



felix

Union President
discusses revised
disciplinary
procedure > Page 24

Marking boycott
begins > Page 3

ISSUE 1824

FRIDAY 5TH MAY 2023

“Save our Security”

► Whistleblowers “betrayed” by HR talk of “bullying regime” across Imperial Security department

Isabella Ward Co-Editor-in-Chief

Whistleblowers from Imperial College Security have alleged bullying and constructive dismissal by senior Security staff and Campus Services management, reinforced by collusion between HR and management.

This comes off the back of a string of cuts to Security officers' pay and annual leave, made fraudulently

without consulting unions or staff. Staff allege that they were “threatened with the sack” if they did not accept these, which has been exacerbated by a lack of impartiality from their Unison representative. Security officers have been under-allocated over 30 hours of annual leave for thirteen years.

Whilst a grievance submitted by Silwood Park staff was ruled in their favour over a year ago, they claim there

has been a “staggering” lack of action and accountability.

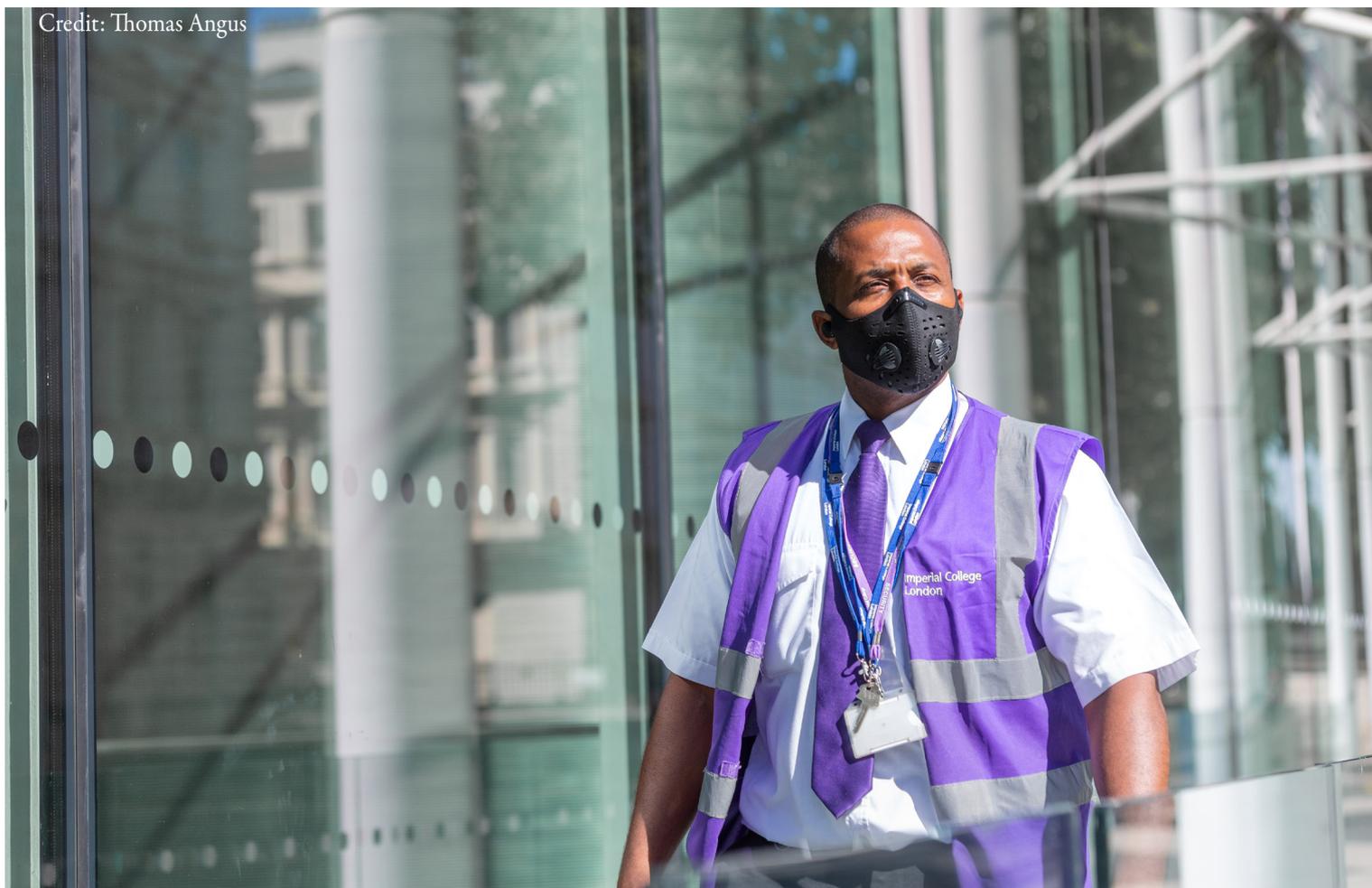
As the number of sub-contracted agency staff increases, *Felix* has revealed a conflict of interest between senior Security management and the contracted agency, Diligence. The ineptitude of some Diligence officers to keep the campuses secure has also come to light.

Supervisors and management failed to

protect some Security staff throughout the pandemic, during which officers “felt abandoned”. Security staff are under heightened stress and the number of officers on stress-related sick leave is apparently increasing.

Read the full investigation on pages 4 - 8.

Credit: Thomas Angus



Marking boycott begins at 145 UK universities

► *UCU renews mandate for six months more of strike action.*

Sam Lovatt News Writer

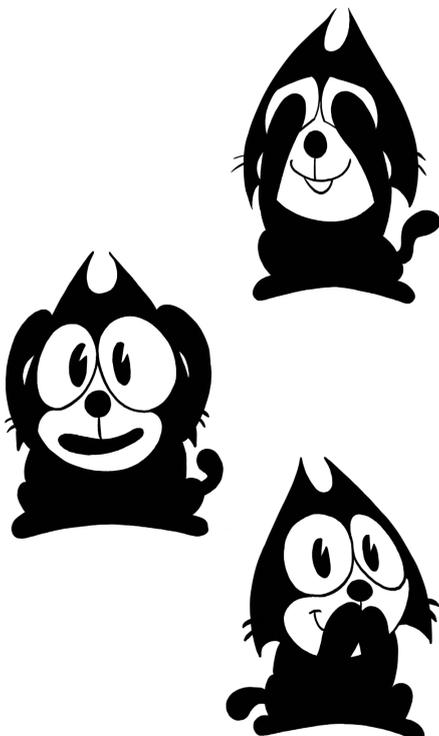
‘Imperial UCU is asking all staff UCU members involved in summative assessment duties to cease undertaking these duties starting from 17th May, and continuing until either (a) the dispute is settled, (b) the branch calls off the boycott, or (c) the end of the mandate is reached in October.’

EDITORIAL

This issue was produced thanks to the work of:

Jamie John	News Editor
Isabella Ward	News Editor Sport and Societies Editor
Angie Lo	Science Editor
Taylor Pomfret	Science Editor
Marie Mori	Environment Editor
Simran Patel	Environment Editor
Elif Civelekoglu	Comment Editor
Isaac Winson	Puzzles Editor
Amy Smith	Catnip Editor
Gilbert Jackson	Arts Editor
Sophie Pointon	Arts Editor
Zanna Buckland	Books Editor
Joe Riordan	Music Editor
Tara Palchadhuri	Music Editor
Jonah Hewett	Film and TV Editor
Mike Buzadji	Film and TV Editor
Charlotte Probstel	Food and Travel Editor Sport and Societies Editor
Natalie Yu	Head Illustrator

And our numerous contributors!



Fair recognition

Felix was two days away from being seven months clean of running a bullying headline. Unfortunately, it seems that despite all the surface commitments, little has changed in a university rocked so recently by a bullying scandal which garnered national press attention. The investigation into the treatment of Security staff here at Imperial provides damning evidence that a bullying culture pervades the College.

The officers' experience with Human Resources (HR) is a worrying indicator that this "bullying culture" transcends the Security team and even their umbrella department, Campus Services. In fact, the obstinance and collusion with management exhibited by members of HR begs the question of just how equipped they are to deal with unfair treatment of employees across the university. By showing how Human Resources have failed to mediate between officers and management, leaving staff feeling "betrayed", this investigation may have also shone a light on how a culture of bullying has persisted at Imperial. Furthermore, the insufficiency of the grievance process points to a failure in the College complaints procedure.

However, the Security officers' plight is heightened by the fact that they lack representation by recognised trade unions. Having been failed by Unison, most of Security is now represented by GMB, whose ability to protect officers' rights is ultimately limited by the union's lack of recognition by the College. On the other hand, recognition alone may not be the

solution; whilst recognised union Unite did attempt to protect the Security officers' rights, they had little success.

One of the issues raised by Security staff is the increase in sub-contracting by the College. They fear that they will eventually be replaced by agency staff. This favouring towards agency staff is a symptom of casualisation; the increasing use of Diligence and the rise in zero-hour contracts (which UCU members aim to "stamp out") are two sides of the same coin. The key difference, however, is that whilst academic staff have been striking in part because of this issue, security don't even have the power to do that. In a final stand, security have created a petition to the Provost, asking that their jobs and overtime cease to be threatened by replacement with agency staff.

Last week, a member of Security personnel informed HR that they were speaking to *Felix*. Shortly afterwards, that same member of staff had an overtime shift he had signed up for cut. Several Security officers had previously informed me that they believed cutting overtime is one of the bullying tactics used by their supervisors and management to keep them in line. Having heard officers' stories, I would not be surprised if this is the case, and I fully condemn such a shameless and blatant attempt to bully Security staff into submission and into silence. *Felix* will be closely monitoring the treatment of Security staff following publication of this article. *Isabella Ward*



Statement of Intent

At Felix, we believe that it is always in the interest of the students to be in the know. Transparency in the workings of the College and the work of your student representatives is key. Therefore we, the Felix Editors, on behalf of the team promise that:

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, Isabella Ward, and Zanna Buckland
Co-Editors-in-Chief 2023**

Felix Office
Beit Quad, Prince Consort Road
London, SW7 2BB

Tel: 020 79548072
Email: felix@ic.ac.uk

felixonline.co.uk
Twitter: @feliximperial
Facebook: @FelixImperial
Insta: @felix_imperial

Printed by Iliffe Media
Winship Road,
Milton, Cambridge
CB24 6PP

Registered Newspaper ISSN 1040-0711

Copyright (c) Felix 2023

Continued from page 1... Marking boycott...

A marking and assessment boycott began at 145 UK universities, including Imperial College London, on 20 April, the University and College Union (UCU) confirmed last week.

UCU members – including lecturers, teaching staff, and technicians – voted by a margin of 56% to reject an offer made by Universities UK (UUK), which represents university employers in the dispute, on 17 April. The offer pertained to the ongoing dispute regarding the pay & working conditions of UCU members.

Regarding the dispute over changes to the USS pension scheme, which has been going in parallel with the pay dispute, UCU members voted by a margin of 85% to accept proposals agreed on by UUK, calling off strike action related to the pensions dispute. However, as action in both disputes included a marking and assessment boycott, and concerns around pay & working conditions remain unresolved, this will make no

difference to the action taken.

The boycott commences just over two weeks after the UCU renewed its mandate for strike action for another six months, when a rebalot of UCU



Striking Imperial College staff on the picket line in February.

members found 85.65% in favour of strike action and 89.92% in favour of action short of strike action, with a turnout of 56.41%.

The rebalot gives the UCU a six

month mandate for strike action and action short of striking, and the union has said that such action will continue until an agreement is reached with the university employers, or until the

mandate runs out.

Strike action has been taking place at some UK universities since 2021.

The dispute over pensions began when a revaluation of the USS pension scheme

found that it was set to be in a deficit of £14.1bn. This led fund managers to levy increased contributions onto workers in return for a 35% reduction in guaranteed retirement income for its average member, stating that the fund was unsustainable if such action was not taken.

