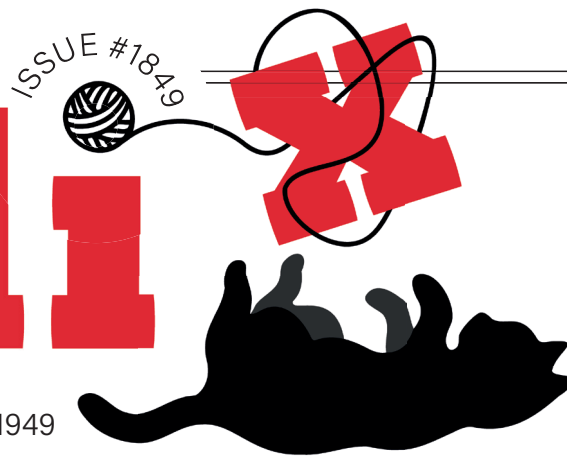


First published in 1949, *Felix* is released weekly during term time and is distributed around Imperial's London campuses. All students, staff, and alumni are welcome to contribute to the paper.

Felix

KEEP THE CAT FREE | SINCE 1949



Encampment activists: College's response to demands is 'shockingly underwhelming'

Editor-in-Chief
JAMIE JOHN

Pro-Palestinian activists at the Queen's Lawn encampment on Thursday called Imperial's reply to their demands "shockingly underwhelming", but stopped short of announcing new action ahead of a group meeting to discuss how they will respond.

Representatives of the encampment distanced themselves from comments made by a speaker at the group's rally yesterday, who declared that Summer Ball – an end-of-year celebration for Imperial students – "will not be happening". Summer Ball takes place every year on Queen's Lawn, where the encampment is located.

The representatives said: "We are part of the students and we are for the students, who are overwhelmingly supportive. Our enemy is the [university's] management. We will have a level of presence at Summer Ball, but it will go ahead – we are working with the student union to ensure that happens."

The campers had been expecting a response to their demands of the university last Thursday but were subsequently told they would receive an update early this week.

By the time of a pre-planned rally at 12:30pm on Wednesday, there was still no word from the university, and so the students doubled down on their protest, increasing the intensity of their rhetoric at the rally, before staging a sit-in at the Faculty Building, where the College's

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Encampment activists staged a sit-in outside the Faculty Building, where the offices of Imperial's leadership are located. Walt Gao for *Felix*

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We will, to the best of our ability, tell you the whole truth and nothing but the truth.

We will keep your confidence and will only publish something you say to us if you have explicitly said that we can.

We will work to expose unfairness and discrimination in all forms that it takes at the College.

We will treat fairly any article sent to us, regardless of point of view, and do our best to work with you to prepare it for publication.

Signed by:
JAMIE JOHN
Editor-in-Chief

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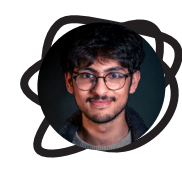
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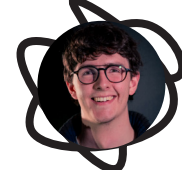
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NEWS

Imperial second in world university rankings

College tops UK and Europe ahead of Oxbridge peers in QS World University Rankings 2025.

News Writer
MOHAMMAD MAJLISI

Imperial College has been ranked second in the world in the latest edition of the *QS World University Rankings*. The College is now the highest-ranking university in both the UK and Europe.

Rising from sixth place in the 2024 rankings, Imperial has overtaken both Oxford, which has remained in third place, and Cambridge, which fell from second to fifth place this year. This is the first time in a decade that Imperial has ranked ahead of its Oxbridge peers. MIT remains the best university globally, maintaining its position for the 13th year in a row.

Imperial was ranked 22nd for academic reputation, 11th globally for employer reputation, and sixth globally for

sustainability practices. Earlier this year, it announced the Imperial Zero Index, a framework that will be used to screen investments and research partners.

Responding to the achievement, Imperial College President Professor Hugh Brady said: “Imperial’s ranking is a testament to the quality and commitment of our entire community. It is inspiring to see our students, staff, and partners come together every day to interrogate the forces that shape our world and address the challenges facing humanity and our planet.”

Despite Imperial’s success, 58% of UK universities have fallen in the table as funding woes begin to hit. Research by the Office for Students indicates that 40% of UK universities could face budget deficits



Thomas Angus for Imperial College London

this year, and government pressure to reduce net migration is expected to drive a decline in international student numbers.

A total of 90 universities from the UK make the QS league table, making it the second-most represented location behind the United States. 15 British institutions rank within the top 100, two fewer than in last year’s table.

→ FROM P. 1: ACTIVIST DEMANDS

most senior staff work.

For the first time, protesters named President Hugh Brady and Provost Ian Walmsley in their chants, shouting “Hugh Brady, shame on you” and “Ian Walmsley, shame on you”.

One speaker at the rally had a message for Brady and Walmsley, the two most senior leaders at the College.

“When you go home to your big mansion and your six-figure salary, do you hear the screams of children [in Gaza] at night?” he asked through a megaphone.

At 5:30pm, an hour after the encampment’s final event of the day, Imperial sent its response. University Secretary Richard Martin and Vice-Provost Peter Haynes said that they recognised “the profound human suffering” caused by the war in Gaza.

The university rejected activists’ calls for Imperial to condemn Israel’s actions in the Gaza Strip, saying it would undermine the College’s ability to provide “an open forum for debate an exploration of all topics.”

Protestors have sent the university the names of companies they want it to divest

from and cut research – because of alleged complicity in ‘crimes against Palestinians’.

Imperial responded to the divestment demand saying that all its investments are made in accordance with its Socially Responsible Investment Policy, which makes it a “signatory to the UN Principles of Responsible Investment”. It did not comment further.

The university said its research relationships are governed by its Relationships Policy, legislative requirements, and the provisions of the National Security & Investment Act 2021.

The Relationships Policy compels ‘individual members of the College community’ to abide by its guidelines ‘when forming relationships with third parties,’ and charges them with ‘escalating matters where appropriate’.

An encampment representative said: “Our position [is that Imperial] has moral responsibilities beyond the minimum required by law.

“They have an existing relationships policy which mentions the role of individual academics to assess the ethical and moral implications of their work. It’s

our belief that the College should do that institutionally as well.

“[Some of] the companies that we have identified in our report are companies that are specifically listed by the United Nations High Commission as operating illegally in the occupied territories [of Palestine].

Addressing Imperial’s investment policy, the representative said: “Any ‘socially responsible investment’ policy is not worth its name if it enables investment in companies complicit in what these companies are doing.”

The activists have also called for Imperial to ‘support Palestinian students through scholarships, establishing links with Palestinian universities and supporting the rebuilding of the Gazan higher education system.’

In its response to the activists’ demands, Imperial highlighted its work with the Campaign for At Risk Academics (CARA). In May, the College announced it would fund and host eight CARA fellows – at risk in their home countries – to complete two-year research placements at the College.

The encampment representatives said that the CARA programme did not meet

their specifications. “It’s our opinion that Imperial’s responsibility – given its relationships with these companies who are complicit in what’s going on in Gaza right now – goes beyond temporarily exporting Palestinian academics from Gaza.

“The minimum we would ask for is that they set money aside to be ready to help when the conflict ends to help rebuild the indigenous Palestinian academic environment.

“Imperial’s response is absolving them of any moral duty by simply pointing to laws or acts that they have in place. They are trying to shove it under a rug rather than taking a principled approach as we’ve been trying to get them to.”

On 7th October, Hamas launched attacks on Israel, killing around 1,200 people and taking a further 252 hostages, according to Israeli authorities.

Over 36,000 people have been killed in Israel’s retaliatory attacks in Gaza since then, according to Palestinian officials from Gaza’s Hamas-run health ministry.

The university has been approached for comment.

Trade union claims Imperial ‘wilfully’ misled Privy Council and weakened academic freedoms

Editor-in-Chief
JAMIE JOHN

The Imperial-affiliated branch of a trade union has accused Imperial College London of intentionally misleading a body of advisors to the King and weakening academic freedoms.

Imperial UCU, which represents members of the University and College’s Union (UCU) at Imperial, says that the university has ‘pushed through amendments to the College Statutes’ that allow it to ‘more readily make changes to staff academic freedoms’.

The College incorrectly claimed that there was ‘no opposition’ to its proposals in a cover sheet submitted to the Privy Council – advisors to King Charles III who subsequently ratified the changes.



Imperial UCU on picketing outside the College Main Entrance last year. Rolando Charles for Felix

A document sent together with the cover sheet did acknowledge objections had been raised, but Imperial UCU alleges that the university ‘provided a misleading, truncated and inaccurate overview of the dialogue’.

Imperial says it is committed to academic freedom and has no intention of reducing or weakening protections around it.

The Privy Council was alerted to the cover-sheet error and corrected it, requiring no further action from the College.

In his monthly video conference with staff in May, Imperial President Hugh Brady said there was “no substance” to the claims.

“We have no intention of making any changes to our commitment to academic freedom, and even if we did, we’d have to go through a full consultation process on the matter.”

Why is Imperial UCU claiming academic freedoms have been weakened?

The College has moved a series of provisions enshrining academic freedoms for staff from the College Statutes to the College Ordinances.

The provisions remain effectual, but Imperial UCU claims that by moving them out of the Statutes, the College has permitted itself to ‘adjust or remove [them] with relative ease’ in the future.

In order to amend the College Charter or Statutes – which together set out how the university is governed – Imperial must gain the consent of the Privy Council.

But changes to the Ordinances, says the trade union, ‘are comparatively simple’ to make and ‘can be signed off by the College’s internal governing body without external approval.’

The Ordinances can be amended by Imperial College Council, Imperial’s governing body, which consists of College leadership, Imperial staff, and students, as well as external figures from the world of business.

To change Ordinances related to ‘an academic or teaching matter’, College Council must additionally seek the ‘the views of the Senate’, a separate body consisting of top academic staff, elected members from each faculty, and student union representatives.

Legal protections

Academic freedom is protected by several laws. Legal protections for academic freedom are outlined in Article 10 of the

European Convention on Human Rights, the Higher Education and Research Act 2017, and the Higher Education (Freedom of Speech) Act 2023.

Article 7 of Imperial’s Charter also protects academic freedom for staff at the College. It says: ‘Academic staff shall have freedom within the law to question and



President Hugh Brady said there was no substance to the claims.

test received wisdom, and to put forward new ideas and controversial or unpopular opinions, without placing themselves in jeopardy of losing their jobs or privileges.’

However Imperial UCU argues that these regulations do not provide the level of protection afforded by the provisions that were moved out of the College Statutes and into the Ordinances.

The provisions moved to the Ordinances state that Imperial will apply academic freedoms as defined in a 1997 UNESCO document entitled, ‘Recommendation concerning the Status of Higher-Education Teaching Personnel’.

The UNESCO document contains 19 pages on the roles, rights, and freedoms of higher-education teaching personnel, and the organisations that represent them.

It says that academic staff ‘have the right to teach without any interference, subject to accepted professional principles,’ and affirms their ‘right and opportunity... to take part in [university] governing bodies’.

Writing on its website, Imperial UCU said: ‘These are major protections to academic freedom within Imperial College, and were rightly enshrined within the Statutes.’

‘We have written to the Provost, President and head of HR outlining our concerns on many occasions [but] College

management continue to assert that there is nothing to worry about.

‘We formally asked the College to approach Privy Council to reverse the changes, and to begin a proper staff consultation on the proposal, however they have declined.’

‘No opposition’

Imperial UCU first raised concerns upon being informed of Imperial’s intentions to amend the statutes in September last year.

Over the months that followed, Imperial UCU says ‘it became clear that there had been no consultation with College stakeholders on the matter.’

Minutes from a joint meeting on 2nd November reveal that Imperial agreed to a ‘more-in-depth conversation’ on the proposed changes with Imperial-affiliated trade unions.

A month later, and before holding a second conversation with the unions, the College informed Imperial UCU that it had received permission from the Privy Council to make the constitutional amendments.

‘This was extraordinary and troubling news,’ says Imperial UCU. ‘Not only had College management defaulted on a written agreement with one of its affiliated trade unions, but they had also managed to get the paperwork through Privy Council, which is something potentially difficult to reverse.’

In January 2024, the trade unions were sent a copy of the paperwork Imperial sent to the Privy Council. In its application, Imperial said it was consulting the trade unions on the academic freedom provisions.

The university claimed that ‘no opposition has been indicated,’ something it would later claim was a ‘technical’ issue.

The error was later corrected but Imperial UCU says: ‘It is clear that they have wilfully misled Privy Council in order to push the changes through.’

Israel-flag bearers opposite encampment say boycott efforts discriminatory

Five students waved Israel flag in peaceful display next to pro-Palestinian encampment last Friday.

News Writer
SAFIYYA AHMED

News Writer
AINI NOORALLY

Five students stood opposite the pro-Palestinian encampment on Queen's Lawn on the afternoon of Friday 31st May and waved the flag of the State of Israel, saying that they wanted to encourage an exchange of ideas on the conflict in Gaza.

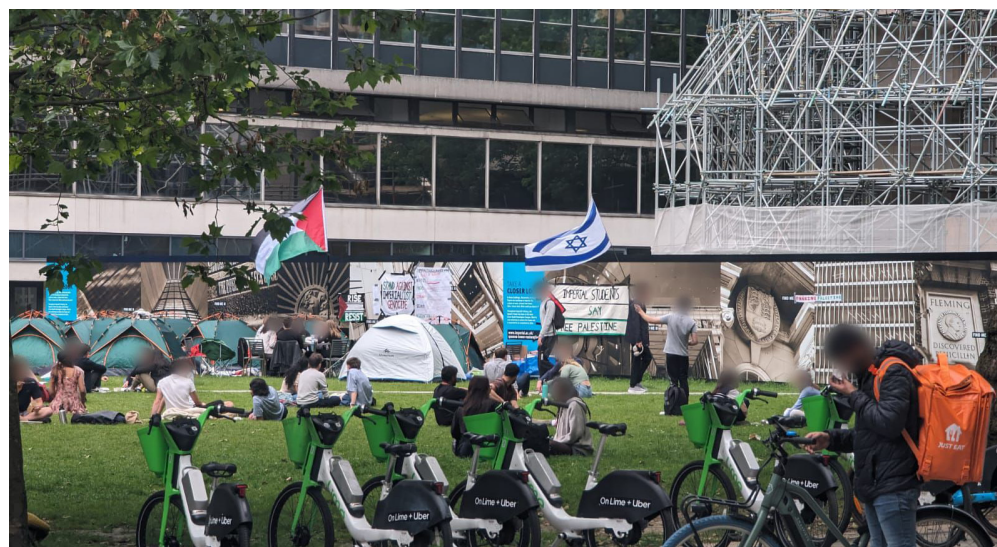
They said that pro-Palestinian activists were discriminating by "singling out of the Jewish state for boycott" – a charge strongly rejected by protestors at Imperial.

