decades to work a bit less. Because whilst many of us love our jobs and work incredibly hard and probably work more hours than we absolutely need to, that is not true for everyone. They might prefer a better work-life balance.

There is also the matter of skills, which I'm glad is now an absolute core of the debate about the future of work. We need to make sure everyone

is able to increase their skills and capabilities to succeed in the digital age – people who have never been online before all the way through to the very top PhDs – and that we are attracting the brightest and the best from around the world.

Ultimately I'm optimistic that so long as we get the policy response right and so long as the tech industry more broadly responds to this challenge in the right way, then we can make a success of it. After all, we are attracting the jobs to the UK that are building that technology-driven future. We are making sure that the UK is at the leading edge of these changes in order to try to bring that prosperity here. We are making sure that jobs are available, that people get the skills and that we can benefit from this technology. And we're doing everything we can to ensure that prosperity is shared.

But we cannot be complacent about it. We must make sure we get the analysis correct so we get the response correct as a society. And we must make sure that this great technological revolution that we are all involved in and living through works for everybody in our country. That is our goal.

This article was adapted from Mr Hancock's keynote address at the Future of Work Summit on 15 June 2018, when he was Secretary of State for Digital, Culture, Media and Sport. For the unedited speech visit www.matt-hancock.com/news/future-work-summit-speech

SMALL IS BEAUTIFUL

When **Jean Kitson** (1992, English) left a stable job to set out on her own, she discovered that a boutique business can be both competitive and tremendous fun

It's a glamorous word, entrepreneur. It conjures something of the adventurer. Or as *Star Trek* has it, enterprise is 'to boldly go where no man has gone before'.

I don't often think of myself as an entrepreneur. What I do seems all together more ordinary. I run a business. I set it up four years ago simply to gain the freedom to work in a way unavailable at either my previous company or its competitors. I continue to do what I have done for years, which is represent screenwriters. But nonetheless I created an enterprise by taking a financial risk to create a profit. Ipso facto, I am an entrepreneur.

I am not alone in this everyday entrepreneurship. It is the lifeblood of UK private business – Small and Medium Enterprises make up 99% of UK private business, and micro-businesses (0-9 employees) are 96%, comprising 33% of employment and 22% of turnover. Irritatingly only 21% are run by women, so the myth of the Mumpreneur (horrible term) is somewhat overstated. Small business is a boom area – there were 64% more SMEs in 2017 than in 2000.

Whether you are growing a small company or forging a large one, the skills are the same. Clarity of purpose is key; it is easy to get lost in the nitty gritty. For me, my reason for starting the business was so clear that it has sustained our growth over the past few years, and is informing the next stage of the company. Creative and intuitive thinking is important, or we simply echo our competitors.

Confidence and engaged leadership attract customers and clients, and bring us strong employees. An entrepreneur is not a manager. I shake off as many managerial tasks as possible to stay focussed on the bigger picture.

Leading an enterprise is also stressful and difficult. I was helped by early work with a business coach (another Exeter graduate) who helped me shake off the negatives of a bogged down career. I'm also part of a group of SME owners who share their experiences and challenges. You don't get a lot of feedback when you're up top, and although resilience comes from within ourselves, it really helps to be part of a business community.

There are advantages to being small. We are light on our feet. Our overheads are minimal. We can make an important company decision over coffee, and implement it immediately. We don't have to answer to anyone except our clients and customers. We sometimes lose out to the bigger players, but being boutique also plays to our advantage. So it goes. In the end, the quality of the service we offer and the writers we represent are all that matters.

When I left a nice stable job and jumped out on my own (with two kids under five and no second income), friends said I was brave, or mad. I didn't think that. I thought it would be fun, and exciting, and interesting. And it is, continually. So perhaps I am more of an entrepreneur than I think. Thanks for your attention. I'm going to get back to the adventuring.



Creative and intuitive thinking is important, or we simply echo our competitors



The road to medical usage is long and arduous but seeing an idea materialise can be immensely rewarding

At the cutting edge

Visiting Fellow in Medicine Professor **Christopher Cheng** left Silicon Valley in January to spend six months writing, lecturing, and researching in Oxford. He brought with him expertise in entrepreneurship and medical device technology and leaves having written most of a book, delivered symposiums, engaged in successful collaborations, and banked memories that only Oxford can provide

Spending six months as a Visiting Fellow at Exeter College, away from my medical device start-up and Stanford University in Silicon Valley, has been wonderful and is fodder for lifelong memories.

One example is Exeter High Table in the main hall, which typifies the Oxford experience. Never will you see grandness and fineness in such harmony, where the evening

drips with formality and tradition, yet everyone is exceptionally warm and welcoming. Over Hilary and Trinity terms, I attended over 30 High Tables and filled over 35 guest spots, mostly with visitors from California. I made new friends in Oxford, including my neighbour George, a successful independent art dealer, whom I invited as a guest to High Table. George was able to decipher the silverware on

the table – each piece between 200 and 400 years old – using the cryptic marks to identify the location of origin, silversmith, and source of the silver.