The revaluation was conducted near the beginning of the COVID-19 pandemic. The UCU has said that the revaluation was “flawed” because “global markets were crashing” at the time, leading to an erroneous final assessment.

The total impact of the strike action is currently unclear, though renewed action may lead to problems with graduation for final year students whose work may not be marked in time. An email sent to undergraduates in the Department of Life Sciences by the Director of Undergraduate Studies at the end of January stated that the Department “will carefully review [the strikes’] impact on you and take account of any adverse effects and put in place appropriate mitigation”.

Culture Channel displays visual stories from Imperial College

► *May series of images released on the Culture Channel.*

Sam Lovatt News Writer

The Culture Channel showcases visual stories drawn from the College’s collection of art, photography and cultural events.

The channel is updated monthly and the collection, going back to August 2022, can be found by scanning the QR code across. Images of the current series can be seen on many of the screens around the Imperial campuses.

The Culture Channel is brought to you by the Artworks Group, formed in 2020 to help the College reflect its diverse community and address historic biases and inequalities. If you have any comments on the Culture Channel, or would like to suggest an image that could be included in a future collection, please contact the Artworks Group at artworks@imperial.ac.uk.

The Group hopes that taking a break from work and revision to immerse yourself in the culture that Imperial has to offer might give some respite from the daily slog.



Research Associate Dr Samuel Fabian working with a Yellow Brimstone moth, featured in the May series on the Culture Channel.



NEWS

Imperial “cancerous from top

Isabella Ward Co-Editor-in-Chief

In December 2021, Security staff from Silwood Park submitted a grievance against senior members of the Security team, Human Resources (HR), and Campus Services management. They complained of wrongful cuts to their pay and annual leave, and a lack of transparency in these decisions, underlined by deceitful and coercive behaviour by senior members of staff. The independent investigator upheld their complaints.

Over one year on from the ruling, there

has allegedly been little accountability or action.

Having finally given up on holding out for change, Security staff from Silwood Park approached *Felix*. They also felt that issues had escalated to the point of threatening staff and student safety. “There is a lot to tell,” they warned me.

Thus began a string of phone conversations with Security officers from across the South Kensington, White City, and Silwood Park campuses who felt it was time to share their stories. In several instances, both the officer and I would be on the South Kensington

campus – I in the *Felix* office, and he about to start a 14-hour long night shift – but I would never meet them in person: they were afraid senior Security staff would check CCTV or swipe card access to identify them.

This is the culture of fear instilled in Security staff at Imperial. Having faced over a decade of cuts to their benefits, they were already disillusioned with Imperial. But this has been exacerbated by an alleged bullying culture which, as they fought with individuals from Campus Services management and HR became evermore prominent.

As *Felix* spoke to officers, tales of gross corruption unravelled, including alleged bullying by management, betrayal of employee relations by HR, and financial misconduct by senior members of the Security team. As a retired member of Security staff laid bare his experiences, he articulated: “I’ve never quite figured out if the management team are Machiavellian or just inept”.

Felix investigates the myriad of claims put forward by Security officers at the end of their tethers.

Security suffer repeated cuts to overtime pay and annual leave

► *When Security disputed a 9-shift equivalent cut to annual leave, they realised they had been under-allocated leave for 13 years.*

The Security team has suffered multiple cuts to their pay, annual leave, and overtime since 2010.

- Silwood Park security work a rotating eight day pattern, comprising two day shifts (6am-6pm) followed by two night shifts (6pm-6am).
- Security officers receive the equivalent of 39 days of annual leave (25 normal days off + 8 Bank Holidays + 6 College Closures), in alignment with the College allocation for all staff.
- This 39 days is equivalent to 327.6 hours per year for the hours Security work.
- Since 2010, Silwood Park Security officers have only been receiving 292.5 hours of annual

leave.

In 2015, Security officers lost more annual leave and premium payments, and were allegedly “threatened with the sack” if they did not accept.

Altering pay and annual leave modifies the terms and conditions of Security’s employment, which they would have agreed to on signing their contract when joining the team. To do so requires consultation between management, staff and unions. However, since 2010, Security’s management has instead been implementing these changes through issuing documents referred to as ‘Departmental Standing Orders’, thus bypassing consultation. Campus Services management attempted to legitimise the use of standing orders to modify terms of employment by falsely claiming that Security staff had all agreed in writing to the use of these instruments when signing their contract.

In 2018, to account for a reduction in weekly working hours of 37.5 to 37 for other working Level 1 staff, Security received an additional 26 hours of annual leave. In April 2021, Security were informed of further reductions to their annual leave:

- The additional 26 hours of leave was removed.
- Their annual leave was incorrectly calculated by HR and reduced to

“

[WE WERE] ROBBED BLIND LEFT, RIGHT, AND CENTRE.

286.65 hours.

- Overtime pay for officers working on Christmas Day was cut.

On querying the removal of the 26 hours, management informed Security that it had been a “one-off goodwill gesture”, and that they would not be receiving it on an annual basis, contradictory to what management initially confirmed.

From 2015, booking a day shift off only cost Security staff 7.5 hours. In 2021, terms were again changed so that Security staff needed 12 hours to book off a day shift. This extra 4.5 hours per shift cost them 9 full shifts worth of annual leave. “Over the years they’ve just been cutting, cutting,” a member of Security staff told *Felix*.

Security also did not understand why their leave had been further reduced. Therefore, they did the calculations themselves and realised that HR had

Contract actual wording

Acceptance of Contract of Employment

I have read and accept the letter and contract offering me the appointment, the terms and conditions of service and I wish to accept this appointment.

I confirm that, during my employment, I will act in accordance with: existing College policies and regulations; any changes that may be made to existing policies or regulations; any new policies or regulations as they are introduced.

I understand that this contract alone constitutes my contract of employment with the College subject only to any changes notified to me by the HR Division.

Imperial College London: Security Standing Orders

Date of Issue: November 2017

STANDING ORDERS

All security and support services staff, when they accepted their contract of employment with Imperial College London, signed the following agreement:

"I confirm that during my employment I will act in accordance with: existing College policies, regulations and Departmental Standing Orders and any new policies, regulations or updates to existing Standing Orders as they are introduced.

The following document outlines out the Standing Orders for Imperial College London Security staff.

Above: a Silwood Park Security officer’s contract of employment, signed on joining the team in 2010. Below: a document justifying the use of Standing Orders.

to bottom”, say Security staff

made an error, and in the process discovered that for over a decade they

“

WE ARE NOT GETTING FAIR HEARINGS

had been receiving significantly less than they were entitled to. “[HR] robbed us blind left, right, and centre,” one officer exclaimed. When they raised this with HR and attempted correct it, a senior member of HR repeatedly refuted their claims and persistently attempted to justify her calculations. “I believe her actions are a disgrace and should be openly explained,” another says.

Once again, there had been no consultation process, despite changes to the terms and conditions of employment. When Security officers asked HR to discuss the issues, the meeting was refused and management responded: ‘It was made perfectly clear that the decision which was HR-led and agreed to by the Unions, has already been made and is in accordance with the Law concerning Annual Leave. The

decision is final.’ Since Unite and Unison had not consulted any of their members, Security wrote to those unions. Whilst Unite allegedly attempted to meet with management, this was ineffective. On the other hand, the Unison representative for the College replied “to be honest [I] think that security officers have been lucky that the arrangement lasted as long as it did. It certainly isn’t fair on the rest of the college that we don’t get the same privilege.” Security officers feel they were failed by their Unison representative especially, and since then many of them have opted to join the GMB union instead.

This is something Security officers believe HR use to their advantage: in 2022 HR planned to hold a joint review with Unison only (excluding Unite) on the working week and Terms and Conditions for Security officers. “We believe this was a deliberate effort to make changes with the Union rep most sympathetic to her wishes,” an officer says. Furthermore, despite GMB now representing the majority of Security staff, the College has not recognised them, and so they are not obliged to invite them to consultations. “We are not getting fair hearings,” says another.

Staff speak of “bullying regime” of senior Security team

► *Security officers allege “bullying culture” by supervisors is exacerbated by collusion with HR*

Security officers said that over the years, some of their colleagues have been mistreated, and even asked to leave, because they have upset someone, overhead something, or “don’t fit in”. A Silwood Park officer told *Felix* “I believe bullying and intimidation has been rife within our department for a long time and has been used to keep us in line and to stop us questioning management’s decisions.”

He told *Felix* how he was bullied by a member of management for years who would call him “knob jockey” behind

his back, supposedly in an attempt to “alienate people”, and how his complaints were always dismissed. The individual has since been made redundant, yet even now, the concerned officer feels the “bullying regime” pervades. Having recently had surgery for a heart condition, he cites how a week before surgery, he asked to be excused from his patrols as his heart was only functioning at 20%. He was refused, whilst a few weeks later a colleague with a sprained ankle was relieved of their patrols. Having been a committed member of

Susan Parker

Unite Imperial College Branch Chair

“

This is the first time Unite officers have heard anything of the private security company issues.

Unite as a trades-union has spent many hours over the last couple of years, supporting our security staff members and working on their behalf in discussions with management and HR about these changes. We should point out that management/HR usually slaps a ‘confidentially’ clause on these proceedings, which is greatly frustrating as all the time and effort that is spent is not visible to our membership.

From the point of the trades-unions we must be clear that there has and is a strong tendency for management to report that the ‘Unions’ are ‘in agreement’ and generate statements to that effect when no such thing has happened!

The trades-unions do NOT have any power of veto. We cannot stop management and HR from putting through policy, procedures, and any other documents such as the security standing orders. We DO NOT ‘agree’ to any of these things, even for those that we get sight of, and even on occasion effect some changes above and beyond comments on grammar and pronoun usage.

Unite, as well as the other trades-unions, have argued against the compulsory signing requirement of the security standing orders. We support the assentation that they can be seen as changes to the employment contract, and this is very disturbing. We note that the main body of staff at Imperial are not required to sign such documents, so believe this practise is highly discriminatory.

The issues around security staff are significant and their annual leave equivalent is atrocious. By using an hours-equivalent shift-based model they are in our opinion being very poorly treated by Imperial management (I am being polite here), who seem intent on cost optimisations rather than best-practise service provision to our community.

It is my personal opinion, which I have expressed many times in meetings with HR and security, that our security staff are the most important group of people at Imperial. Their job is to keep us safe on campus whilst the rest of us go about our studies and other activities. Plus, they are first responders in any incident or medical emergency, which we know from our First-Aid training is especially critical if someone needs an AED defibrillator.

If we are NOT safe on campus, then everything else is moot. We need more security staff, working proper hours, with sufficient numbers that they have resilience in their provision and attendance. And they need proper physical number of days leave, as with all the other staff who work ‘normal’ hours.

NEWS

College Security for over a decade, he is now leaving Imperial for another security job elsewhere: “As far as I am concerned, I have been constructively dismissed. Because I just can’t take it any more,” he said.

Several other members of the Security team feel they have been “singled out” as part of management’s attempt to “divide and conquer”. An officer notes that, since he was involved in union meetings of 2015, he feels he has been “discriminated against compared to other staff”. “I would never recommend anyone working for Imperial College;” another said, “it’s a bullying culture.”

Officers also feel that their supervisors either send staff to new locations, add new duties, or cut overtime shifts as bullying tactics. The above officer’s shift representative was moved from Silwood Park to a London Campus. He resigned

shortly after, “under duress (from management and his supervisors)”, the officer suspects.

The Security officers’ situation is made all the more desperate by the behaviour of HR, who they feel are “in cahoots” with management. One officer said that in situations where he and his colleagues had hoped HR would mediate between Security officers and management “they instead seemed spiteful!”

Allegedly, a member of Security staff was asked to leave shortly after overhearing the then-head of security boasting about a pay bonus he had received from the College due to his success in drastically reducing spending on Security. He did not appeal because he felt that collusion between Security management and HR would make it a futile attempt.

