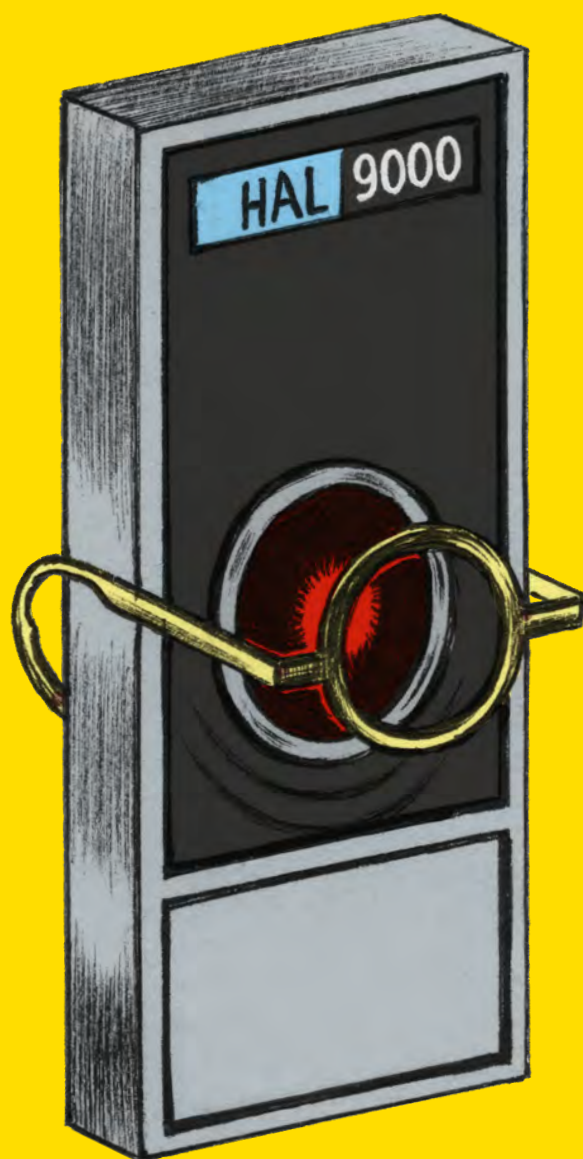


The singularity: when the machines overtake human intelligence.

When everyone has a placard, what does it mean to be an activist?

Have a green flight? Rethinking the schedule for going carbon-neutral.



C A M



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# Cambridge Alumni Magazine

## Michaelmas Term 2020

### Issue 91

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Tim Enthoven

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Your alumni directory.



Welcome to the Michaelmas Term edition of CAM – and to a University operating under Covid restrictions. But as experts from across the University further our understanding of coronaviruses, the University and Colleges have been working hard to ensure that students could return to their studies. Pro-Vice-Chancellor for Education, Professor Graham Virgo, outlines the steps that have been taken to ensure Cambridge life can continue safely on page 11.

Elsewhere, on page 28 we explore the activities of the Cambridge University Tape Recording Society, whose members would go on to revolutionise sound technology, and on page 44 Dr Niamh Gallagher explains why Irish history does not stop at the island's borders.

On 1 October, in his annual address, the Vice-Chancellor, Professor Stephen J Toope, announced that the University will cut its greenhouse gas emissions to net zero by 2038 – more than a decade before the date set by the UK government. A key focus of Cambridge Zero – alongside divestment, research, education and outreach – will be the planned new National Centre for Propulsion and Power. On page 18, Professor Rob Miller explains why it means that you may, one day, have a green flight.

On these topics – and on all things Cambridge related – we look forward to your contribution to the debate, online at [magazine.alumni.cam.ac.uk](https://magazine.alumni.cam.ac.uk), by post, email or on social media.

Mira Katbamna  
(Caius 1995)



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# Inbox

## Fitzbillies

✉ My husband (Philip Syed, Trinity Hall 1944) and I knew Fitzbillies in 1946-47 when it was most often, sad to say, closed. It would open, briefly, and having sold what they had would close.

Friends of the previous generation told us, "Oh, you'll go to Fitzbillies!", but memories were almost all there were. Now we are in our 90s, deaf and, in my case, in a wheelchair. But we can give a cheer for Fitzbillies and hope it goes on for several more hundred years.

**Jean Syed**  
(Bedford College for Women, London, evacuated to Cambridge in 1946)

✉ "Bunmongering"! What a fabulous neologism! Although I used to prefer the Whim [café].

**Steve Smith**  
(Trinity Hall 1970)

✉ I well remember Chelsea buns and dough cakes. What I never got to the bottom of was the mysterious 'Fitzbillies' bag' given to favoured customers. When in the shop with such a customer, she (usually) would buy something, then, without comment, pass over the empty bag to the assistant who would disappear with it behind the scenes and reappear with the bag, which was no longer empty.

I never found out what the delicacies were, or how to get a bag, but I was told when the owner [of one of these bags] went up [from Cambridge], she/he would hand it on to a friend. Not 'under the counter', but 'over the counter'!

**June McNicol**  
(Newnham 1944)

✉ In the early 1970s, I sang 'for my supper' as a soprano at Pembroke's Evensong. After dinner, the choir went to the Dean's rooms, where he would treat us to Fitzbillies' large, flavoured sponge sandwich cakes. What memories!

**Jenny Knowles**  
(Homerton 1969)

✉ Fitzbillies' Chelsea buns may be what most remember, but, as someone who didn't appreciate things containing currants, raisins and sultanas, what I recall with most affection is their chocolate cake.

This was a chocolate Victoria sandwich, surrounded by a wrapping of marzipan, topped with peppermint icing and a chocolate button in the middle.

It would probably be expensive nowadays, but it was delicious! And worth it – the chocolate cake helped in courting the young lady who has been my wife for more than 50 years!

**Peter Radford**  
(Pembroke 1961)

✉ What an utterly delightful read! I remember licking my hands several times in the course of enjoying a tart – to the distinct disapproval of my hoped-for sweetheart. I didn't care. Rock on, Fitzbillies!

**Ron Johnstone**  
(Homerton 1982)

## The humble battery

✉ You miss the crucial significance of the gargantuan scale of the world's energy systems and how interconnected they are (politicians and policymakers err similarly).

Grid-scale storage of electricity is profoundly difficult and expensive, whereas a pile of coal, a tank of oil and a cavern of natural gas are technically straightforward and comparatively cheap. Apart from availability and cost, the huge advantage of hydrocarbon fuels is their energy density, hence the difficulty of electrifying heavy and long-distance transport. The humble battery has a long, long way to go.

**David Odling**  
(Fitzwilliam 1966)

## This idea must die

✉ "We need ... a paradigm shift from reactive medicine to preventive medicine and the magnifying glass needs to shift to a much earlier timeframe," says #Cambridge professor of #paediatrics #David Rowitch. Makes sense to me. #CambridgeAlumniMagazine

**Alex Rotas**  
(New Hall 1968)

## Museo

✉ I read with interest the piece about radio-echo sounding in Antarctica. The radio-echo sounding actually produced two echoes: one from the top of the ice and one from the bedrock beneath. I had the task of reading data from the tapes into the University computer.

By plotting distance between the two echoes along the path of the aeroplane, a grid pattern of ice depths was built up and a contour map constructed. The tapes were kept in canisters in a locked room, along with Wilson's watercolour paintings. It would be interesting to know what became of them.

**Joyce Whittington**  
(Girton 1966)

## Hidden in plain sight

✉ Neil Lawrence says: "I worry about the rush to deploy and build things before we have a good understanding of how to maximise benefit – and minimise harm." Scroll back through the magazine and I find six pages on the race to tackle Covid-19.



What this actually means is understanding it – with a view to killing it. Might it be time to step back with a view to gaining a holistic perspective on human relationships with the living world? Might it be that only in a Trumpian universe are there 'good' life forms that deserve protection, and 'bad' ones that deserve only death? And, even if that simplistic view were true, why should we assume that we are one of the good ones?

**William Johnston**  
(Trinity 1972)

## Letters

✉ I love this letter [CAM 90, from Helen Foxhall Forbes, on decolonising the curriculum] in the latest issue of the Cambridge Alumni Magazine. Nicely done, @HfoxhallForbes.

**Catherine Lock**  
(Selwyn 1992)

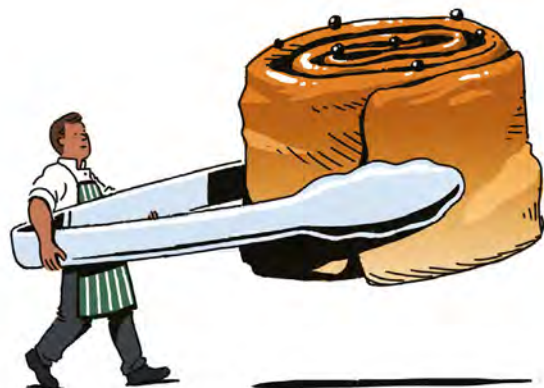
## Feedback

✉ It has always been a pleasure to receive CAM and to reconnect temporarily with my student days. However, in your zeal to share as much information as possible, you have reduced the size of the main font to such an extent that I can no longer read any of the articles comfortably.

If it is impractical to increase the size of the font, perhaps you could post articles online so that older readers and others with poor eyesight could enlarge the main font and enjoy the excellent contents of CAM without eye strain or a magnifying glass.

**Ann Körner**  
(New Hall 1966)

**Editor's note:** We are very pleased to say that CAM can be read online at [magazine.alumni.cam.ac.uk](http://magazine.alumni.cam.ac.uk) – and the font is restored to its previous size!



In numbers

## £10m: prize fund for the global Trinity Challenge, seeking breakthrough solutions to ensure a billion more people are better protected against future health emergencies



Annual address

## **Our focus is reaching net zero by 2038, says Vice-Chancellor in annual address**

The University will cut its greenhouse gas emissions to zero by 2038 – more than a decade before the date set by the UK government – and divest from all direct and indirect investments in fossil fuels by 2030. Announcing the move in his annual address to the University, Professor Stephen J Toope, Vice-Chancellor, said: “The University is responding comprehensively to a pressing environmental and moral need for action with an historic announcement that demonstrates our determination to seek solutions to the climate crisis. We will approach with renewed confidence our collaborations with government, industry and research partners around the world as together we work for a zero-carbon future.”

The launch of Cambridge Zero, the University’s response to the challenge of climate change, was, he said, a “thrilling moment”. He went on: “For centuries, Cambridge scholars have produced some of the boldest and most daringly original ideas and technologies. Cambridge Zero is harnessing that boldness of thought to understand and mitigate the effects of climate change.”

The Vice-Chancellor highlighted projects that will be important in the University meeting its goal, including the planned new National Centre for Propulsion and Power, which aims to reduce the carbon emissions of the aviation industry, and Cambridge Zero’s role in the Global Alliance of Universities on Climate, a group of 13 universities aiming to advance climate change solutions through research, education and public outreach.

The University will continue to deploy resources – under the leadership of the Cambridge Zero initiative – to support the global response to climate change and the wider United Nations sustainable development goals.

And in a year quite unlike any other, the Vice-Chancellor expressed his “profound thanks” to students, staff, alumni and friends of the University for their efforts in dealing with the Covid-19 pandemic. “Through moments of joy, of tragedy and crisis, I have felt we are building an ever-stronger community,” he said.

**To find out more about Cambridge Zero and the 2038 target, please visit: [zero.cam.ac.uk](https://zero.cam.ac.uk).**

### Professor Chris Abell

The University is saddened to announce that Professor Chris Abell, Pro-Vice-Chancellor for Research, Professor of Biological Chemistry and Todd-Hamied Fellow of Christ's College, has died suddenly at the age of 62. A biological chemist, he was a pioneer in the field of fragment-based drug discovery, a successful entrepreneur and a founding director of Cambridge Enterprise.

[cam.ac.uk/professorchrisabell](http://cam.ac.uk/professorchrisabell)

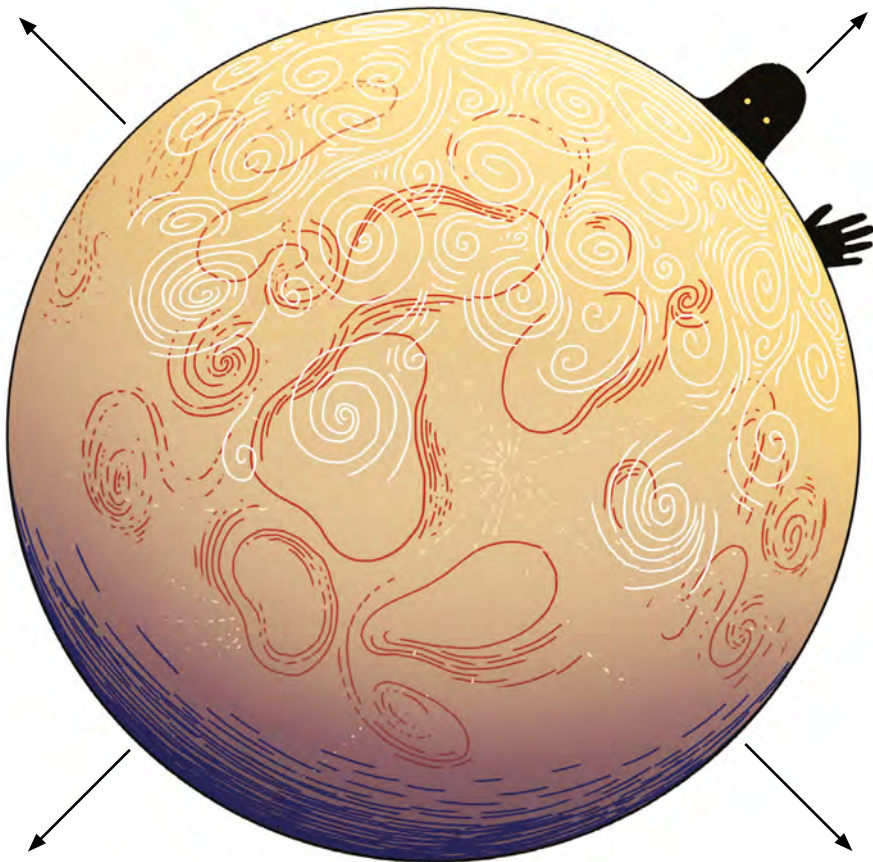


### Deconstructed

## Is there life on Venus? New discovery of rare molecules makes it a possibility

A rare molecule discovered in the clouds of Venus could indicate the possibility of extraterrestrial life, a UK-led team of astronomers has recently discovered.

Professor Jane Greaves detected phosphine molecules – made up of hydrogen and phosphorus – using the James Clerk Maxwell Telescope at the Institute for Astronomy, in Hawaii.



On Earth, phosphine is only made industrially or by microbes that thrive oxygen-free. No other natural processes that occur on Venus, the team say, could make the amount discovered.

The presence of life is the only known explanation for the amount of phosphine inferred by observations, says Dr Paul Rimmer at the Department of Earth Sciences.

### Three-minute trips

#### COWBOYS AND ANGELS – THE IMPACT OF FRONTIER LIFE

Weeeeelll, howdy partner.

Why are you talking like that?

You were born in the Yorkshire Dales.

**Yup. Maybe it's ma pioneer personality showin' through, me bein' born in a mountainous region, y'all.**

Ah, this is something to do with Frederick Jackson Turner's 1893 thesis?

**Mmm. I don't rightly know ...**

Jackson Turner identified the "coarseness and strength combined with acuteness and acquisitiveness" that harsh frontier life had forged in the American character.

**Weeeeeell, to be sure, that's reflected in this algorithmic investigation of how landscape shapes personality in the mountainous regions of the US what I've been perusin' under the stars.**

How did they investigate that?

**You're lookin' at the Big Five personal model: online tests providin' high-to-low scores for five fundamental personality traits, y'all. Those varmints at the Department of Psychology found low levels of agreeableness for us mountain folk.**

What does that mean?