The past six months have been some of the most meaningful of all my life, with the opportunity to write a book, lecture on research and entrepreneurship, organise symposiums, engage in meaningful collaborations, form lasting

relationships, and explore another country with my family. Oxford definitely feels like another home, and I look forward to stepping back on these hallowed grounds. It took me 22 years to get back to Oxford since I was a visiting undergraduate; I do not intend to wait that long for the next time.

Upon going back to Stanford, I'll return to my position as Adjunct Professor, Vascular Surgery, to start a new medical consulting practice, and continue to work on my medical device start up, Kōli.

Six years have passed since I co-founded Kōli in 2012. During this time I've seen first-hand the process by which academics can commercialise their ideas. Funding is a major challenge for any venture. At Kōli we have been the fortunate recipients of funding from the United States National Science Foundation. If internal funding is limited within a university, or prototyping is too expensive, it may make sense to found a start-up early on which can raise finance independently. Start-ups have other benefits: they are free to hire people; own the intellectual property they generate; and can move faster than larger academic institutions and firms.

Finding the right business partner is also crucial. This partner should be

a company or individual with financial and technical resources to help pursue the venture – and the motivation to make it a success. For example, if there is a company with specific expertise in a critical technology needed for the product, there is no better way to accelerate development than to partner with that entity. Kōli has partnered with Nitinol Devices and Components, a leading manufacturer of medical devices. The other benefit is that the partner usually has experience in product development, business plan development, fundraising, regulatory strategy, or commercialisation – skills that can be rare in academic settings.

The most difficult part of finding a committed external partner at an early stage is having enough meat in the product idea and business plan to convince the partner to co-found a company. Note that these partnerships are formed earlier than in typical strategic partnerships where significant development has already been done. The founder should be prepared to give up significant equity. Remember, this is actually a good thing because you are not looking for an employee, you are seeking a co-founder.

Having found a partner, there needs to be clarity about who will be

driving the venture and making key decisions in what areas. Also, the partner needs to be able to commit a substantial amount of time (counted in years, not months) and resources to reach agreed-upon milestones. The road to a working prototype, then clinical trials, and finally medical usage, is a long and arduous one, but seeing an idea materialise into a tangible therapy, and then using that therapy to help patients can be an immensely rewarding experience. Regulatory hurdles may be far more onerous now than they once were, yet the process of innovation is alive and well with advances in computer technology and rapid prototyping.

During my time in Oxford I was pleased to organise group sessions to discuss the medical device industry, entrepreneurship and choosing between academia and industry with students and researchers. I will look back on my time in Oxford fondly, for the opportunities to lecture on entrepreneurship and research; work on my forthcoming book on vascular deformations; and for the social side of life at the University. From organising a wine tasting evening at Exeter, to attending High Table, my time at Oxford, while brief, has left me with lifelong memories to cherish.



The science of energy storage

Solar and wind power aren't able to rival the flexibility afforded by fossil fuels, which we can store for years and burn when we need energy

Cheap energy storage could make or break our fight against climate change. **Akshat Rathi** (2008, Organic Chemistry) explores attempts to find the next big technology that could provide a true alternative to fossil fuels

Humans can store all the major commodities needed for modern life: water, grain, steel, fuels and so on. And we can also store them in huge quantities. Once you produce the commodity, all you need is an appropriate space to put it. Sadly, a set of those necessary commodities has become a bane of 21st-century life: fossil fuels.

Burning fossil fuels releases carbon dioxide into the atmosphere, taking us into the age of human-driven climate change. This makes it imperative that we find clean alternatives to sate humanity's ever-growing need for energy. And if you've read anything about energy in the last few years, you would be aware that two clean sources have emerged as likely winners: solar power and wind power. Nuclear power has fallen out of favour after the Fukushima Daiichi Nuclear Power Plant meltdowns in 2011; hydropower has geographical limitations; and other clean-energy technologies such as tidal power are at an early stage of development.

But solar and wind have a weakness: they are intermittent. I don't need to explain the fickleness of good sunshine on these British Isles, but you'd think wind would be no problem. Not quite so. This past June, for instance, the UK went without much wind power for almost two weeks. Solar and wind power aren't able to rival the flexibility afforded by fossil fuels, which we can store for years and burn when we need energy.

That could change, however, if we are able to master the technologies needed to store energy. I say 'technologies' because it's unlikely to be just one technology that can solve the problem alone. None of the technologies developed so far comes close to replacing fossil fuels in a one-on-one contest.

Let's start with hydrogen, because it's the closest replacement to petrol. Industrial-scale hydrogen can be produced by simply splitting water into its constituent parts – hydrogen and oxygen. This process uses electricity and can be performed at times of surplus, creating a store of energy for future use. When you need the energy back, hydrogen can be burned cleanly, producing only water. Thanks to the obsession of Japanese carmakers, we already have hydrogen fuel cell cars that run as well as petrol-powered cars. And because hydrogen can be

compressed, it's theoretically possible to move it over large distances, just like we move oil today.