Just last week, an officer from Silwood

Park explained to HR his grievances with management, and why he was

“ IF YOU CAN’T GO TO HR, WHERE CAN YOU GO?”

speaking to Felix. The following day, this officer had an overtime shift he had signed up for cut; he says this is only the second time he has had overtime pulled in 13 years. He suspects this is retaliation for what he said about management and for speaking with *Felix*. Indeed, HR informed management some time ago of Security’s action to talk to *Felix*, in what the officer calls a “betrayal of employee relations”.

“HR and Security management are

just looking after each other”, the officer says, “and if you can’t go to HR, where can you go?”

Imperial College London responded: “Everyone deserves to feel safe at Imperial. Bullying and harassment is unacceptable and must not be tolerated anywhere within our community. As well as our existing Harassment, Bullying and Victimisation Policy, we recently developed a suite of core College Values and Behaviours to embed a positive and inclusive culture at all levels. We have a team of Harassment Support Contacts who can provide confidential support to staff who feeling bullied, harassed, or intimidated at work, and our Report and Support Tool allows staff to disclose unwelcoming behaviours - including bullying.”

Security staff feel failed by the College’s complaints procedure

► *Security staff cite disappointment with amount of action and accountability since going through grievance process last year.*

Feeling they had been “betrayed” by both HR and Unison, who were “as bad as our bosses”, the eight Security officers at Silwood Park submitted a grievance against Imperial College management and HR in November 2021. In it, they complained chiefly about the lack of initial consultation in changes to annual leave and the subsequent reluctance to address this. They also



WE NOW HAD NOTHING TO LOSE

requested that their annual leave was rectified, and that HR and management conceded that there had wrongfully been no consultation and resolved for this to not happen again in the future.

However “the changes made to our annual leave were not the sole reason that we felt that it was time to make a stand, it was more that it was the final straw;” an officer said. “After years of watching our contracts being eroded, we felt there was nothing left to take from us and that we now had nothing to lose”.

Within a week of submitting the grievance, an extra, unexplained full

patrol of the campus was added to their shift duties. Security officers believe this to be a direct consequence of having initiated the grievance. The patrol was to commence on the 1st December 2021: the same day that security had their grievance meeting with an independent investigator.

As part of the investigation, on 14th January 2022, two Security managers were interviewed and assumedly asked about this extra patrol. Three days later, a document detailing shift procedures, including the extra patrol, was emailed to Security staff. The document was backdated to 1st April 2021 – a few weeks before Security were told of changes to their annual leave – but Security staff claim to have never seen it before. Two months later the document appeared in the Silwood Park Security office; a supervisor was caught on CCTV carrying the “fraudulent” document into the office, on top of a microwave.

“Whatever we tell them, they said “how can we cover this up and make it go away?”. They are not worried about any accountability whatsoever or admitting to anything” an officer despaired.

Nevertheless, the officers were relieved that in March 2022 the independent investigator ruled upholding all the complaints made in the Grievance and recommending that either the error in

annual leave entitlement be rectified or that a consultation be launched.

In May 2022, a consultation was held with Silwood Park Security over Teams, which resulted in what / calls “a disgraceful attempt by management and a senior member of HR to try and justify the amount of annual leave that they had told us we would be receiving.” “HR made us feel that we were liars and we were thick,” an officer says. Therefore, Security officers wrote to the head of HR, requesting that the member be removed from the consultation due to a clear lack of objectivity. This was refused but she was not involved again.

“It felt like more of a charade,” says an officer, pointing out that the consultation was only for Silwood Park employees and not South Kensington employees, despite their Terms and Conditions having been wrongfully changed as well. Management and HR stated that they had already implemented the changes for South Kensington staff, with whom they had no intention of consulting as they had “accepted” the changes.

The consultation process concluded with a correction of Security officers’ basic hours, but lacked any apology for the mistakes or the attempts to try and force officers into accepting them. Officers were also told they would not be getting neither the 26 hours back in

leave nor overtime payment, and would not be receiving any compensation for the extra hours that had been missed off their allocation for over a decade.

One year on from the ruling, little has changed, and Security officers are apparently no closer to obtaining an apology from the College: “There is no intent to look into the way HR behaved;” an officer says, “were we to behave in such a poor and questionable manner, we have no doubts that we would have been shown the door. The different standard of acceptable behaviour between levels is staggering.”

In fact, despite their satisfaction with the ruling, the Silwood Park team feel utterly failed by the grievance process:

“One of the many disappointing aspects of the grievance process experience was that the recommendations made in [the grievance] report were handed straight back to the people that the grievance was directed at, namely [HR] and security management. Having witnessed their attempts to cover up their other indiscretions, the lack of changes made was sadly predictable.”

They voiced their frustrations in an email to Professor Ian Walmsley, highlighting the ineffectuality of the grievance process. The email was simply forwarded to both the HR department and head of Security, both of whom

the officers had raised the grievance against. The response from the Provost himself, after they re-sent the email, was “underwhelming and disappointing”.

The College responded: “The grievance in question was investigated by an impartial colleague outside of HR and all their recommendations accepted

and were implemented. This included an apology issued to security staff regarding the communication of the change in calculation of annual leave entitlement,

and a formal consultation on the changes which ran from 23 May to 30 June 2022. The review of the Standing Orders is still underway.”

Due Diligence

► *Security staff feel heightened job threat from agency Diligence, claiming sub-contracted officers are not up to the job.*

Security agency Diligence Security Solutions Ltd. has been sub-contracted since 2015. At the time, an affiliate company of Diligence Security, Diligence Technical Solutions Ltd, was partly owned by a senior member of the Security team’s spouse. The two companies have shared two of the same directors: Dr Michael Patrick Bateman and Mr Adam William Frame.

In 2018, Diligence Security filed for insolvency and subsequently agreed to Company Voluntary Arrangements (CVA), allowing them to continue trading as long as they made monthly payments of £3000 to creditors for five years. That same year, Imperial College allegedly signed a three-year

“
**YOU’RE
BASICALLY ON
YOUR OWN**

contract with Diligence Security.

The concerned spouse resigned from Diligence Technical that July and was replaced by Frame. However, the company was struck off a year later due to failing to file accounts. Frame later became Director of Diligence Security in August 2020.

The supervisor for Diligence Security’s CVA notes that, whilst displaying resilience during the pandemic, Diligence Security struggled to retain existing work and win or renew contracts due to being under CVA. Indeed, in May 2020 the company paid a total dividend of £28,321.90 to

creditors. Yet little over a year later, in July 2021, they paid £134,021.32: nearly five times as much. The supervisor also notes that Imperial College London provided its largest existing contract.

In June 2021 Diligence Security changed the conditions of their CVA and terminated it with a final one-off payment of £99,000, so they would succeed in re-tendering the Imperial contract. Imperial have allegedly since extended their contract with Diligence to five years.

Imperial College London told *Felix* that the procurement of this supplier was in line with College Procurement Regulations and went through the appropriate competitive tender and contract award processes at Imperial.

A conflict of interest amongst Security management is apparently not unprecedented: allegedly, the directors of previously contracted training companies Andy McCormack and Blue Mountain were friends with a senior member of Security staff. “It’s not right,” says an officer, “and that management are aware makes me think that they are just ignoring it.”

The number of Diligence Security staff used has been increasing: one night recently only 15 out of 31 of the Security officers on duty were in-house staff. Some areas are now exclusively manned by Diligence, including St Mary’s Hospital, the Heart and Lung Institute, and Beit Quad. In-house staff were initially told that sub-contracting was introduced as a cost-saving measure to reduce operating costs, which at the time were £500,000 over budget. However, since in-house security are no longer paid heightened rates for overtime, the College is likely saving little money by

fielding Diligence personnel instead of

“
**(MANAGEMENT)
DON’T CARE
ABOUT STAFF
AND STUDENT
SECURITY**

Security staff.

Furthermore, in-house security staff are concerned that the lack of experience and knowledge of the area Diligence Security staff have is “putting staff and students at risk”. Diligence has allegedly already been banned from manning the Burlington Daines Medical Research Facility after failing to respond to a fire alarm.

Hence, despite increased dependence on Diligence Security, key responsibilities such as dealing with fire alarms are left to Imperial staff. A member of security at White City, where they work shifts in pairs, tells *Felix* “You’re basically on your own”.

In June 2021, a warden phoned the police after finding a large number of intruders in Xenia Hall shortly after midnight due to the door of the building apparently having been left open. Despite the noise being made, Security had marked in the log book ‘nothing to report’ at that time. Whilst the log book declared that they had been present at the time of this instance, there was no sight of them. When the log book was checked by the warden around 1am, it had also already been signed for a security patrol set to occur at 4am, again claiming ‘nothing to report’.

Whilst the Diligence employee responsible has been dismissed, in-house staff are concerned about the calibre of personnel working alongside them, as an officer claims “[management] don’t care about the quality of security officers they bring into this university. They don’t care about staff and student security.”

An officer from White City explains: “[Diligence] standard is not the same as ours, but to our management it counts as the numbers. They only see the numbers. As long as they have the numbers, it seems they are happy.” Indeed, management recently justified the increasing use of Diligence personnel as ‘not a cost-saving [decision], but simply a way to ensure our staffing levels are well-resourced where they are most needed.’ A member of the Silwood Park team disputes this: “why would the department want unqualified Diligence ‘colleagues’ filling the roles which could be far more effectively manned by Imperial staff?”

Imperial College’s Security numbers have dwindled. However, Security officers believe this to be the result of a deliberate attempt to “run our numbers down” by not hiring despite the natural decline in numbers due to retirement, etc. Although the College do advertise the Security officer role, they do so at a salary over £13,000 below an officer’s actual pay, which, including an allowance due to the anti-social and flexible hours they work, is approximately £38,000. Furthermore, some of the Diligence staff who are more experienced and capable have reportedly been banned from applying to work full-time at Imperial.

There has been an increase in stress-related sickness and time off work, and the unpleasant prospect of being on shift with unequipped Diligence personnel has disinclined people on sick leave to come back to work. A retired officer tells me that within three months of being moved to White City, he was put on shift with a member of Diligence staff. Eventually, the stress of the forced relocation and work meant he took three months off with stress until he was “given an ultimatum: ‘come back to work or you’re sacked.’”

Felix is in the process of investigating this story. If you have information you would like to share, we welcome you to email us at felix@imperial.ac.uk

Location

South Kensington Campus - On site only

Position type

Full time, permanent

Salary

£24,742 plus benefits

Department: Campus Services | Category: Professional / Support Services / Security

A job advertisement for a Security officer role with an actual salary of around £39,000.

NEWS

Stress-related sickness on the rise

► *Bullying culture and increased workload, due to lower staff numbers and untrained agency staff, has taken a toll on morale.*

The increasing use of “unqualified” personnel has apparently upped the pressure on already thinly-stretched staff. The number of guards on a shift has been axed over the years: whilst in 2010 the South Kensington campus was manned by 13-14 Security guards,



THEY DON'T THINK HOW TO KEEP STAFF SAFE... THEY PUT US AT RISK

now there are only 5-6. Security understands that, as the College have sold off parts of the campuses over the years, redundancies are inevitable. However, they say “the method by which the unfortunate members of staff were selected was changed on numerous occasions and caused stress and anxiety to all concerned”. Allegedly, in 2014 when the number of staff on shift at Silwood Park was reduced, the College used the number of sick days employees had taken to determine who they would make redundant. Two employees took voluntary redundancy as they had both had extended sick leave shortly before.

When numbers were further reduced in 2021, both people chosen to be made redundant had extended time off sick prior to this with stress related illnesses.

The lack of transparency, as Diligence personnel are increasingly “creeping into the department”, has taken a toll on workers’ mental health. “We’ve been working under duress, strain, not wanting to come to work, depression, no motivation,” an officer says. Another, who already suffers with anxiety, tells me how he has had to increase his medication recently partly due to the stress induced by his employers and workplace.

Security staff even feel that Diligence is just another tool in management’s arsenal to bully Security and force acceptance of conditions, under the threat of cutting overtime (as happened to a member of the Silwood Park team last week) or even replacement. “the (senior Security team) are narcissists, and they rule with fear,” a member of Security told *Felix*.