A student who arrived at around 1:30pm waved a flag alone before being joined by four peers, one of whom wore the flag as a cape.

One of the flag bearers, a student at the Business School, said he was there for a "free exchange of ideas". "If there is a Palestinian flag, there's no reason there shouldn't be an Israeli flag."

He took issue with pro-Palestinian activists' calls for the 'exclusion' of Zionists on campus.

Zionism is a movement that



A student waved an Israeli flag alone opposite the encampment before being joined by four peers. Tara Palchadhuri for Felix

advocates the right of Jewish people to self-determination, and supports the development and protection of the State of Israel.

Critics of the movement cite Israel's occupation of the West Bank – where it has been accused of violating international human rights law – and its actions in the Gaza Strip following Hamas's attacks on the state last year.

IC Action for Palestine, one of the groups responsible for the encampment, has called Zionism 'a political movement that to this day employs policies of apartheid, occupation, ethnic cleansing, colonialism, and genocide.' It has called for the 'full exclusion of Zionists on campus'.



For many Jewish students, Zionism is Jewish nationalism, the hope to be in our homeland.

The flag-bearing student said that Zionism entailed "the belief of the Jewish people to have a state in their homeland of 3,000 years," adding: "For many Jewish students, Zionism is Jewish nationalism,

it's the hope to be in our homeland, it's the thing we pray about three times a day. There needs to be a sense that Jewish people feel comfortable on campus.

"This whole thing that Jewish students are welcome but not Zionists is ridiculous. For a Jew not to be a Zionist, you are cutting off parts of his identity."

He added that the name given to the encampment at Imperial by its inhabitants – 'Imperial College Liberated Zone' – was "not the most comforting for a Jewish student".

The student explained that he didn't think the pro-Palestinian movement as a whole was antisemitic, but felt the "singling out of the Jewish state for boycott" was "obviously antisemitic".

Pro-Palestinian activists at Imperial have strongly rejected allegations of antisemitism. IC Action for Palestine has previously said 'anti-racism' is 'at the heart' of its movement and that 'anyone of any faith or ethnicity' is welcome to attend its events, provided they opposed 'the slaughter currently being conducted in Gaza.'

Last Friday, responding to the flag bearers in comments to *Felix*, a representative of IC Action for Palestine said: "Those of us who believe that all people can coexist are opposed to any ideology which seeks to segregate people

[and conducts] huge amounts of political violence against them."

Hamas attacked Israel on 7th October, killing 1,200 people and taking 252 others hostage, according to Israeli authorities. Since then, Israel's military campaign has killed more than 36,000 people, according to Palestinian officials from the Hamas-run health ministry.

The flag-bearing Business School student said that Israel's response to Hamas's 7th October attacks constituted a "completely just war" to destroy Hamas and recover hostages. "What happened on October 7th was the worst day in terms of number of Jews killed since the Holocaust."

A fortnight ago, Imperial hand-delivered a notice to the encampment, outlining the terms that it expects them to comply with in their occupation of Queen's Lawn.

The university says that campers must not cause 'unreasonable disruption' and that if they leave Queen's Lawn, they will not be allowed to re-enter.

Since the establishment of the encampment, members have organised food and first aid, appointed dedicated media representatives, and held afternoon 'teach-ins' on the history of the region.

An encampment representative speaking on Friday 31st said that they had not experienced or instigated any violent encounters with non-protestors. Those who stayed in tents overnight said that they were left to the site in peace.

“People care deeply about this”: two w

Felix sat down with an activist on Monday to learn how the encampment functions and what comes next.

Editor-in-Chief
JAMIE JOHN

It has now been two weeks since students at Imperial walked across Queen’s Lawn and set up an encampment on the university’s South Kensington campus.

Since then, activists have busied themselves with a roster of events, ranging from teach-ins and rallies to poetry sessions and movie nights.

Today, on the afternoon of Monday 3rd June, a banner-making session is underway. Seven students sit in a clearing amid a small sea of tents and paint slogans onto large sheets of white fabric. In brushstrokes of red, green, and black – the colours of the Palestinian flag – the activists render their calls for a ceasefire and a free Palestine.

Under a gazebo a few metres away, donations pile up. Bottled water, fruit juices, olive oil, bananas, chewing gum, handwash, and cutlery sit crowded onto two tables, and an assortment of pots and plates is stacked nearby. Underneath one of the tables, a plastic storage unit is filled to the brim with canned food and pasta.

“We’ve had huge donations of food,” says George (not his real name), a student who has been a part of the pro-Palestinian movement at Imperial since October. “Especially things like snacks – there’s always, always snacks for people to eat.”

We are sat at the edge of the encampment, next to the paved pathway

that cuts diagonally through Queen’s Lawn.

In the time since the encampment’s establishment, the number of tents has more than doubled, from 10 on 23rd May to over 20 on 3rd June.

George says that the increase is due to demand from students who have passed by and expressed an interest in joining.

“It’s been the most surprising thing, we’ve had to pick up seven or eight new tents,” he explains.

“At Imperial, you often feel that there’s a culture of apathy to what goes on in the world politically. Even recently, when we’ve done rallies, it’s been hard to connect with other people who care just because of how little time they seemed to have.

“But when we sit here, especially at lunchtime, people walk by and every 20 to 30 minutes, someone drops by to express support. People who I’ve never seen before care deeply about this and come out of the woodwork because we’re here all the time.”

The encampment’s Instagram account, which first posted on 23rd May, is approaching 1,000 followers at the time of writing. A GoFundMe created to solicit donations for food and camping supplies has raised over £3,000; £1,000 came from a single anonymous donor.

George says that being involved in the movement has been a big source of motivation “in all areas of my life”, including work. “Whatever I do, whether it’s research, academia, or another job, this movement has made me think: What’s the end result? What’s the outcome of the work that I do?”

“Part of the reason we raise these demands is because there are ways to use science and what we learn at Imperial that don’t involve ending lives at an industrial scale. Of course my involvement takes up time, but it makes me feel more connected to the world and gives me energy that I never had – it’s rewarding.”

He disputes a claim made by a member of Imperial’s security staff, who said that while many tents were pitched, only around five people were present at the encampment overnight.

“We saw that and we genuinely don’t know where they get that number. We’re convinced they’re just counting the people that get up at night.

“We make sure someone is awake here at all times for security,” he explains. “So we have six people up at night – three shifts of two people.

“On any given night, there will be empty tents – like last night, there were two empty tents. But the absolute minimum we’ve had is 12 people, usually it’s around 18 to 20.

“There’s a core group of who are here three-quarters of the time, and then we have others who come for a couple of nights and then leave. Right now we have about the right amount of material for the number of people.”

The encampment is managed by a series of five working groups – loosely organised groups of volunteers which each have their own group chat and are responsible for a single key function.

A welfare group keeps tabs on tents and food to ensure that capacity meets demand. The encampment’s internal security group manages night-time rotas and liaises with Imperial’s own security staff.

An outreach working group focuses on messaging “so that people understand why we’re here and how they can get involved.” The media team, by contrast, works on artwork, arranging banner-painting sessions like the one taking place today.

A fifth and final team – the events group – holds overall responsibility for the weekly timetable (“So when people want to do teach-outs or hold a film night, they make sure there are no clashes.”)

George says that the encampment is governed by consensus, and that those who want to take on more responsibility are allowed to do so. “Over the course of the week, people propose different events that they want to do. Then we get together in a group of 10 to 15 to ensure there’s no clashes and that there’s coverage of all the different things we want to talk about.”

“There are a few people in multiple working groups who talk to each other to ensure there’s a strategy and a collective



Students painted banners at the encampment on Monday. W

response, but whenever there’s a bigger question we try to get everyone on the encampment together to see what people think.”

The welfare team seeks to provide at least one meal a day for inhabitants and implements a food rota to manage cooking and procurement.

George says that businesses – both local and in central London – have offered food, and people have brought cooked meals to the encampment. “For example, there was a group of women who came by and gave everyone cooked lunch.

“If something like that doesn’t happen, people either get snacks or we’ve cooked meals ourselves.

“There is stuff for people to eat breakfast and lunch as well, but it’s not a scheduled thing, so people go get food at work or eat at the cafeteria.”

The day after our conversation, someone from the farmers’ market on Imperial College Road brings paella for lunch.

Imperial has provided portaloos a short distance from the encampment, and there are toilets and showers in neighbouring buildings, so everything other than laundry can be done on campus.

“We’ve had a couple of people who live nearby who have taken laundry loads [for the encampment], but in the main, people

Weeks at Imperial's Gaza encampment



alt Gao for Felix

bring a few days' clothing and go back home to do their laundry."

The group has developed an "onboarding process" for those who wish to join them, George says.

"We discuss our demands [of Imperial], our politics, our rules in terms of how we engage among ourselves and with the public. We have a document that outlines the minimum baseline we expect – tidying up, cooking and other expectations, how to deal with outsiders and engage them further.

"We explain how to give people information we think is important, to be friendly and open, and how to deal with anyone who is hostile – the priority is to protect people here. After that, we make sure they've got a place to sleep."

George says that "anyone who agrees with our demands is welcome here," but subsequently clarifies his statement.

Last term, Piers Corbyn, alumnus, anti-vaxxer, and conspiracy theorist attended a protest. IC Action for Palestine, which organised the event, later issued a statement saying Corbyn was not invited and that his views did not align with "the values of our actions and work."

"Piers Corbyn would not be welcome on the encampment," says George. "Despite what he might say, he doesn't agree with our

aims." He adds that the same goes for those who espouse antisemitic beliefs – they would be told to leave.

The Imperial settlement is part of a wider phenomenon of 'Gaza solidarity encampments' that has swept across higher education institutions in the UK and US over the past few months. Students pitch tents in open spaces on campus and call on their universities to divest funds from businesses aiding the Israeli war effort in Gaza.

The encampments take inspiration from earlier protests such as the Vietnam anti-war demonstrations in the late 1960s, and the anti-apartheid movement in the 1980s, when student activists mobilised on campuses to voice their outrage and lobby for change.

The campus occupation movement soared to prominence two months ago after the president of Columbia University authorised the New York Police Department to clear an academic building that students had occupied. Riot police swarmed the surrounding streets, clashing with protestors and arresting over 100 of them.

In the wake of the events at Columbia, encampments were established on campuses around the UK, including Oxford, Cambridge, Manchester, Leeds, and a number of London universities.

Tensions have ratcheted up as Israel continues its assault on Rafah, a city in southern Gaza where civilians displaced by the war had initially been told to relocate.

The Israel Defence Forces say that Rafah is the last stronghold of Hamas, perpetrators of the 7th October attacks in which 1,200 people were killed and 252 others taken hostage.

Over 36,000 people have been killed in Israel's retaliatory attacks on Gaza, according to Palestinian officials from the Hamas-run health ministry.

The campus demonstrations have elicited mixed responses from universities. At Brown University in the US, encampments were cleared after administrators agreed to put divestment calls to the institution's governing body, which will vote on the matter in October.

Columbia University, which has taken a more strident stance on protests, cancelled its main graduation ceremony citing security concerns. The university will instead host a series of smaller ceremonies.

Closer to home, students at Goldsmiths in south-east London dismantled their encampment last month. After five weeks of occupation, the university agreed to demands including the provision of scholarships for Palestinian students, the publication of a statement calling for a ceasefire in the war, and a review of the institution's use of the IHRA definition of antisemitism.

Fears of antisemitism are among the drivers of crackdowns on protest. The United States Congress has held a series of hearings on campus antisemitism, calling college presidents to testify. Congressional representatives excoriated the presidents of Harvard, MIT, and the University of Pennsylvania for their responses to the question of whether calling for the genocide of Jews violated rules on bullying and harassment. A protracted argument over Harvard president Claudine Gay's response ultimately led to her resignation.

In May, UK Prime Minister Rishi Sunak met with university vice-chancellors and Union of Jewish Students president Edward Isaacs. Sunak said that 'a small minority' of people on campuses were 'propagating outright harassment and antisemitic abuse.'

A day after the Imperial encampment was established, five students stood opposite the tents and waved an Israeli flag, accusing pro-Palestinian activists of discriminating by "singling out... the Jewish state for boycott".

Activists at the encampment firmly rejected allegations of antisemitism, saying that 'anti-racism' was at the heart of their movement. The students added that 'anyone of any faith or ethnicity' was welcome to attend their events, provided they opposed 'the slaughter... in Gaza.'

George, the student activist at Imperial, says that the group is in contact with protestors at universities around London. "Especially at UCL and SOAS, where they've

faced significant attacks from both their administration and the outside. They've shared lessons with us to ensure we're ready for that in future.

"We also try to support each other – so a lot of people at SOAS were involved in a demonstration at the Egyptian embassy last Friday. We sent people there to support them, because we're much closer."

Imperial's response to the encampment has been "very hands off," says George. "We feel like they've been working with us in good faith so far.

"However, we are very aware that some of their actions could be explained by them wanting to stall for time and dissipate the problem without actually addressing our concerns.

"We're very happy to work with them, but it is also our job to understand where they might be looking to act as a pressure release valve without changing their behaviour."

Interactions with security and other staff on campus have been "very constructive and positive". "We work with security to make sure we aren't making noise when people have exams and they helped sort us out with [portable] toilets.

"They've been very open with us about their concerns and how we can address them – and vice versa."

Students at the encampment are awaiting an imminent response from Imperial on their demands – originally expected last Thursday, but later postponed to early this week.

Summer Ball, the flagship end-of-year event, is due to take place in just over two weeks. What happens if their demands are not met by then, and Imperial tries to remove occupiers by force? "There are people here willing to make a strong effort to stick around," says George, adding that the encampment will remain "until our demands are met.