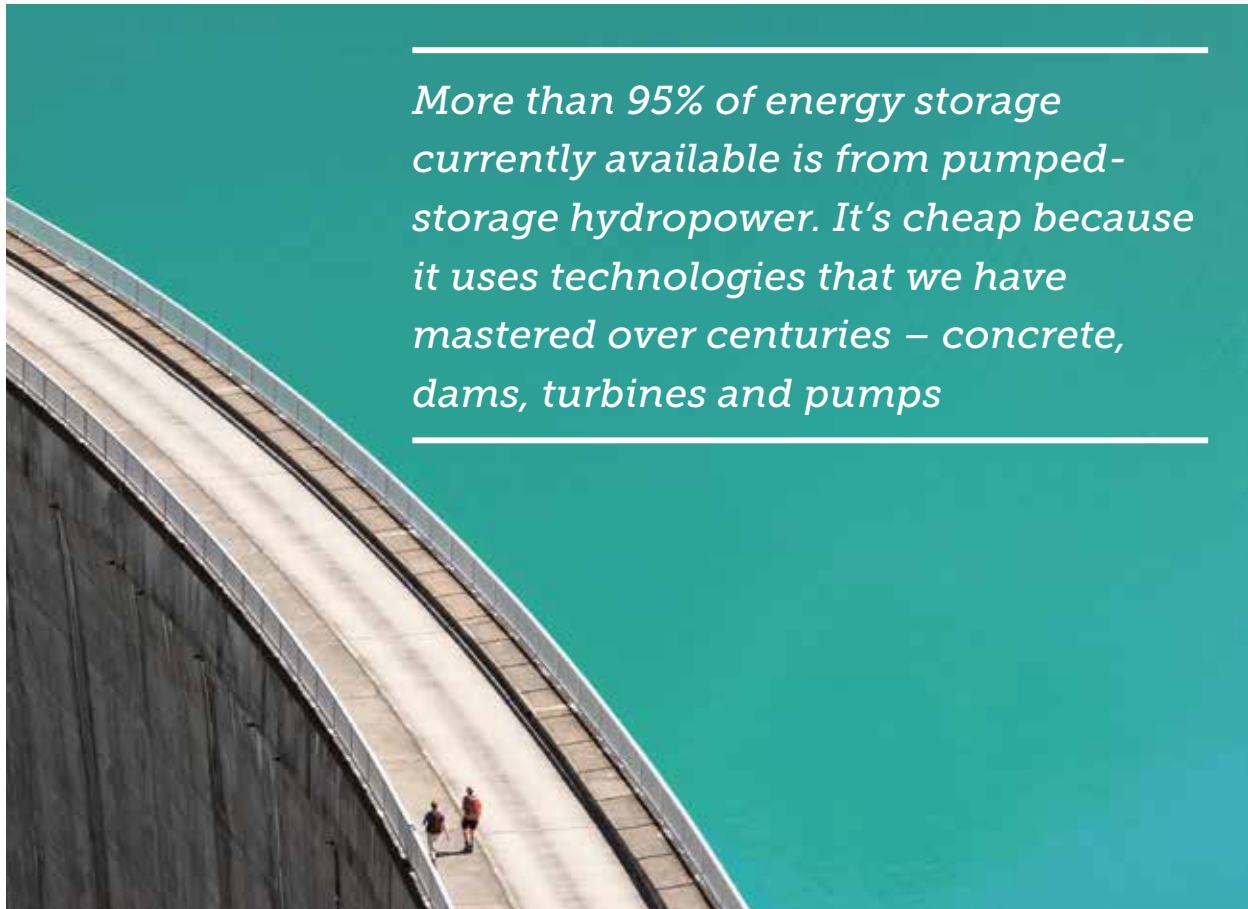
And yet hydrogen can't compete with fossil fuels because it's currently much more expensive. Even if the cost of production were to come down, hydrogen lacks the distribution network available to fossil fuels or electricity. After decades of work, as of 2017 there are only 300 hydrogen filling stations in the whole world (for comparison, London alone has more than 900 petrol stations).

Next, let's consider lithium-ion batteries. The technology, first commercialised in 1991 by Sony, has made smartphone-technology possible. Compared to other battery technologies, such as lead-acid or nickel-cadmium, lithium-ion batteries are able to store more energy at lower cost and in much lighter materials. That is why our smartphones are thinner than a finger and our laptops aren't the weight of bricks. These batteries are also capable of releasing the energy stored in them in quick bursts. That's crucial for electrical cars, which nowadays beat some of the best gas-guzzlers in drag races.

These strengths, however, come at a cost. Lithium-ion batteries are too expensive to store the amount of energy that may be needed for a gloomy winter, say. And the costs are unlikely to come down much, because the raw materials required are expensive. While you may hear stories about using lithium-ion batteries for energy storage on the grid, just remember that those applications will, at best, deal with daily or weekly fluctuations in electricity demand, not monthly or seasonal supply issues.

Finally, take the case of pumped-storage hydropower. This is the oldest form of large-scale energy storage on the electric grid. When there is excess power on the grid, water is pumped up into a dam. When energy is needed the water is allowed to flow out of the dam and turn turbines to generate power. It's what we learned in high-school physics: converting potential energy to kinetic energy and vice versa.