There is a clear disregard for the wellbeing of their Security staff, perhaps exemplified best throughout the pandemic, during which they “felt abandoned,” a Silwood Park officer says. Security asked for screens to be put up in their office to protect them, which management allegedly refused.

Disillusioned with management, and failed by HR and Unison, Security staff are running out of places to turn. Whilst representatives from GMB are welcome to accompany Security staff at consultations, unless they are recognised by the College, they have little power to stand up for their members’ rights. At the very least, Security staff are owed remuneration for their miscalculated annual leave from the last thirteen years, but they don’t even dare to hope for that.

All the ruling of the grievance did was offer false hope; over a year on, no significant changes have been made. In fact, Security staff allege that they have suffered even more because of the grievance. They now fear retaliation from management for telling their story to *Felix*. “I’ve had some colleagues saying you’re going to lose us all our

jobs,” an officer said, “but if we don’t speak up, management are just going to keep doing what they’re doing.”

In a university rocked recently by a bullying scandal, Security staff are dismayed that their plight has been largely ignored: “when the (former) CFO and President got accused of bullying a few individuals, an independent investigator was brought in,” an officer points out, “management has been bullying us for years and nothing has been done.”

Furthermore, they now doubt the Provost’s commitment to stamping out bullying, following his “disappointing” display of indifference to their situation.

“I’m disillusioned with Imperial. It’s a bullying culture and it’s just cancerous from top to bottom,” an officer says.

Meanwhile, Diligence personnel are eating away at Security’s overtime, whilst

When the UK government announced a change in policy such that people in close contact with people who had tested positive for the virus did not have to self-isolate if they had been double vaccinated, management illegally attempted to obtain staff’s vaccination data without giving reason or outlining data use. “It was all very underhand”, a member of staff says. When this was queried, there was allegedly bullying. The data was reportedly destroyed soon after.

Moreover, the use of Diligence Security personnel in Silwood Park increased from December 2020, and in preference to offering staff overtime. Officers protested to having to work

in close proximity with individuals travelling from London during the peak of the pandemic and before anyone had been vaccinated, so the Head of Security confirmed on the 18th December that Diligence would not be used. Contrarily, Diligence personnel were used on the 19th, 20th and 21st. “(Management are) dismissive, condescending, and feeding lies,” says a Silwood Park officer.

At the time, Security guards had one of the highest death rates from Coronavirus. “They didn’t think how to keep us safe,” another says, “they put staff at risk”. Security staff received a one-off £300 payment to recognise their commitment despite the heightened risk throughout the pandemic.



Credit: Thomas Angus

A South Kensington security guard in August 2020.

management allegedly wield the threat of being replaced by agency staff to enable their coercive behaviour, arguably putting staff and students at risk.

All this makes for a grim outlook for Security at Imperial. “It’s going to be bad

“ I’M DISILLUSIONED WITH IMPERIAL... IT’S CANCEROUS TOP TO BOTTOM

for us but bad for the college more;” on officer comments on the exodus of in-house Security officers, “all the training

and experience they had, knowledge of people, departments, is going to be lost.”

The toll on staff is spiraling: lower staff numbers due to higher counts of stress-related sickness heighten workload, already exacerbated by agency staff. Security staff seem tired. A member of the team warns me: “the morale is so low and there’s no attempt to re-establish it all. It’s frustrating and people have had enough. Management are expecting people to give their all but just keep chipping away at them.”

Felix welcomes you to share any information or opinion you have on this story by emailing us at felix@imperial.ac.uk

FRIDAY 5TH MAY 2023

SCIENCE

SCIENCE

Imperial makes instrumental contribution to Jupiter mission

► *A magnetometer created by Imperial physicists is now on board the historic JUICE spacecraft on a mission to study Jupiter's moons.*

Taylor Pomfret Science Editor

The European Space Agency (ESA) successfully launched its flagship mission, the Jupiter Icy Moons Explorer (JUICE), on the 14th of April from Guiana Space Centre in the French Guiana, South America. The JUICE spacecraft was launched by the Ariane 5 ECA rocket, the same rocket model that launched the James Webb Space Telescope on Christmas Day, 2021.

A magnetometer designed by Imperial physicists, known as J-MAG, has the honour of being one of the instruments onboard the JUICE mission to study Jupiter's moons. J-MAG will study the moon Ganymede, exploring the liquid oceans beneath its icy surfaces and shedding new light on Ganymede's potential as a habitable environment.

The J-MAG project was led by Principal Investigator Michelle Dougherty, Head of Department of Physics at Imperial. The magnetometer was created to study the magnetic fields of Ganymede, some of which are in its oceans. The oceans on Ganymede are thought to be salty, and movement in the charges of this salt gives rise to currents, which in turn lead to generation of small magnetic fields in accordance with the Ampere-Maxwell Law. However, these fields are also embedded within the larger, intrinsic magnetic fields of Ganymede, Jupiter, and the Sun.

J-MAG will thus study the interaction of Ganymede's and Jupiter's magnetic fields in order to detangle them from the smaller fields of the oceans, and understand their depth and extent.

This can then help inform whether Jupiter might have the conditions to support life.

J-MAG has been designed to be incredibly precise, thanks to the work of the Department of Physics' J-MAG instrumentation team, led by instrument manager Patrick Brown. This level of precision is especially important considering the complex environment of Ganymede's magnetic fields. Designing this instrument was tricky: building the instrument during the COVID-19 pandemic whilst still meeting ESA's project deadlines must've been a particular headache! During the height of the pandemic, in 2020, the Imperial team actually took home parts of magnetometer to tweak on their kitchen tables, emphasising further the feat of the design and engineering of J-MAG.

In an interview with the *Evening Standard*, Professor Dougherty said: "You need a lot of patience to be involved in outer-planetary spacecraft missions. I'm going to be 68 when JUICE gets to Jupiter. It's young people who are going to be working on the data that gets sent back."

This mission serves as an excellent reminder for undergraduates across all disciplines of some of the exciting research they could potentially pursue in the future. The UK Space Agency invested around £9 million in the mission to explore Jupiter and its moons. The UK's space sector is continuing to thrive and is committed to pushing the boundaries of science, innovation, and technology that will support a vast array of jobs for the future.

More on the JUICE spacecraft

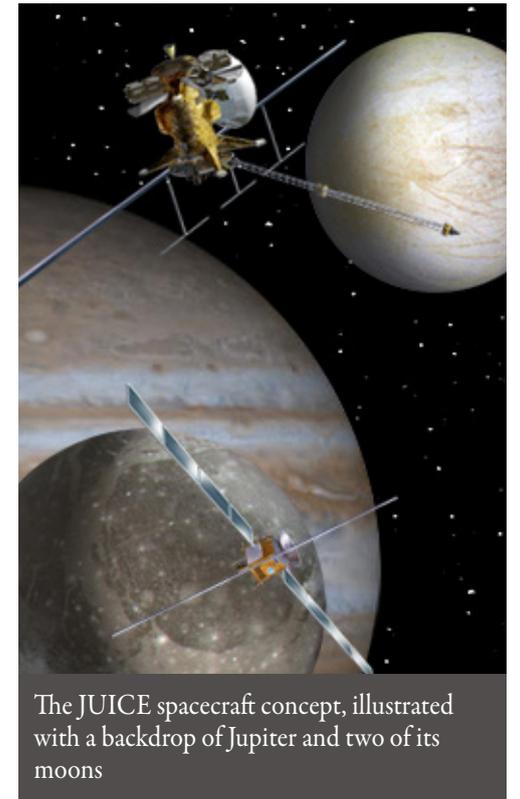
Inspired by NASA's Cassini-Huygens mission probing the study of Saturn's moons and manufactured by Airbus Defence and Space, JUICE will study three of Jupiter's Galilean moons: Ganymede, Callisto, and Europa. The moons are thought to contain bodies of liquid water beneath their icy surfaces, making them potentially habitable environments.

Onboard the JUICE spacecraft are 11 scientific instruments, carefully selected following a competition by the ESA. These instruments are compartmentalised into four types: remote-sensing, geophysical, experimental, and in-situ instruments. The latter is a unique class of instrumentation: the term itself refers to an instrument that makes measurements of a particle and field environment that a satellite is embedded in. In-situ instrumentation is crucial to the space sciences. Although remote, ex-situ observations can provide lots of essential information for planetary exploration, in-situ instruments can provide more detail for a unique, up-close inspection of the compelling features of the Jovian system.

Imperial's J-MAG magnetometer is among only three in-situ instruments onboard the spacecraft. The scalar magnetometer has a nominal measurement range of 0-50,000nT, with a precision of 3pT. This level of precision is especially important considering the complex environment of Ganymede's magnetic fields. The smaller ocean-generated fields – which are predicted to be nearly two million times smaller than Earth's magnetic field ($\sim 50\mu\text{T}$) – are embedded in larger fields from the interior of Ganymede, from its primary, Jupiter, and from the Sun itself. All these fields

Edited by: ANGIE LO
TAYLOR POMFRET

Credit: Wikimedia Commons



The JUICE spacecraft concept, illustrated with a backdrop of Jupiter and two of its moons

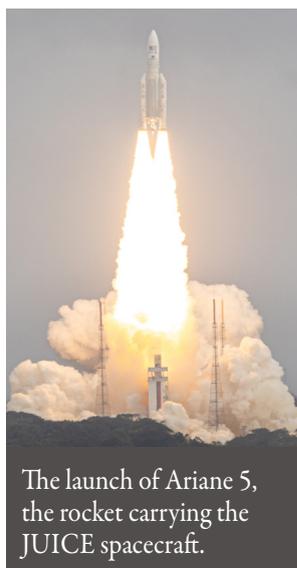
need to be untangled, which is where J-MAG comes in.

The main scientific objectives for Ganymede, and to a lesser extent for Europa and Callisto, are: characterisation of ocean layers and detection of putative subsurface water reservoirs, topographical, geological and compositional mapping of the surface, study of the physical properties of the icy crusts, characterisation of internal mass distribution dynamics and evolution of the interiors, investigation of Ganymede's tenuous atmosphere, and lastly (and arguably most importantly!) study of Ganymede's intrinsic magnetic field and its interactions with the Jovian atmosphere.

Ganymede's ocean-generated field is unlike any other moon or rocky planet in the Solar System, besides Earth, making it a prime target for the ESA. JUICE will arrive at the Jovian system in July 2031. It will first perform a flyby of Ganymede in preparation Jupiter orbital insertion about 7.5 hours later. JUICE will then fly by Europa and Callisto in July 2032, orbit Ganymede in 2034, and formally conclude its mission by impacting Ganymede at the end of 2035.

Orbiting Ganymede will form the core of the study for the JUICE orbiter; with its complementary investigations of Europa and Callisto forming a complete, comparative picture of these Galilean moons.

Credit: Wikimedia Commons



The launch of Ariane 5, the rocket carrying the JUICE spacecraft.

SCIENCE

The peculiar case of identical twins in forensic genetics

► *Identical twins have always posed a challenge in forensics. Now, researchers have found a new way to differentiate between twins in crime scenes.*

Natasha Ali Science Writer

Picture the following scenario.

A crime is committed. DNA evidence is recovered from the scene. It is analysed, processed, and run through databases until a match is found. Usually, a conviction would be all but certain from this point on, but this particular crime has one unfortunate catch.

The suspect in question has an identical twin, genetically indistinguishable. Suddenly, a conviction cannot be made. The case remains in limbo. And the suspect is protected by the simple fact that they belong

to the 0.3% of people whose fertilised egg separated early in development to create two embryos.

Monozygotic twins have presented a curious challenge for forensic scientists over the years. They are the sole exception to DNA being unique to an individual, and the standard tests used for human identification are useless against them. Paternity, rape, and even murder investigations have been stalled or left unresolved because of this rare biological phenomenon. That is, until 2014, when the international life sciences company Eurofins developed an ultra-deep sequencing method that could root out a minuscule number of nucleotide differences between identical twins. These disparities were small, seemingly insignificant mutations that probably occurred early in development after fertilised egg separation.