"I guess we'll see what happens, but it's our belief that it is far easier for the administration to meet our demands and satisfy pretty basic moral responsibilities, than to hire bailiffs to kick us out."

Union Sustainability Plan: Share your thoughts

Deputy President (Finance & Services)
STEPHANIE YEUNG

Over the past months, I have worked closely with our students and staff to develop Imperial College Union's Sustainability Plan due to be launched in the 2024/25 academic year.

We are now opening the floor up for our students to review the current plan, and to share your feedback that will help shape the details of the plan!

What is the Union Sustainability Plan?

As an organisation, we represent our students on their experiences and perspectives, and this is no different on the matter of sustainability. Sustainability is fast becoming a top priority for our students, and we recognise the moral responsibility we have to contribute to a more sustainable and resilient future, for both the institution and broader community.

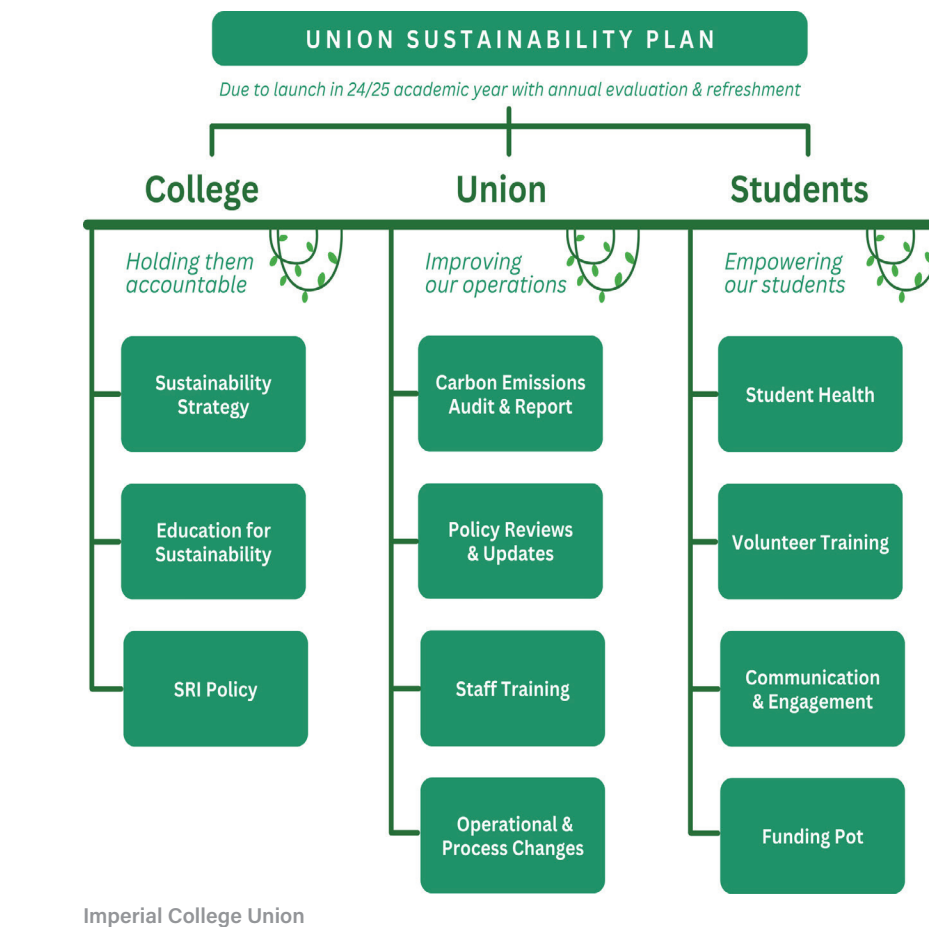
The formulation of the Union Sustainability Plan is our first attempt to strategise our approach towards environmental, economic, and social sustainability through the theory of change.

The aim is to conduct an annual evaluation and refreshment of the plan, informed by the actions and outcomes of our initiatives every year, to ensure the targets and activities are tangible and relevant.

The three pillars

The plan is supported by three core pillars of focus, including:

1. College: To effectively hold the college to account on their commitments to sustainability
2. Union: To deliver Union services that have sustainability at its core.
3. Students: To empower our students to engage with sustainability across the Union, the College and wider society.



College

As the organisational advocate for our students, we have always and will continue to engage the College and hold them accountable for their sustainability initiatives. This includes the College's Sustainability Strategy, integration of sustainability into education at Imperial, and the implementation of their Socially Responsible Investment (SRI) Policy.

Union

Introspectively, the Union also strives to improve our own internal policies, processes, and practices to become more sustainable. This includes auditing and reporting our carbon emissions for both internal and student activities, and enacting any operational changes that will reduce our carbon footprint. We also want to revise our policies to integrate sustainability principles, and deliver climate literacy and other sustainability training to our staff.

Students

We want to enable our students to become agents of change themselves to deliver the impact they want to see in the world they will be living in. This includes embedding sustainability into our student volunteer

training, having clear and meaningful communication and engagement with our students on our sustainability initiatives, supporting our students to have a positive health and wellbeing, as well as establishing a funding pot for student projects related to sustainability.

What does this mean?

Under the 3 pillars of the plan, we have identified specific actions we want to undertake in the 2024/25 academic year.

For example with the College, we have and will continue to lobby for the expansion of their SRI Policy to include a commitment to full divestment from fossil fuels, a sentiment that has been voiced by our students on multiple occasions through campaigning and Union Council.

Another example with our students, we have identified volunteer training as a key point to educate our student leaders, and equip them with the skills and mindset to deliver sustainable events and activities within their societies, communities, and beyond.

If you want to find out more about the plan, check out the survey consultation that contains more details about it, and please feel free to get in touch with me at dpfs@imperial.ac.uk



What have we done so far?

To help us develop the plan thus far, we've done:

- Initial consultation of the plan framework with 30+ students during the October Environment & Sustainability Forum
- Discussions with Imperial's Sustainability Strategy Director (Harriet Wallace), specifically in relation to the Sustainability Hub's experience and expertise in carbon emissions measurement, reporting, and reduction
- Feedback session with the Union's sustainability staff network

The conversations we have had so far have helped shape the plan, but we want to hear more from our wider community!

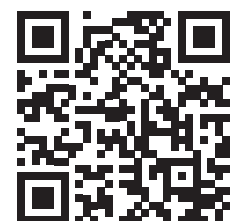
Our next steps to refine the plan include:

- Survey consultation with our community (Scan the QR code!)
- Live consultation session with our community
- Discussions with senior student volunteers at Union Council & CSPB
- Internal consultation with wider Union staff body

Our survey consultation is now open for you to share your thoughts. Fill it out before 1st July to help shape the plan!

More details about the plan are also linked in the survey to give you a better understanding, and the live consultation session also gives you the chance to probe further with us!

Share your thoughts about the Union Sustainability Plan here!



SCIENCE

Gearing up for the Great Exhibition Road Festival

The festival will be looking to welcome over 50,000 attendees for a weekend of free science and arts events.

Science Editor

TAYLOR POMFRET

The Great Exhibition Road festival (GERF), which started soon after the formation of the Albertopolis in 1851, returns this year on the 15th and 16th of June. The festival brings together some of the world's most iconic institutions to Exhibition Road to create an inspirational fusion of the arts and sciences.

2024 theme: 'Flourish'

GERF's theme this year is 'Flourish', aiming to celebrate how science and the arts can help people, communities, and nature to grow and prosper. The theme is part of GERF's mission 'to be a world-leading festival for science and creativity', which 'prioritises inclusion to engage diverse public participants and raise science capital'.

What's on?

GERF will be spread across all corners of Imperial College's South Kensington campus over the festival weekend. Attendees will have the chance to participate in hands-on creative workshops, interactive family-friendly shows, panel sessions and talks, and live music performances. Here's your guide to the nine zones that will feature throughout the weekend of the festival:

Quantum physicist and science broadcaster Prof. Jim-Al Khalili will kick off this year's 'Flourishing Science Talks'. His lecture, titled 'The Story of Time', will discuss how we can use our current understanding of the laws of physics to tell a new story about the nature and beha-

viour of time.

At the main thoroughfare of the festival – Exhibition Road – the main stage will be hosting a variety of world-class acts. This year, for the first time, the stage will be hosted by local radio station Portbello Radio. Among the artists performing will be the 'Royal College of Music's 10-Piece Brass Band', London's top vintage band 'The Shirt Tail Stompers', winner of the Royal Albert Hall's Future Makers 2023 competition 'Amity', and the punchy 'Big Smoke Valley', who describe themselves as 'purveyors of voodoo funk'.

Brand new to the festival this year are the NextGen Zone, designed specifically for 13-25 year olds, which will be hosted in the Smith Centre, and the Science Cabaret Zone which will be situated at Dangoor Plaza.

Over in the Queen's Tower Rooms will be the festival's Tech Zone. An exhibition to keep your eye on is the 'Build a BodyBot' stall, which combines the world of robotics and art. Imperial biomedical researchers have partnered with media artist Woo Jin Joo to give festival-goers the opportunity to build their own BodyBot buddy out of recycled textiles. To inspire designs, there will be demonstrations of the materials used to build real-fibre robots, as well as displays of robotic kits. The Tech Zone will also feature an AI silent disco called 'Swarm Dance', at which one can learn how AI behaviour can evolve from simple dance instructions.

For the biologists, head over to the Business School, which will be hosting the Brilliant Bodies Zone. This zone synergises the arts and sciences like no other. Among the stalls will be 'Paint Drip Brains' where you can develop creative drip paints that model how brain cells communicate to each other, 'Heartbeats in Harmony', where you could create electrocardiographic (ECG) artwork and take home a live 3D scan of their own heart, and – if you're feeling brave – head over to the 'Cell Poetry' exhibition where you'll have the chance to write your own rhyme and spit some poetry bars with a microbiological twist.

Right next to the Brilliant Bodies Zone will be the Energise and Space Zones, spanning Imperial's main entrance and the City and Guild's Building. If you're interested in learning about comets and black holes, head over to the Space Zone for a chat with Imperial Physicists Marina Galand and Toby Wiseman about how we



Top: Exhibition in the Brilliant Bodies Zone (Credit: Imperial)
Bottom: Science broadcaster Prof Jim-Al Khaili, who will be kicking off this year's 'Flourishing Science Talks' at the festival. (Credit: Duncan Hull, CC BY-SA 4.0)

can intercept comets, and learn about the concept of time travel. Also in this zone, my friend, Neha Yasin, and I will be exhibiting our third-year coursework which proposed how we can use radio astronomy to monitor the rise in communications satellites such as SpaceX's Starlink network. Formula One fans will particularly enjoy the Energise Zone, as you'll have the opportunity to meet with students and staff from the Mechanical Engineering department, and design your own eco-friendly racing car that can be tested in a time trial competition racetrack to try and top the leaderboard.

To wind down from learning lots of brand-new science, the festival will have a bar on the Plaza and a Family Fun Zone in Prince's Gardens with lots of activities, games, and experiments to try out.

The festival will run from 12pm on each day in various venues across South Kensington. Anyone can just show up on the day, but some tickets and activities do require pre-booking.

ENVIRONMENT

Transitioning towards a bio-based economy to combat climate change

Environment Writer

JULIA PURRINOS

A bioeconomy is an economic system that depends on biological resources and processes to produce goods in an environmentally friendly manner. Current industrialised economies rely on fossil fuels to manufacture products like engine fuels and plastics, which form the basis for many products and services that we use. The primary fossil fuels – oil, gas, and coal – are unsustainable carbon sources that contribute to climate change by emitting greenhouse gases when burned. The alternative, a bio-industrial model, would use bio-based feedstocks and synthetic biology to sustainably create precursors to mainstream products. Start-ups in synthetic biology hubs, such as SynBiCite at Imperial, have already started to corner the sustainability market with this new model – particularly in the bio-based plastics and fuels sectors.

Synthetic biology

Synthetic biology is an emerging, interdisciplinary field in which scientists engineer new systems out of biological components to fulfil useful purposes. By harnessing biological systems, synthetic biologists can produce essential raw materials from renewable feedstocks and engineered micro-organisms. This would help us reduce our reliance on petrochemical processes and therefore reduce our carbon footprint.

At its core, synthetic biology emphasises responsible innovation, enabling industrial processes to evolve in harmony with the planet's needs rather than depleting its resources. It can facilitate the development of carbon-neutral fuels, biodegradable materials, and efficient carbon capture technologies. These advancements can transform how we produce and consume both energy and raw materials.

Biofuels

The extraction, transportation, and refining of fossil fuels release large amounts of carbon dioxide and methane – both of which are potent greenhouse gases. Biofuels attempt to combat this by being made in a short time span from biomass such as crops and biowaste, which can include plant and food litter. The more recent 'third generation' biofuels come from the photosynthesis of algae – producing bioethanol from only water, sunlight, and carbon dioxide. The next generation of biofuels use genetically re-engineered cells to maximise the biofuel produced from a variety of sources. This innovative approach leverages engineered micro-organisms to produce renewable biofuels, reducing our reliance on fossil fuels.

Bioplastics

Traditional plastics, a major source of pollution in industrialised nations, contribute significantly to the climate crisis. Their production relies on fossil fuels, and their decomposition or incineration releases greenhouse gases. In contrast, bioplastics can be produced from plant matter waste such as crop residues. The key innovation involves re-engineering cells to convert this waste into biodegradable plastics to create a renewable production cycle. These bioplastics can be applied in many ways similar to conventional plastics, making them a viable and sustainable substitute that supports bioeconomies.

Biomanufacturing

Biomanufacturing processes use biological systems re-engineered by synthetic biology to produce renewable materials like biofuels and bioplastics. Re-engineered cells are cultured in bioreactors and create desired molecules such as bioplastic precursors that are then extracted and purified for industrial use. For example, Ginkgo Bioworks is a leading synthetic biology company that specialises in designing micro-organisms for industrial applications. However, the main downside is its higher cost and lower efficiency compared to

standard industrial processes. Additionally, biomanufacturing is yet to be adopted by industrialised nations. The UK and USA are the only countries to significantly invest in synthetic biology approaches to sustainability. This emphasises the need for a global shift towards bio-based economies to ensure sustainable development and environmental protection.