More than 95% of energy storage currently available to the world's electric grids is from pumped-storage hydropower. It's cheap because it uses technologies that we have mastered over centuries – concrete, dams, turbines and pumps. However, it requires specific geography, which



More than 95% of energy storage currently available is from pumped-storage hydropower. It's cheap because it uses technologies that we have mastered over centuries – concrete, dams, turbines and pumps

is one reason why just 10 countries account for nearly three quarters of all pumped-storage hydropower in the world.

The demand for better energy-storage solutions remains strong. Luckily, a plethora of start-ups are trying to find the next big technology that could help humanity provide a true alternative to fossil fuels. For a series I'm writing for *Quartz*, a global business publication, I got to discover a few of them.

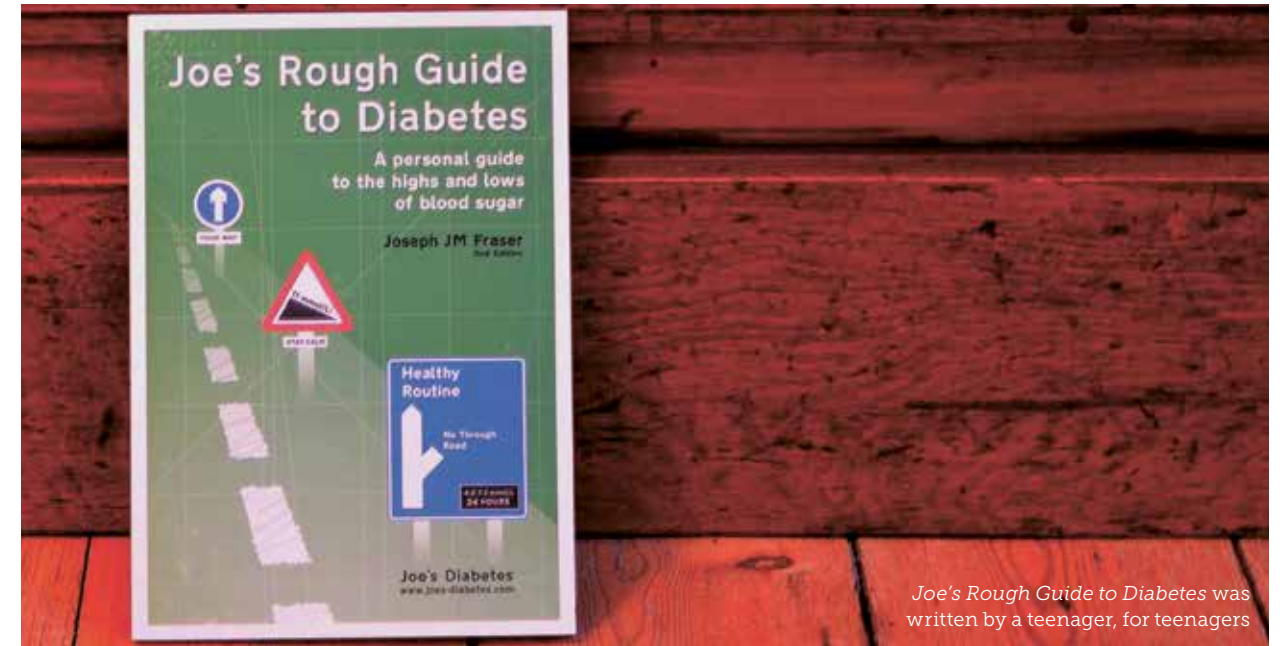
At **Form Energy**, Yet-Ming Chiang, a professor at the Massachusetts Institute of Technology, and Mateo Jaramillo, a former Tesla executive, combined to build what they call a 'reversible power plant'. Their thinking is that the scale of energy storage the world needs is best met with large units, which can produce energy and store energy reversibly whenever needed. The science underlying their bet is secret, but it's promising enough to receive funding from a Bill Gates-led energy investment fund called Breakthrough Energy Ventures.

At **Quidnet Energy**, Joe Zhou, a serial entrepreneur in Silicon Valley, is hoping to overcome some of the limitations of hydropower. He has found that, at high enough pressures, water pumped into old oil-and-gas wells compresses the rock like a spring. When energy is needed, the valve is reversed and the water comes gushing out with force that can turn turbines to generate power. Unlike hydropower there is no dam or reservoir, so Quidnet's technology can be applied in more locations.

At **Energy Vault**, Andrea Pedretti wants to use waste materials to store energy. For example, when buildings are demolished, the waste concrete is usually dumped in landfills. Energy Vault instead recycles that material into blocks, then at times of excess energy uses a machine to raise the blocks and create potential energy. When the energy needs to be recovered, the blocks are released.

At **Alacaes**, Giw Zanganeh is storing energy in the Swiss Alps by compressing air inside large mountain caverns. Physics dictates that when a gas is compressed it releases heat, and when a gas expands it absorbs heat. So far, however, researchers looking at compressed air to store energy have failed because they've been unable to manage the loss of energy from this temperature change. Zanganeh's technology overcomes that problem. When energy is available, pumps compress air into a cavern where mountain rocks absorb the heat. When energy is needed, the compressed gas is released along with the heat stored in the rocks.

There is no guarantee any of these technologies will make it through to commercial use. But as long as there are lots of people trying to solve our energy storage problem, there is a decent likelihood of some solutions succeeding. In our fight against climate change, we will need many arrows in the quiver.