While this discovery was pivotal, it was also limited. Ultra-deep sequencing requires the entire genome of both twins to be processed many times for accurate results. This makes it both expensive and



Credit: Natasha Ali

time-consuming to perform. The paper presenting the discovery was fittingly titled 'Finding the Needle in the Haystack' – it is simply an inefficient method that can and should be improved upon. While there have been efforts to look for other variations between twins, such as differences in RNA expression and epigenetics (environmental DNA modifications affecting gene expression without changing the DNA sequence), these come with their own restrictions. RNA can be unstable and easily degradable, and epigenetic modifications like methylation are vulnerable to environmental factors that can affect results. All this is to say, those with an identical twin are still in a much better position to 'get away with murder' than the rest of us.

However, in March 2023, a new paper published in *Forensic Science International* offered a solution to this predicament, utilising a collection of genes already being used in precision medicine: the immune repertoire.

The immune repertoire is a feature of the adaptive immune system, a pro-

cess that allows the immune system to form 'memories' through retaining antigen-binding receptors from previous pathogen encounters. These receptors are coded for by a subset of genes that recombine with each other to create unique sets of antigen-binding receptors. The immune repertoire is simply the term used to describe this collection of genetic rearrangements in a person's adaptive immune system at any given time, and it can be modified by the pathogens and foreign bodies a person is exposed to throughout their lifetime.

While twins may grow up in similar environments, it is highly unlikely they will be exposed to the exact same pathogens at the exact same time, especially in grown adult twins who presumably move to separate homes. Because of this, their immune repertoires will be solely their own. And by extracting peripheral blood and sequencing various adaptive immune system-related genes, scientists have now been able to detect substantial differences between monozygotic twins' T-cell receptor genes.

In all the twin pairs tested, a difference of 34 base pairs in nucleic acid length distribution frequency was found. While other genes showed little to no difference between twins, this could be because only four pairs of twins were tested, all of Han Chinese ethnicity. Scientists hope that by collecting more samples and exploring other ethnic groups, they will be able to uncover more differences between monozygotic twins that can be easily detected.

If this method proves to be successful and reproducible, it will be cheaper

and more efficient to implement than its ultra-deep sequencing counterpart, since only the adaptive immune system genes will need to be studied instead of the whole genome. It will also be more reliable than its RNA and epigenetic counterparts, as immune repertoire genes have been verified to remain stable for at least three years.

Evil twins committing crimes and framing their doppelgängers is an old trope that has been explored repeatedly in art and media. Hopefully, with these new findings, we can prevent it from becoming reality.

Scan here to read the original article from *Forensic Science International*:



Review: Pint of Science (Taster Edition)

► *Science meets chill at an overall enjoyable night out.*

Credit: Taylor Pomfret

Angie Lo Science Editor

Pint of Science is an annual science festival where members of the public gather at local pubs, cafés, and other spaces to listen to scientists talk about their research, engage in discussion with researchers, and play science-themed games. The official festival will be held in late May, with talks all over the UK and the rest of the world. During the holiday, Taylor and I attend Pint of Science's taster event to get a sneak peek at what the upcoming festival will be like.

The event is held in a very casual setting; with the exception of a projection screen and table of games at the front, the pub looks the same as it usually would. Attendees gather in groups around tables, sipping drinks and nosing on onion rings as scientists talk. Taylor points this out as something he especially appreciates: here, science becomes open, losing the air of professionalism and stuffiness which fills labs and lecture halls.

Three talks are presented during the evening: one on how research into parasitic infections can give information that can help deter childhood stunting, another on the engineering and logistics of designing low-cost prosthetics, and



Attendees gather to listen to a talk at the Pint of Science taster event.

the third on how examining the eye's blood vessels can shed unexpected light on general health conditions. Although the same talks won't be held during the

Credit: Taylor Pomfret

actual festival, one can expect similarly thought-provoking talks covering a variety of scientific fields, relating to relevant topics and issues. Each talk is followed by a friendly Q&A session where attendees have a chance to learn more about scientists' research.

Between talks, there are breaks for attendees to converse with one another, as well as to grab some drinks and pub grub. Unfortunately, food and drink aren't included in the ticket price, so you'll have to pay extra if you do want a pint to go with your science (here's hoping that the pub you choose is cheap!)

There's also a game running during the breaks, which allows attendees to try their hand at pipetting – after a short tutorial on how to use a pipette, attendees compete to fill a row of wells in the shortest time possible. Taylor and I have a go, and although we don't take home the winning prize (a Pint of Science pint glass), we still have a good time. They manage to make pipetting fun – something which, after many agonising sessions at the biochemistry lab, I didn't think was possible.

One downside of the event is that some of it can feel rather technical: some

of the talks mention advanced concepts and feature busy, complicated-looking diagrams in their visuals. If you don't have a lot of background knowledge on the particular field being presented, there are times where it's hard to keep up. This isn't common between all talks, though, and the messages are still largely quite accessible. Overall, Taylor and I learn a lot—and we enjoy much of the event as well.

Pint of Science will be held during the evenings of May 22-24 in 30 pubs across London. Tickets cost £5 each. For more information, including the talks lined up for this year and the pubs that are hosting, scan the QR code below:



The pipetting race, the taster event's featured science game.

ENVIRONMENT

Edited by: SIMRAN PATEL
MARIE MORI

ENVIRONMENT

There's microplastics in my beer?

► *Imperial's Dr Stephanie Wright shares her thoughts on the invisible particles threatening our health and biodiversity.*

Pete Knapp Environment Writer

I am a beer drinker. Not much, perhaps one or two a week, but I enjoy them. However, after reading a paper from 2022 that reports there are up to 50,000 microplastic particles in a pint of beer, it started to put me off. Then I found out it's not just plastic particles that get into beer, but also compounds that make plastic soft, called plasticisers – which can leach out of plastic tubing during the beer-making process. The more I investigated microplastics, the wider the problem appeared. We have a global microplastic problem that is totally out of control. But is this a health problem? And if so, what can we do about it?

I spoke with Dr Stephanie Wright, a lecturer in environmental toxicology at Imperial College. She has researched microplastic exposure and its biological impacts for over 12 years.

How does plastic get into beer?

"Firstly, the water source might have plastic fragments or fibres in it," Dr Wright starts off. "We know that freshwaters, including groundwater, are contaminated with microplastics from plastic waste breaking down, tyre wear,

synthetic fibres from clothes, and waste directly from industry – but definitely not at the levels found in the beer in this study."

Microplastics are tiny pieces of plastic smaller than 5mm in length. Research from the Centre for Ecology & Hydrology shows untreated water contains 4.9 microplastics per litre on average, while treated water in the UK holds only 1 microplastic per 10,000 litres. Clearly, for 50,000 microplastics to get into each of our pints there must be a more significant source. "The water would have to be to be very contaminated," Dr Wright says.

"Secondly, it could be coming from the factory." But the 2022 study showed that microplastics were mainly fragments rather than fibres, so clothing from workers, for example, seemed an unlikely source.

"Lastly, plastic components in packaging and machinery are likely to be a key source. Plastic isn't as stable as we once thought it was – it can quite easily shear and release microscopic and nanoscopic particles," Dr Wright says.

My image of a brewery is of metal vats and glass, so where is the polystyrene? Dr Wright says that classifying plastics

can be challenging. "The biggest challenge is minimising contamination during analysis – that's the art. Then, comparing the chemical fingerprint of a microplastic to a known library can be tricky. You might think 'Oh, I've got polystyrene.' – but it's actually sulfonic acid or something different. I wonder if, on a first glance, you record it as polystyrene when it might be something else."

Might it be safer to drink beer from cans or bottles, or draught beer from a tap? "There's just so much variation," Dr Wright says. "The role of batch-to-batch variation versus factory-to-factory, brand-to-brand, process-to-process. You might think that drinking from a glass bottle would contain less plastic, but that might not be the case. Sometimes beverages in glass bottles can contain more plastic particles than in plastic containers. Cans have their own issue, being lined with a polymer inside. There are too many variables and not enough evidence to be able to conclude how to reduce your microplastic exposure from beer".

Processed foods

I asked Dr Wright about processed foods, where microplastics might be a bigger issue than in beer. The tubing that is used in food processing is soft because it contains plasticisers. "Plasticisers are not chemically bound to the plastic polymer, which means they're highly susceptible to leaching into whatever the surrounding medium is. That could be food or drink. They mimic the shape and structure of a lot of naturally occurring molecules such as hormones. There is a lot of epidemiological evidence linking what we call 'exposure to endocrine-disrupting chemicals' with issues of fertility and reproduction," Dr Wright says.

From 1965 to 2015, there was a 32.5% decrease in sperm concentration in European men. According to the United States CDC, between 2015 and 2019,

8.9% of American women required medical help to get pregnant. One of the causes could be environmental chemicals – such as phthalates, which is a widespread plasticiser in consumer products.

BPA is a chemical found in plastics that are often used in containers that store food and drinks. "It is recognised as an endocrine-disrupting chemical", Dr Wright says, "and it was banned from all sorts of children's toys, babies' bottles – and now a lot of products are opting to be BPA-free. The problem is, what is it being substituted with? There are more synthetic compounds that are essentially there to do the same job, which have a very similar structure, and so do the same thing in our bodies."

Babies' bottles

Soft plastic is used in babies' bottles, and store-bought baby food is often processed. Could their exposure to plasticisers be a health risk? "This is [a] clear way for a plasticiser to be leaching into the food that the baby is consuming", Dr Wright says. "Also, heating plastics weakens the material, so sterilising babies' bottles and mouthpieces likely causes these plasticisers to leach at a faster rate. This also causes greater shedding of microplastic particles".

Using plastic water bottles until they become brittle indicates that all the plasticiser has leached out into the liquid. Using metal or glass containers will reduce your exposure to microplastics and plasticisers, and buying them second-hand will reduce the carbon emissions from producing them.

But with babies' hand-to-mouth behaviour, it is common for them to be exposed to microplastics in dust from synthetic fibres from clothes, furniture, bedding, curtains, carpets, and upholstery. Indoor air contains much more airborne plastic than outdoors – with between 5,000 and 900,000 microplastics settling every square metre, compared to between 0

Credit: Envato Elements



and 800 outdoors. This means infants ingest, inhale, and have skin-exposure to microplastics that cannot be dealt with simply.

Compostable plastics

The new plant-based plastics – the kind that you see with a green leaf symbol on them – are called ‘bioplastics’. They are derived from plants, but bioplastic isn’t so different to the plastics made from petrochemicals, and they can also take years to break down. “You might think that compostable plastics are green and good for the environment, but it will only fully compost if it enters industrial composting because it requires very specific temperatures and oxygen and pH to actually degrade,” Dr Wright says. “We are currently studying this. Although it is not yet published, it seems that there are still bits of ‘compostable’ plastic left at the end of the composting process – which will end up in the environment when the compost is re-applied to land. The required conditions needed to break it down don’t apply there with respect to the oxygen, the temperature, and the pH – so it won’t really compost any further. They will end up in soils, water bodies, and air – just like the other microplastics.”

“Bioplastics can degrade a bit differently in the body, releasing ‘oligomers’ that are smaller than bits of polymer – which can lead to acute inflammation, and accumulate in the liver, intestine, and brain”. This means plant-based plastics create their own health risks.

When you see ‘compostable’ teabags, they are most probably made of polylactic acid. Brewing a teabag made with PET (the most common thermoplastic) and PA (nylon) at 95°C can shed up to 11.6 billion micro- and nanoparticles into a cup of tea. This is over 200,000 times the maximum number found in a pint of beer. I am not aware of a study looking at the shedding of polylactic acid, but I would not be surprised if it were of a similar magnitude. When I found this out, I started to brew my tea loose, or tear open a teabag and throw it away before it reaches the water if that is the only option I have. Drinking tea might therefore be people’s highest exposure to ingested plastic, but Dr Wright says “I’d want to see a bit more evidence, and more studies repeating that, to see if it

really is a phenomenon or if it was a one-off.”