Government regulation/investment

It is important to note that government involvement, through regulation and investment, forms the backbone of all economies by supporting the development of various sectors. Notably, the UK government has pledged to invest £2 billion over the next 10 years in synthetic biology technologies to advance the UK bioeconomy. This substantial investment aims to attract more private investors, promoting growth in sustainable synthetic biology businesses and driving innovation in the field.

Tackling climate change requires an industry-wide shift to sustainable bio-based processes derived from organic matter, as well as adaptation of manufacturing practices. This is vital in creating a sustainable cycle where waste becomes our new source of raw materials. Increased government and private investment in the bioeconomy will pave the way for a bio-based industry that supports our climate instead of harming it.



Envato Elements

An interview with FoNS-MaD 2023 finalists: Team Licaze

Environment Editors
MARIE MORI
SIMRAN PATEL

The Faculty of Natural Sciences Make-A-Difference (FoNS-MAD) competition can turn undergraduates into entrepreneurs in a year. Students from the maths, chemistry, life sciences, and physics departments team up and find low-cost solutions to a global challenge. The teams pitch their idea to a panel for the chance to secure funding and lab space to test their idea for commercial potential over eight weeks. Here, FoNS-MAD alumni Chan Li, Hongyang Zhu, and Ruchita Duva speak with *Felix* about their idea to manufacture a biodegradable plastic alternative made from crustacean shells and crop weeds.

How did you manufacture this plastic, starting from the raw materials?

Zhu: We bought some crabs from Billingsgate Market and ground it up, and treated it with a very strong acid and alkali solution. Then, we tried to combine chitin with lignin, but the combination didn't work well. So we asked our supervisor and she advised us to convert the chitin to chitosan. In this process, we treated chitin [a substance found in the exoskeletons of arthropods] with very concentrated sodium hydroxide so that we were able to remove the acetyl groups and form chitosan.

Duva: For our lignin extraction, we wanted to use crop weeds, so we went to Hyde Park and found weeds, dried it, and heated it in a round-bottom flask. We treated it with an acid and alkali solution, and let it boil until it was a dark-brown solution. Then we filtered it and did a centrifuge to separate out the lignin powder.

Li: Then we combined the chitosan and lignin powder in a petri dish using an acetic acid solvent. We explored different proportions of chitosan to lignin – so we started off with just chitosan, which forms a clear

plastic film, but it wasn't very waterproof. So we tried to improve the water resistance of the film by adding up to 50% lignin. By the time you get to 50%, it felt like a bit of wood – the bioplastic was thick, and had a slightly crispy and brittle texture. The optimal proportion was around 20 to 30% lignin in terms of flexibility. We also tried adding some other modifications to our bioplastic – we tried adding beeswax to make it more waterproof, which worked quite well. We also tried honey, but the bioplastic film just became very sticky and difficult to peel off, which just turned out to be a really sticky mess.

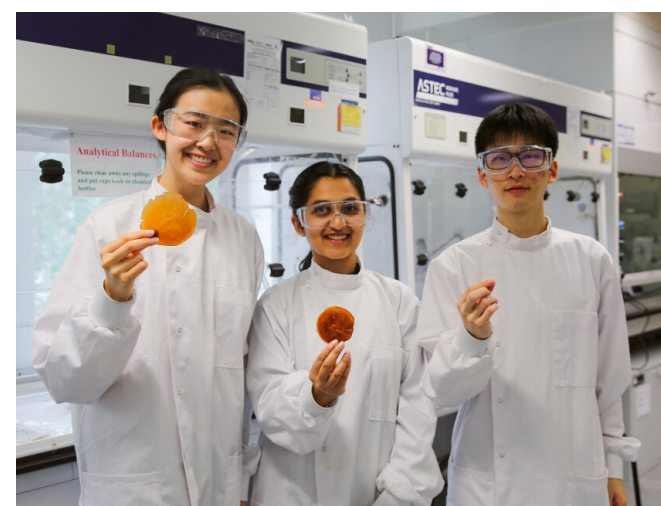
We spent quite a few days in the mechanical engineering lab testing out the strength of the plastics. We would cut out little strips of plastic and clamp it onto the machine and pull it apart to see how much force we needed to apply in order to break the plastic much stress there was.

Other people have come up with this combination of lignin and chitosan for different uses. What makes your particular version of it special?

Li: It has to do with where we're sourcing our materials from. For chitosan, we're sourcing it from invasive crustaceans, or seafood waste. Ruchita came up with the idea for sourcing lignin – she mentioned that farms in India burn weeds and that releases a lot of carbon dioxide. By incorporating the weeds into our product, it prevents the weeds from being burned and emitting carbon dioxide.

What were your main takeaways from the competition?

Duva: What attracted to FoNS-MAD is its originality – it was an amazing way of bringing out the creativity in all of us. It's also about carrying the responsibility to take on the whole project and having the independence to make decisions. When you have that independence, it also comes with problems – I never did a risk assessment before FoNS-MAD. We also expanded our network



Team Licaze with their bioplastic product Imperial College London

– tutors, people who helped us, group members – with whom we had fun and serious moments working together. I think it's very important to know how people can help you in so many different ways. I think that's a good lesson I learned: if you want help, just ask for it.

Zhu: We learned to use equipment that we wouldn't have in labs that are part of our degrees – for example nuclear magnetic resonance and Fourier-transform infrared spectroscopy to test purity. I just spoke to some PhD students and they said only PhD students are usually able to access those machines. If we hadn't done the FoNS-MAD lab placements, we wouldn't even have had the opportunity to see the machines.

What does the future hold for Licaze?

Li: What inspired me when I went to the final events of previous FoNS-MaD competitions was that there were people that took their idea further to build start-up companies. They managed to secure so much funding, which was amazing – and ideally I'd like to do the same with Licaze. But we're all quite busy in second year at the moment, so we've left it there for now. We really need more lab time – the eight weeks of lab placement that we had only allowed some initial research and testing, and there are still many problems we hope to solve. For example, how do we make this small plastic sample into an actual packaging product?

Zhu: There was another thing that we called the 'mystery product'. During the extraction process, we accidentally made a waste product that created a very flexible and strong film, but we couldn't figure out what the compound in it was. So we need time to figure that out, but we're very busy.

Duva: There were resources that we didn't have access to, like electron microscopes to take photos of the surface of the plastic to understand the structural properties of it. So if we had opportunities to give us better equipment to do that, then that would be perfect.

Revaluing crude glycerol to lower biodiesel costs

A team led by Uruguayan scientists is working on a novel biorefinery technique using bacteria found in kombucha to revalue the by-product of biodiesel.

Environment Writer

SABRINA CITTADINO

By 2030, global biodiesel production is estimated to be 50 billion litres – 38.8% more than what was generated in 2021, according to data from the Organisation for Economic Co-operation and Development (OECD) and the Food and Agriculture Organisation (FAO). This shows that, at its own pace, the world is increasingly trying to move away from dependence on petroleum-based fuels.

One of the biggest consumers of fossil fuels is transport, which is why biofuels such as bioethanol and biodiesel have emerged as a green alternative, especially since the 2015 Paris Agreement. At that time, UN member countries pledged to substantially reduce their greenhouse gas emissions to limit global temperature rise, and many began blending a small percentage of biofuels with petroleum-based fuels. According to the National Biofuels Federation of Colombia (FedeBiocombustibles) – the world's tenth-largest biodiesel producer – one gallon of biodiesel reduces CO₂ emissions by eight kilos compared to a gallon of diesel.

However, this biofuel also has a downside, because for every 10 kilos of biodiesel produced, one kilo of highly contaminated crude glycerol is obtained. This has two problems: on the one hand, if it is sold, this glycerol has a very low market value, so it does not help

lower the price of biodiesel, which today costs 70% and 130% more than diesel on the wholesale market; on the other hand, if the glycerol is discarded because it is contaminated, it has a harmful impact on the environment.

A group of researchers from the ORT Uruguay university have been working since 2016 on a solution to make crude glycerol more valuable on the market. Not only will it cease to be a polluting by-product, but it will also boost the production and consumption of biodiesel by lowering its cost.

“Our work aims to generate a biorefinery concept to take the waste from biodiesel production and turn it into other products with greater added value. In our case, we are doing this with bacteria of the genus *Gluconobacter*, which, in products for human consumption, can be found, for example, in kombucha,” says Magdalena Ripoll, one of the researchers on the project.

So far, the team has already succeeded in obtaining different valuable products from working with these bacteria. One is dihydroxyacetone (DHA), a component useful in the dermo-cosmetics industry, where it is present in self-tanning creams. Another is serinol, which is used as a precursor for the synthesis of synthetic antibiotics, X-ray contrast agents, and pharmaceuticals.

The other product is glyceric acid, a chiral molecule of high market value because it is produced only in small quantities and has significant potential functions. “Some studies indicate that it can be used to treat the effects of alcohol on the body. Others say it can be protective in



The bacteria found in kombucha can be used to reduce the price of biodiesel. Envato Elements

some skin cells,” explains Ripoll. The study of this molecule is currently quite limited, as it is very expensive to produce and buy, so the work of the Uruguayan scientists could help it be produced in larger quantities, through cheaper and more environmentally friendly means.

Previous studies have obtained DHA from the glycerol resulting from biodiesel production, but they did so from pure glycerol. What's special about this team's research is that it is from crude glycerol. This is fundamental because, according to Ripoll, it is estimated that in industry, the purification of a compound can influence up to 70% of the cost of the production process.

But what specifically do these bacteria do? The project involves working with *Gluconobacter* bacteria which, being acetobacter, have enzymes in their internal membrane that are responsible for oxidising sugars and sugar alcohols to obtain energy. These oxidations take place in the periplasm, between the inner and outer membranes, and once the bacteria have taken up the substrate, they expel the product – what the researchers are looking for – into the culture or reaction medium. “The positive thing about this is that we don't have to break the cell to get the product we want, which makes purification easier,” says the scientist.

In addition to working with crude glycerol, the novelty of this research is that it is carried out with these

bacteria in a resting state. Normally, in industry, DHA is obtained from growing *Gluconobacter*. This means that they produce the compound in a complex culture medium while having everything they need to multiply and reproduce, such as yeast extract, peptone, or salt. “We are looking for an alternative by doing it with cells that are not in the process of dividing, but are metabolically active, that is, they can catalyse conversion reactions,” says Ripoll.

The Uruguayan scientists therefore first grow the bacteria; separate them from the growth medium; re-suspend them in water and crude glycerol; incubate the bacteria in a shaker with aeration and a certain temperature; place them in laboratory flasks or reactors; and, finally, obtain the product of interest (DHA or glyceric acid) in a reaction medium made up of water.

Water as a medium is another new contribution these scientists have made. As Ripoll explains, when the compound of interest is obtained after oxidation by the bac-

teria, it is much easier to purify than in a complex culture medium. “While crude glycerol already has many contaminants, such as methanol, fat, and ash, by using water we avoid contamination by components of the culture medium and cell metabolites obtained during bacterial growth,” she explains.

Given their potential, the scientists are also testing the same technique with the same bacteria, but in the food industry. “We are trying to make the most of apple juice waste,” says Ripoll. Various compounds can be obtained from the sugars in this waste that are useful for other industries; one example is sorbitol, which can be oxidised to sorbose, a precursor of vitamin C.

Uruguay – a country of just 3.5 million people, and surrounded by Argentina and Brazil – is an example of a country that has had to stop blending biofuels with fossil fuels in 2022, due to the cost to industry and consumers. And although the ORT Uruguay study emerges as a solution to this local problem, the researchers know

that science is about contributing internationally, and about sharing and exchanging technologies.

Scientific research such as this offers a clear opportunity for industries, governments, and decision-makers around the world to invest in increased biodiesel production. Here in the UK, according to a report published in 2023 by the Department for Energy Security & Net Zero, verified renewable fuels – of which biodiesel accounted for 44% – achieved average greenhouse gas savings of 81%. However, demand for the petroleum-based fuels for transport is still significantly higher than the demand for biofuels.

With greener and cheaper biodiesel production, the industry will incur lower costs, eventually translating into cheaper prices on the market. According to Ripoll, this will make this biofuel more accessible to a larger number of consumers, ultimately allowing more vehicles to significantly reduce their greenhouse gas emissions.

Tales of Unsung Wilderness 5: On the Fence

Environment Writer

SHREYAS KUCHIBHOTLA

A fence is one thing that is common to nearly every urban area in the world. Though nothing screams human (or possibly beaver) interference like artificial barriers, fences are often teeming with life.

Most invertebrates, particularly in open grassy areas, congregate at the ground layer. They conduct their activities discreetly under the cover of thick vegetation. However, on a warm and bright day, something motivates them to climb. Mere minutes after the sun comes out, the tops of fence posts become alive with activity as folk from the ground meet those from the air in a lively exchange of shared interest – warmth. Arthropods are ectotherms, so they require warmth to keep their body temperature at a reasonable level. To achieve this, nothing is better than the exposed tip of a fence post. I often saunter beside fence posts on grassland, looking for movement or contrast at the edges.

As with most things I do in the field, it is met with confused looks from passers-by, but the rewards make the experience worth it. I’m usually after spiders, and this technique works for a very specific reason. Spiders can fly.

As I write this, I sense some of my arachnophobic readers shudder. I won’t attempt to sugarcoat it – in the words of the great arachnologist W S Bristowe, “We have to get used to the idea of an extensive floating population of spiders, insects and plant spores in the air above us.” What is this horde of aerial spiders?

Numerous spiders disperse via a method called ballooning, where they let out little strands of silk and let the wind take them to new beginnings. The most spectacular example of this is in the tiny money spiders of the family *Linyphiidae*. Come a good day, they march up to the tops of fences, post boxes, cars, and often humans – and prepare for takeoff. Fences work very well as helipads, so a keen arachnologist can intercept them at both ends of their journey. This is also useful because many spiders are too small to be properly surveyed by other



A ground spider (*Drassyllus cf pusillus*) about to balloon off a fence post, Bushy Park, London, May 2024 Shreyas Kuchibhotla

methods, and examining fence posts can reveal a greater diversity of arachnid life than one can ever imagine. On a nice day at London’s Bushy Park a few weeks ago, less than half an hour of looking at fences yielded about 10 different spider species.