From 'diabetic' to Joe's Diabetes

Joe Fraser (2005, English) describes his entrepreneurial journey from being controlled by, to taking ownership of, his diabetes

I was diagnosed with Type 1 diabetes aged 13. Frankly, it was a shock and I found the disease hard to manage. Beyond the daily grind of injections and finger pricking, it was very easy to take too much or too little insulin, leading me into crashing hypos (when the blood sugar drops too low) or uncomfortable hypers (when it gets too high), which are damaging in the long-term. At that age in particular, it was hard finding yourself alienated from your own body. I felt 'diabetic' – defined and controlled by the disease.

There was little practical support, and education on offer was either aimed at 'kidz' or scientists. I was trying to lead a 'normal' teenaged life of school, sports and parties, so nothing on offer spoke to me. There were peer support groups of other diabetic teenagers, but I didn't really want to engage with them: it was my problem to solve, and I didn't want to try and make friends with people on the basis of us both having rubbish pancreases! So it was really only after a few years of trial and error that I finally worked out how to control my diabetes. It took a long time despite strong support from my family and school.

That experience drove me to write *Joe's Rough Guide to Diabetes* during a gap year before I came to Exeter. It was a manual designed to help people understand

diabetes theoretically and practically, so as to avoid the pitfalls I'd experienced. More importantly, it was written by a teenager for teenagers. In essence, it was the education I wish I'd received when I was diagnosed. In 2006, 20,000 copies were published by Wiley, and distributed by Sanofi.

At Exeter, I managed my diabetes relatively well (barring the odd notable exception, such as when I forgot to take my insulin after Finals...) but I learned a lot more too. After university, I set up Joe's Diabetes Ltd (www.joes-diabetes.com) with the aim of improving the quality of living for people using insulin. I used these new experiences to write an expanded version of the book for a second edition. I also realised that there were probably many more people like me at the time who only took some of their diabetes supplies around with them at any given time. Obviously, that's not ideal for control, but there is a lot of equipment and it can easily become chaotic and bulky. So I designed the 'Small-in-one': a compact carrycase that holds all the supplies a diabetic needs for 24 hours.

My innovations are highly informed by my experience of when I was newly diagnosed: I wrote the book, designed the case, and run the company to stop people feeling 'diabetic' and to help them take ownership of their diabetes.

Matt Hancock becomes Exeter's first ever Cabinet minister



Matt Hancock visits Exeter College in 2015



Two Cabinet reshuffles saw Matt Hancock (1996, PPE) elevated first to Culture Secretary and then to Health Secretary, reports **Matt Roller** (2016, PPE)

One big winner in a tumultuous year for British politics has been Exeter alumnus Matt Hancock (1996, PPE). January's Cabinet reshuffle elevated him to Secretary of State for Digital, Culture, Media and Sport, a role once dubbed 'minister for fun'. A further reshuffle in July triggered by the resignations of Cabinet ministers David Davis and Boris Johnson saw Mr Hancock promoted again, this time to Secretary of State for Health and Social Care.

Although Mr Hancock's time as Culture Secretary was short, his few months in the job were much more challenging than the moniker 'minister for fun' might suggest. His earlier experience as Minister of State responsible for digital policy (a role he took up in 2016) no doubt came in handy, as the nature of the Cabinet post has changed almost completely since his predecessor David Mellor coined that tagline in 1992: many of the issues Mr Hancock dealt with concerned social media, data protection and the press.