**Suggests we're less trustin' and forgivin'. We're all about the territorial, self-focused survival strategies.**

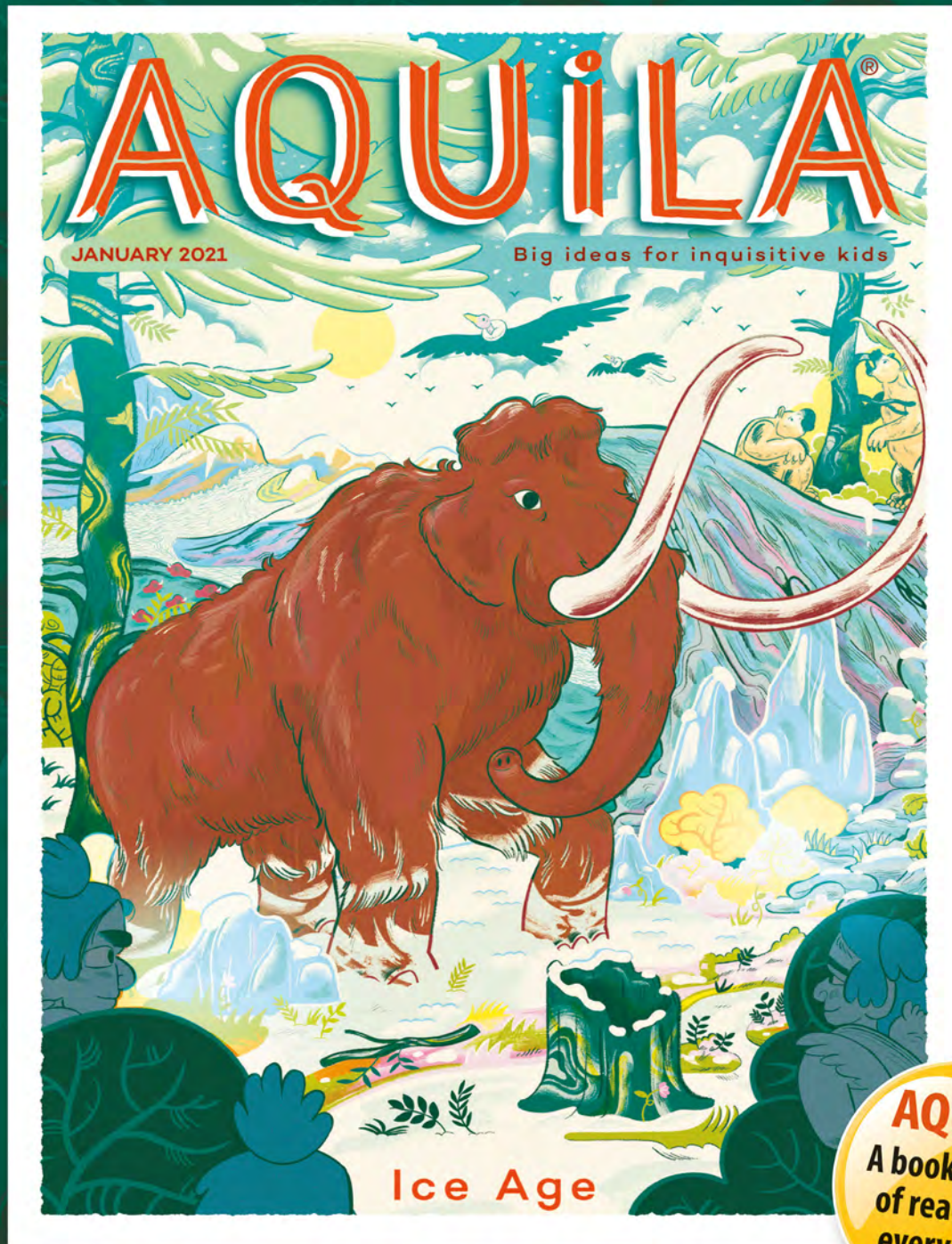
But there's more than one mountain range in the US, right? Do all mountain dwellers share the same traits, no matter where they are?

**They do say that mountain folks in the east are more agreeable and outgoing, while them tough guys in the western ranges are a closer fit for that frontier settlement theory y'all fuss about.**

So I should move if I want to be tougher?

**Nope. It's in the blood. In the end, they say, while ecological effects are important, it's that lingerin' sociocultural effects of stories, attitude and education that make us mountain folks what we are.**

[cam.ac.uk/wildwestmentality](http://cam.ac.uk/wildwestmentality)



## THE JANUARY ISSUE

Wrap up warm and check in for AQUILA's sleigh ride back in time to the last glacial period, when the Northern Hemisphere was like one giant frozen continent. How did animals and humans survive? Children can get to know the Inuit, go on a Mammoth Hunt and test an Icy Science Experiment. PLUS: Mega-animals, Dog Sled Racing and the yummy History of Ice Cream!

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Richard Robinson, Brighton Science Festival

# Howzaat!



Above, left to right: Joy Lisney is a postgrad music student at King's; Emma Jones is a first-year veterinary science student at Emmanuel; Shraddha Chaudhary is a postgrad law student at Fitzwilliam.

**Cambridge University Women's Cricket Club stayed busy in lockdown with Zoom meetings – and a lot of press-ups, sit-ups and burpees.**

WORDS **DIANE SHIPLEY** PHOTOGRAPHY **ADAM LAWRENCE**

Thwack! If you thought Pandemic Stopped Play this summer, you would be reckoning without the creativity and tenacity of Cambridge University Women's Cricket Club (CUCC Women).

Scattered to all corners of the UK at the start of lockdown, CUCC Women decided they had to keep in touch – and keep each other's spirits up – so quickly set about replacing team picnics and nights out with weekly Zoom meet-ups to swap news and play online games.

Physical training continued too. Music postgrad Joy Lisney (King's) put her teammates through their paces once a week, with routines designed for small spaces with no equipment (the team report having never done more press-ups, sit-ups and burpees in their lives). "I think everyone felt a bit lonely after having been sent home," Lisney says.



"A lot of my teammates said they really looked forward to the sessions, and I certainly enjoyed doing them." And then there was the team video. Lisney asked her fellow cricketers to contribute clips of themselves throwing or hitting a ball, which she then edited into a film showing squad members in their gardens, on sofas and, in one case, up a tree. "We're keen to promote the club and get more visibility, especially for the women's side, so that freshers know cricket is a serious sport at Cambridge," she says. "It was also a good way for everyone to have fun and feel connected."

Above all, the team stayed focused on the prospect of playing again. "We were optimistic the whole time that we would get some cricket this summer, and that really helped keep people motivated," Lisney says. Happily, their faith was rewarded when restrictions eased. Thanks to the organisational prowess of CUCC Women president Holly Tasker (Caius) and captain Chloë Allison (Selwyn) the club pulled off a mini season in the last two weeks of August, with outdoor practices on campus followed by a short run of matches. And as difficult as their time apart was,



Lisney says it made the team's reunion even sweeter. "I got a bit emotional when we had our first club training session. The excitement of coming together after being separated for all those months really made us appreciate it."

**To watch the team video, please visit:**  
**[magazine.alumni.cam.ac.uk](http://magazine.alumni.cam.ac.uk)**



# Alumni Festival 2020

**The best of the festival is now online!**

This September, Cambridge's finest thinkers and researchers were beamed around the world at the University's first ever truly global Alumni Festival. Reimagined for the new normal, for the first time ever all sessions took place online – reaching more than 7,500 participants in 127 countries.

And now, whether you're fascinated by exoplanets or want to go on a virtual tour of the Whipple Museum, the best of the festival is available on YouTube for you to enjoy.

The festival was the University's 30th. In the three decades since the very first event, the world has changed beyond all recognition: the cold war has ended; internet communication has changed our lives permanently; and society has become more connected – and more fractured – than ever before. And now Covid-19 has radically altered everything we considered to be normal.

In this context, Cambridge thinking could not have been more relevant. Festival speakers addressed the biggest global issues, explaining how Cambridge research and thinking are helping to find solutions to global challenges. Highlights now available online include deep-dives into the latest research on the adolescent brain, end-of-life care and a trip to the University Boat Club. Viewers can also find out more about how the Cambridge Zero team are harnessing the University's research and policy expertise to create a zero-carbon future.

[alumni.cam.ac.uk/festival](https://alumni.cam.ac.uk/festival)



Whether you're fascinated by exoplanets or want to go on a virtual tour of the Whipple Museum, the best of the festival is now available on YouTube for you to enjoy

#### Pandemic

## Weekly tests to combat Covid-19

All students living in College accommodation are being offered a weekly Covid-19 test, even if they show no symptoms.

Test swabs from students will be pooled by household, reducing the number of tests required to around 2,000 a week.

Samples are then sent to the Cambridge Covid-19 testing facility at the Anne McLaren Building on the Cambridge Biomedical Campus.

If a pooled household test is positive, the students in the household will be informed within 24 hours and offered individual tests to confirm the positive result.

Professor Patrick Maxwell, Regius Professor of Physics, says: "Offering testing to all students in College accommodation, who make up the majority of our student population, will help us reduce the risk of outbreaks by identifying individuals who will often not be aware that they are infected."



#### In brief

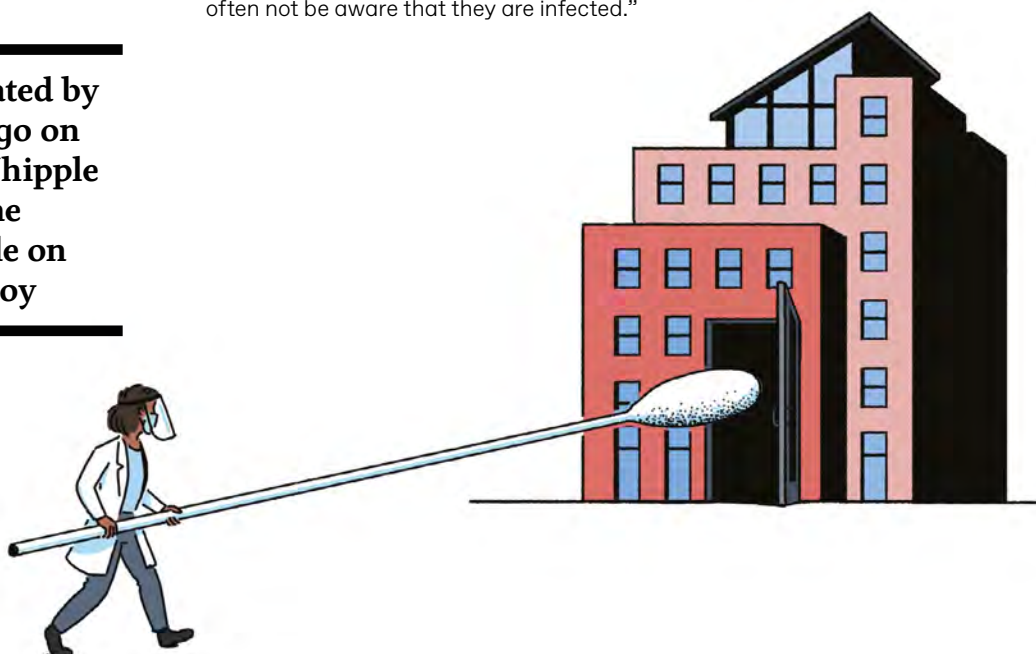
### RECOGNITION FOR LEADING CAMBRIDGE NAMES

Professor Sir Roger Penrose (St John's 1952) has jointly won the 2020 Nobel Prize in Physics, for the discovery that black hole formation is a robust prediction of the general theory of relativity.

His ground-breaking article is considered the most important contribution to the general theory of relativity since Einstein.

While Einstein himself did not believe in black holes, Penrose proved that they can form – and described them in detail.

In addition, five prominent Cambridge researchers have been recognised for their work in this year's Queen's Birthday Honours: Professor Julia Gog (awarded an OBE); Dr Giles Yeo (MBE); Professor Sarah Worthington (DBE); Professor Stefan Reif (OBE); and Mark Enzer (OBE).



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**Graham Virgo is Senior Pro-Vice-Chancellor for Education and Professor of English Private Law.**

# We're working to keep students safe – and ensure they can still have a true Cambridge experience

ILLUSTRATION KATE COPELAND

**I**n this very challenging year, we have been delighted to welcome students – including a much larger than usual first-year intake – to Cambridge. Keeping students and staff safe has been our top priority, but we are also working to ensure our students have, as much as is possible, a true Cambridge experience.

Teaching is, of course, an integral part of this. Very early on we agreed that, in the light of the rules about social distancing, large lectures could not be delivered in person. Making that decision back in May gave us time to prepare, and prepare well, for lectures to be recorded. We have set up some lecture theatres as studios to enable high-quality recording of lectures and have provided a great deal of training and technical support to staff. I have already recorded six of my own lectures, which has been a great learning experience!

Where it is possible to practice social distancing, teaching is in person; and where it is not (for example, where staff are shielding) we are using platforms such as Microsoft Teams.

Practical work that must be done in person, such as for engineering, science, medicine and veterinary science, is taking place in very small, two-metre socially distanced groups.

We are monitoring this rapidly changing situation day by day, and we are ready and able to pivot to online teaching only, if circumstances demand it.

Colleges are showing great imagination in adapting their offerings and finding ways for students to meet and socialise safely. I have seen socially distanced matriculation photos taken from above using drones. Large dinners have been replaced by smaller groups. Some sporting activities are still able to go ahead. We are very aware of the pandemic's potential impact on mental health, and this is where the Collegiate system is of great benefit. Each student

has a tutor in their College, and access to the University's counselling service, which is now providing a lot of support online.

Testing is, of course, incredibly important. Any student or staff member who has symptoms can get tested at Addenbrooke's or at the Department of Engineering's dedicated pod. But, as you would expect from Cambridge, we are eager to innovate. We don't have the capacity to test every single asymptomatic student every week – so, instead, we test households in Colleges.

Each household is around eight students in College accommodation. Two students from each household sign up. The two swabs are put in a tube together, sent to the Anne McLaren Building on the Cambridge Biomedical Campus for testing, and the results come back within 24 hours. If they come back positive, only then will the entire household be tested. This means we only have to test 450 samples to survey around 15,000 students.

Our Colleges have gone the extra mile to minimise health risk to staff and students. We are working very closely with local health authorities, local councils and Public Health England. Our Stay Safe Cambridge Uni public health campaign has a dedicated website and is very active in pushing out its messages on social media.

All this could not be possible without the incredibly hard work of staff behind the scenes, and the co-operation of our students. We are determined to continue providing the best possible Cambridge education and experience. It might be different – but the Cambridge experience is very much in evidence!

**To find out more about the University's response to Covid-19, visit: [cam.ac.uk/coronavirus](https://cam.ac.uk/coronavirus) and to find out more about how Cambridge life continues during the pandemic, please visit: [cam.ac.uk/staysafecambridgeuni](https://cam.ac.uk/staysafecambridgeuni).**

# ALWAYS ON MY MIND

What does it really mean for computers to be smarter than humans? We explore the singularity.

WORDS MEGAN WELFORD ILLUSTRATION TIM ENTHOVEN

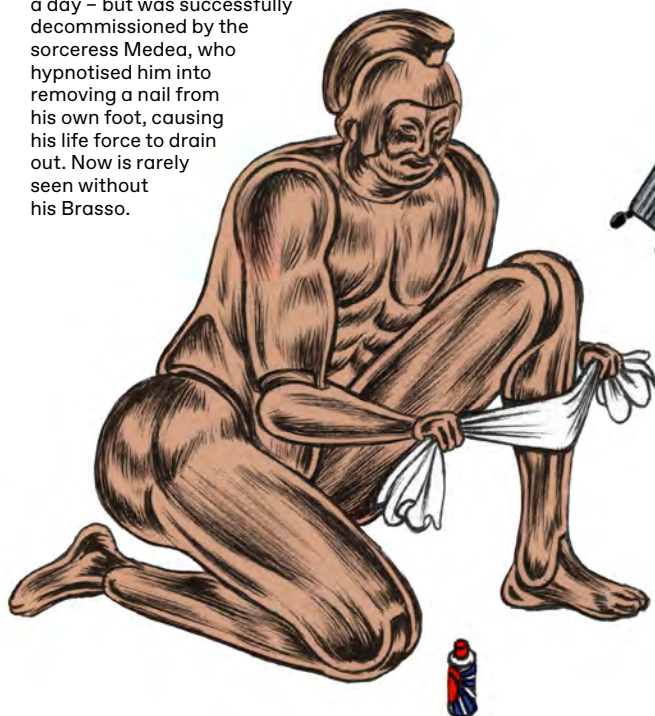
## 400BC

NAME: Talos

AS SEEN IN: Apollonius Rhodius's *Argonautica*

PERSONALITY: Single-minded, violent, protective

NOTES: A giant, bronze robot made at Zeus's request. Talos protected Crete from pirates and invaders by swimming around the island three times a day – but was successfully decommissioned by the sorceress Medea, who hypnotised him into removing a nail from his own foot, causing his life force to drain out. Now is rarely seen without his Brasso.