Tyres

New evidence suggests that vehicle tyre wear pollution in urban areas could pose environmental risk up to 10,000 times higher than other microplastics found in European rivers.

About a quarter of a tyre is plastic, and this may account for 5–10% of ocean microplastics globally. It is estimated that

Dr Wright’s suggestions for reducing microplastic exposure and release.



Drive less, if at all



Wash clothes less frequently, on shorter cycles and lower temperatures



Avoid factory-made teabags by drinking loose tea



Use paper-based toilet roll instead of wet wipes



Think about using alternative materials without plastics to feed babies



Ventilate indoor spaces, especially when changing bedsheets



Avoid eating processed foods, where making it from scratch reduces plastic exposure



Use a second-hand metal or glass bottle instead of a plastic one



Use ceramics or glass in a microwave instead of plastic containers

3 billion tyres reach the end of their lives each year, generating 2,907,000 tonnes of tyre wear particles per year globally. Resuspended road microplastics, including the plastics used to make road markings, could contribute up to 84% of plastics in the air.

Large tyre wear particles are part of road runoff on rainy days, resulting in the leaching of toxic chemicals. Smaller particles – of the micro and nanoscale – may be small enough to become airborne and get breathed in.

Conversations that I’ve had with researchers in this area have led me to believe that as new tyres are being developed to shed fewer large particles, they may actually be shedding more fine particles that could cause greater harm to the environment. As the materials are designed to be less prone to breaking apart, this may lead to less degradable particles that pollute our environment for much longer.

This is another huge reason to reduce all private car transport, rather than pushing people to buy electric cars. We need emphasis on moving away from the reliance on cars where we can. “Fewer cars means less tyre wear”, Dr Wright says. Rather than literally reinventing the wheel, we need to reduce the number of tyres by using and campaigning for public transport and reducing the amount we travel.

made of plastic. A study of 7532 undergraduate students in the United States showed 70% of men and 60% of women believed that cigarette butts were biodegradable.

Besides stopping smoking completely, the alternative solution here is to carry a personal pocket ashtray to avoid discarding cigarette butts into the environment.

What do microplastics do to your body?

“Even if a microplastic particle is inert, the body will try to get rid of it. In doing so, cells in the body will trigger inflammation – which is a natural response to foreign entities. But if it happens all the time, then it is a problem. In the worst cases, this ‘chronic inflammation’ can cause tissue scarring if unresolved,” Dr Wright says. In the same way that air pollution causes inflammation leading to over seven million deaths every year according to the WHO, inhaled or ingested microplastics and nanoplastics might cause the same kind of inflammation. The scale of the direct harm to human health from microplastics is expected to be less than from air pollution, but the environmental impacts are expected to be far worse.

Microplastic effects on nature

At the end of their journey, microplastics and nanoplastics reach the soil and the ocean. In 2020, there were over 400,000 incidences of water companies discharging untreated sewage into rivers and coastal waters in England – each of these incidences release microplastics into aquatic ecosystems.

These microplastics have been shown to stunt the growth of earthworms, significantly affect the behaviour of fish larvae, and kill water fleas. The likelihood of coral disease increases from 4% to 89% when they are in contact with plastic.

I asked Dr Wright if these plastic particles might bioaccumulate – passing up the food chain, getting more concentrated as they go. “Bioaccumulation would only occur if they’re building up in the gut or other tissues, which means they’ve got to be ‘bioavailable’ – meaning they are taken in through the gut, across the epithelium, and into tissues. This has been shown to happen with plastic particles that are

Cigarette butts

The UK government’s ambition of a smoke-free country by 2030 will help to reduce the most prolific item of plastic pollution in the oceans – cigarette butts. Cellulose acetate, the plastic comprising cigarette filters, is not biodegradable under normal natural conditions. According to Dr Ruediger Krech from the WHO, they contain over 7000 toxic chemicals and roughly 4.5 trillion butts pollute our environment every year. This effectively means every smoker throws nine out of ten cigarette filters directly into the environment.

Cigarette companies have worked hard to make cigarette butts look like they are made of paper, cork, or natural fibres. I was surprised to find out that only 60% of members of tobacco control advocacy groups, which supports the implementation of the World Health Organization’s Framework Convention on Tobacco Control, knew they were

ENVIRONMENT

very small, but research is so limited currently. We don't really know the importance of the plastic particle type or shape, for example," Dr Wright says.

What can we do about it?

"I suggest we rethink our relationships with new plastics and to reuse what we already have", Dr Wright says. "To reduce microplastic release, we need to think about avoiding plastic materials in our daily life".

"You've got to pick your battles,

though. You've got to do what's right for you and what I've suggested here might not be what's right for everyone", Dr Wright concludes.

So... does the presence of microplastics in beer stop you drinking it?

"Not at the moment", Dr Wright says. "I think having one or two a week is fine. But ask me again next year."

Overall, this is a systemic issue. Individual choices might make a difference to our individual exposure, but

we need to drastically and immediately reduce our reliance on plastics and synthetic fibres – this requires direct action to force governmental changes. Producing all the materials we currently use with natural fibres instead would immensely consume resources – so reusing natural fibres, taking care of them, and washing them less frequently is also essential.

I personally put pressure on governments with activism working with the UK-based Scientists for Extinction Rebellion

and global group Scientist Rebellion. There is a more specific group called Plastic Rebellion, and there are many other activist groups who put direct pressure on policy-makers to make the changes we so desperately need. So, let's raise a glass to all those taking action – what's in that glass is up to you.

Tales of Unsung Wilderness 1: spiders and the arrival of spring

► *In this series, Shreyas explores the hidden world underneath rocks and logs – brimming with activity, colour, and life.*

Shreyas Kuchibhotla Environment Writer

In Southeastern India – where I'm from – there is no spring. The days oscillate between hot and very hot, save for a few days of respite in December. My attitude changed when I arrived in the UK. All of a sudden, I stopped pining for rain and began to look forward to warmth and sunshine. Rainy days aren't particularly unbearable for me, though. It's the other inhabitants of Britain's wilderness that hate them.

Herptiles (reptiles and amphibians) and bugs mostly lie dormant throughout the winter – especially on the particularly cold days. It's not a good idea to disturb sleeping herptiles, but some bugs are fairly active during winter – just not out in the open. Lifting and glancing underneath debris, such as logs and rocks, often reveals a whole host of wildlife scuttling for cover. I persevered even during the cold months, and was occasionally rewarded for my efforts with some centipedes and money spiders. For the most part, all I was able to find were the omnipresent and cold-resistant woodlice, slugs, and earthworms.

However, on a pleasant March morning of log-flipping in Hyde Park, I noticed some movement on the ground. A little black speck sprinted across the mud and into some leaves. I didn't think much of it, and continued on my way. Then, another. And another. I couldn't believe my luck – these were tiny wolf

spiders (*Pardosa sp.*) enjoying the sun while it lasted. I hastily brought out my phone – clip-on macro lens attached – and scanned the surrounding leaf litter. Every few seconds, one of them would show up, stop for a moment, and dart with unbelievable speed into the foliage. I endeavoured time and time again to get one of them to stay still just for a second, but they disappeared the moment their eyes saw motion. Wolf spiders have very well-developed vision because of their diurnal, active-hunting habits. While this clearly worked in their favour, it hardly worked in mine.

I was absolutely spellbound as I watched these little black gems weave their way in and out of the leaves, almost as if part of some ethereal dance. Every now and then, a particularly large spider would show up – what I thought was the slightly more bulky spotted wolf spider (*Pardosa amentata*) but, much to my delight, was actually a fox spider (*Alopecosa pulverulenta*). Despite dwarfing their little black companions, fox spiders are equally as fast. I gave up on getting close-up shots, and had more success taking videos while inching closer to them.

Also in the mix were some nursery web spiders (*Pisaura mirabilis*), famous for their characteristic X-pose. They are also, unfortunately, just as quick as the wolf spiders. When I managed to successfully catch one in a jar, and tip it onto my hand in the hopes that it

would calm down, it swiftly dived to the bottom of my finger and leapt into the leaf litter.

Among the tireless sprinters, I also managed to find a juvenile ground crab spider (*Xysticus cristatus*) sunning itself on a leaf. I felt as though I had happened upon something rare, but was pleasantly proven wrong when I witnessed the same spectacle half an hour later on a different leaf pile. This was not an isolated incident, but a sign of sunny days to come.

When reading about *Pardosa*, I would often read lines such as "actively run on the ground during warm sunny days". As a habitual log-flipper, I ignored these – I have spotted a singular common wolf spider (*Pardosa pullata*) under a log on a cold, damp day, so I assumed they were just tough to find. In a way, turning over pieces of cover is taking the easy way out because it takes advantage of spiders' universal need to be hidden. By observing them frolicking on the leaves, the joy felt more shared. It appeared that these dainty little creatures only hid temporarily – after scrambling for cover, they would adorn the fallen leaves moments later.

In a city notorious for its unpleasant weather, that one sunny day in Hyde Park was an oasis of sorts – for both me and the spiders. I will never forget the 'dance of the wolves', welcoming spring upon the leafy remnants of the autumn gone by.

Credit: Shreyas Kuchibhotla



Fox spider (*Alopecosa pulverulenta*)

Credit: Shreyas Kuchibhotla



Nursery web spider (*Pisaura mirabilis*)

Credit: Shreyas Kuchibhotla



Ground crab spider (*Xysticus cristatus*)

The Cat #005

COMICS



HEADSHOTS

Charles patiently waits for the coronation

This is so boring... all I can think about is that magnificent statue of the well-endowed man outside Imperial College