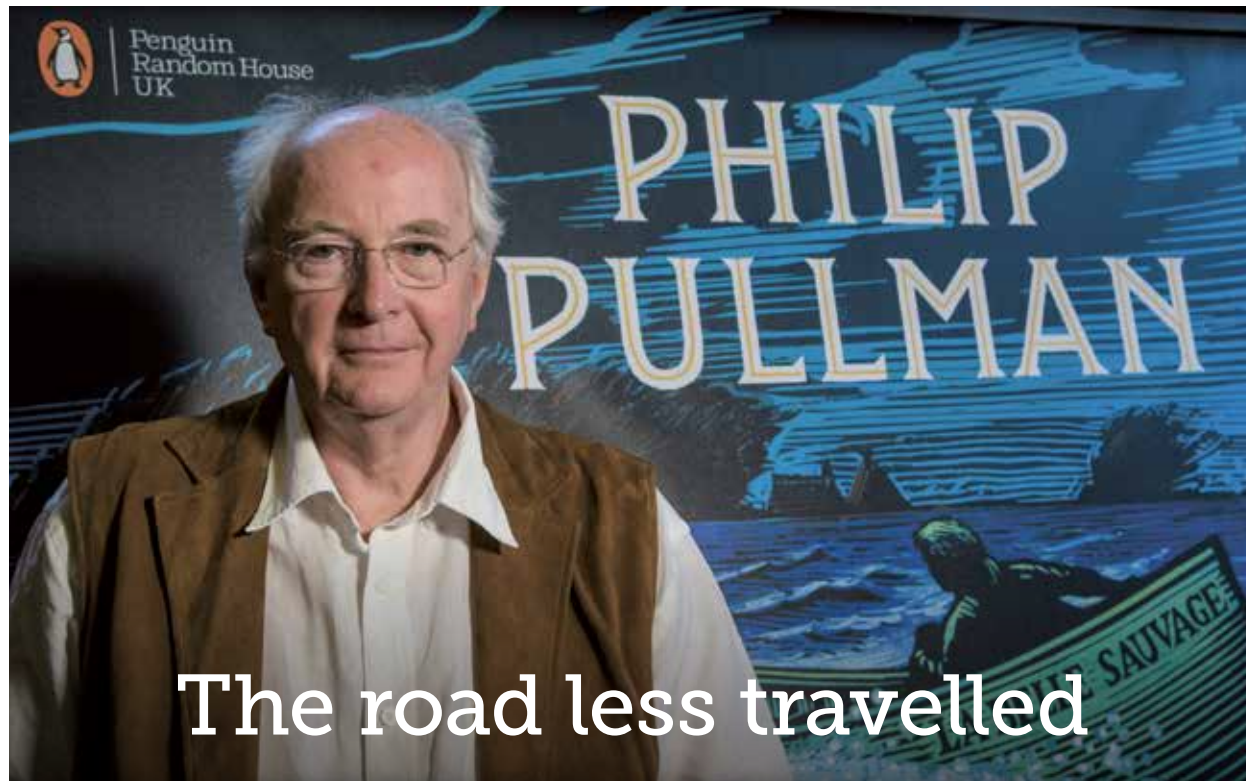
In March, the Cambridge Analytica scandal threatened to change a whole generation's use of social media, after whistle-blower Christopher Wylie claimed the firm had used personal information harvested from more than 50 million Facebook profiles without permission to target users with political advertising during the 2016 US presidential election. Facebook apologised for its own role in the affair, but Mr Hancock was quick to criticise the social media industry's approach to regulations, labelling Facebook's role 'creepy' and 'completely unacceptable'. He promised that firms would be fined billions if they fail to take steps to protect their users, and revealed that 10

of the 14 biggest tech companies snubbed a Government meeting about online behaviour.

Only time will tell if Mr Hancock's attempts at a crackdown on the behaviour of giants of the social media industry will prove successful. But the early signs are encouraging: he met several times with experts on data protection, and was in contact with US officials for advice. This is not an issue that a politician in this role would have even had to consider when Mr Hancock was an undergraduate at Exeter in the early days of the internet, but the job's ever-changing nature necessitated it: adaptation and innovation are both crucial qualities for the post.

Mr Hancock himself even offered an alternative to Facebook earlier in the year, when he launched his own social media platform. The creatively named 'Matt Hancock MP' app was designed to allow him to communicate with members of his constituency and provide a platform for updates on his appearances in parliament. He is also an avid user of Twitter and Instagram: one of his first acts as Health Secretary was to tweet 'Really looking forward to joining [the Department of Health and Social Care] at such an important time for our great NHS. I can't wait to get started.'

A crowded in tray awaits Mr Hancock, with contentious issues such as social care reform and the NHS funding settlement needing his attention. The role of Health Secretary also carries with it greater public scrutiny and intense debate about the Government's policies, so we can expect to hear more from Mr Hancock in the coming months – unless he's reshuffled to another portfolio first!



The road less travelled

Philip Pullman (1965, English) takes fans' favourite Lyra Belacqua on an epic journey in his latest novel, discovers **Shammah Banerjee** (2015, English)

*Two roads diverged in a wood, and I –
I took the one less travelled by,
And that has made all the difference.*
Robert Frost, 'The Road Not Taken'

At a 1999 science fiction convention, Philip Pullman illustrated storytelling with these lines borrowed from the American poet Robert Frost. 'The wood is the world in which the characters live and have their being; it's the realm of all the things that could possibly happen to them,' he explained. With the release of *La Belle Sauvage*, the first part of the *Book of Dust* trilogy, he revisits the 'wood' first created in the much-loved *His Dark Materials* books – only this time he discovers it through a new story, down a new road.

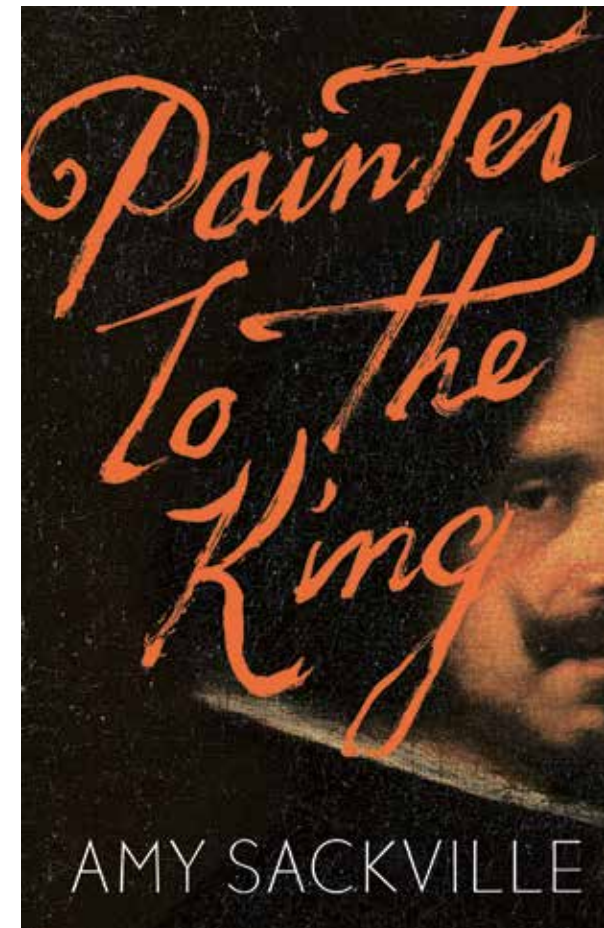
Recently awarded 'Author of the Year' at the British Book Awards, Philip Pullman is an alumnus of Exeter College and a resident of Oxford. His affection for the city shows through his novels, as his characters negotiate a path between our universe and others, fictionalised versions of Oxford and the one we know and recognise, exploring themes of Edenic innocence, scientific discovery and 'Dust' (sentient particles that permeate all worlds but are invisible to human eyes).