Any discussion about invertebrates on fence posts is not complete without a mention of the charismatic Fencepost Jumping Spider (*Marpissa muscosa*), the UK’s joint largest member of the family *Salticidae*. This species is considered Nationally Scarce (recorded in 16 to 100 hectads across Britain), but it has begun popping up in more and more places – including some (very fortunate) people’s gardens. This fairly large spider is distinctly shaped: flattened and elongated to allow it to squeeze into cracks in tree bark – and, of course, the peeling bark on the sides of fence posts. On a warm afternoon day, *Marpissa* emerges from its retreat and begins to trot along the surface to hunt insects and often smaller spiders. Being a jumping spider, it has large eyes and superb vision. This means, unless you approach with caution, there is a good chance you may

never see it at all. I have often managed the approach with some degree of finesse but blundered as I raised my camera, causing it to scuttle down into its lair, or even more frustratingly, right into the grass underneath. It was only earlier this month that I managed to photograph this species in all its glory, striking blue eyes gazing inquisitively into the void.



A fencepost jumping spider (*Marpissa muscosa*) on a wooden fixture at Bushy Park, London, May 2024
Shreyas Kuchibhotla

While I have a bias towards spiders, fence posts don't. Added to the mix are various insects, caterpillars, and sometimes even woodlice. One group of insects that I've always been fascinated by is the robber flies (*Asilidae*) – aerial hunters that attack smaller insects in mid-air and drag them down to feed. In open areas with a dearth of suitable perches, these magnificent insects can often be found on wooden fences – with or without prey, and sometimes reproducing. Bush crickets (*Meconema spp.*) are also frequently spotted on fence posts, slowly waving their enormous antennae from side to side, Ladybirds of all shapes, sizes and – for lack of a better word – spottedness arrive in numbers when the sun comes out. As for woodlice, there's barely a niche that they haven't occupied. They are crustaceans, so their only requirement is a bit of moisture every now and then. While they are often most active at night, I have seen many individuals climbing fences in broad daylight. I am not sure what prompts them to do this – surely it makes for easier exposure to potential predators – but perhaps they have their reasons.



A robber fly (*Asilidae*) with insect prey on a fence post at Richmond Park, London, August 2023
Shreyas Kuchibhotla



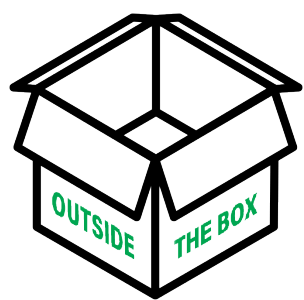
A bush cricket (*Meconema sp.*) on a metal fence at Regent's Canal, London, May 2024
Shreyas Kuchibhotla

From my travels across southeastern England, I've noticed three distinct kinds of 'fences' – the long wooden ones with posts every few metres, the more urban metal ones, and of course rural stone walls. Each of these is home to a subtly different array of invertebrate life. Jumping spiders (*Salticidae*), crab spiders (*Thomisidae*), and running spiders (*Philodromidae*) looking for a meal seem to prefer wooden fences, while ballooning money spiders (*Linyphiidae*) are generally found on metal. Harvestmen, leafhoppers, and cobweb spiders seem to like metal fences too. Spiders in particular love the tiny crevices between the metal segments, where they build their webs. I have always seen robber flies on wooden fences, while stone walls can be home to various lapidicolous (stone-related) invertebrates such as centipedes. In parts of western England, stone walls are home to the rare Pied Stone Spider (*Liocranum rupicola*) – a beautifully marked arachnid that I haven't gotten the chance to meet yet.



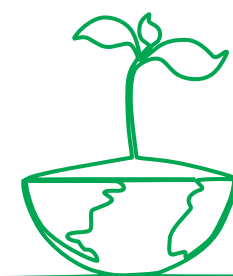
A rare crab spider, *Xysticus acerbus*, with weevil prey, Bushy Park, London, May 2024
Shreyas Kuchibhotla

I can't remember the exact moment that I first glanced at a fence post. What I do know is that not a day goes by in London when I don't sneak a furtive glance at one – often while talking to someone or walking back home from the bus stop. While fences act as dividers, atop their surface is a fascinating assemblage of life that is a bridge to the diversity of the natural world.



Eco frontiers: from groundbreaking discoveries to trailblazing leaders

WITH ZANNA BUCKLAND



Despite all the negativity in environmental news, there are always people working towards a better planet. This week, we take a look at some of the recent triumphs for the environment sector from all over the globe. This includes the release of Imperial College's decarbonisation plan for the South Kensington Campus, in a report titled 'Our journey to a net-zero estate by 2040', prepared with help from Arup consultants.

Breaking the cement ceiling

Researchers at the University of Cambridge published an article in *Nature* on the 22nd of May describing a breakthrough in cement recycling. They found that cement could be used as a substitute for the lime-dolomite flux used in electric-arc furnaces for steel recycling. Lime flux works by being floated on the surface of molten steel to prevent the metal from reacting with air and forming impurities – the waste product of this is a mixture of chemicals called slag, which was identified as having a similar composition to used cement. The replacement of lime flux with used cement is now being trialled by several materials processing plants since the researchers also determined that the resultant waste product could be recycled into new cement for use in concrete. If this process can be commercialised and implemented at scale, it would greatly decrease carbon emissions for both the concrete and steel recycling industries, two of the most carbon-intensive materials used in the construction industry.

Madame President, PhD

On the 2nd of June, Claudia Sheinbaum was elected as the president of Mexico for 2024–30. Sheinbaum broke several records with her win, as Mexico's first female and Jewish president, and its first president that has a PhD in energy engineering. Sheinbaum worked at the Intergovernmental Panel for Climate Change, contributing to the organisation's Fourth and Fifth Assessment Reports with a focus on climate-change mitigation. She researched energy use in Mexico's building and transport sectors for her PhD, and worked on electric vehicle and bus rapid-transit projects in Mexico City as its environment secretary. Sheinbaum's historic appointment promises to be interesting for Mexico's environmental commitments, especially with Donald Trump appearing to be a strong contender for this year's US presidential elections.

Costa Rica's zoos on the verge of extinction

At the end of May, Costa Rica finally closed all of its state-run zoos, a process that began in 2013 but was delayed by the automatic extension of a management contract with wildlife foundation Fundazoo. Expiry of the contract this year has allowed the Ministry of Environment and Energy to go ahead with the closures of Simón Bolívar Zoo and the Santa Ana Conservation Center. The remaining animals are in the process of being transferred to a rescue centre, where they will be evaluated to determine whether they are fit for release into the wild or should be relocated to other wildlife sanctuaries. Tragically, several of the animals died following the initial transfer, which was attributed to their history of confinement causing stress. Although the country still has 18 private zoos – a mixture of rescue centres closed to the public, wildlife sanctuaries open to visitors, and breeding centres – the closure of state zoos has still been recognised as a step in the right direction. Environmental groups have long decried the state of Costa Rica's public zoos, with their animals allegedly having a low quality of life and unsanitary living conditions; this development could set a precedent for countries in similar situations to follow suit.

Planes, runways, and aviaries

With help from law firm Client Earth, the Portuguese Society for the Study of Birds have successfully overturned the Portuguese government's plans for an airport to be built on the Tagus estuary. This wetland habitat near Lisbon hosts thousands of birds, both local and migratory, and has Special Protection Area and Site of Community Importance status. The legal suit was supported by several national non-governmental organisations (NGOs), as well as numerous activists and scientists who opposed the airport's planned location. The lawsuit targeted the plans not only on the grounds of wildlife preservation but also stating they were not in line with the country's climate commitments. Although proposed construction on the Tagus estuary has now been prevented, the Portuguese government is now pushing forward with a nearby site in Alcochete; the result of a strategic environmental assessment to determine the best place for the airport.

Client Earth has also recently taken on legal action

to tackle bottom trawling practices in the Mediterranean Sea. Bottom trawling is the act of non-selective fishing along the seafloor, which is harmful to marine ecosystems because it damages wildlife that isn't being harvested. The firm, along with the NGO BLOOM, are calling for the revision of authorisations for this practice to continue in areas where it should be banned in line with EU law.

Iceland's Mammoth operation

Mammoth is the name given to the world's largest direct-air carbon-capture and storage plant, which began partial operation in early May. Managed by Swiss company Climeworks and located in Iceland, the plant is claimed to be able to capture up to 36,000 tonnes of CO₂ per year when operating at full capacity. The Mammoth direct air-capture facility sucks air into collector chambers containing filter material for extracting CO₂. Concentrated CO₂ is then mixed into a water-based solution and injected deep in the ground where it mineralises into solid rock. These kinds of facilities are not a foolproof solution to climate change; huge amounts of electricity and water are required to run them at the scale necessary to remove sufficient amounts of CO₂, so other climate-change mitigation measures remain essential. However, Mammoth has been effective and useful thus far, and is set to become fully operational by next year, and Climeworks is looking to expand to locations in Norway, Canada, and Kenya.

Law of the sea

On the 21st of May, the International Tribunal for Law of the Sea ruled that greenhouse gas (GHG) emissions be considered marine pollutants, legally requiring countries to reduce their emissions to stop polluting the world's oceans. This climate advisory opinion – the first of its kind – is a response to questions brought to the Tribunal by the Commission of Small Island States on Climate Change and International Law in 2022. The opinion specifies that member states have an obligation to protect and restore marine environments from the impacts of climate change and ocean acidification resulting from excess GHG emissions. Small island states, such as Tuvalu, Antigua, and Barbuda, are at high risk from climate-change effects, being more vulnerable to flooding and more-severe storms.

COMMENT

Why I'm switching academia for journalism

Comment Writer
PETER KNAPP

The question on most PhD students' minds is: what do I do next? I have just passed my PhD viva (hooray!) and I'm starting the next leg of my journey. It's not a postdoc; it's a move to journalism.

It is important for me to make the change from a career in science to journalism because, well, the planet is on fire and I think the world of research is too slow and lacking the emotional communication needed to make rapid change.

The power of stories

People listen to stories. The most memorable lectures may start with "let me tell you a story about...". We can also see that it's the stories of climate scientists that make the front page, not their research papers. Last month, the *Guardian* front-page headline 'Scientists despair amid forecast of at least 2.5C temperature rise' told the story of how hundreds of world-leading climate scientists 'envisage a "semi-dystopian" future, with famines, conflicts, and mass migration driven by heatwaves, wildfires, storms, and floods'. Scientists are almost allergic to telling people how they feel, but when they do it can put their work on the front page.

It doesn't always work well. The BBC's *Today* radio programme ran this story but wrecked it. After reading out the headline, they dismissed it as 'gloomy', apologised for even reporting it, and then proceeded onto a 'good news story'

whilst having a good old laugh about it. It almost copied from a scene in the film *Don't Look Up*, which shows a newsroom obsessing to 'keep it light' when two interviewed scientists stress that the world faces obliteration from an incoming meteor. We are immersed in desperately poor mainstream journalism that downplays the existential emergency we are all facing within our lifetimes. Mainstream media is beyond parody and I believe it is time for more scientists, like me, to emotionally engage with the media, to tell stories, and to communicate the scale and urgency beyond the lab or the office. We need to do everything to stop the carbon emissions going up, and up, and up.

Most of us can link our work with the climate emergency. My air-quality PhD can relate to wildfires, for example. It may be surprising to hear that many more people die from wildfire smoke than from the flames themselves.

One study from California in 2021 found that smoke from wildfires can be up to 10 times more harmful than the same type of air pollution coming from combustion activity. Also, mental health is affected by wildfires, where suicide rates increase in areas suffering wildfire smoke.

Beyond my PhD, I plan to make a film about wildfires. I will spend three months in Europe over the summer to ask people directly affected by recent wildfires how their experiences may have affected access to food, community, and housing, as well as their mental health and attitudes towards activism.

A recent paper from Dr Fredi Otto at the Grantham Institute showed that 45%



'The world of research is too slow and lacking the emotional communication needed to make rapid change,' writes climate activist and recent PhD graduate Pete Knapp. *Pete Knapp*

of Australians who had experienced wildfires first-hand 'increased their activism after these experiences, especially to incorporate ways of sharing stories of their bushfire experiences with others. Some of these individuals felt that activism helped them cope with their bushfire-related trauma'. Without a journalism portfolio, I have little access to funding. I have therefore set up a crowdfunder for £7,000 to pay for my transport, food, accommodation, and kit (scan QR code to donate to Pete's fundraiser).

Direct action and protest are critical for change

I took a huge gamble during my PhD: I was arrested with eight other scientists in protest against new oil and gas licences issued by the UK government. I was investigated by the university the week after it was published in *Felix* and it was used against me, contributing to a campus ban that lasted indefinitely for the last six months of my PhD. But I did it because I believe non-violent direct action is essential in times of crisis, and we are very much in crisis.

I wish that Imperial had encouraged, or even supported me to effectively engage with the public and those in power through protest and direct action. Instead, punitive measures were imposed that were designed to stop me acting upon my knowledge. In this sense, I felt betrayed by the hostility in academia, and that freelance journalism would allow me to be more honest and to act more in line with my moral values. Im-

perial needs to be much more welcoming to protest to foster the open and stimulating environment that we need for progress, so it doesn't either lose or silence valuable voices.

Academics turning to direct action is not extreme, it's a necessary step to uphold our responsibilities and ethics. In fact, Stephen Humphreys, Professor of International Law at the London School of Economics, who was interviewed in the *Guardian* story I mentioned, was asked what individual action would be effective, he said: "Civil disobedience". We have been told unofficially by members of the Climate Change Committee - the advisors to the UK government - that direct action is effective in putting the issues into the agenda. It makes a difference: the 'pink boat' action by Extinction Rebellion in London in 2019 saw a 10% jump in the public treating the environment as their top concern.

So, my time after the PhD will be spent engaging in continued non-violent direct action as well as telling stories through film and journalism. I strongly suggest that fellow academics treat telling stories with the same seriousness as they treat publishing papers. Our future is in the balance.

Imperial did not reply for a request for comment on Peter's allegations that his activism "contributed to a campus ban that lasted indefinitely for the last six months of my PhD".



Donate to Pete's fundraiser here.