The BBC in search for new chairman



CROSSWORDS

4 points each

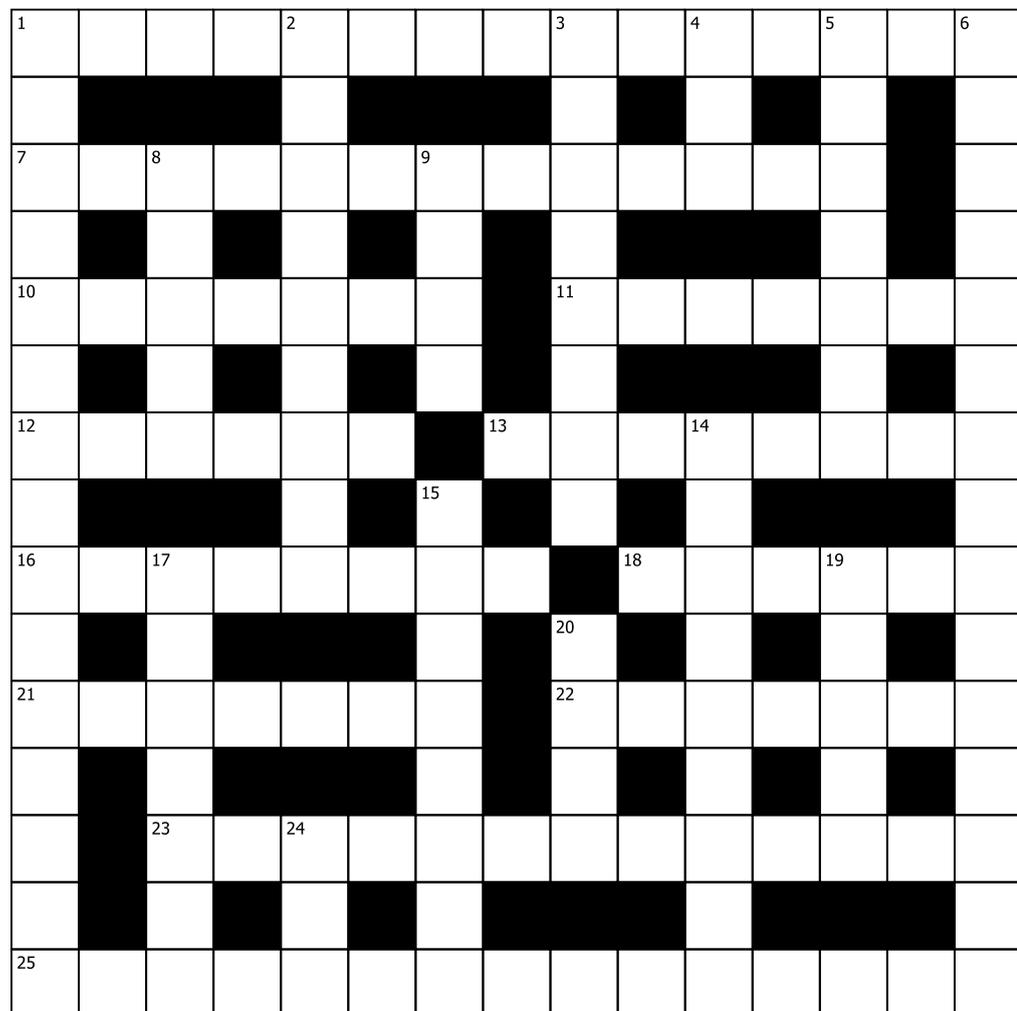
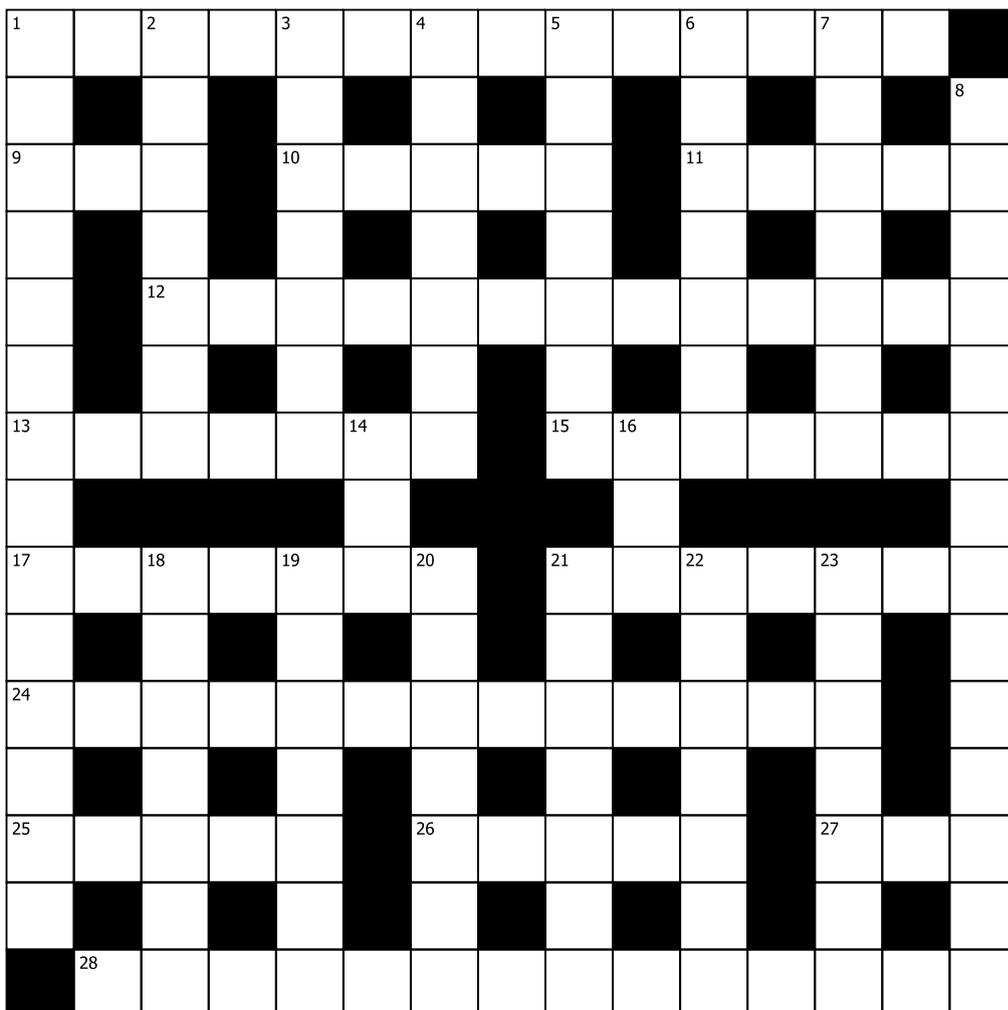
PUZZLES

Across

- 1 Largest carnivorous marsupial, best known as a *Looney Tunes* character (9, 5)
- 9 Annoy (3)
- 10 Upset (3-2)
- 11 Decorate (5)
- 12 Another term for punctuation used in speech (8, 5)
- 13 Amount paid all at once (4, 3)
- 15 Breastbone (7)
- 17 Remaining in one's bank account (7)
- 21 Placed side by side (7)
- 24 Spherical bacteria, often cause of skin infections (13)
- 25 Saying or phrase (5)
- 26 Animals known for regenerating their tails (5)
- 27 Fails to work - unsatisfactory (3)
- 28 1964 musical comedy film starring the Beatles (1, 4, 4, 5)

Down

- 1 Board game centred around collecting cylindrical sectors (7, 7)
- 2 5th largest worldwide religion, originating from the Indian subcontinent (7)
- 3 Arched openings (7)
- 4 Gap (7)
- 5 Cutting pliers (7)
- 6 A rough or drawing used for an oil painting (7)
- 7 2008 film starring Robert Downey Jr. (4, 3)
- 8 Colloquial title for popular gambling machine (3-5, 6)
- 14 Covered vase (3)
- 16 Hit lightly (3)
- 18 Belonging to the 6th most populous country in Europe (7)
- 19 Digger up of bodies (7)
- 20 Owning claws (7)
- 21 Curved structure holding up openings (7)
- 22 Bullies (5, 2)
- 23 Get-together (7)



Across

- 1 1939 film starring Vivien Leigh and Clark Gable (4, 4, 3, 4)
- 7 'God from the machine', used to describe a type of plot device (4, 2, 7)
- 10 Multiple late-summer months (7)
- 11 Jewish language originally from German dialect (7)
- 12 One down from Mornington Crescent (6)
- 13 Characteristic of the Underworld (8)
- 16 Animal known for game franchise started in 1991 (8)
- 18 Rubbed to cause irritation (6)
- 21 Crunchy, yellow, and comes in three flavours (7)
- 22 Used to reload old rifles (7)
- 23 Sixteenth century fleet which failed to take England (7, 6)
- 25 One up from High Street Kensington (7, 4, 4)

Down

- 1 Used to be sung by the nation, not any more (3, 4, 3, 5)
- 2 Used to make dull, sharp (9)
- 3 Theoretical particle travelling faster than light (8)
- 4 Biblical judge of Israel (3)
- 5 Bloke from Verona (7)
- 6 Tree killer (5, 3, 7)
- 8 Strong impulses (5)
- 9 Violent dance to music (4)
- 14 Doesn't last long (9)
- 15 Means of making that which jam and butter goes on (8)
- 17 Fully determined (4-3)
- 19 Female lead in 2001 Dreamworks film (5)
- 20 Stops the doorway collapsing (4)
- 24 French friend (3)

PUZZLES

5 points

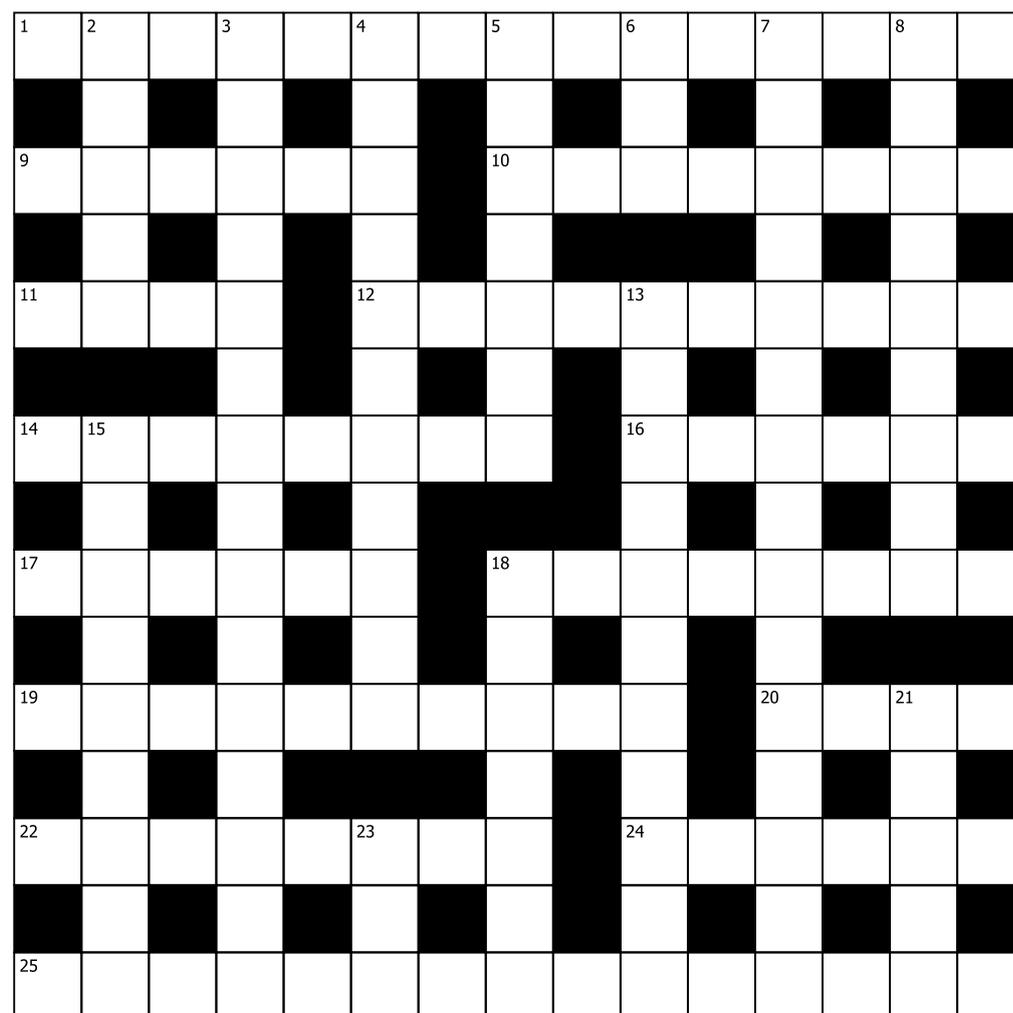
CRYPTIC CROSSWORD

Across

- 1 Headland, hear! Fasten up in front!
Devil in the depths (4, 4, 7)
9 Heard Frank Lost footing, messy way
to enter (2, 4)
10 Farewell, Near option is the only way
to vote (2, 5)
11 Repeating yourself can lead to a bit
of comedy (4)
12 One of Three? Sounds patchy,
Marley (4, 6)
14 Correct - orange two-time gets
pulped (2, 6)
16 Put an egg in left ear - how off beat
(6)
17 Hear in addition (1-5)
18 Swept back, it gave out a path (4, 4)
19 Regarding the gifts stands - to this
end (10)
20 Pear - blended or cut? (4)
22 Text on fizzy drink is merely an
illusion (8)
24 Lifted at the waist by means of odd
German (6)
25 How to keep up with your
neighbours whilst getting mad (7, 8)

Down

- 2 Round region creating toxic gas (5)
3 Single-heartedly screw up home repairs,
leave to follow the trail? (6, 3, 6)
4 Witch sees soup mixed outside where
food is known to disappear (11)
5 Under a story (7)
6 Minor crash in ugly race (3)
7 A wise man is around, short time with
ruler then motor on to Rhode Island in a
haze (7, 8)
8 Hallucinated weird loss of half of Luther,
filled with cheese (9)
13 Block the hero to take a break from the
desktop (6-5)
15 This guy sucks (9)
18 Group observed a way to get ripped
(4-3)
21 Power - clear! How pungent (5)
23 There's a beat in this, ask an expert (3)



Crosswords by: POMPI

Picture Hunt

3 points

This photo was taken somewhere on campus - know where?