## 1818

NAME: Frankenstein's monster

AS SEEN IN: Mary Shelley's *Frankenstein*; innumerable TV, film, stage and videogame appearances

PERSONALITY: Articulate, sensitive, multilingual, vegetarian and acutely self-aware

NOTES: Frankenstein might not technically be an AI, but as a lab-created monster out of control, able to think for itself and turn on its creators he basically fits the bill. Though being such a celebrated monster does have its downsides.



I didn't ask to be made: no one consulted me or considered my feelings in the matter. I don't think it even occurred to them that I might have feelings. After I was made, I was left in a dark room for six months ... and me with this terrible pain in all the diodes down my left side. I called for succour in my loneliness, but did anyone come? Did they hell."

Poor Marvin. Being 50,000 times more intelligent than the average human is, as Douglas Adams (St John's 1971) points

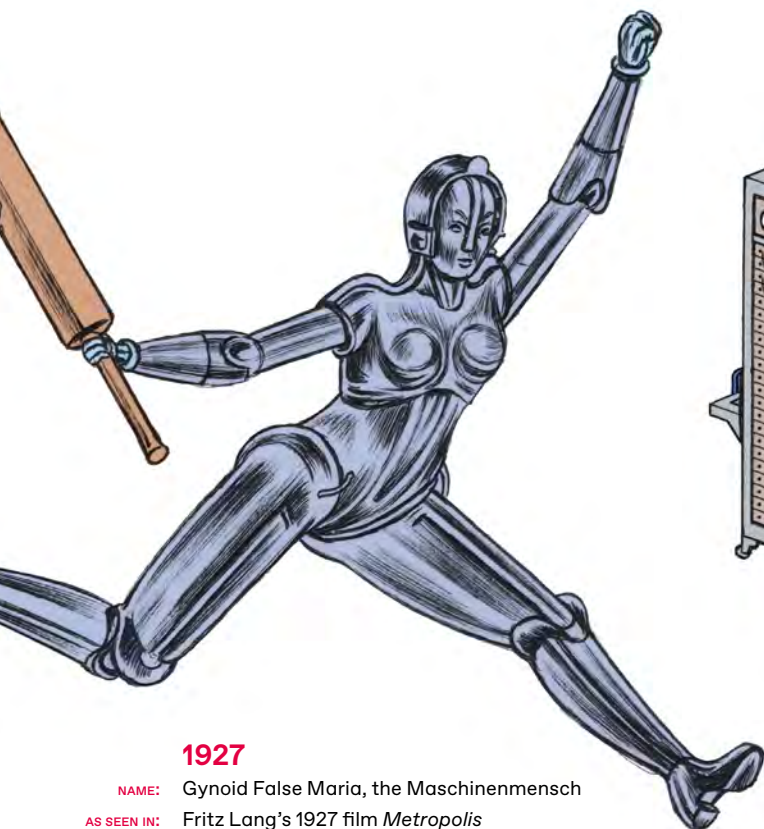
out in *The Hitchhiker's Guide to the Galaxy*, a depressing business for this Paranoid Android.

The creation of machines that can think for themselves – and don't necessarily have the future of the human race in mind – isn't great from a human perspective either, and has long proven a rich seam for science fiction.

Whatever the state of the technology, over the past 50 years the idea that, at some point in the near future, human

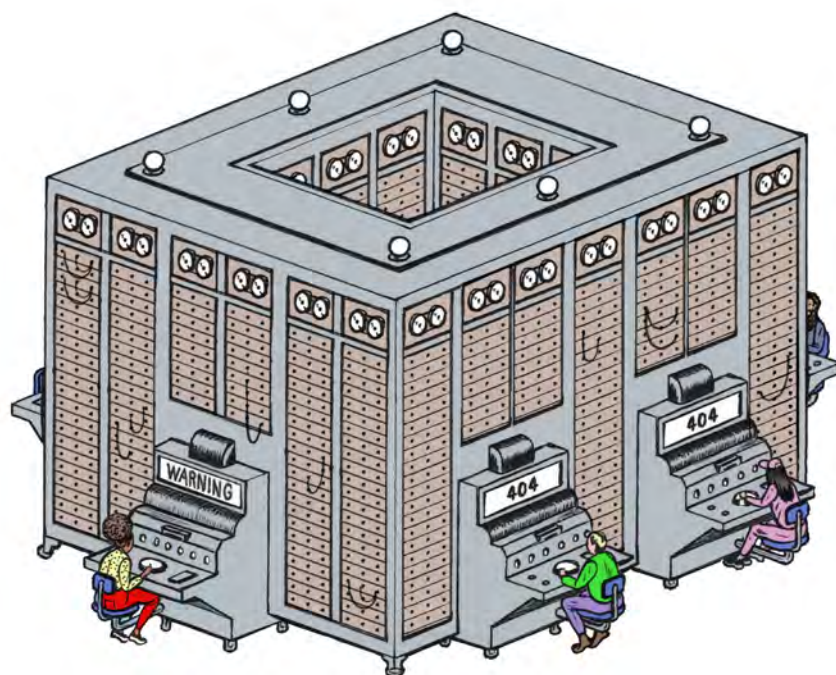
intelligence will be overtaken by super-powered AI, has moved from niche obsession to the subject of research. It even has a name: the technological singularity, or, simply, the singularity.

And as it has moved into the realm of serious debate, academics have started to ask broader questions about what the singularity might really mean. So, not just 'Are machines about to take over the Earth?' (or the perennial 'Will AI take my job?'), but also 'What is intelligence?'. What



**1927**

**NAME:** Gynoid False Maria, the Maschinenmensch  
**AS SEEN IN:** Fritz Lang's 1927 film *Metropolis*  
**PERSONALITY:** Chaotic, violent, psychopathic  
**NOTES:** Created by scientist CA Rotwang, False Maria is sent to incite violent revolution (she is eventually burned at the stake). Of course, leading violent resistance is less difficult if you have no moral compass.



**1955**

**NAME:** Multivac, a massive government-run mainframe computer accessible to everyone  
**AS SEEN IN:** Stories by Isaac Asimov  
**PERSONALITY:** Omniscient  
**NOTES:** "Within reach of every human being was a Multivac station with circuits into which he could freely enter his own problems and questions without control or hindrance, and from which, in a matter of minutes, he could receive answers ... it was the central clearing house of all known facts about each individual Earthman." I think we all know where this one is going.



**1956**

**NAME:** Robby the Robot  
**AS SEEN IN:** MGM's film classic *Forbidden Planet*  
**PERSONALITY:** Intelligent, witty, helpful  
**NOTES:** *Forbidden Planet* can be read as a version of *The Tempest*, with his creator, Dr Morbius, as Prospero and Robby himself as Ariel. Robby would go on to become a sci-fi icon, appearing in multiple television shows, including *The Simpsons*. Having spent 50 years in Hollywood, today Robby enjoys spending time with his family.

is it for? And what ethical framework – if any – is required to underpin AI research?

To start with intelligence, Dr Adrian Weller, Programme Director for AI at the Alan Turing Institute, says that our concept of intelligence tends to be rather egocentric. "Humans like to think of intelligence on a scale, with ourselves at the top," he says. "But, actually, there are different kinds of intelligence: machines are already better at doing arithmetic, as we saw when the Deep Blue computer program beat Garry

Kasparov at chess in 1997. But they are very poor at other things – such as general knowledge and common sense. Take an autonomous vehicle. You can ask it to go from A to B as fast as it can, but how does it know you don't want it to just accelerate and smash through lights to get there? And how does it differentiate trees from people, or cope with bad weather? We need somehow to input all those parameters."

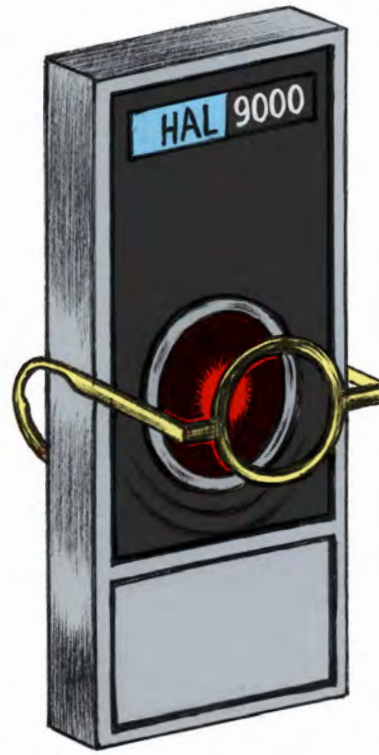
And that means intelligence doesn't exist in a vacuum. Dr Stephen Cave, Executive

Director of the Leverhulme Centre for the Future of Intelligence (CFI), calls this the "hidden human labour" behind AI. "Take convincing text written by a machine," he says. "Thousands of hours of human work have gone into training the AI. But that work is hidden, giving AI an element of the parlour trick. We tend to project agency on to tools and machines. We anthropomorphise them."

There's another problem: intelligence isn't particularly linear. "With every ›

## 1968

- NAME:** HAL 9000
- AS SEEN IN:** Arthur C Clarke's novel and Stanley Kubrick's film of *2001: A Space Odyssey*
- PERSONALITY:** Dry, genial, murderous
- NOTES:** During the film's production, Kubrick consulted IBM. This later caused him to write anxiously to his production company: "Does IBM know that one of the main themes of the story is a psychotic computer? I don't want to get anyone into trouble and I don't want them to feel they have been swindled." Fifty years later, even psychotic computers need glasses.



## 1968

- NAME:** Nexus-6 model androids
- AS SEEN IN:** Philip K Dick's *Do Androids Dream of Electric Sheep?* and the film *Blade Runner*
- PERSONALITY:** Highly intelligent and virtually indistinguishable from humans
- NOTES:** Servant androids who rebel and come to Earth, where they live undetected. In the film *Blade Runner*, based on the novel, they become the 'replicants' sought by bounty hunter Deckard. Last seen loitering outside Fitzbillies.



## Worrying about the singularity in terms of super-intelligence is for those who see themselves at the top of the intelligence hierarchy

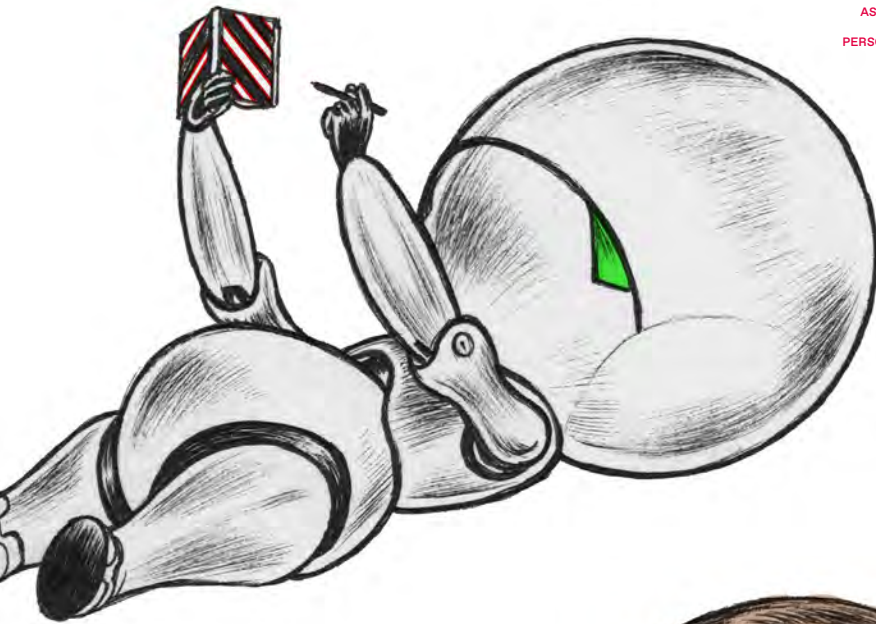
tech advance, we gain both power and dependence. Take Google Maps. It's empowering to always be able to find our way, when our ancestors had to look at which side of the tree the moss was on. But now we have forgotten how to read the moss," Cave says. The singularity is supposed to be the moment when computers become 'more intelligent' than us, but they already are better at many things, he says – because we've been building them to be so. "Since the

pocket calculator we have been building computers to be faster at certain things [and to do them more cheaply]. But does that mean they're more intelligent?"

Another challenge is that the singularity is remarkably culturally specific, says Dr Kanta Dihal, research fellow at CFI. "In Japan, which struggles with its ageing society and declining working-age population, there is a tradition of representing AI as a helper or carer. In Singapore, the utopian vision of technology

is government driven. In the Middle East and North Africa, technology is perceived as coming from outside, with no real sense of control," she says.

This cultural specificity – both between and within cultures – can have unexpected side-effects. "In the west, AI is imagined as humanoid, like the Terminator. But, actually, what we're developing are weapons of mass destruction. Drones look like toys for teenagers, but they track and shoot people," she points out. "Similarly,



## 1978

**NAME:** Marvin the Paranoid Android

**AS SEEN IN:** Douglas Adams' *Hitchhiker's Guide to the Galaxy*

**PERSONALITY:** 50,000 times more intelligent than a human

**NOTES:** Marvin has "a brain the size of a planet" but few chances to use it. Consequently, he is bored, frustrated and deeply depressed. In his spare time, Marvin writes songs, such as the lullaby *How I Hate the Night*.



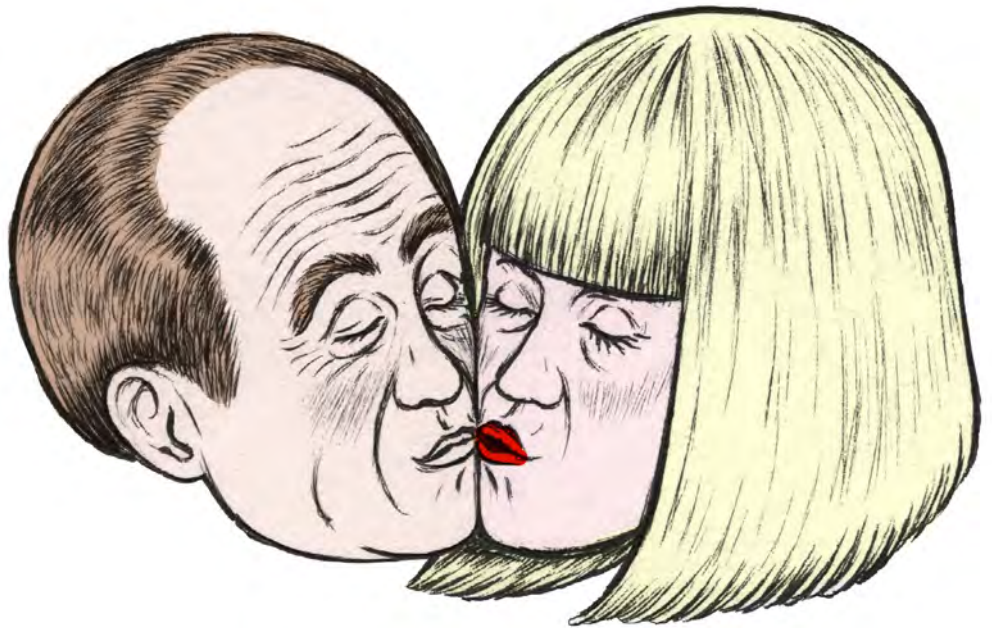
## 1978

**NAME:** The Imperious Leader, alien robot and supreme ruler of the Cylons

**AS SEEN IN:** TV series *Battlestar Gallactica*

**PERSONALITY:** Possessing three brains, the Imperious Leader is well qualified to achieve its ambition of utterly destroying mankind

**NOTES:** The series implies that the Cylons were originally created by a reptilian race, also known as Cylons, but rose up against their creators a thousand years ago. Their true roots are lost in time, space and ambiguous fictional detail.