Before donating, please read Chuffed.com's terms and conditions (<https://chuffed.org/terms-conditions>)

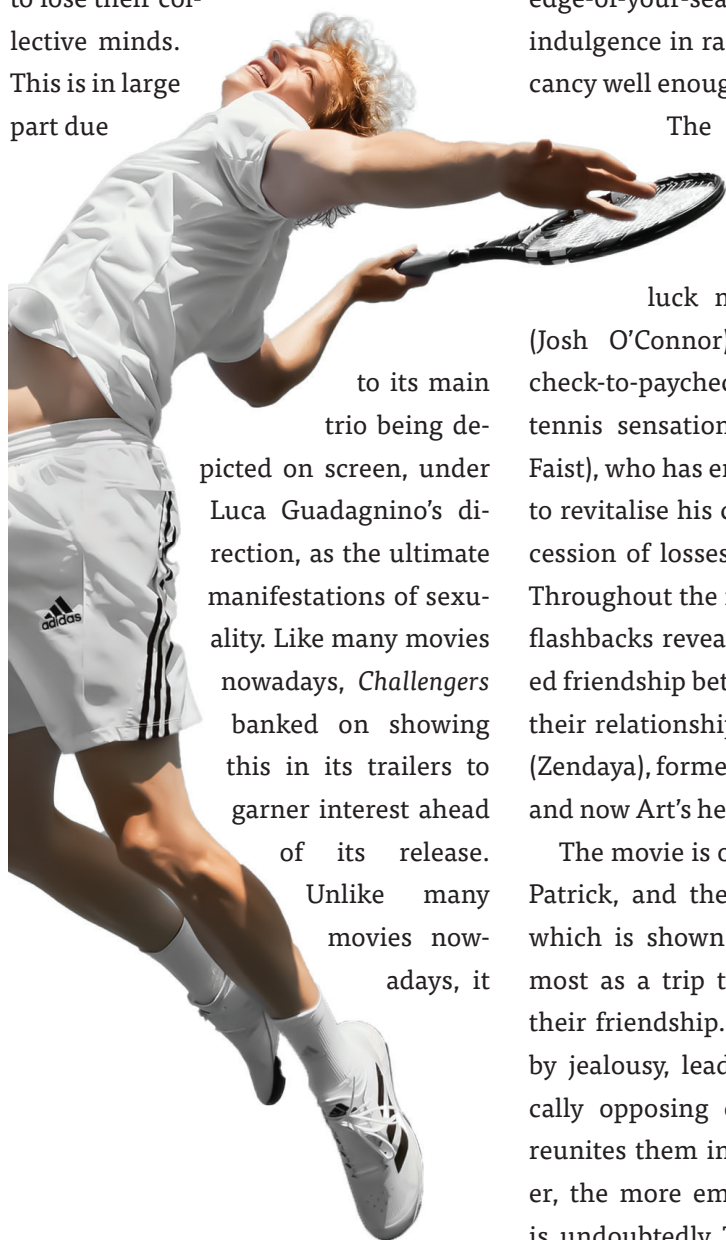
FILM&TV

Challengers

A love triangle of Venusians meets a racquet sport in one of the biggest releases this season.

Film Writer
TARUN NAIR

At the time of printing, *Challengers* has been out in cinemas for six weeks, and has inspired many a superlative headline in online reviews, and caused cinephiles all across the Internet to lose their collective minds. This is in large part due



to its main trio being depicted on screen, under Luca Guadagnino's direction, as the ultimate manifestations of sexuality. Like many movies nowadays, *Challengers* banked on showing this in its trailers to garner interest ahead of its release. Unlike many movies nowadays, it

proceeds to not deliver at all on the consequent expectation of on-screen intercourse during its 131 minute runtime. Not that you miss it: the tennis matches shown in the movie, what with their edge-of-your-seat rallies and occasional indulgence in racquet abuse, fill this vacancy well enough.

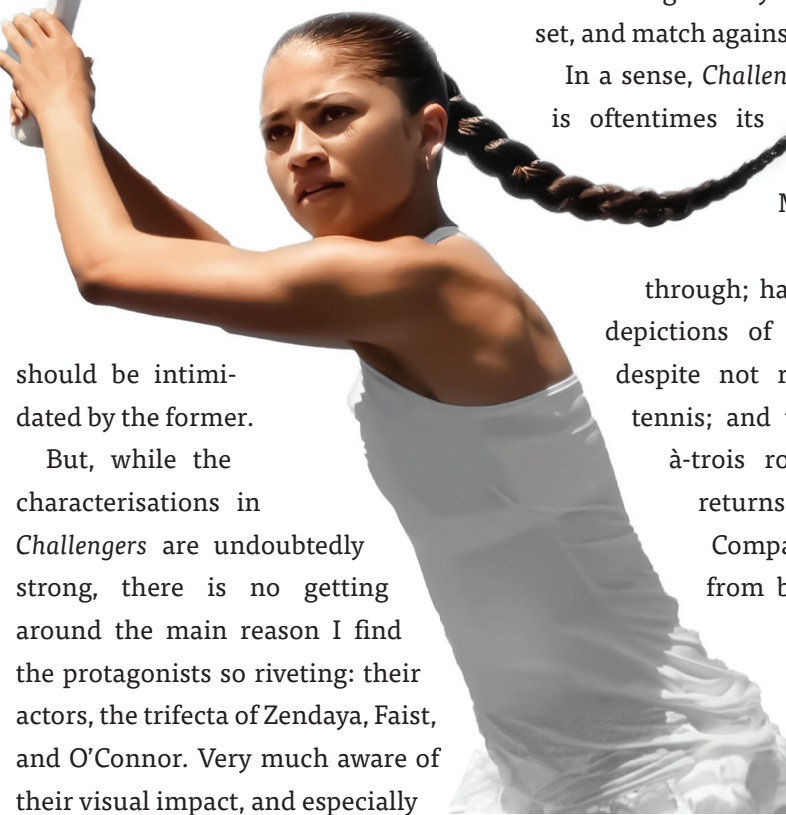
The movie opens with the Phil's Tire Town Challenger final, between down-on-his-luck maverick Patrick Zweig (Josh O'Connor), who is living paycheck-to-paycheck, and international tennis sensation Art Donaldson (Mike Faist), who has entered the competition to revitalise his career following a succession of losses at higher level events. Throughout the match we see a series of flashbacks revealing the past deep-rooted friendship between the pair, as well as their relationship with Tashi Donaldson (Zendaya), former star of the tennis world and now Art's head coach and wife.

The movie is ostensibly about Art and Patrick, and the match between them, which is shown throughout, acting almost as a trip through the archives of their friendship. The two are torn apart by jealousy, leading them on diametrically opposing career paths until fate reunites them in New Rochelle. However, the more emotionally-charged story is undoubtedly Tashi's. Once the cyno-

sure on the court (and apparently on the dance floor too), hailed as the 'tennis champion of tomorrow', a knee injury brutally cuts her down before she has the chance to go professional, forcing her to settle for coaching instead. This is especially crushing given Tashi's view of tennis matches as intimate relationships between players. After her one-sided takedown of Anna Mueller, she remarks sentimentally, "We understood each other completely... It was like we were in love." Tennis is more than simply a passion or a job – it is an obsession for her.

It is therefore easy to get the impression that she is living vicariously through Art; his wins are her wins, his losses are her losses, his chance to stop his career's freefall is hers too. A chance for which – resentful of her husband's lack of zeal – she emphatically says, "I would've killed to have ... I literally would f**king stab someone [for it]." Yet to go so far as to call her entirely egotistical would be a

mistake. Tashi had shown great interest in the pair since their days as the doubles team 'Fire and Ice'. She recognises Art's latent potential despite it being obscured by Patrick's showy unorthodoxy, even suggesting to Patrick that he



should be intimidated by the former.

But, while the characterisations in *Challengers* are undoubtedly strong, there is no getting around the main reason I find the protagonists so riveting: their actors, the trifecta of Zendaya, Faist, and O'Connor. Very much aware of their visual impact, and especially

their sheer sexuality, Guadagnino supplements his leading cast with deliberate costume design, lighting, and posturing throughout to emphasise their presence on the screen.

All this adds

up to a film which – without so much as full-frontal nudity outside of a locker room – manages to stimulate more lust and feel more sensual than most other R-rated movies with obligatory explicit sex scenes. Restraint is king.

Moreover, the way the trio's acting plays off each other is appreciable, – when one is not too busy ogling their trimmed figures. The restrained expression of Faist and O'Connor offers space for Zendaya's dynamism: a comical look of incredulity as Patrick asks for her coaching; thinly-veiled frustration at Art's plans to retire; and the roar of overflowing ecstasy as she wins game, set, and match against Mueller.

In a sense, *Challengers* is oftentimes its

own inverse. Marketed as erotic yet doesn't follow through; has some of the best depictions of tennis in cinema despite not really being about tennis; and takes the ménage-à-trois romance trope and returns an anti-romance. Compared to its peers from bigger studios, and well-established franchises, it's no blockbuster – but it is a damn good movie.

BOOKS

An orchestra of unneutral chaos

Liberation Day by George Saunders is a celebration and elevation of the short story.

Books Editor

FIYINFOLUWA T. OLADIPO

A mother confronts the bounds of forgiveness when her son is pushed down by a random stranger on a high street. An employee for an underground amusement park is caught in between the truth and a web of lies when people start to question the reality of conditions in their workplace. A comment in a break room spirals out of control, with amusingly unintentional consequences, but raises broader questions on the true nature of accountability.

You wouldn't be at fault for thinking these were bad prompts for a philosophical discourse on ethics and morality. However, in the hands of George Saunders, these are tools in an arsenal used to take a cross-section of the human soul.

Liberation Day is a collection of nine stories by the American writer, five of which had been already published between 2013 and 2022. It is his most recent addition to his opus, including the 2015 Man Booker Prize-winning *Lincoln in the Bardo*, and Folio Prize recipient *Tenth of December* (this contains the bio-dystopian short story 'Escape from Spiderhead' which was adapted for film by Netflix in 2022).



These are tools in an arsenal used to take a cross-section of the human soul.

Liberation Day is the work of a refined craftsman. Many of ideas and premises here are echoed from his previous works: the story 'Liberation Day' bears similarities to 'The Semplica-Girl Diaries' in *The New*

Yorker, and 'Ghoul' is reminiscent of 'My Chivalric Fiasco' in *Harper's Magazine*. However, neither the re-branding of these ideas nor the novelty of newly introduced ones that make this a great collection – it is the subversive manner in which they are presented.

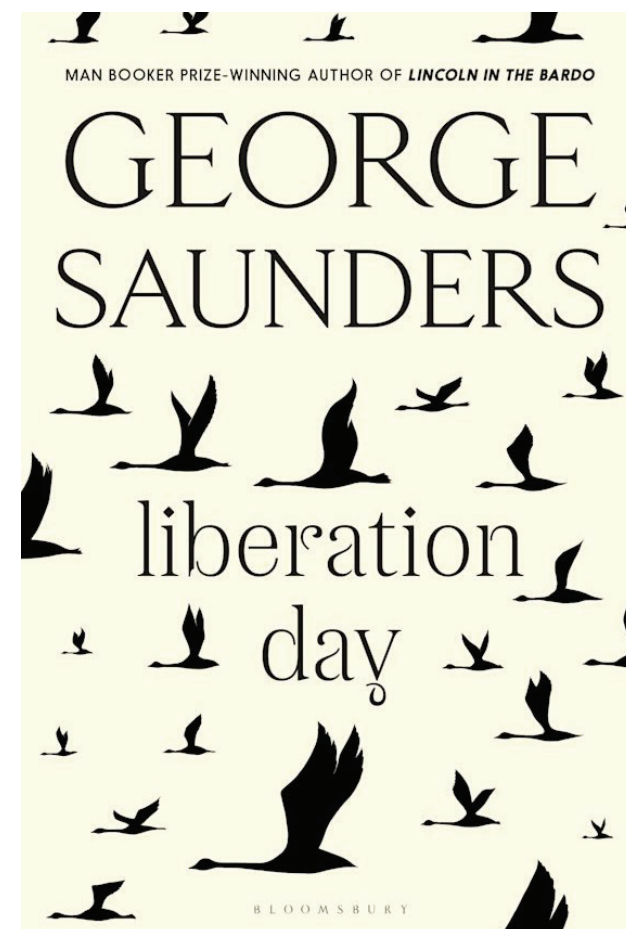
In the titular short story, human beings called Speakers can be bought, installed like furniture, and reprogrammed to deliver performances – imagine Shakespeare live on your living room wall! However, a Speaker must confront his literal and figurative position in the world in a decisive moment, when disaster strikes a wealthy family during one of their performances.

This is in contrast to the much more subtle 'Love Letter', where a man compels his grandson to take the quiet road after an unsaid event disrupts their family life against the backdrop of a politically decadent America.

Spectacle and suspense are significant to why the stories in *Liberation Day* work so well, and possess a refreshingly smooth television-like quality to its narrative. When, in 'A Thing At Work', an offhand comment by a coworker places a woman into an uncomfortable position with her boss, the vividness of the drama that ensues feels more akin to a prestige drama than fiction. I paused, quite literally, to laugh and applaud its sheer creative audacity once it was over.

But after the set-up of each story comes a punchline, and Saunders posits questions on virtue and true morality to his reader from the dredges of everyday life. Succinctly put: what makes a good person? And what makes you a good person? Saunders delivers a play-by-play of the answers given by his characters. And the end is an orchestra of chaos that puts light to the hypocrisies existing in our own belief systems.

There are weaknesses to the collection. Stories with more complicated worlds – such as



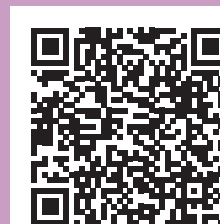
'Ghoul' and 'Elliott Spencer' – built with their own unique syntax may be harder to intuit on first read, and can prove more frustrating than rewarding to decipher. However, this is minor critique in



A glorious success that sings with a crispness only the short story offers.

the face of an incredibly deft feat in fiction, and Saunders' indirect style is worth the initial resistance.

Liberation Day is a glorious success that sings with a crispness only the short story offers. It stands as a testament to the art of the story, and how it can be used to help ground our perspectives of ourselves first, then each other, and finally the world.



Read the short story 'The Mom of Bold Action' for free in *The New Yorker*.