In the new novel we see the setting extended north beyond the city to Port Meadow, Godstow and Wolvercote. The story follows the progress of adolescents Malcolm

and Alice as they canoe down a biblically flooded river Thames with baby Lyra in an effort to take her to the safety of her father, in London. The villain Bonneville pursues, a figure characterised by sexual deviancy and unpredictably neurotic behaviour. The violent tensions between Bonneville and his deranged hyena-dæmon (essentially his 'inner-self' in animal form) allow Philip Pullman to extrapolate on the relationship between human and dæmon, upon which Lyra's universe is built.

The true spectacle of the novel is perhaps not Malcolm and Alice's adventure, but the return to Philip Pullman's intricately designed set of scientific laws. Introduced in *His Dark Materials* and continued in *The Book of Dust*, the properties of Pullman's universes are examined through Bonneville's obsession with mapping Dust particles and the 'Rusakov field'. It satisfyingly pre-empt the exploration of Dust in *His Dark Materials*, which develops to become a symbol of hopeful universality across worlds broken by human discord.

Described by Philip Pullman as not a prequel or a sequel, but an '*equel*' to *His Dark Materials*, Exonians will be pleased to discover that the first instalment in the new trilogy returns to Jordon College, Pullman's fictional version of Exeter College. Named 2018 'Book of the Year' by booksellers Waterstones, it is a bold and vivacious painting of a new path through an old 'wood'; a wood which many millions have explored, and will continue to explore.



A royal portrait

The latest novel from Amy Sackville (2002, English Studies) envelops **Livi Dunlop** (2013, English) in the heat, dust and sensuality of 17th-century Spain

Amy Sackville's *Painter to the King* is a lush inhabitation of art history by a linguistically playful and devastatingly imaginative author. *Painter to the King* is the third novel by Exeter alumna Amy Sackville, who came up to read for an MPhil in English Studies in 2002. It follows her critically acclaimed novels *The Still Point* (2010), for which she won the John Llewellyn Rhys Prize, and *Orkney* (2013).

The novel's title refers to Diego Velázquez, employed for nearly 40 years as court painter to King Philip IV of Spain during the 17th century. Amy Sackville stitches the rich detail of his work into her novel, stepping into his canvases to explore the tensions and fears of a royal family on the wane as Spain's Golden Age drew to a close.

The text is peppered with cropped details from Velázquez's artwork – an eye, a jug, a creased paper, a clasped hand. The author as artist is herself visible within the text – on a swing in a Welsh garden, holding a plastic menu in Madrid, or gazing at a small self-portrait of 'Diego'. The depth of her research is not only evident from the historical accuracy and detail present in the novel; the act of researching is itself reproduced as she imagines the Buen Retiro Palace as it would have been, then steers readers into the site of the palace as it is now: a space of open parkland, dusty and hot, the palace long since demolished. Sackville writes, 'I want to somehow simply set down what it looked like to you, the world, what it felt and smelled like...preserving in the observation not the thing observed but the fact that I was here to make it.'

Amy Sackville reimagines lost paintings based on surviving records, haunts her characters with the spectre of death, and circles around the King's genetic legacy (his one surviving son would die impotent and chronically disabled due to generations of familial intermarriage). The heat and dust and sensuality of Spain in political decline, even as the person commissioned to capture it reaches his artistic peak, lingers on beyond the pages. The result is a delicately wrought exploration of artistic legacy and personal failure. Praised by critics – *The Guardian* described *Painter to the King* as 'one of the finest historical novels of recent years' – Amy Sackville's latest work is a novel to remember.

Recommended reading

Whether exploring London's secrets, the human imagination or Britain and Ireland's highest peaks, this year's Exonian publications will take you on a journey to remember



London Quiz Book

Mark King (1974, Modern History and Modern Languages)
Drawing on extensive knowledge and celebrating London's diverse riches, The Blue Badge Guide's *London Quiz Book* invites you to come on a wide-ranging exploration of the city Mark King calls 'The Big Onion' and see London as you've never seen it before.