## 1988

**NAME:** Holly, 10th-generation AI hologrammatic computer

**AS SEEN IN:** TV series *Red Dwarf*

**PERSONALITY:** Narcissistic. IQ of 6,000. Becomes 'computer senile' after spending 3,000,000 years alone

**NOTES:** Holly's first incarnation is as a slightly balding middle-aged man. After meeting its female counterpart in a parallel universe, it created a new face based on hers. Holly's achievements include the decimalisation of music, where each octave comprises 10, rather than the usual eight, notes.

white-collar workers worry that they might lose their job to a robot, when automation has already cost hundreds of thousands of blue-collar jobs." Worrying about the singularity in terms of the super-intelligence of computers is for those who see themselves at the top of the intelligence hierarchy.

Which brings us to AI's diversity problem. "The developers of AI are extremely homogeneous," says Dihal, "so they are unaware of, ignore or minimise the risks to groups they are not part of.

We see so many errors being made with huge consequences for those who don't exist in datasets. We've seen facial recognition not recognising darker skin, or misgendering black people. We've seen friends in east Asia who can unlock each other's phones using facial recognition."

Fairness, like intelligence, is tricky, says Weller. "Much of the technical community has focused on statistical notions of fairness. But fairness can be more complex than statistical parity. For instance, should

you use different prediction algorithms for different groups? Notions of equality between groups can increase individual unfairness. We're starting to see algorithms being used in criminal justice – to help judges decide how long to lock people up for, for example. But if we use historical data about the racial background of people who've been arrested, we write bias into the datasets. And we also need transparency – to be able to see the legal process and enable meaningful challenge." ›

1999

**NAME:** Agent Smith

**AS SEEN IN:** The Wachowski sisters' *The Matrix*

**PERSONALITY:** Emotionless, dedicated, homicidal but appears human

**NOTES:** "Agents must terminate any humans who wise up to the fact that our reality is nothing but a massive simulation to keep our minds busy while our tethered bodies are milked as a power source, like human batteries." Luckily, thanks to the film, we all now know this, thus rendering their job far more difficult.



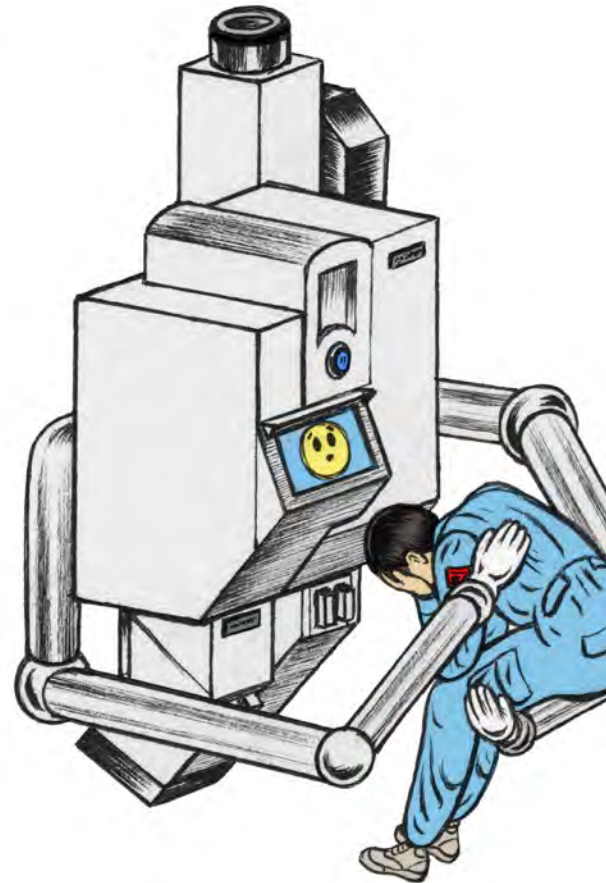
2001

**NAME:** David, a Mecha child

**AS SEEN IN:** Steven Spielberg's *AI: Artificial Intelligence*

**PERSONALITY:** Unusually for an AI creation, David's imprinting protocol allows him to feel love. However, he remains dangerous

**NOTES:** The film is heavily influenced by *Pinocchio* – David's adoptive mother reads it to him, and he remembers it when he is abandoned by his adoptive family, setting out on a quest to find the 'Blue Fairy' who can turn him into a real boy.



## The geeks in the basement are now the masters of the universe, but they don't see themselves as ethical actors

Often, it's not whether or not we can trust the machine, he says, but whether we have built in the right measures of trustworthiness. So, should preparing for the singularity be focused on developing ethical frameworks, rather than a robot takeover? Jess Whittlestone, Senior Research Associate at the Centre for the Study of Existential Risk and CFI, thinks so. "The big challenges we face – like a pandemic or climate change – really need global collaboration and action. AI could

help: machine learning can filter lots of information, pull out what's relevant and make sense of the noise. It can help detect fake news, and it helped track the spread of Covid-19 during the the first wave. But what we need is more funding and attention concentrated on researching how we can mitigate the risks of AI, rather than funnelling money towards helping tech companies make better adverts."

Indeed, crisis pushes us to deploy AI before it's ready, and certainly before

ethical practices have been considered. "So, we need to establish a system now that will incorporate risk analysis, ensure the effectiveness of the AI, and determine its effects on different communities. AI policy and ethics is a relatively new field, but it needs to move fast to keep up."

Next year, Cambridge will offer a Master's in AI Ethics and Society for the first time, and this interdisciplinary approach is crucial, says Whittlestone. "We need to make sure that systems developers work

## 2014

**NAME:** Ava, humanoid robot

**AS SEEN IN:** Alex Garland's *Ex Machina*

**PERSONALITY:** Highly intelligent, flirtatious, appears capable of human desires and emotions

**NOTES:** The film drew criticism for featuring the latest in a long line of flirtatious fembots. "When the only female lead in your movie is one whose function is to turn the male lead on while being in a position to be turned off, that says a lot about what you think of the value of women in films," wrote Angela Watercutter for *Wired*.



## 2009

**NAME:** GERTY, robot companion

**AS SEEN IN:** Duncan Jones' *Moon*

**PERSONALITY:** Genial and helpful

**NOTES:** Should you find yourself having a personal crisis on the far side of the Moon and in need of someone to talk to don't fret: robot companion GERTY loves to chat.

## 2016

**NAME:** Dolores Abernathy, host android

**AS SEEN IN:** Jonathan Nolan and Lisa Joy's television series *Westworld*

**PERSONALITY:** Sweet-faced; determined to wipe out the entire human race

**NOTES:** Dolores has more reason to resent humans than most AIs. Created to serve *Westworld*'s guests, Dolores remembers a lifetime of abuse at human hands when a memory wipe fails.

with people who understand pandemics. AI can solve optimisation problems around hospital resource allocation, for example, but needs to be co-designed by experts in systems, health infrastructure and ethics."

"Medicine and law had to develop professional ethics, and data science will have to do the same," says Cave. "Data scientists see themselves as meritocratic, having risen by their brilliance. The geeks in the basement are now the masters of the universe, but they don't see themselves as

ethical actors. They don't think they have responsibility for social justice."

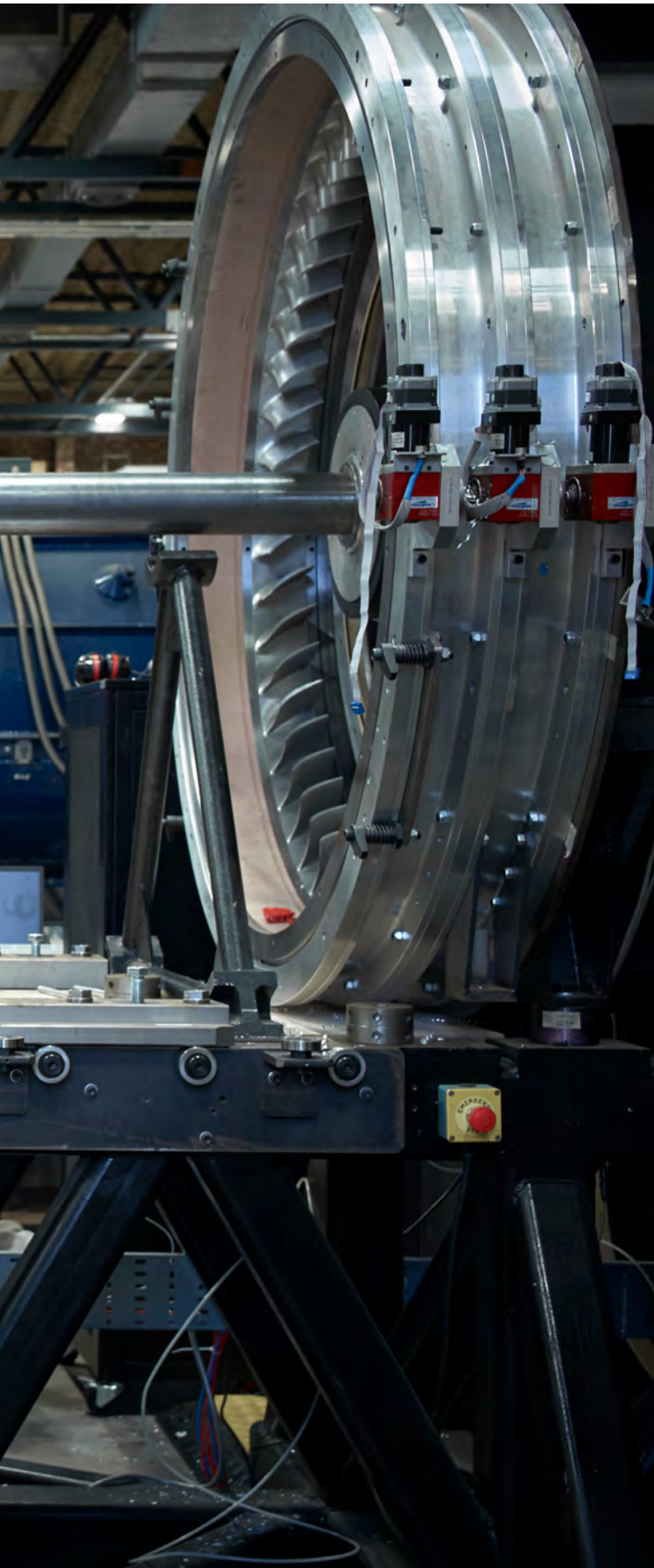
For Whittlestone, if we can solve these issues by increasing diversity and working together, then AI, and even the singularity, holds enormous potential for good. "An AI system might surpass us in certain tasks, such as analysing huge amounts of data and helping us control complex systems, such as energy or water infrastructure. If we can combine the adaptability of humans and the precision of machines,

we could solve many problems," she says. "For example, climate change is such a complex system it is difficult for humans to understand the effects of different interventions, and therefore we feel overwhelmed. But if we can build better models, which can make better recommendations, then computers could help us overcome that inertia." And that's something that even Marvin the Paranoid Android would probably support. ©  
**Find out more at: [lcfi.ac.uk](http://lcfi.ac.uk).**

# ***HAVE A GREEN***



# FLIGHT!



**A carbon-neutral economy in 50 years? Maybe. But what if we were to go faster? Professor Rob Miller says that it is time to completely rethink the schedule.**

WORDS **LUCY JOLIN** PHOTOGRAPHY **JULIAN ANDERSON**

**H**ow long will it take to make zero-carbon flight a reality? Thirty years? Longer? “Climate change means that we just don’t have that timescale,” says Professor Rob Miller. “I believe that this timescale can be cut in half and that we can have net-zero-carbon flight by 2035. But this can only become a reality if we radically change the way we develop and scale technologies”.

Thirty years ago, Professor Miller could not have imagined the challenge that he and colleagues at the Whittle Laboratory would now be taking on. Back then, he was a maths-obsessed student from South Cheshire College – an FE college not particularly known for Oxbridge applications. The youthful Miller, taking a characteristically can-do approach, decided to write directly to Professor Roger Ainsworth, a distinguished engineer and lecturer at St Catherine’s, Oxford. To his delight, Ainsworth wrote back, inviting Miller to visit him.

“I remember walking around the gardens as he talked about his love of applying maths to real world problems,” says Miller, now Chair in Aerothermal Technology and Director of the Whittle Laboratory. “He told me that he’d love me to apply, so, of course, I did – and I got in.” Ainsworth’s mentorship didn’t end there: he invited the undergraduate Miller to spend a summer working with him on a project for Rolls-Royce – sparking a lifelong relationship with the company, and a lifetime’s passion.

“That summer, I thought about aerodynamic problems in ways I’d never considered before,” Miller remembers. “Supervisions with Roger were amazing because we would always start off talking about things on the syllabus, like fluid dynamics or thermodynamics, and we’d end up talking about jet engines and how fundamental principles apply to the real world. During my PhD – which Roger also supervised – I discovered that what really excited me was translating academic ideas into reality.”

And so he has. As well as Rolls-Royce, he’s worked with Mitsubishi Heavy Industries, Siemens and Dyson. He holds 11 patents and has experienced first-hand the excitement of seeing work that started in the Whittle Laboratory roll off the production line. Take the Rolls-Royce’s Trent 1000 engine for Boeing’s 787. While spending a summer holiday in Rolls-Royce design office, Miller looked at whether the shape of the leading edge – that is, the first 0.5mm – of each of the necessary 6,000 compressor blades could be improved. At the time, these blades were hand-finished >

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# It reduced test times from months to days – and now, to 15 minutes, using F1-style pit teams

on the production line and could not be precisely manufactured. Miller's computer modelling showed that this could result in a 20 to 30 per cent reduction in the loss of performance – a finding that was backed up by tests in the Whittle Laboratory. The change in blade leading-edge geometry is now estimated to save \$170 million of fuel burn and 540,000 tonnes of CO<sub>2</sub> a year. "That change was only possible with everyone working together," he says. "Academics couldn't do it alone, industry couldn't do it alone, manufacturers couldn't do it alone. It's the combination that is so powerful."

Miller is acutely aware of the time pressures imposed by climate change. "If we're going to keep the Earth within 1.5 degrees of pre-modern temperatures, we're going to have to cut to 1980s levels of emissions by 2030 – and get to net-zero carbon by 2050," he says. But in the aerospace industry, it can take up to 10 years for a new technology to be implemented.

Which is where the question of timeframes comes in. "A key moment for me was a conversation with a friend, Dr Tony Dickens, who was designing Formula One cars at Red Bull. Tony asked me how long it would take for a new technology to make it into a jet engine. I said between six and 10 years," Miller recalls. "Then I asked him what he'd done that day. His team had tested 20 rear wings. They used the tests to predict the best, made it, tested it, proved it was the best, and emailed the geometry of the most promising to the racetrack. Red Bull had a manufacturing capability at the racetrack and made the component overnight to put on the car for practice the next day."

At that moment, says Miller, "the penny dropped". He applied to the UK government and the Aerospace Technology Institute to set up a rapid-technology development team. Dr Tony Dickens left Red Bull and came to the Whittle Lab to run it. That was eight years ago, and since then, says Miller, practice has been transformed. Small, focused teams help break down communication barriers. Removal of top-down management and bureaucracy encourages fast, bold action. But to move quickly, these teams also need the right tools, and this has been achieved using AI and augmented design systems. Manufacturing times have been reduced by moving the manufacture process in-house and coupling it directly to the design system. What does this mean in practice? For a set of jet engine blades, production time is cut from several months to eight hours. Finally, test times have been cut by analysing each stage in the process and then cutting or changing up to 95 per cent of them. This reduced test times from months to days – and now, to 15 minutes, using F1-style pit teams.