PHOTOGRAPHY

Smells like home

A sensory trip down nostalgia lane

Head Photographer
ROLANDO CHARLES

Home means different things to different people. This is a bit of a cliché, but it is indeed true that there are no two homes alike. It is also intriguing that siblings may not have the same idea of home, yet people from opposite ends of the world might share some of the same memories and a common nostalgia for some oddly specific aspect of their childhood.

In the last couple of weeks I've been thinking a lot about home. Now, having spent almost two years in a country different from the one I grew up in, I have become somewhat disillusioned with the idea of moving abroad to study. I've come to realise that home simply means being around the people I love. And this feeling goes hand in hand with our sensory perception of home, which is completely subjective. For example, I distinctly remember waking up on a Saturday morning and hearing the sound of small spoons hitting two or three mugs, and the unmistakable smell of warm milk for breakfast. Even if I tried to recreate that feeling here and now, I'd fail miserably, as it's not just the physical sensations that are missing but the feeling of home associated with them.

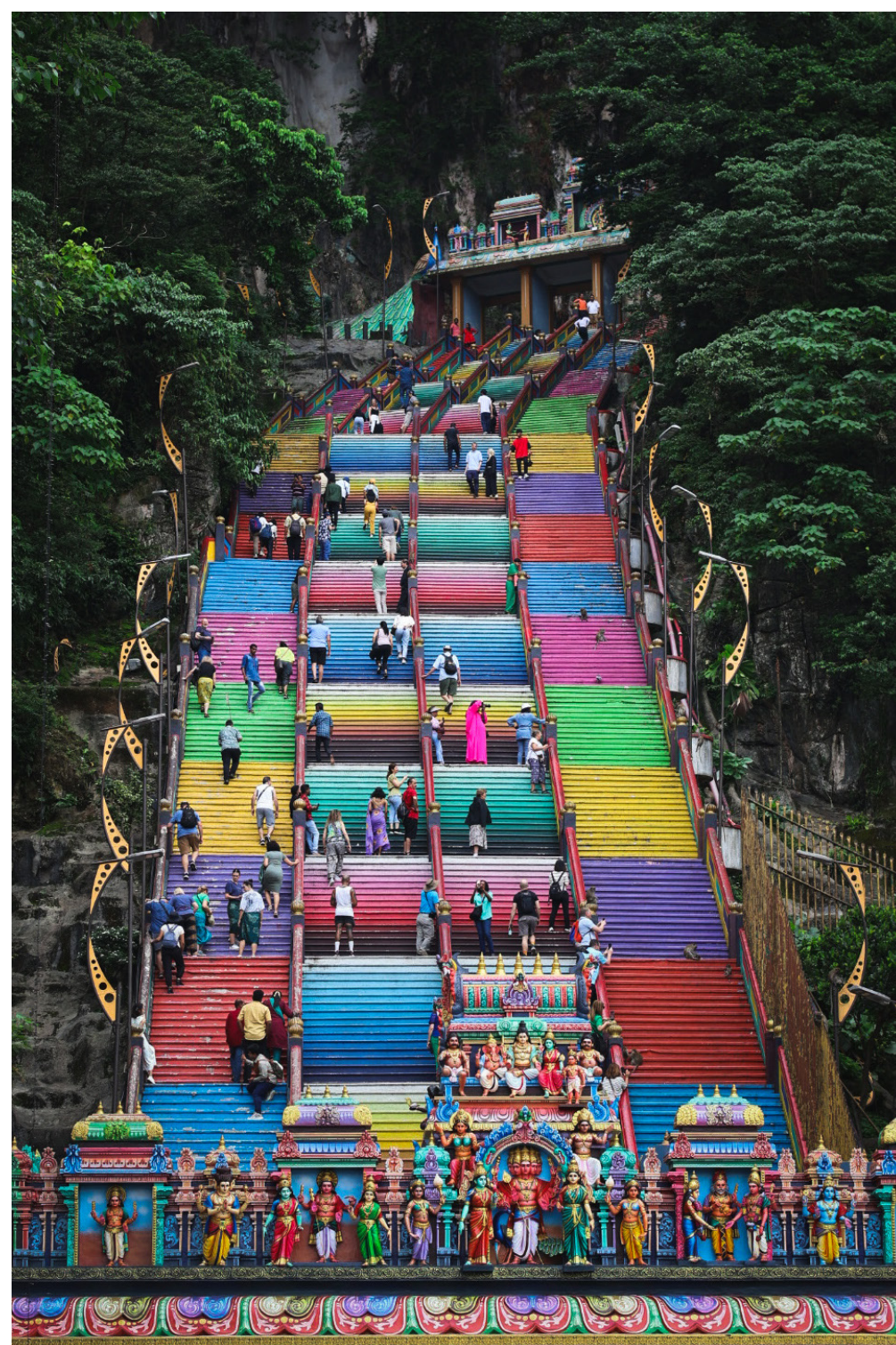
Some senses are more suited than others to evoke such feelings, as in the title of this article. I think the greatest advantage of our sense of smell is that it aids memory better than anything else. Often all you need is a whiff of some long-forgotten scent to remember days' worth of memories and feelings. This week's theme is exactly what I've just chaotically described: a jumbled mess of nostalgia and perception, an unsolvable equation

of smell and home.

But we are photographers, and what a wonderful challenge it is trying to photograph a smell. By definition, it cannot be accomplished simply using your eyes, so how do you tackle it? We can find a workaround to this by capturing an image that evokes a distinct scent, instantly jogging the memory as we discussed. Close your eyes for a moment – how hard is it to smell something just by thinking about it?

The Climb immediately hits you with vibrant, loud colours, and then ever so subtly envelopes you with very distinct smells. Wet foliage, humidity, and spray from the waterfall, your sweat from walking up all those stairs, fresh air piercing through your body. These smells evoke nostalgia in Jia, who uses this image to tell a story, telling us about her life, about her childhood. That's what is special about 'Smells like home': it's such a personal and subjective theme that it feels like I'm peeking into someone else's memory. Let me also appreciate the technical skill displayed in *The Climb*: dramatic dark greens worthy of *National Geographic*, framing bright colours that can lighten your mood. The wonderfully executed vertical composition and professional editing contribute to what could naively be seen as a 'poster photo', while in reality this hides a profound, almost religious quality.

Unfortunately for all other Imperial College photography enthusiasts, this will be the last photo competition theme of this academic year. Thank you to everyone who participated – it was a pleasure and a privilege to be able to look at and judge your very best pictures. I look forward to beginning a new series of 'Photo of the Week' in October 2024!



The Climb Jia Yang Lee

SOCIETIES



Sophia Perera

Came for the show, stayed for the energy

ICSM's RAG Fashion Show 2024 empowered small designers to prove just how sustainable, and how fun to dance in, fashion can be.

Societies Editor

CHARLOTTE PROBSTEL

The Imperial College School of Medicine (ICSM) hosted its annual fashion show earlier this year on 27th February. The event, held at the Electric Brixton, commemorated the theme of our generation: sustainability. Fast fashion was banned on stage, with clothes sourced exclusively from small independent London-based designers and aspiring designers within the ICSM body.

The dress code for attendees was vintage, a theme in which one bioengineering attendee was so invested that “even his underwear was vintage”. But not only were the outfits from a sustainable background – so were their styles, which drew inspiration from all over the last

century; from 20s lingerie to 1980s workout clothes. One could say that even the styles had been recycled.

The models and the crowd

With over 180 models prepped and trained to perform short dances and walks across the stage, the three-hour-long show was unforgettable. 1200 audience members of mostly medics and a few bioengineers came to cheer on their friends and coursemates, anticipating revelations of previously unseen confidence and per-

formance skills. “It [the show] is heavier on the dancing than on the clothes” mentioned Sahil, who walked in the Boys

Streetwear category last year and found the confidence to walk the Boys Swim category this February.

Dancing, music, and spontaneous walks

In all the categories, performers followed a simple routine, with pairs or individuals walking up and down the runway, finishing in a short spontaneous pose. You could see the amount of time that had been invested into the coherence of the dance moves, as performers had been

of 12 performers, I applauded the choreographers behind the show. Girls were lifted, hips were swinging, and there was no shortage of turns and twirls.

The dances varied according to the theme of the clothes and the corresponding background music. Although legends Black Eyed Peas, Kanye West, and Bruno Mars were in the mix, the playlist was dominated by powerful female performers such as Beyonce, Ariana Grande, and of course, the icons of the 2000s, Britney, Fergie, and Lady Gaga. To match this fiery playlist, the struts down the catwalk, which presented each individual outfit, were nothing short of what you might expect from wild young adults – sludrops, twirls, and flexing of biceps and triceps alike. Luckily, the staff ensured all guests were over 18, allowing the show to be entertaining and sexy.



One could say that even the styles were recycled.

practising in one three-hour session per week, for several months. Factoring in that each group consisted of an average





were also entertaining; men and women in suits presented powerful and subtle dance moves, presenting a unified feeling of being within the professional world. Furthermore, models in casual-wear painted a romantic picture of dating and youthfulness, highlighted by men kneeling and gifting their counterparts with roses. The men in Swimwear and Mixed Athleisure greatly enjoyed

IC Dance and Intermission

To give all the performers a little break, the audience was blessed by an epic performance by an all-female IC Dance group. With more refined structure and skill, I was amazed by their smooth transitions and group aura, performing to songs the audience could sing their hearts out to: 'Bad Romance', 'Poker Face',

At a ticket price of £15, the show was a fun night out with friends, and I recommend attending, or even participating, in next years show. It is not only open to our future doctors, but engineers and scientists too.



From Burlesque to mixed suits

The open and closing performances were well-placed in the order of the show, as nobody would have wanted to miss the high-heeled stomping in red lights to the beat of Christina Aguilera's 'Burlesque', which was evident from the roaring response of the crowd. The co-ed shows

showing off their physiques, lifting girls to the sound of 'Can't Touch This' by MC Hammer. The most anticipated category, Boys in Heels, did not disappoint, with flawless struts down the catwalk making the crowd cheer loudly for their peers that were, perhaps for the first time in their lives, walking on elevated shoes.

'Run the World (Girls)', and 'Candy Shop'.

The intermission left no time for silence or boredom. With an impressive ensemble and conductor, IC Jazz Band performed with a selection of live singers, who showed off their vocal talent and ability to control the crowd – an essential element to any musical performance.

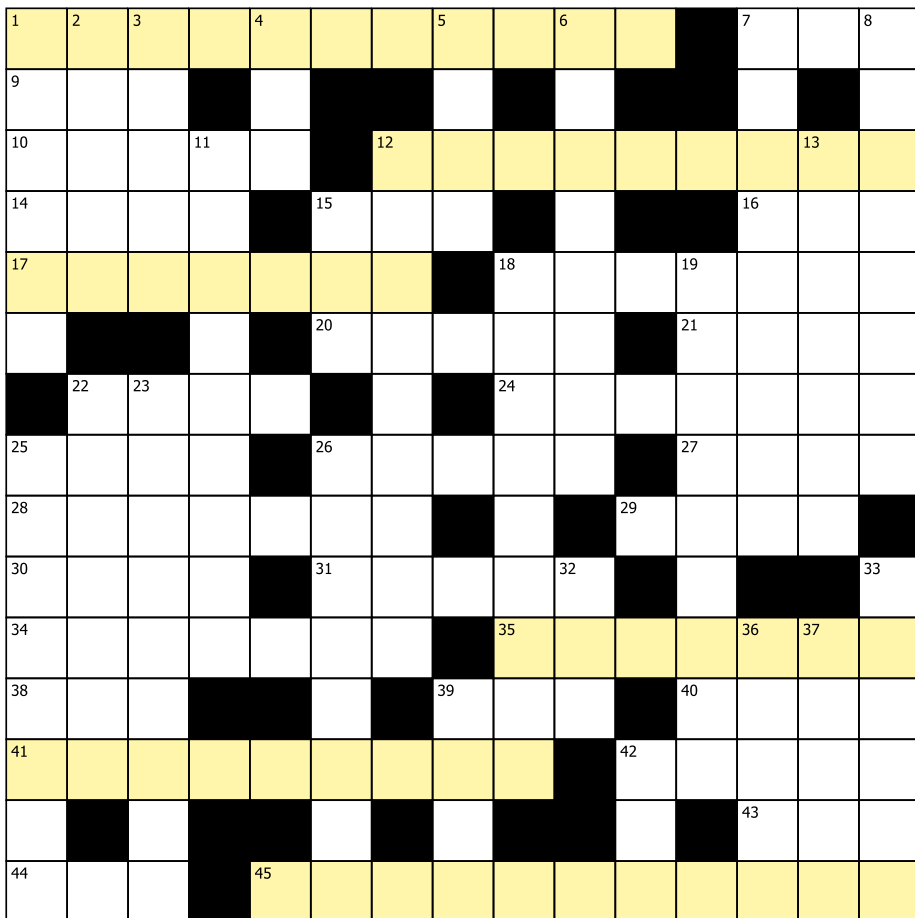


PUZZLES

Puzzles Editor
STANLEY SCOTT

CROSSWORD

Crosscerto (8 pts.)