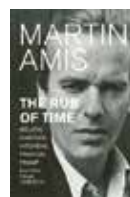
Gender Equality in Law: Uncovering the Legacies of Czech State Socialism

Barbara Havelková (2008, Legal Research)
The legacies of socialism, lingering traditional social attitudes, and the modern intervention of European legislation interact to shape contemporary Czech gender equality law. Dr Barbara Havelková's book provides an authoritative survey of this process.



Seven Types of Atheism

John Gray (1968, PPE)
It is tempting to see the debate between religion and atheism as a modern phenomenon, but John Gray disputes this, and demonstrates the historical complexity and depth of atheism in this new book from one of Britain's leading philosophers.



The Rub of Time

Martin Amis (1968, English)
This collection of Amis's essays shows his gift for writing compelling non-fiction as well as fiction, containing his reflections on the likes of Nabokov, Hitchens and the presidential campaign of Donald Trump.



Kompromat

Stanley Johnson (1959, English)
The year is 2016: a populist candidate is poised to win the US presidential election; the UK stands on the brink of voting for Brexit; the Russian president schemes behind the scenes – or at least that's the plot of Stanley Johnson's fictional political thriller.



I Wonder: The Science of Imagination

Jerry D Rhodes (1950, Modern History)
Jerry Rhodes makes the case for a reappraisal of imagination, detailing its extraordinary capacity to let us make new connections and perceive new approaches to old problems, arguing it is no less vital for achieving success than knowledge or good judgement.



An English Guide to Birdwatching

Nicholas Royle (1976, English)
Professor Nicholas Royle's latest novel is a story of literary theft, adultery and ambition which mounts a moving investigation into our relationship with birds and the environment.



All The Perverse Angels

Sarah K Marr (1988, Jurisprudence)
Following an art curator coming to terms with her past infidelities after leaving a psychiatric hospital, Sarah Marr's debut novel is a breath-taking reflection on the nature of loss and the confusion of love.



Machiavelli, Islam and the East

Giuseppe Marcocci (Fellow in History and Associate Professor in Iberian History)
This new volume, co-edited by Professor Marcocci, sheds light on hitherto unexplored connections between Machiavelli's work and the Islamic World, and as a result invites us to reconsider the intellectual origins of modern western political thought.



The Life and Career of Archbishop Richard Whately

Ciara Boylan (2002, Modern History)
Despite his reformist politics and position as Church of Ireland archbishop of Dublin during the mid-Victorian era, Richard Whately remains an overlooked figure. Ciara Boylan's new biography seeks to remedy this by providing a detailed exploration of his life, ideas and career.



Dangerous Diplomacy: Bureaucracy, Power Politics, and the Role of the UN Secretariat in Rwanda

Herman T Salton (2007, International Relations)
Drawing on research conducted by Dr Herman Salton during his time at Exeter, this book critically examines the role of the UN Secretariat during the Rwandan genocide, arguing that tensions within the secretariat made its response uncoordinated.



Writing after Postcolonialism: Francophone North African Literature in Transition

Jane Hiddleston (Fellow and Professor of Literatures in French)
Professor Hiddleston's book examines writing in francophone north Africa, considering if the notion of postcolonialism is still relevant today, decades after independence, and how writers have responded to the troubled status of literature in their contemporary societies.



Quakers in Plymouth

Martin Wyatt (1961, Modern History)
Based on extensive original research, Martin Wyatt's book chronicles the role Plymouth's Quakers played in the Devon city's history from the 17th century to the present day.



The Top 500 Summits

Barry K Smith (1974, Mathematics)
Part guidebook, part travelogue, Barry Smith's book recounts the personal journey he went on as he walked the 500 highest summits in Britain and Ireland.

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EVENT DATES FOR YOUR DIARY 2018 – 2019

SATURDAY 15 SEPTEMBER
2010 – 2014 Gaudy

SUNDAY 30 SEPTEMBER
Freshers' Parents' Tea

FRIDAY 26 OCTOBER
MedSoc Dinner

SATURDAY 3 NOVEMBER
Choir Alumni Reunion

SATURDAY 10 NOVEMBER
Symposium at Cohen Quad

SATURDAY 17 NOVEMBER
Lyell Society Dinner

THURSDAY 6 DECEMBER
Varsity Rugby Matches – Twickenham

SATURDAY 15 DECEMBER
Alumni Carol Service

THURSDAY 31 JANUARY
Fortescue Society Dinner

FRIDAY 8 FEBRUARY
Biochemistry Dinner

SATURDAY 23 FEBRUARY
Parents' Dinner

FRIDAY 22 – SUNDAY 24 MARCH
Meeting Minds Asia: Tokyo

WEDNESDAY 17 APRIL
Amelia Jackson Society Lunch

THURSDAY 9 MAY
MCR Three-Minute Thesis Competition

SATURDAY 11 MAY
Alumni Garden Party

SATURDAY 1 JUNE
Boat Club Dinner

SUNDAY 23 JUNE
Leavers' Lunch

SATURDAY 29 JUNE
1990 – 1994 Grand Gaudy

All events, unless otherwise stated, take place at Exeter College. For full details of events and booking details please see www.exeter.ox.ac.uk/events. Event details may be subject to change.

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