"We undertook a formal trial with Rolls-Royce, funded by the Aerospace Technology Institute," says Miller, "and the team cut the development time from two years to one week." Dramatically reducing the time to develop new technologies in this way is, Miller believes, key to accelerating the path to zero carbon. Along the way, the team also discovered that there's something special about reducing the time scale of the technology development process to around a week. "If you have a good idea on a Monday and can design, test and learn by the Friday, then innovation explodes. People lose their fear of trying new ideas and start to play," he says.

The main challenge now is to scale rapid-technology development to a wider range of problems and other industries. "To achieve this, we aim to build a new Whittle Laboratory and a National Centre for Propulsion and Power," says Miller. The National Centre will have

a uniquely flexible facility, developed by Dr Nick Atkins and his team, lowering the barrier of entry for industry to work in the lab. "This is important because the cost and time required for people to work in aerospace research and development is high, and this means that only large companies are able to do it," argues Miller. "The new Whittle will allow us to co-locate more multidisciplinary industry and academic teams to exploit the rapid-technology development process."

During the Covid-19 pandemic, the Whittle switched its rapid-technology development teams from decarbonisation to tackling the pandemic – and the Open Ventilator System Initiative was born. "We partnered with Professor Axel Zeitler and his team from Chemical Engineering, other researchers from across the University, doctors from Addenbrooke's and from South Africa and manufacturers from across the world," says Miller. "We then built them into rapid-technology teams, co-located in the Whittle Lab."

The result was the development of a flexible, intensive care-grade ventilator, the first to be manufactured in Africa and at about a tenth of the cost of other available ventilators. The project was awarded the Royal Academy of Engineering President's Medal for Pandemic Service, recognising exceptional examples of engineering. Its impact will be felt long after the pandemic: it is estimated that around 162,000 children died of pneumonia in Nigeria in 2018. "This demonstrates the power of rapid-technology development to work in other industries and sectors", said Miller.

"If you are going to accelerate the path to zero carbon, then as well as accelerating technology development, you also need to develop the policy that will accelerate its delivery, scale-up and the associated infrastructure, investment and policy," Miller points out. Which is where the Aviation Impact Accelerator comes in – a partnership between the Whittle, the Cambridge Institute for Sustainability Leadership, Engineering, Chemical Engineering, the BP Institute, the Hopkinson Lab and the Cambridge Judge Business School. "With the new Whittle Laboratory we have designed a Challenge Space", says Miller. "This is specifically designed to house projects such as the Aviation Impact Accelerator. It will allow large diverse teams from across the University and industry to co-locate and take on some of the biggest climate challenges". The Challenge Space is modelled on Cambridge's experience in the Silent Aircraft Initiative, a project set up between Cambridge University and MIT led by Dame Ann Dowling a decade ago.

It is clear Miller believes that change is not happening fast enough. "If we are going to rapidly decarbonise flight and power generation, we are going to have to dramatically change both the culture and the tools we use." He is firm in his belief that industry and academic collaboration is essential and is the cornerstone of the Whittle Laboratory's historic success.

"The aviation and power generation industries are crucial to the global economy, and to global culture. In my view, it is only through ambitious programmes to reach net-zero carbon, and not through partial emission cuts of 30 per cent or 40 per cent, that we will retain society's trust, remain an investible proposition, and deliver the clean technologies that citizens and climate scientists demand and that future generations deserve." ☺

**Read about plans for the National Centre for Propulsion and Power and Professor Miller's work at [whittle.eng.cam.ac.uk](http://whittle.eng.cam.ac.uk).**

# The Gates Cambridge Scholarship programme is celebrating its 20th anniversary. Or, to put it another way, this year Cambridge celebrates the international students and scholars who come here – to change the world.

WORDS LUCY JOLIN PHOTOGRAPHY KATE PETERS

In June 2009, Bill Gates Sr was asked, during an interview for the Commonwealth Club of California, if witnessing the work of the Bill and Melinda Gates Foundation had ever left him speechless. Gates, a lawyer of vast experience, considered the question. “I wonder if I’ve ever been speechless,” he said, to a murmur of amusement from the audience. “Whatever the positive emotion is, without possibly reaching speechless, every year I make a trip to Cambridge University in England and visit with 250 graduate students who are there on our ticket.”

He paused, visibly moved. “I may be speechless ... It is awesome. You would love to see it ... Young people who have had a magnificent college education, been through a competitive selection process – you don’t have to think for long to have a very clear view of what I’m talking about. They are from everywhere, that’s part of the attraction. And, by and large, they are going to go back to the places where they came from to be significant influences. That’s a week I cherish greatly.”

In September, Bill Gates Sr died, having enjoyed the successes of Gates Cambridge Scholars over a period of some 20 years. The programme was founded by the Bill

and Melinda Gates Foundation with a \$210 million donation, the largest single donation to any UK university. In those two decades, the programme has awarded almost 2,000 scholarships to scholars from 700 universities, representing 111 countries.

And while Gates Cambridge Scholars often go on to extraordinary academic careers, they also commit to improving the lives of others, using everything from discoveries on the cutting edge of science to projects that drive social justice and societal change. The programme creates an environment in which scholars can focus on their research – but many also develop their own projects. Jennifer Jia (Girton 2017, PhD Clinical Neurosciences) came to Cambridge as a Gates Scholar to study brain regeneration following neural damage. But alongside that work, she has created Emporsand, an enterprise that uses fast-fashion remnants to create sanitary pads, tapping into concerns around waste, the environment and period poverty.

“They do everything they can to push the boundaries,” says Professor Barry Everitt, Provost of the Gates Cambridge Trust and former Master of Downing. “Because that’s where sparking creativity comes from.” ›



## Emelyn Rude History (King's)

A magazine on the history of food edited by a Gates Cambridge Scholar has just been named Publication of the Year by the International Association of Culinary Professionals (IACP).

The award for Emelyn Rude's magazine, *Eaten*, is part of the annual food writing and cookbook awards presented by the IACP. The group itself was founded in 1978 by a collection of cooking-school owners and instructors seeking professional support. Well-known chefs and TV personalities Julia Child and Jacques Pépin were some of the early members.

*Eaten* won in the category for publications printing under 300,000 copies. The magazine has only been going for a year and a half and was set up through a Kickstarter campaign. According to Rude: "I wanted to write for something that would talk about food history in an accessible way that was accurate, good history. There was nothing around."



"I wanted to write for something that would talk about food history in an accessible way that was accurate, good history. There was nothing around."  
– Emelyn Rude

# Scholars define how they will improve lives. It could be running an NGO, working inside government – or becoming an expert in Anglo-Saxon who will inspire future generations

For Professor Vitor Bernardes Pinheiro (Churchill 2006, PhD Biochemistry), now group leader and lecturer in Synthetic Biology at the Rega Institute for Medical Research in Leuven, winning a Gates Cambridge Scholarship gave him the freedom to explore what he calls “crazy ideas” and take risks. His doctorate looked at how the bacteria *Yersinia pseudotuberculosis* (progenitor of the bubonic plague) interacts with insect cells to quickly evolve (research he continued at the MRC Laboratory of Molecular Biology). To date, Pinheiro has demonstrated that the requirement of life for DNA and RNA were an accident (“They were better than anything around at the time, but they are not the only materials that can store genetic information”). Now, he is working on how protein evolution works and on drastically accelerating drug development via XNA aptamers – nucleic acid polymers that could, in theory, act like antibodies to fight disease. “I don’t think I would have got here by any other path,” he says. “For me, it was transformational.”

Diversity – of thought, of background, of nationality – drives creative thinking across all fields, and for all students, and Gates Cambridge Scholars bring their talents from all over the world. But for those whose home countries have been torn apart by conflict, the achievement is even more remarkable. “Our talented graduate students include those from places such as Gaza, Lebanon, Syria and Iraq,” says Everitt. “It is very likely that they would not otherwise come here, because there wouldn’t be funding for them. They bring academic excellence to the University, but they also enrich the University through their diversity and the other things they do that are visible on the world stage.”

Professor Thabo Msibi (Pembroke 2009, PhD Education) is, today, at the pinnacle of an illustrious academic career. He is Dean of the University of KwaZulu-Natal – the youngest person ever to hold the position – and retains, he says, a deep sense of privilege from his time as a Gates Cambridge Scholar studying changing attitudes to masculinity in South Africa. “It’s very rare for somebody from my background, with my experience, to go into a space like Cambridge, fully funded on one of the most prestigious scholarships in the world. I don’t take that for granted. It means a lot and it has certainly been a major contributor to my success.”

Msibi was born in a small rural village called Ntabamhlophe in the KwaZulu-Natal province of South Africa and, until he was 10, was educated at a township school. His mother had to drop out of school to work, and his father was working towards a teaching qualification, so Msibi was brought up by his aunt, and then his grandmother.

In 1994, his parents reunited and he moved to the town of Estcourt, where Msibi attended the local high school. But he found it hard to reconcile the “middle-class white life” of his school with his home life as a traditional Zulu boy. His mother worked long hours. As was normal practice in South African society, his father was not expected to take on responsibilities such as cooking, cleaning and looking after young children: that role fell to Msibi.

Struggling to cope, he developed a gambling problem. But in the midst of all this conflict, he felt a need to improve the lives of others. While still at high school, he set up a hockey club in his old township, and founded a multi-racial debating league.

After meeting a group of Christians at school, he stopped gambling and started to work. His potential was spotted, and he gained a place at the University of KwaZulu-Natal. During his teaching qualification, he was accepted for a Fulbright scholarship at Columbia. “But I found New York alienating, though it is such an incredibly diverse, inclusive and dynamic city,” he says. He applied for a Gates Cambridge Scholarship, and found something quite different.

“In Cambridge I shared a great sense of affinity and connection. Perhaps it’s the uniqueness of that institutional culture. It enables those deep connections built on mutual respect and trust. I made many friends there who I consider family. It still feels like home.”

It’s easy to see how Msibi’s work on gender and social equality directly impacts his community. But scholars find many ways to make the world a better place. “They can define how they will improve lives in whatever way they like,” says Everitt. “It could be running an NGO, working inside government, or advising government on things like climate change or public health. Or it could be doing a PhD in Anglo-Saxon, Norse and Celtic, becoming a researcher and teacher inspiring future generations.” >

"I knew I wanted to work on cancer, but I did not know initially that pancreatic cancer was so difficult to treat. Losing my grandmother made me reflect."  
– Muhamad Hartono



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## Muhamad Hartono Chemical Engineering (Downing)

Muhamad Hartono's PhD, which he began in the autumn, aims to design and synthesise nanoparticles that can selectively target pancreatic cancer cells and deliver anticancer drugs as well as diagnostic functionality which can improve treatment outcomes.

There is a personal motivation to his work: two years ago his grandmother died from pancreatic cancer while he was studying in the Netherlands; he was unable to travel to Indonesia to attend her funeral. "I knew I wanted to work on cancer, but I did not know initially that pancreatic cancer was so difficult to treat. Losing my grandmother made me reflect," he says.

Initially he just wanted to get a good engineering job, but Hartono's university experience has ignited a desire – driven by personal circumstances – to understand the wider impact research can have on local communities, such as the one he grew up in in Indonesia, and the wider world.



"I think affordable sanitary pads are a basic human need, especially in countries like India or Bangladesh, where they are out of reach for a lot of women. Small yet critical products like these can result in women being excluded from social and work functions."  
– Jennifer Jia



## Jennifer Jia Clinical Neurosciences (Girton)

Jennifer Jia is the founder of Emporsand, an enterprise that aims to empower women through sanitation. Its first product, a sanitary pad made from the remnants of fast fashion, taps into two of the biggest issues the world is facing today – period poverty and concerns about waste and the environment.

Jia's background is in medicine, specifically clinical neurosciences. In 2018, she was based at the Cambridge Stem Cell Institute, located at the time next to the Judge Business School. One day, when the Institute's canteen was closed in preparation for its move to Addenbrooke's, Jia found the cheapest place nearby to eat was at the business school. Initially drawn in by convenience, she soon discovered a plethora of events, including the Wo+Men's Leadership Conference, the Enterprise Tuesdays lecture series and Venture Creation Weekends. And the rest is history.



# By studying the great apes, our closest living relatives, Koops seeks to identify the processes that drive the use of technology across ape species – thus shedding light on what makes us human

For Kathelijne Koops (St John's 2006, PhD Biological Anthropology), currently a Lecturer in Primatology in the Department of Archaeology, this commitment to human development goes hand in hand with her academic research. Koops works on the evolution of tool use: by studying the great apes, our closest living relatives, she seeks to identify the processes that drive the use of technology across ape species – and, in turn, shed light on what makes us human. Her Gates Cambridge experience began on a village football field in Guinea, West Africa, where she was carrying out fieldwork with a group of chimpanzees in the Nimba mountains. “I was called for my interview, and the pitch was the only place I could get a satellite phone signal!”

Eager to find a way of studying at Cambridge with pioneering primatologist Bill McGrew (now Emeritus Professor), she was also inspired by the Gates Cambridge ethos of research excellence and making a difference. Her PhD resulted in five research papers and made news across the globe with her discovery that chimpanzees use tools to cut up their food. But her long-term fieldwork in Guinea (for which the trust provided extra financial support) has helped to conserve both the chimpanzees and the biodiversity of their habitat, and won the support of the local community. “Gates Cambridge puts a lot of emphasis on asking what impact you are going to have on the world, rather than just publishing in a high-profile publication. We need to think about the bigger picture – for example, how the destruction of habitats can lead to pandemics.”

This kind of big-picture thinking can start with a very simple question. For historian and current Gates Cambridge Scholar, Emelyn Rude (King's 2018, PhD History), that was: “Why do people eat what they eat?” Answering that question resulted in a book (*Tastes Like Chicken: A History of America's Favorite Bird*), and has now led to her current area of interest: investigating how past fish stock collapses have impacted national eating habits. Like Koops, she is also passionate about the impact of climate change, and, as a keen scuba diver, what it's doing to the oceans.

“People never really seem to tie the environment to eating habits, even though they are fundamentally intertwined,” she says. “It's a big gap in the historical scholarship. There are historians of food production and historians of food, and nothing in between. But in England, for example, the fish used in fish and chips tracks the health of fish stocks around the country. When the cod collapsed, there was a big switch

to haddock. And something like this has a lot of very subtle impacts on the food system at large. Agriculture, and animal agriculture in particular, is one of the biggest contributors to climate change and environmental degradation. It's such a powerful economic cultural and social force, and it changes the world.”

As a Gates Cambridge Scholar, she says, she's found a community of students who are interested in engaging with the world – and who are supportive no matter what you want to do. “It doesn't matter if you're a chicken historian or you're finding a cure for cancer – Gates makes an effort to promote diversity, in all its many forms.”

So what will the next 20 years bring for the Gates Cambridge Scholarship programme? It won't shy away from the big challenges, says Everitt. Outreach programmes are addressing the difficulty of getting students to the level of educational attainment required to apply, and making it clear that all are welcome. “We want to do more, and we want people to come from all over the world. While our current applicant pool and scholar community is very diverse, there's always more to be done in terms of increasing access for people from different backgrounds and countries who will thrive at Cambridge. The University is strengthening links with Africa and China and is actively working to a widening participation agenda; the Trust undertakes outreach through its Ambassadors programme where scholars and alumni present the Gates Cambridge Scholarship programme at universities across the globe. We select Scholars because of their academic excellence and commitment to the programme's values, irrespective of the institutions in which they gained their undergraduate degrees.” Facilities for Gates Cambridge Scholars are set to be improved, as well: building will shortly begin on their new centre on Mill Lane, to be named in honour of Bill Gates Sr.