Across

- 1. Les cornes? [6 5]
- 7. One's kin, informally. [3]
- 9. Manipulate an outcome. [3]
- 10. They show people to their seats. [5]
- 12. What skeletons blow? [9]
- 14. Fake. [4]
- 15. Chants in a song, perhaps. [3]
- 16. Telescope still being built. [3]
- 17. They're sure to produce some bangers! [7]
- 18. First-aid kit item. [7]
- 20. Startle. [5]
- 21. Of more than considerable magnitude. [4]
- 22. Underworld river. [4]
- 24. 2001 *Eurovision Song Contest* winner. [7]
- 25. Kind of fur in heraldry. [4]
- 26. Robbery. [5]
- 27. Undershirt. [4]
- 28. Crème brûlée container, e.g. [7]
- 29. Have a josh. [4]
- 30. Is in debt to. [4]

- 31. Recent online discussion point, specifically when compared to men. [5]
- 34. Forest-dwelling primate. [7]
- 35. Do they sound highly strung? [7]
- 38. Old imperial measurement. [3]
- 39. ___ theory, branch of mathematics. [3]
- 40. Radiate or give out. [4]
- 41. Keen readers? [9]
- 42. In mathematics, the sum of a matrix's diagonal elements. [5]
- 43. Litigious activity. [3]
- 45. It contains other instruments and what they play! [11]

- 6. Most agile. [8]
- 7. Adjusts all the knobs, for example. [4-5]
- 8. Abuse. [8]
- 11. Void. [9]
- 12. Corn starch, e.g. [9]
- 13. Lament's author. [7]
- 15. UK census publishers. [3]
- 18. Keeps static, or jams. [9]
- 19. One throwing dirt over their shoulder, perhaps. [9]
- 22. Coastal construction. [7]
- 23. Leader of a medieval central Asian dynasty leader. [9]
- 25. Shields from harm. [8]
- 26. Latin name for Ireland. [8]
- 32. Park one's bum. [3]
- 33. Coastal Belgian city. [6]
- 36. Stage of insect metamorphosis. [5]
- 37. Less unpleasant. [5]
- 39. Two-___, dance move. [4]
- 42. Piece of tripartite name of classic children's game. [3]

Down

- 1. Truncated cones. [6]
- 2. Keir's rival. [5]
- 3. Surrey town. [5]
- 4. "Is it possible a ___ can lend three thousand ducats?" – Shylock, *The Merchant of Venice*. [3]
- 5. Not theirs. [4]

Cryptic across

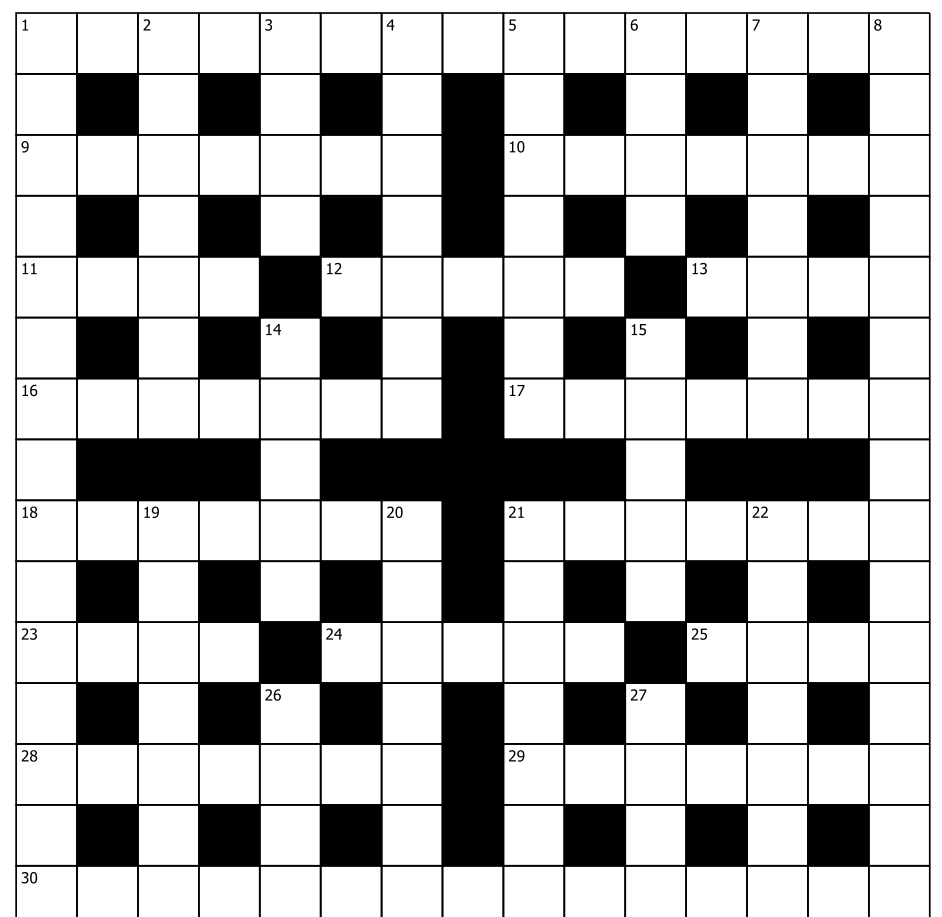
- 1. Flipping the script, so to speak. [15]
- 9. Badly damages the measurements. [7]
- 10. I see men going mad. They're no friends of mine! [7]
- 11. Four came into end-of-life age. [4]
- 12. Yeaned for a cheddar piece. [5]
- 13. Pretty good deal. [4]
- 16. Unusual torture with damaging radiation. [7]
- 17. School of fish's headmaster? [7]
- 18. With which one might come at writing from a different angle? [7]
- 21. Flexible, but quietly secular, the saint hid. [7]
- 23. When rounded, loses two pence and a quarter – loose change. [4]
- 24. Sauces turning into sweet substance. [5]
- 25. Up to now, I was a beast. [4]
- 28. I said, I saw something hideous! [7]
- 29. Dodgy risk in a cockpit starts to be troublesome on a flight. [7]
- 30. Vote quashed general's half-baked devotion to monarch. [3 4 3 5]

Cryptic down

- 1. Rubbish pile in the Arctic is only just the beginning. [3 2 3 7]
- 2. Gun alternative is coming. [7]
- 3. The beginning of technical activities. [4]
- 4. In religious group, a class. [7]
- 5. Wary three points could be on-the-nose? [7]
- 6. With sweat droplets arisen, shocked. [4]
- 7. Back at 1: about time, funnily enough, to make copies. [7]
- 8. Old bird hatched in winter, perhaps? [2 6 7]
- 14. Seed in another seed? [5]
- 15. Stop fretting about the airport! [5]
- 19. I heard a rowdy fool. [7]
- 20. First of all: stop, quit underestimating evil, evangelical zealots, end their forcing! [7]
- 21. King playing a harp on his head. [7]
- 22. The approval of such things. [3 4]
- 26. Very short letter? [4]
- 27. Repair aquariums across this country. [4]

CRYPTIC CROSSWORD

(12 pts.)



SUDOKU

5		3	6			7	8	
			3				6	
		4		8	1		3	
2	5	7					6	
				7				
	8					5	4	7
3			1	5		7		
8				4				
7	4				6	2		5

					1		6	
		9		4				
		3	6		8	5	2	
				8	7	4		9
		1	9		6	3		
8		5	2	3				
	5	6	7		3	8		
				1		6		
3		8						

9			2			1		
		6			8		3	9
	1				4			8
1					3	2	9	
		2				3		
	8	7	9					6
6			4				5	
2	5		6			9		
		1			9			2

				8	9		3	6
8						7	2	
	7		3		2			
					7	2	6	9
	1						4	
4	6	2	8					
			2		6		9	
	9	3						4
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			5	4		7		
		4		8			1	9
	5		1		7	8		
	2	8						
4	3						6	2
						3	8	
		9	8		2		7	
1	4			7		6		
		7		6	5			

				8	9			2
9						6		
7		5	1				3	9
	3	8	4					
4			8	2	1			3
					6	2	4	
3	7				8	5		4
		2						1
8			7	5				

Medium/Embarassing (1 pt. each)

Hard/Laughable (2 pts. each)

Extra hard/Easy (3 pts. each)

GROUPING GRIDS

obadiah	minerva	albus	sclera
philtrum	crux	cepheus	lucius
harry	galatians	malachi	glabella
sirach	octans	draco	gelasin

How-to:

For fans of *Only Connect*! The sixteen clues in each of these puzzles can be placed into four groups of four, each with a connecting feature. To solve the puzzle, write these groups and their connections below! An example can be seen in last week's solutions.

ciren	peg	tow	sisimiut
bridge	tromsø	svalbard	box
nut	murmansk	dump	wor
fire	pickup	lei	headstock

Medium (1 pt./group, 1 pt./connection)

Hard (2 pts./group, 1 pt./connection)

1.					Connections
2.					
3.					
4.					

1.					Connections
2.					
3.					
4.					

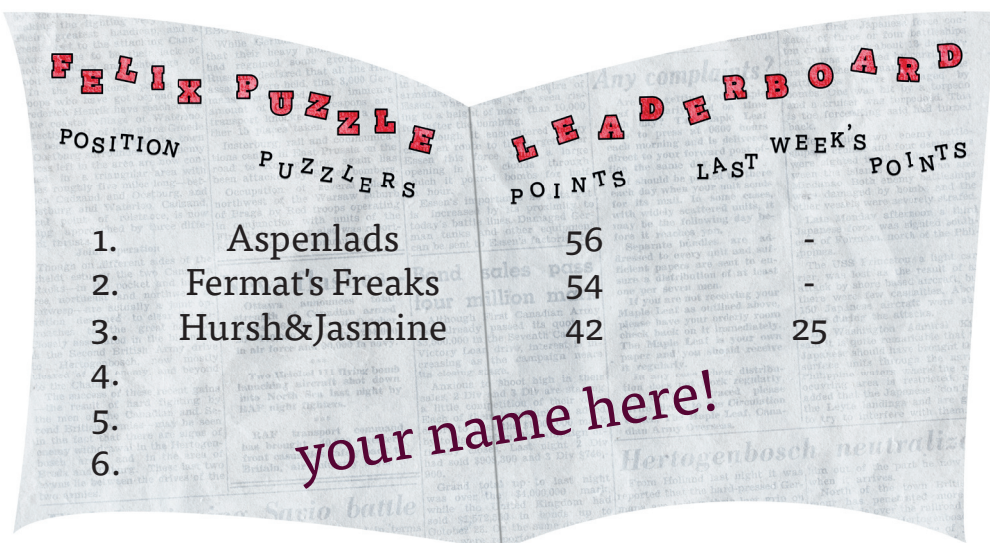
COMIC

Submitted by Sitong Guo



Ranking Rumours

© Sitong Guo @namou_art



Graphic by Selina Ye

Send a picture of your solved puzzles to puzzles.felix@ic.ac.uk by **20th June** to get yourself or your team on the leaderboard! Send them in by **18th June** if you want to see your points for this week in next week's issue, so we have time to include them.

Puzzle Editor's Note

Dearest puzzlers,

With just one more issue to go after this one, the ever bittersweet conclusion of another year at Imperial College is almost upon us. For those of you still doing your exams or with other academic commitments requiring your dedication, I hope they're going smoothly and you're filling the gaps with puzzles! And, to those whose summer has already begun: who doesn't love a crossword in the sun*?

To those of you who are cryptogram fans, please don't despair at its conspicuous absence this week: it will return in a fortnight, alongside a myriad of other puzzles. That issue, being my last, will be a particularly special one. So keep picking up *Felix*, and, until next time, happy crossing, connecting, completing, comic-consuming, calculating, and completing!

- Stanley

*That being the large bright object in the sky which is more prominent around this time of year, not the shameless rag.

MATHS PUZZLES

(3 pts. each)

Submitted by Charlotte Probstel

What's the remainder?

Senior Mathematical Challenge
2000 Q1

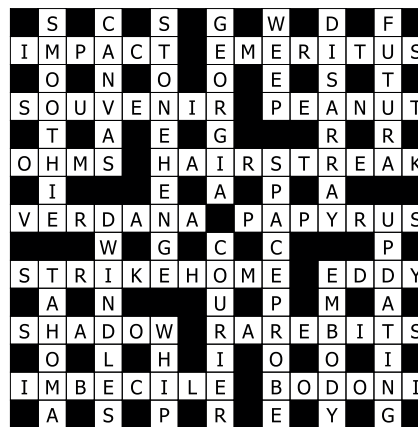
What is the remainder when the number 743589×301647 is divided by 5?

Consecutive integers

Senior Kangaroo 2013 Q12

The sum of 5 consecutive integers is equal to the sum of the next 3 consecutive integers. What is the largest of these 8 numbers?

Last week's solutions



My Type of Puzzle



Cryptic

"If only there would be an invention that bottled up a memory, like scent. And it never faded, and it never got stale. And then, when one wanted it, the bottle could be uncorked, and would be like living the moment all over again."

Quote from: Rebecca (Daphne du Maurier)

Cryptogram (Becky)

Q: Isaac is planning a nine-day holiday. Every day he will go surfing, or water skiing, or he will rest. On any given day he does just one of these three things. He never does different water sports on consecutive days. How many schedules are possible for the holiday?

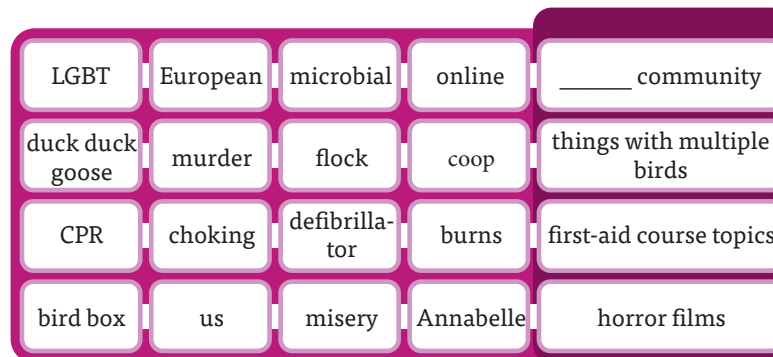
A: 3363

Maths puzzle: Isaac's holiday

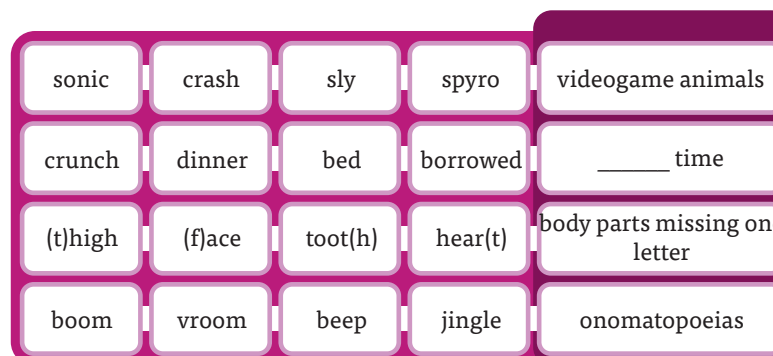
Q: Find a set of ten positive integers such that no six distinct elements of the set have a sum that is divisible by six. Is it possible to find a set of eleven positive integers with the same property?

A: (e.g.) {6, 7, 12, 13, 18, 19, 24, 25, 30, 31}, no

Maths puzzle: Divisibility by 6



Medium grouping grid



Hard grouping grid