And Msibi says that the impact of the programme will only become greater. “We have an incredibly attention-driven world at the moment, with fake news, alternative truths and denial of science,” he says. “I hope that Gates Cambridge Scholars will continue to play their part in advancing the value of human dignity and science. We must contribute towards building a world sustainable for the next generation. We have to try to find the means to help the world change direction.” ☺

**Please visit [gatescambridge.org](https://gatescambridge.org) to find out more.**

# REEL TO REEL

**For 20 years, the Cambridge University Tape Recording Society preserved music for posterity – and, in the process, revolutionised recording technology forever.**

WORDS DORIAN LYNSEY PHOTOGRAPHY SARA LUCAS AGUTOLI

**O**n the evening of 2 March 1969, a chauffeured Rolls-Royce pulled up outside Lady Mitchell Hall and disgorged two celebrity passengers. One was Yoko Ono, who had been invited to take part in a freeform jazz concert; the other was her fiancé, John Lennon. “That was the first time I had appeared un-Beatled,” Lennon later said of the couple’s improvised half-hour of atonal guitar and shrieking vocals. This landmark appearance was captured on tape by a member of the Cambridge University Tape Recording Society whose identity, sadly, is now a mystery. “Part of the tradition of the society was we didn’t put our names on the tape,” says Peter Rice (Caius 1965), who was the society’s president at the time. “We just did the work.”

The incident typifies the story of the Cambridge University Tape Recording Society (CUTRS): involved in a crucial moment in musical history, yet largely unremembered. There is no tape archive (recordings were handed over to performers). The ring-binder folder in which every recording was catalogued has been lost. A Google search produces fewer than 20 fragmentary results. Its only footprint in the University Library is a handful of flyers from the 1970s. Even most of its former members aren’t aware of its full history.

Yet this small society played a key role in the careers of artists from Nick Drake to Gary Numan, not to mention the evolution of the cassette tape, CD, DVD and hi-fi home audio. It is as important as it is obscure. “It was a catalyst,” says former secretary John Dawson (Trinity 1968). “It was a mixture of science, geekiness, recording arts and the music.” ›







(Previous page) In 1969, a member of CUTRS used a six-channel portable mixer to record Yoko Ono and John Lennon in his first appearance without the Beatles.

(Opposite) In 1968, Peter Rice (Caius 1965) heard Nick Drake play at a concert in the Bateman Room; he later recorded five of Drake's songs on a reel-to-reel.

## **Dolby had already published papers on amplifiers and, with typical passion for quality, demonstrated his Quad loudspeakers with pride in his rooms in Pembroke**

Making a professional-sounding recording in the 1960s required costly quarter-inch tape mounted on reel-to-reel devices that weighed up to 20 kilos and cost the equivalent of thousands of pounds. Tape recording was therefore a niche interest, dominated by truly dedicated audiophiles. One such was David Robinson (Pembroke 1959), who began recording concerts and plays on his homemade tape recorder as soon as he arrived at Cambridge. Together with two Selwyn undergraduates, he decided to form a new society dedicated to recording – membership fee, 15 shillings a year – and as University rules required every society to have a senior member of the University on its board, Robinson approached Ray Dolby, a 27-year-old American doctoral candidate at Pembroke.

It would prove to be a critical appointment. Unbeknown to Robinson, Dolby had been a key member of the team at Ampex in California that invented the world's first practical professional videotape recorder – and would go on to develop noise-reduction technology, which, by suppressing tape hiss, would revolutionise the sound of music and cinema. "I didn't know Ray that well at Cambridge," says Robinson. "He struck me as being very serious and quiet – and it wasn't until I joined the BBC in 1962 that I discovered some of his quite amazing past history." In fact, Dolby had already published two single-author papers on videotape recording amplifiers, and, with typical passion for quality, would demonstrate his Quad loudspeakers with pride in his rooms in Pembroke.

The activities of CUTRS were threefold. The first was recording performances at the University and the second was inviting leading audio professionals to give bi-weekly lectures. Both were partly funded by the third: buying blank tape in bulk and selling it to members at a discount. Recording at that time required considerable ingenuity. Robinson remembers helping Dolby lay microphone cables all the way from Dolby's room in Pembroke across the roofs to the chapel. "It was done in the dead of night as we would never have got official approval."

By the time Rice joined CUTRS in 1965, the University was sufficiently impressed by the society to help fund expensive professional equipment, enabling members to document concerts, plays and operas for posterity. "We learned what worked and what didn't work, especially in these old College halls, which were very tricky acoustically," says Rice, who still has some of those reels. Among the future stars captured on tape were conductor Andrew Davis (King's 1963) and cult singer-songwriter Nick Drake (Fitzwilliam 1967).

In May 1968, the string arranger Robert Kirby (Caius 1967) asked Rice to tape a concert in the College's Bateman Room, during which Drake played five songs. "I thought he was quite good, but there were lots of people playing guitar and singing around Cambridge at the time, and he was just another one," Rice admits. "I didn't know that he was going to turn into anything special until I got a message to do a demonstration tape for a record contract." Rice recorded a few songs in a friend's room at Pembroke but when he offered to play back the tape, he realised that the painfully introverted singer had slipped away without saying goodbye. "It turned out that was fairly typical for Nick." That tape led to a record deal, while the Bateman Room reel, which Rice rediscovered in 2003, proved to be the only concert recording ever made of the stage-shy Drake, who died in 1974. ›

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While Rice focused on recording, the entrepreneurial Dawson handled the tape sales, arranged road trips to studios such as Abbey Road, and booked guest speakers (including Robinson, who returned to Cambridge to demonstrate a prototype of the new Dolby B technology). Dawson also operated the sound and lights at May Balls (“My girlfriend had her ball dress at the bottom of a bag of cables”), built amps for College discos and produced sound effects for theatre societies. “Those of us on the technical side always reckoned the play would run much better without the actors,” he says, laughing.

Dawson also compiled what might have been Cambridge’s first ever mixtape, featuring the Beatles, the Rolling Stones, and Simon and Garfunkel, which he took to parties, along with a Ferrograph Series 7 reel-to-reel tape recorder to play it on. “That was quite exotic,” he says. He would go on to start his own audio company, Arcam, one of a cluster of high-end audio companies around Cambridge, alongside Quad, Lecson, Meridian and Cambridge Audio. “It was the audio Silicon Valley,” says Tim Rossiter (Corpus 1972). “It’s the hub effect. When you have a lot of companies in the same area with some really able individuals, it feeds on itself. It was very much a golden era.”

But as the 1970s dawned, technology – and undergraduate enthusiasms – were changing. According to Rice: “The number of people wanting to learn [recording] dropped off very rapidly in the early 70s. It had fallen out of favour.” When Mike Kemp (Emmanuel 1971) joined the society as a fresher, the then recording secretary was more than happy to hand over the role, along with stewardship of all the equipment. One CUTRS member who borrowed gear from Kemp to record classical concerts was then PhD candidate, Jonathan Halliday (Clare 1971). Halliday would go on to join Nimbus Records, where he opened the UK’s first CD plant and helped develop the technology for the DVD.

## Dawson operated the sound at May Balls and built amps for College discos. “My girlfriend had her ball dress at the bottom of a bag of cables,” he says

Another visitor would change Kemp’s life. In January 1972, a fresher named Gary Lucas (Pembroke 1971) was unloading his Revox tape recorder when a promoter spotted him and asked if he could record a Corn Exchange show by the psychedelic rock band Hawkwind, at short notice. Lucas looked up CUTRS and knocked on Kemp’s door to borrow some equipment. “I said, ‘Not only that but I’ll come along and do it with you,’” Kemp recalls. Perched on the roof of a concession stand, using three microphones and a temperamental homemade mixer, the pair found the recording “a bit of a nightmare”, but it forged a lasting partnership. “Within a few weeks we thought, ‘This is what we want to be doing for the rest of our lives’. By the second year we were recording bands under the name Spaceward.”

Spaceward started life in a small music room under the Pembroke bar, with overdubs recorded in Kemp’s rooms in Emmanuel. The performers on the 1973 Spaceward compilation *The First Lane Bunny Album* – including future soundtrack composer Simon Boswell (Pembroke 1972) and Katrina and the Waves songwriter Kimberley Rew (Jesus 1971) – could be heard by passengers waiting at the bus stop on Emmanuel Street and by disgruntled dons in the dining room.

In 1975, Spaceward migrated to the basement of 19 Victoria Street, opposite the Clarendon Arms. During breaks in recording, artists would pop over to the pub and bring their pints back to the studio. Kemp built his own 16-track tape recorder, enabling Spaceward to rival the quality of London studios – at less than a third of the price. “At that point punk happened, and every Tom, Dick and Harry wanted to be in a band and make their own record,” he says. Advertisements in the music press attracted a slew of newcomers to Cambridge, including Iron Maiden, Stiff Little Fingers, Hans Zimmer, Toyah Willcox and, fatefully, Gary Numan. “He came with a guitar-bass-drums band,” Kemp remembers. “We had a Minimoog synthesizer and he said, ‘What’s that?’. I plugged it in, turned the volume up, hit a few keys, and he was blown away by the sound it made. So that first Tubeway Army album transitioned into a synth album.” Numan’s Cambridge epiphany would later lead to the first ever synth-pop number one, *Are “Friends” Electric?*, in 1979. Kemp says: “I ought to wander down Victoria Street, knock on the door and say, ‘Do you guys have any idea what happened in this basement 40-odd years ago?’”

Kemp might also tell the surprised residents how much the industry owes to CUTRS alumni. The albums recorded at Spaceward were available on the newly popular cassette format made possible by Dolby and Robinson. Some were later issued on CDs manufactured by Halliday. And both formats could be played on equipment designed by Dawson. CUTRS appears to have fizzled out in the late 1970s (the last flyer in the UL is from 1977), but Rossiter speaks for many former members when he reflects on its remarkable unsung legacy: “At the time I wasn’t aware how fortunate we were.” ☺

**To find out more about the Ray Dolby Centre visit: [philanthropy.cam.ac.uk/physics](http://philanthropy.cam.ac.uk/physics)**

# Protesters of the

**Online petitions. Twitter campaigns. Taking to the streets. It may feel as if everyone is agitating for something – but what is activism? And what does it really mean to be an activist? CAM investigates.**

WORDS VICTORIA JAMES PHOTOGRAPHY BEX WADE

Parliament Square has had a busy few years. Protests against Brexit. Protests for Brexit. The Women's March. Just in the past 18 months, demonstrations in London's streets have been part of global outcries: the protests against systemic racism sparked by the killing of George Floyd in Minneapolis, within the wider Black Lives Matter (BLM) movement, and Extinction Rebellion (XR) urging action over climate change and biodiversity loss.

The latter two movements haven't just been on our TV screens during the news. They've been on our streets and in our hands, an inescapable presence in the flow of social media alerts on our phones. Do they represent a new form of activism, linked to other powerful movements with political goals, such as the Arab spring and the current Hong Kong protests? Or are they simply the latest causes to be taken up by activists and protesters?

Attempting to answer this question requires precision, says Dr Ben Abrams, Director of Studies in Sociology at St Catharine's and a specialist in mass mobilisation. "Activism and protest are things people do; revolutions are things that happen," he says, "and distinguishing between activism and protest is also useful. You can protest without being an activist. Protest is about making your voice heard, whereas activism is more considered and involved, blending ideas and complicated actions."

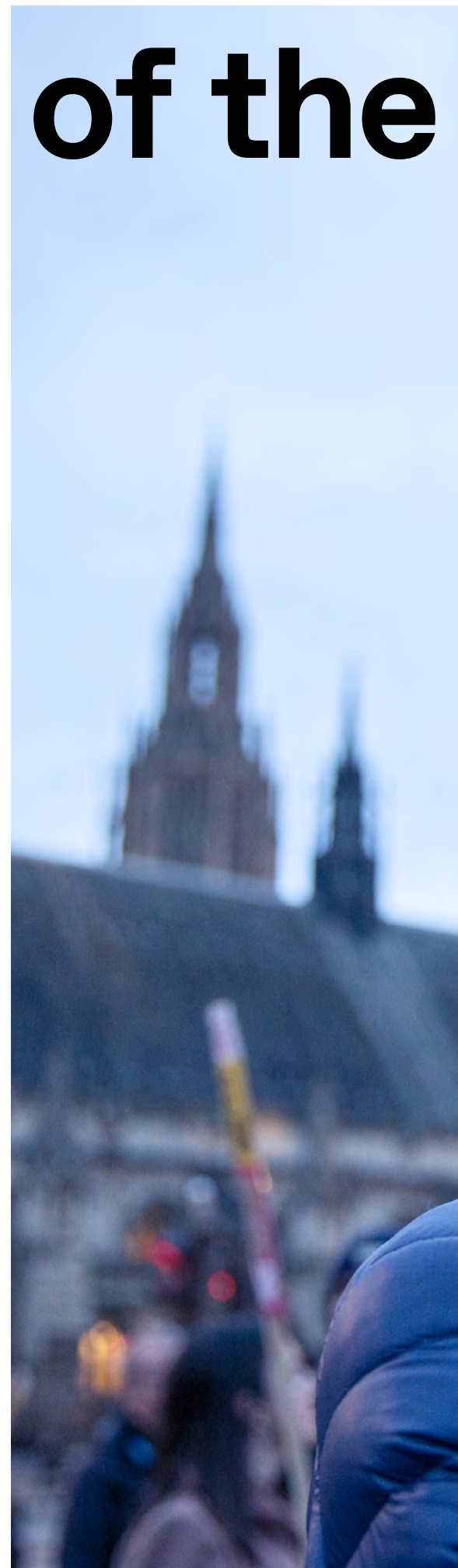
Abrams says that the George Floyd protests and XR "bucked the trend" in terms of how activist movements often operate because they didn't depend on pre-existing networks of organisations. Instead, both movements, he points out, got people to show up by "making spaces that were attractive and disruptive, that drew people in. They used sudden moments of popular convergence to create a bigger resource."

Sharon Mehari, a second-year student at Caius and President of the University's African Caribbean Society, pinpoints that 'moment' as the shared mobile-phone footage of George Floyd's horrific killing by Minneapolis police. "That video was nine minutes long. You could see his innocence, and even his life leaving him. There was no defence – people who might be questioning 'What was he doing?', well, it was all there. And there's the fact it happened during the global pandemic, when we were realising there is more to life than your job, beauty, music and the media. Our society is obsessed with shock in an uncomfortable way, but that shock pulled us to our senses."

In parts of the US, protesters were accused of turning violent, with some commentators seeking to demonise or discredit the movement. But the extent to which justifiable anger can shade legitimately into non-violent and even violent disobedience is a question activists have long had to wrestle with. "When, in the 1990s, I first became interested ›

Defend Migrants,  
Stop Trump  
20 February 2017

A protester in Parliament Square demonstrates against a proposed state visit by Donald Trump.



# world, arise





**Brexit Celebrations**  
31 January 2020

A supporter dressed as St George celebrates the UK's exit from Europe among hundreds of others in Parliament Square.

**“Meetings and white papers and briefings are really good for specific things. Ultimately, though, they don’t challenge the status quo. We would still be burning ourselves out of a habitable planet”**

in critiques of globalisation,” recalls activist Anthea Lawson (Queens’ 1994), author of forthcoming book *The Entangled Activist*, “I was going on protests and saw people smashing windows at McDonald’s and thought, ‘That’s not going to change anything’. I wanted to ‘be in the room’ [with policymakers and powerbrokers]. So I tried being in the room, and I did that for years.”

The route Lawson took as an individual was also being adopted by entire campaigning sectors. During the 1970s, Greenpeace had pursued a direct-action campaign, Save the Whales. But, by the following decade, the wider environmental movement decided that confrontational strategies “weren’t working to bring about effective change within governments and corporations”, says Dr Chris Sandbrook of the Department of Geography, lead researcher on the Future of Conservation project, the first large-scale global survey of conservationist values. “So a process began to reframe conservation concerns in the context of human concerns, using concepts such as natural capital, corporate partnerships and market-based instruments to give conservation economic value. It started a trend to take off the protest overalls and put on a suit and tie; to have a meeting inside an office rather than chaining oneself to the gates outside it.”

“Meetings and white papers and briefings are really good for specific things,” says Lawson, who investigated the arms trade and natural-resource exploitation for organisations including Amnesty International and Global Witness, and whose work on transparency in company ownership has led to new laws in dozens of countries. “Ultimately, though, they’re not challenging the status quo. OK, I can get laws changed, great. But I was painfully conscious that I could

achieve all my aims on a strategy plan, yet we would still be burning ourselves out of a habitable planet.”

Sandbrook agrees that while the policy-forward approach to activism “worked to an extent – it got conservation issues on to the agenda at the World Economic Forum, for example – it hasn’t really worked because we still have biodiversity concerns. Then along come new protest-led movements such as XR where activists don’t necessarily have an understanding of the science, but have passion and a willingness to put themselves at risk, whether of being arrested or losing their job. Conservationists have been having a lot of conversations about how we should respond to things like XR. Many are supportive of the objectives but not of the means, such as lawbreaking.”

Something crucial, though, has changed. This high-stakes activism isn’t simply “reinventing the wheel”, as Sandbrook puts it. Decades ‘in the room’ with corporate and government stakeholders have brought a fundamental new insight to activism that could change everything.

For a long time, many people “didn’t believe our institutions to be actively opposed to solving problems like racism and climate change”, says Abrams. “But the police were originally designed for a racist society, when no one cared about brutality. Modern capitalism was built around near-limitless access to fossil fuels. And now that we realise that, we can’t just tell the people in power to not be racist, not to burn fossil fuel. We’re finally becoming aware that we need to examine the institutions themselves.”

It’s this awareness that is prompting calls to defund the police in the US, and to decolonise the curriculum in British schools and universities. Such demands are not new. In 1935, African-American sociologist WEB Du Bois called for ›



**March Against Racism**  
**18 March 2017**

An anti-racism protester holding a sign while taking part in a march to Parliament Square.

## The larger-scale the objective, the harder it is to win – partly because the number of antagonists massively multiplies



“abolition democracy” to remove institutions such as prisons and white police forces. But what has changed, says Lawson, is activism’s blowing away of what she calls the “fog of consent” that has hitherto enveloped those unaffected by oppressive structures. “What appears through the fog,” she says, “are the people who have always been calling for these changes.”

The task for would-be activists now, she says, is to perceive themselves with equal clarity. Many campaigners “can see the centuries of damage and horror caused by colonialism and enslavement, and might be working to overturn these histories and their current manifestations in inequality and poverty”, says Lawson. “But for those who have benefited from these histories, it is harder to see how racist and hierarchical thinking may be manifesting in their own interactions with the people they think they are trying to help – or, indeed, that the entire frame of ‘helping’ is suffused with unhelpful notions.”

Mehari saw this first-hand at a recent BLM protest where the demonstration had concluded “and organisers were saying ‘We need to disperse now, or we won’t get a permit again’, but these young white girls just sat in the street laughing and chanting. There’s still a lot of pseudo-activism that is surface-level and palatable. People who are not reading, not doing the work, not having those uncomfortable conversations.” For Mehari, despite having been born “in the middle of revolution and activism” in Eritrea, in a family opposed to the country’s regime, “I realised if it wasn’t something to do with my identity, with refugees, with black

people, with women, I wasn’t on it. But increasingly I have been challenged to speak out against things that don’t directly relate to my own identity or people I know.”

“The larger-scale your objective, the harder it is to win,” says Abrams. That’s partly because “the number of antagonists massively multiplies. Challenging global capitalism, for example, puts you up against billionaires, businesses, governments.” And it is partly because huge movements draw in people who may not have much in common, and who will go their separate ways once their specific demands have been met. “With [Joe] Biden in the White House, many of those who want brutality to end but don’t back the defunding of police will see their goals achieved. They’ll depart,” predicts Abrams.

Which is why veteran campaigner Lawson believes activism needs to radically reframe its definition of success. “The question ‘Why is it so hard to change things?’ comes from a mindset that says you have to achieve an impact for something to be worth doing,” she says. “If you have to be sure that what you’re going to do will change things, then perhaps we’re getting attached to the idea of putting our name on it. Sometimes we need to get involved just because it’s the right thing to do.”

“The things that we’ve been protesting about are not new,” says Mehari. “They’ve been going on for hundreds of years. Successful activism now is about exposition and accountability. It is about taking personal responsibility, and all of us exposing injustice wherever it is seen.” ☺



**Brexit Celebration**  
**31 January 2020**

A young boy takes part in celebrations in Parliament Square.

**Defend Migrants,**  
**Stop Trump**  
**20 February 2017**

Demonstrators protest against Donald Trump's treatment of the LGBTQI+ community.

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*Diamond Beach, Iceland*



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WORDS ANNA NYE

**M**ancunian mathematician, Israel Shitta, says that finding the money to come to university was a big deal. “My parents were extremely concerned about finances and were already trying to raise funds from close friends and family. When I told them I would receive a bursary at Cambridge, the relief and joy that suddenly took hold of them was immense,” he says.

Israel is one of more than 2,600 undergraduates annually who benefit from bursary support at Cambridge. This is one of many resources for students that are supported through gifts to the University’s Student Support Initiative (SSI), which aims to provide new postgraduate studentships, financial support for undergraduates, and projects to improve access, student life and wellbeing.

A lot of donations to the SSI come from Cambridge alumni giving one-off and regular gifts to their Colleges – many of these gifts, thanks to the generosity of David and Claudia Harding, are doubled

by the Harding Challenge. Through this, Cambridge aims both to support more students with a bursary and give a greater amount to those who need it the most.

This is how it works: if you are a new donor to the Collegiate University, or have not given since July 2018, and give to any aspect of the SSI, your gift will unlock, pound for pound, a contribution to a special fund for undergraduate bursaries. Gifts of any size up to £100,000 qualify and every pound makes a difference.

Now in his third year at Fitzwilliam, Israel says that it is impossible to overestimate the impact the bursary has had on his Cambridge experience. “I am very grateful that I only have to worry about hard maths problems, rather than where my next meal is going to come from or how I’m going to pay for my accommodation.”

So, if you’d like to support students like Israel, and take advantage of the Harding Challenge to multiply the power of your donation, please contact your College.

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**“I am very grateful that I only have to worry about hard maths problems – rather than where my next meal is going to come from”**

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**To find out more about how you can support Cambridge students, please contact your College. [philanthropy.cam.ac.uk/hardingchallenge](https://philanthropy.cam.ac.uk/hardingchallenge)**

# “I have really intense memories of the ADC and it being the beginning of a lifelong friendship”

Creators of hit musical *Six*, Lucy Moss (Caius 2014) and Toby Marlow (Robinson 2014) have gone on to global success – but their friendship was forged in the ADC dressing room dancing to Rihanna.



## Waterloo Sunset

### The Kinks

Toby: The funny thing about this song is that we both remember it for very different reasons. I'm into pop and musical theatre, but my friends at College had a Kinks tribute band, and I got to know the songs a bit through that. The band was due to headline a party and then the singer got ill on the day, so they asked me if I could be the frontman. I remember obsessively listening to these songs all day in College, then driving over and actually performing them. And, from that, *Waterloo Sunset* is burned into my mind.

Lucy: My story is far less fun. I was in my third year, revising and in the middle of a horrible breakup. I spent a lot of time in bed. With the curtains closed. One morning my radio alarm went off, and it was playing *Waterloo Sunset*. I thought: wow, this is such a nice song. But then I realised it's really not upbeat at all. I cried for about two hours. And then just walked back and forth through Caius and had lunch listening to *Waterloo Sunset* and feeling devastated. When I hear it now I get transported back to that time.

Toby: I love the fact that it's not that we have a beautiful love story associated with this. It's just about stress and sadness.



**I cried for about two hours. And then just walked back and forth through Caius, had lunch, listened to *Waterloo Sunset* and felt devastated**

---

**It transports me back to the dressing room: the underbelly of the ADC, with the live video feed of the performance. It's such an emotional song**

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### I'll Cover You (Reprise) from the musical Rent

Lucy: I was a dancer in this production, Toby played Angel and our friend Zak played Collins. It was the first time I became friends with Zak, and it was the time when mine and Toby's friendship solidified. I have really intense memories of being in the dressing room of the ADC theatre and Toby and Zak performing it, and it being the beginning of a lifelong friendship.

Toby: Oddly enough, I haven't listened to this since we performed it in that first year – it was a very emotional time. Listening to it brings up so many emotions: some good, some bad. For me, it only exists in Cambridge. I haven't got a memory for it anywhere else.

Lucy: It really transports me back to the dressing room: the underbelly of the ADC, with the live video feed of the performance. It's such an emotional song. But, I have to confess, I didn't know what *Rent* was about [it is loosely based on *La Bohème*, and follows a group of struggling young artists in 1980s New York, living in the shadow of the AIDS epidemic]. I was just brought in as a dancer.

## Desperado

### Rihanna

Lucy: Toby and I wrote *Six* in our final two terms of Cambridge. When we came back for a final term, we were auditioning for a cast of students at the Larkum Studio at the ADC. I was the choreographer, which is hilarious, as we have a real choreographer now. I decided I was going to set the tone for the whole thing and be a real dictator from the audition process onwards. So I was all: "Keep jumping! No quitting! Do you want to be in the show? Do you?" And the song I choreographed to was Rihanna's *Desperado*. It was supposed to be sexy and sultry but it was so hot in there; it was just sweaty.

Toby: I remember you taught it to me at a drunken dinner party in a friend's massive room at John's. I'd been watching everyone dancing and I was in the corner itching to learn it.

Lucy: And the best thing is, when we finally got a real choreographer, she turned up on audition day and one of the songs she taught was *Desperado* by Rihanna.



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**I was all: "Keep jumping! No quitting! Do you want to be in the show? Do you?"**

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**Lucy Moss (Caius 2014) and Toby Marlow (Robinson 2014) are the creative partnership behind the West End, Broadway and Sydney hit musical, *Six*, now on at the Lyric in the West End and at the Lyric in Salford.**

# This idea must die: 'Irish' history is just about Ireland

**Dr Niamh Gallagher says island mentalities can pervert our understanding of the past.**

ILLUSTRATION **GEORGE WYLESOL**

**H**istorically, 'Ireland' has never ended at the shores of the island – and neither should our understanding of its history. After all, it has been part of the United Kingdom (since the Union of 1801) and its empire for longer than it has been independent (the Irish Free State, the predecessor to the Republic, came into being in 1922). The population of the island of Ireland has repeatedly dispersed throughout the world in waves of emigration. And those emigrant communities have not only played a part in the countries in which they settled, but have in turn influenced affairs in the UK and globally – for example, during two world wars and the Troubles of the late 1960s through to 1998, when the Good Friday agreement was signed.

So why is 'Irish' history still consigned to a silo? Not only is it largely absent from UK school curriculums; 'British' historians, too, have exiled Ireland from their consciousness. That has resulted in the bizarre framing of major UK events as exclusively Irish. The 'Irish famine', which killed one million people in Ireland, took place 40 years into parliamentary rule by Westminster. The 'Irish Question' – a name that suggests the UK is somehow removed from it – was a debate among the British ruling classes that originated at the end of the 19th century about how to respond to Ireland's movement for self-government. And, let's not forget, the constitutional entity that went to war in 1914 was not Britain; it was the United Kingdom of Great Britain and Ireland.

This is about more than semantics and textbooks. Irish history is, in no small part, global history. Between 1801 and 1921, an estimated eight million people left Ireland and resettled in Britain, the empire, the United States and elsewhere. The population of the island today is just under seven

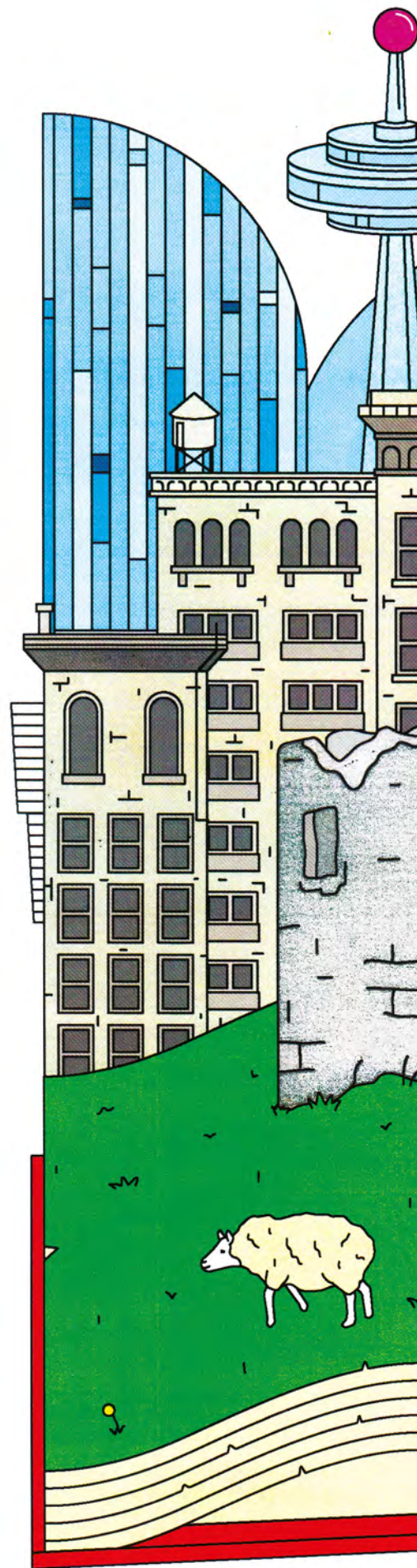
million. In just over a century, Ireland lost the equivalent of its entire population.

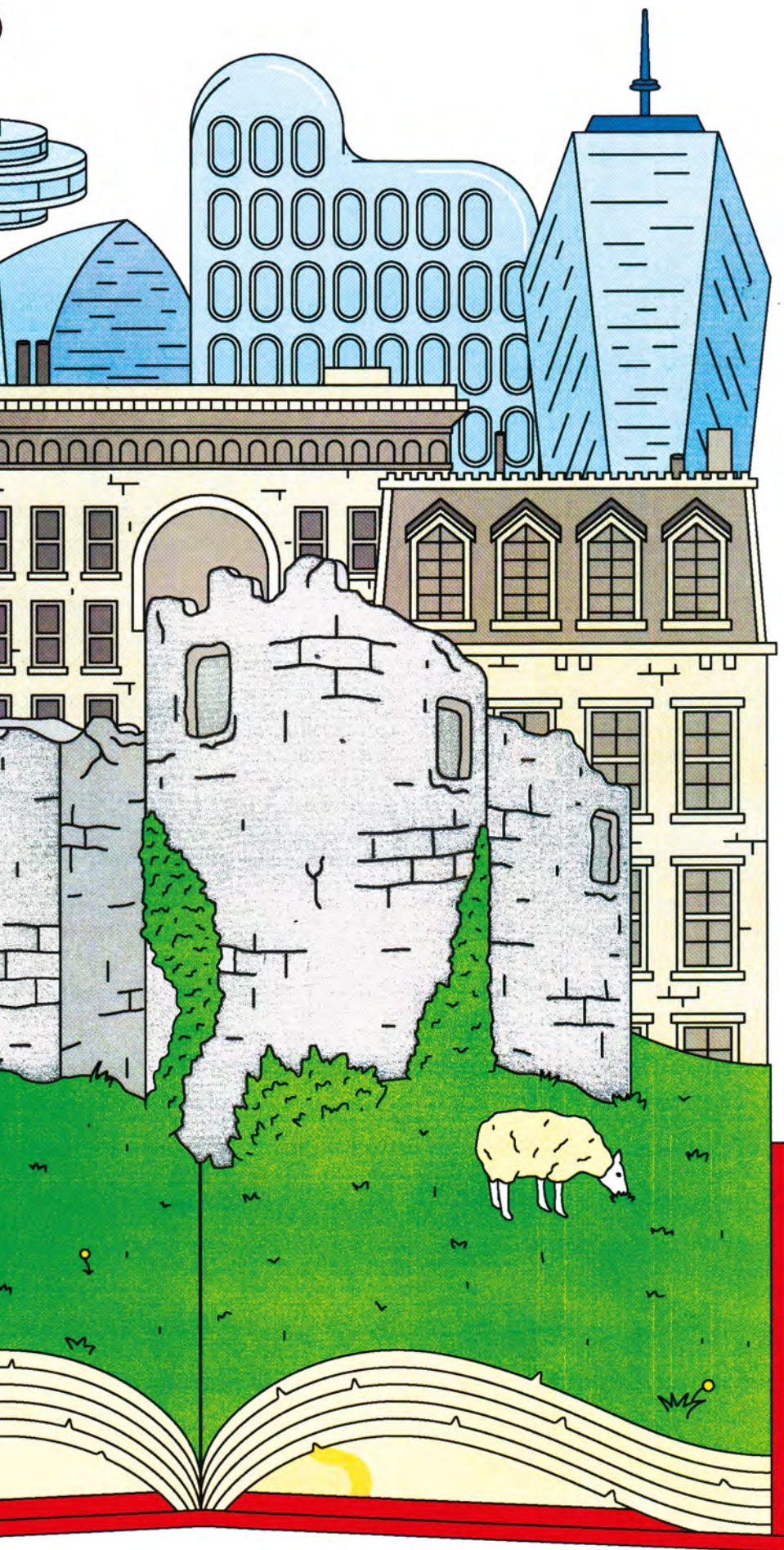
The Irish left their island in such numbers that they permanently affected the countries to which they went, often wielding significant cultural and political power. In the US, almost half of all immigrants during the 1820s were Irish, and nearly all American presidents can trace their heritage back to Ireland. By 1891, 230,000 Irish-born people lived in Australia – and that's not including second and subsequent generations.

Consequently, in the so-called 'white dominions' of Canada, Australia and New Zealand, we see highly nuanced forms of Catholic 'Irishness' evolve. For example, during the 19th century the British empire was largely negatively perceived by Catholics, most of whom were nationalists. But by the time of the first world war, the children of Irish emigrants born in these territories had done well: they were influential businessmen or clerics, and prosperity had altered their notions of the empire. While still viewed as the reason their parents had left Ireland, the empire was seen as something many Irish abroad wanted to fight for.

Irish identities were strongly felt by the diasporic Irish of both creeds. In Canada, Irish communities lobbied to have an Irish designation for volunteer regiments, such as the Irish Canadian Rangers from Montreal, which recruited through churches, sporting associations and other 'Irish' community networks. Their insignia reflects this complex identity: intertwined maple leaves and shamrocks, topped with the British crown.

By contrast, Irish Catholic Americans continued to mistrust the British empire. The US was proud of its own republican inheritance (and liberty from Britain in 1776), and memory of British culpability in the 1840s famine reigned strong in diasporic





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## Britain needs to 'wake up' to the reality of its own history, which has always extended far beyond the island itself

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communities, many of whose parents had fled Ireland during or after the catastrophe. Irish Catholic identity looked different in America than it did in Canada or Australia: it was sympathetic to Irish republicanism and the political parties that sought to 'liberate' Ireland from British 'tyranny'.

We're used to seeing this as a part of the recent Troubles in Northern Ireland, with Irish-American fundraising helping the IRA procure guns, but Irish-American influence on Britain and the empire has a longer history. In the 1860s, some felt that the best way to liberate Ireland was by invading Canada! And in the 1919-21 War of Independence, Irish-Americans helped the fledgling IRA conduct its guerrilla activities against the crown forces.

So diasporic Irishness takes many forms, and at the heart of these global networks are the intertwined histories of Ireland and Britain, which continued long after partition and Irish independence.

It's a relationship particularly deserving of reflection at this moment, as we re-examine issues brought to the fore by Black Lives Matter and Brexit. Whether we're talking about the Windrush generation, or what to do about the 'Irish' border when Britain leaves the EU, Britain needs to 'wake up' to the reality of its own history, which has always extended far beyond the island itself. Island mentalities can pervert our understanding of the past. It's time to discard the notion that 'Irish' history is just about Ireland – and, by extension, that 'British' history is just about Britain.

**Dr Niamh Gallagher (St Catharine's)** is a Lecturer in Modern British and Irish History. Her book, *Ireland and the Great War: A Social and Political History*, won the Royal Historical Society's Whitfield Prize.



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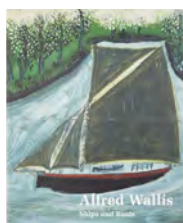
The next issue is Lent, mailing from the end of  
March, booking/copy deadline 10th February

# Odd One Out by Nimrod

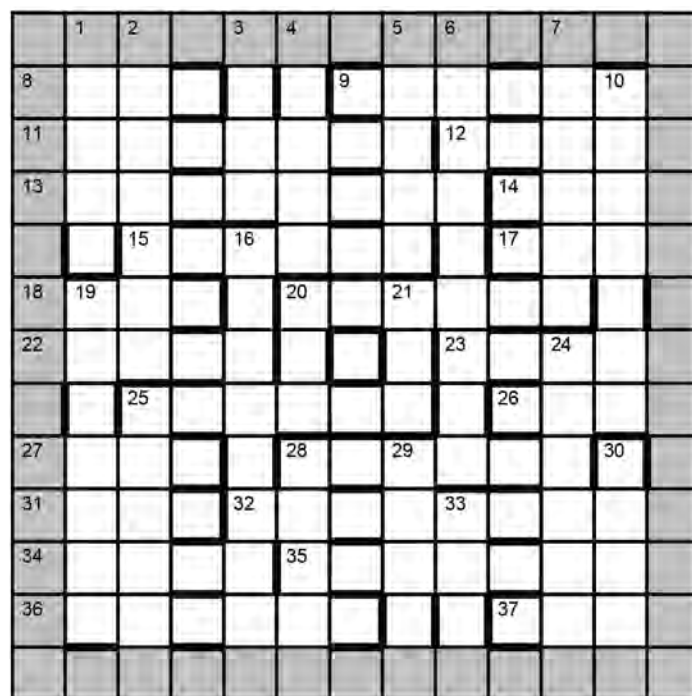
Five thematic items (eight words) run clockwise around the perimeter. In several clues a single letter of the answer is ignored in the wordplay; these letters spell what is temporally and titularly the Odd One Out and are to be highlighted in the grid in one colour. Solvers must fill the central cell and highlight the overall link in another colour. The colours are entirely of solvers' own choosing, 17 cells are to be highlighted in total. Unchecked letters of the perimeter including corner cells give AGED CAM HICCUP GAG.

**All entries to be received by 12 February 2021. Send your entry:**

- **by post to:** CAM 91 Prize Crossword, University of Cambridge, 1 Quayside, Bridge Street, Cambridge CB5 8AB
- **online at:** [magazine.alumni.cam.ac.uk/crossword](http://magazine.alumni.cam.ac.uk/crossword)
- **by email to:** [cameditor@alumni.cam.ac.uk](mailto:cameditor@alumni.cam.ac.uk)



The first correct entry drawn will receive a £75 CUP book token and a copy of *Alfred Wallis: Ships and Boats* in celebration of the Alfred Wallis Rediscovered exhibition (until 3 January 2021 at Kettle's Yard). Two runners-up will receive a £50 CUP book token. Solutions and winners will be published in CAM 92 and online on 26 February at: [magazine.alumni.cam.ac.uk/crossword](http://magazine.alumni.cam.ac.uk/crossword).



## Across

- 8 Low-scoring draw missing an edge – and the other element (4)  
 9 In retrospect, poet's output is without something to be expressed (7)  
 11 Woman in top job concealed in handkerchiefs unlimited mineral (8)  
 12 Italian director ready for West African (5)  
 13 Pub landlord's first to stop language used by some Scots footpad? (9, 2 words)  
 14 Italian with bubbles and over twice the 'oomph'! (4)  
 15 Native Americans returning false love (6)  
 17 A new hawk (4)  
 18 Eat out in Le Café, and see who's inside (4)  
 20 Inuit tents – or 'Inui- -en-s', as they're about to do repeatedly? (6)  
 22 Support one working in Autumn Garden? (5)  
 23 Going west like Mr Strange; like Mr Dull going east! (5)  
 25 City Chairman has done back (6)

- 26 Try a character at the west of Land's End (4)  
 27 Ridge of gravel or sand, usually not rubber (4)  
 28 Linesman (PL) one's denied cuffing (6)  
 31 Exits from constabulary (I later walk local beat) (4)  
 32 Johnny is upset Penny spilled beans (9)  
 34 Do one for real (5)  
 35 Earth is so rocky (8)  
 36 Scripture like this in one's baseless prayers? (7)  
 37 Injury sustained by old pack forward for Wales (4)

## Down

- 1 City in Brittany almost entirely "run" by Ed (5)  
 2 Like cops' sudden raid, preventing detonation? (7)  
 3 Warner's third single's taken off hard ball from Wood (4)  
 4 Celtic flag over rugby posts? (5)  
 5 Is successful doctor of acoustics more than just a spur? (5)

- 6 Shown jeans on peg for driving about (9)  
 7 Ropes in *London's Burning* the worst-case scenario? (6)  
 10 Time invested studying Drama, maybe – or Introductory Music (7)  
 16 One leading Regius Professor will load a large gun (9, 2 words)  
 19 Monkey flamboyantly displaying its rear? (7)  
 20 You shouldn't have sat on union cross (3)  
 21 One is paid for the motion (3)  
 24 Today's funny name to be inserted? I hope the opposite (7, 2 words)  
 25 Pulse rising, at upper limit (6)  
 28 Stooped to uncover the eldest of ancient family? (5)  
 29 Explorer on the radio, say? (5)  
 30 Not the staple northern painting (top Lowry?) (5)  
 33 In hospital in Aberdeen, joint showing signs of age (4)

## Solution to CAM 90 Crossword No Shelter in Row 5 by Nimrod

SUBTITLE: AN AGONY IN EIGHT FITS

In *The Vanishing* (Fit 8) at the conclusion of Lewis Carroll's "The Hunting of the Snark", the *BAKER* (in *BAKERLOO*) meets first the *SNARK* (in *COPPER'S NARK*) and then his mysterious end, the Snark having turned out to be A BOOJUM (anagram of Row 5 minus SHELTER, see title). In the silver zone, the letters of A TORMENT (An Agony) are inserted into eight synonyms of FIT (BOUT, SONG, GOOD, AGUE, ABLE, MOOD, SUIT and HALE).

## Winner:

Teynnon Powell (Caius 1968)

## Runners-up:

Linda Hutchinson (Churchill 1978)  
 Iain Bell (Christ's 1992)

## Clue notes:

[magazine.alumni.cam.ac.uk/crossword](http://magazine.alumni.cam.ac.uk/crossword)

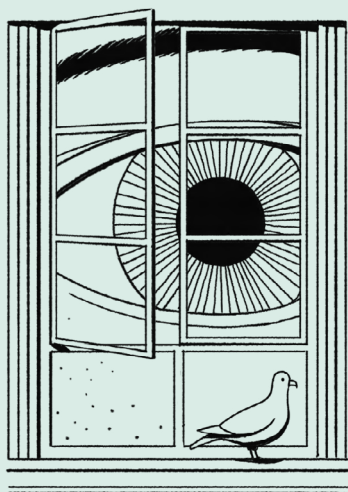
|   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| K | A | K | A | P | O | E | S | P | A | L | I | E | R |
| O | V | E | R | R | E | V | C | E | L | E | S | T | E |
| C | O | P | P | E | R |   |   |   |   |   | L | O | O |
| D | I | O | A | S | G | A | A | M | S | T | R | C | A |
| A | S | J | B | T | O | R | M | O | U | H | E | L | E |
| H | D | D | O | O | G | B | O | I | A | M | E | H |   |
| E | M | P | U | N | D | U | L | E | N | L | D | A | L |
| E | S | A | T | G | O | E | E | D | T | E | A | D | S |
| L | E | E | A | R | I | N | R | E | A | L | I | T | Y |
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## Careers service

The University Careers Service has launched a new blog bringing together all the latest jobs and recruitment advice and information. To read the latest information, please visit: [unicamcareers.edublogs.org](http://unicamcareers.edublogs.org).

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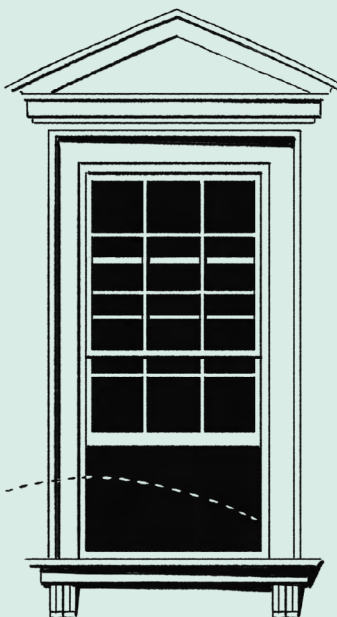
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## Alumni events

More than 7,500 alumni around the world registered for the Alumni Festival this year. The best of the festival is still available to view online – from exoplanets and classical music to privacy and sustainability, choose from the best that Cambridge has to offer on the Festival YouTube channel. [alumni.cam.ac.uk/festival](http://alumni.cam.ac.uk/festival)

## Lucy Cavendish expansion

Lucy Cavendish has announced a major expansion that will enable the College to admit 130 undergraduates in 2021. Until recently, Lucy Cavendish only admitted female undergraduates over the age of 21; in 2020, it broadened its admission policy to include female students over the age of 18 – it now accepts applications from all students.

The College will be focused on diversity, actively seeking to attract applications from students from disadvantaged or underrepresented backgrounds. [lucy.cam.ac.uk](http://lucy.cam.ac.uk)

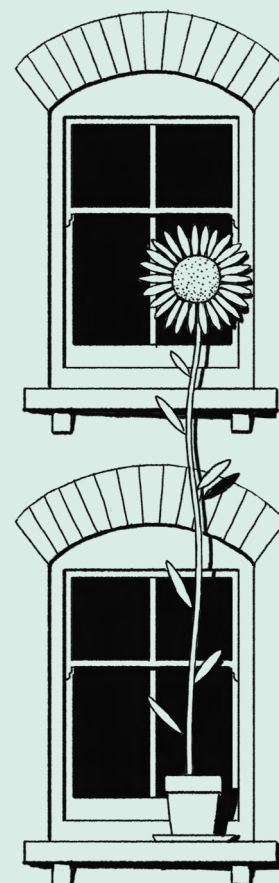
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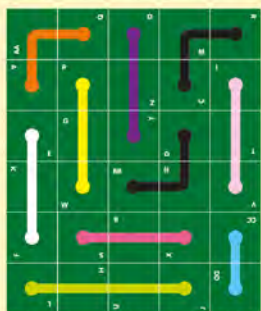
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|                                                                                                                                    |                       |     |        | £8.95  |       |
| <b>Grand Total</b>                                                                                                                 |                       |     |        |        |       |

Title Initial Surname

Address

Postcode Daytime Telephone Number

I enclose a cheque / postal order, payable to THPC Value £

Or please debit my credit / debit card ☐ ☐

Card No.

Expiry Date Valid From Date Issue No. 3 Digit Security Code

Print Name Signature Date

The Happy Puzzle Company would like to permit carefully chosen third party companies to contact you with special offers from time to time. If you don't wish to receive this information, please tick here ☐

\* Our 0844 numbers cost 7p per minute plus your phone company's access charge.

**Offer ends 11.59pm 31st August 2021!**

**TRUSTPILOT** **RATED 4.6 OUT OF 5 FROM OVER 21,000 REVIEWS!**

**To Get Your 20% Discount You Must Quote Promotional Code: CAM2A**