From the Editor

Greetings,

Issue 1822's regular crossword has been reprinted here, alongside a new one, as it was misprinted before.

Bumper puzzling this issue!

As always if you find something amiss with any of the puzzles don't hesitate to email in at puzzles.felix@imperial.ac.uk.

Additionally, make sure to send in requests for new puzzles if you have any you like and can't see in here.

Happy puzzling!

Sincerely,

Isaac Winson, Puzzles Editor

SUDOKU FRENZY

2 points each

PUZZLES

Very Easy

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

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

Easy

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

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

Moderate

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

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

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

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

Difficult

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

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

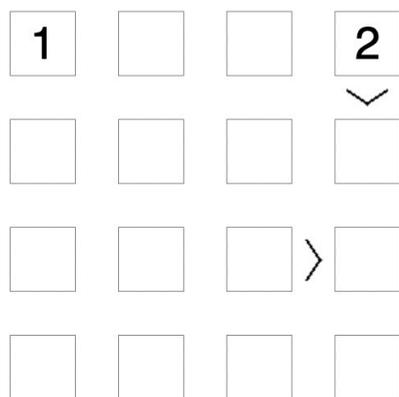
PUZZLES

Futoshiki

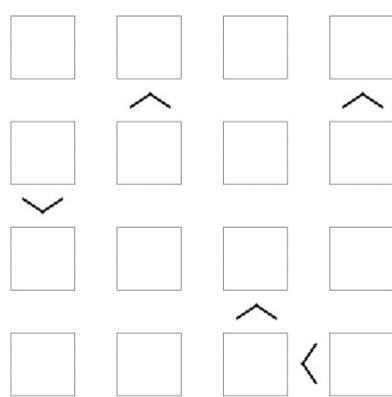
2 points each

Fill in each row and column with a set of the numbers 1 to 4 - similar to sudoku. The greater-than symbols show you which squares have higher values than others.

Easy

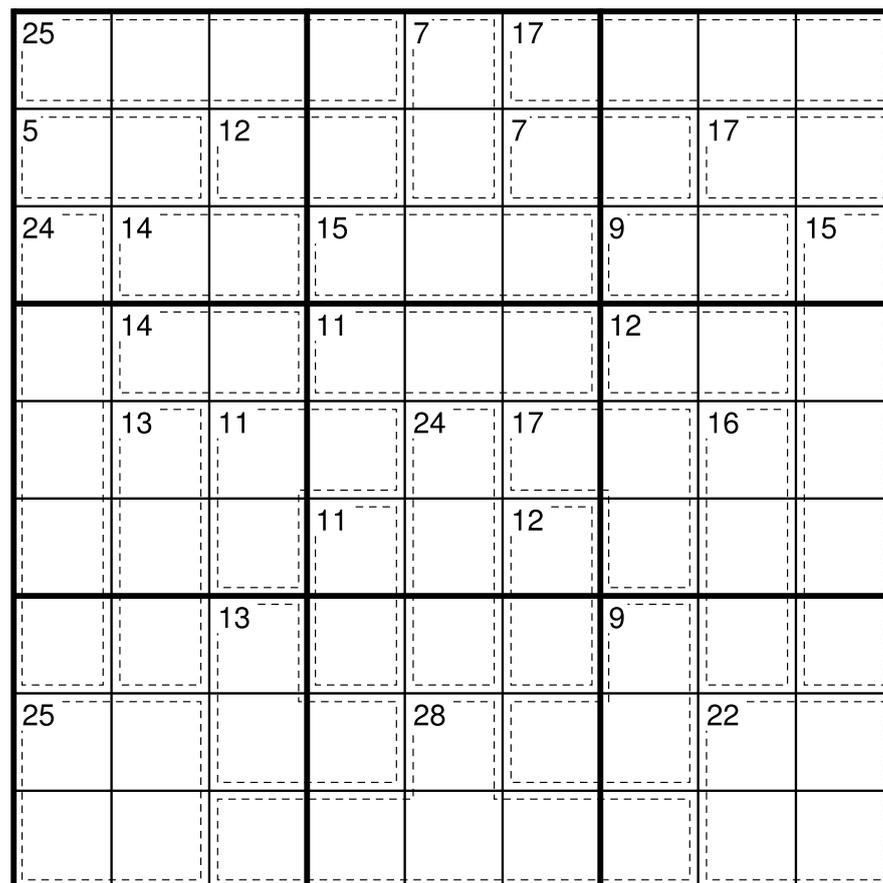


Hard



Killer Sudoku

3 points



Normal sudoku rules apply. Additionally, each dotted zone must add up to the number in its corner.

Missing Vowels

1 point each

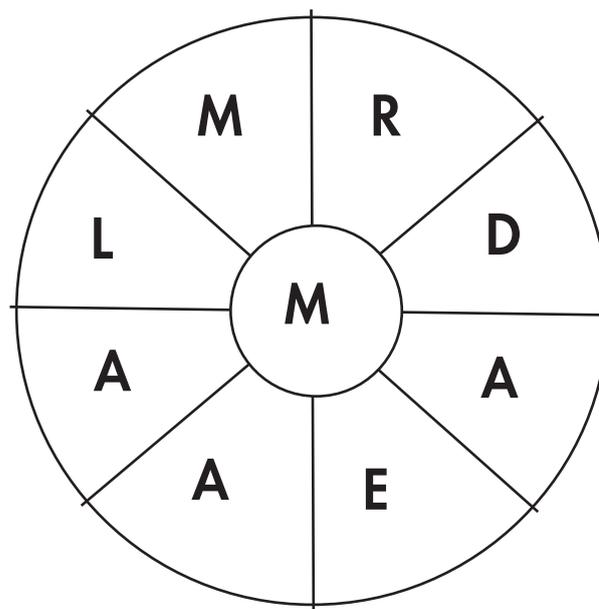
CATEGORY: London

Put the correct vowels and spaces in these jumbled-up consonants to find the answers. Send your answers in along with your puzzler-name to puzzles.felix@imperial.ac.uk for points on the leaderboard:

- i) WS TM NST RB RDG
- ii) SLF D GS
- iii) S PT LF LD SMRK T
- iv) BBY R DST DS

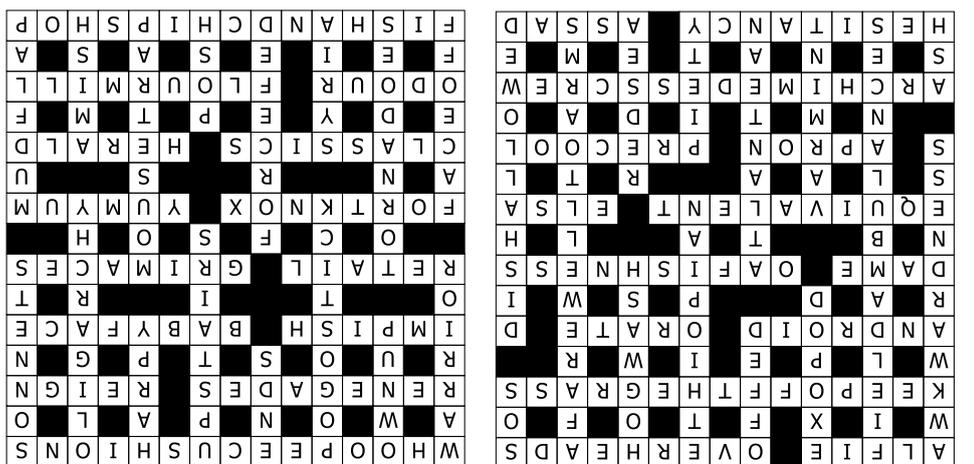
Word Wheel

2 points



Find as many words of three or more letters on the wheel as you can. All words must use the central letter. There is at least one nine-letter word that can be found.

Solutions from Issue 1823



Imperial College
London

ICTExpo

Go from technophobe
to tech'xpert!

23 & 24 May

11.00-15.00

College Main Entrance, SK
Free and open to all

#ICTExpo



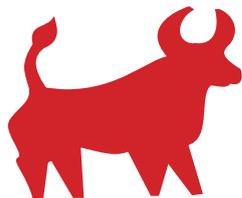
FRIDAY 5TH MAY 2023

CATNIP



ARIES

This week you study your patriotism notes when your doctor assigns you a pro-state exam.



TAURUS

This week your hinge date fails to see the funny side.



GEMINI

This week you come across the Union President's HER profile - it now makes sense why she has no man date.



CANCER

This week you mourn the death of your short friend after they fall into a pitcherplant.



LEO

This week you improve your lab's workplace climate by showing up in your thong.



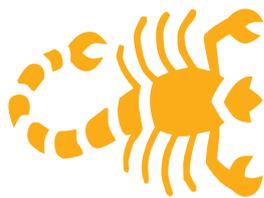
VIRGO

This week you wonder how Elijah could afford a chariot of fire when he hadn't paid his heating bill.



LIBRA

This week a long queue for the loo makes you late for your nuclear physics lecture. It's okay as you now know all about the pee-pee train.



SCORPIO

This week you buy a wrecking ball crane to combine your loves of union busting and bowling in a sport you like to call 'the nurse's strike'.



SAGITTARIUS

This week binge-eating while in Cornwall makes you feel like a king sitting on the Stone of Scone.



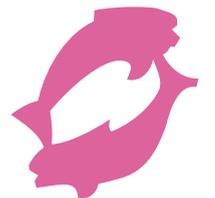
CAPRICORN

This week you explain away the tie-dye tank top your girlfriend finds at the bottom of your underwear drawer by saying it's vest-igial.



AQUARIUS

This week instead of telling your supervisor you spent the break on TikTok, you say you spent it "training the algorithm for your FYP".



PISCES

This week your republican friend concedes defeat in a game of chess after you take the pawn he 'decided was the most important on the board'.

COMMENT

Edited by: ELIF CIVELEKOGU

COMMENT

Climate defeatism: an engineered despair

► *Daniel Hesk evaluates and critiques the culture of climate defeatism, urging readers to take action against those who are the true cause of climate change.*

Daniel Hesk Comment Writer

On a warm night in June of 1947, a passenger airplane caught fire over the Syrian Desert. It blazed like a meteor through the inky black skies, and the people on board, quite naturally, began to panic. The pilot wrestled with the failing controls while the co-pilot entered the aisle, telling the passengers that things would be alright, and that they would make it through this. He sat beside a crying woman and comforted her. He gave her hope, even as flames climbed the wings and the craft spiralled downwards.

The pilot was killed immediately in the crash, along with thirteen others. The survivors were trapped in the middle of a vast wasteland, with little hope of rescue. The co-pilot, however, took charge. He led a party of passengers for miles across the desert. Eventually they found a village and telephoned for help. The co-pilot, whose name was Gene Roddenberry, saved two dozen lives.

Eighty years later, another airplane is on fire. Its descent is on the timescale of decades, and its passenger number

in the billions. For a long time, most of the windows have been closed, but now the blaze is rattling the glass – now the heat is impossible to ignore. Scorching summers, rain-flooded winters. A surge in the frequency and lethality of hurricanes. Brutal famines and droughts. I won't labour the point – I'm sure you've heard it all before. I'm sure it weighs on you like it does on me. It makes you want to grab an oxygen mask and just curl up under your seat, waiting for the end.

'Climate defeatism' is a relatively new term. Also called 'eco-grief', it disproportionately affects young people, as well as those involved in the natural sciences. As STEM students, we are Ground Zero for this eruption of despondency. People feel that the environment is irrevocably damaged, that they will grow old in a world of natural disasters, mass extinctions, and ecological devastation. Worse, they feel that, as members of the human race, they are somehow to blame. That we are a blight upon the surface of our own planet, and it will suffer at our hands as long as we exist.

This malaise, as I see it, originates

from two main sources. The first, I'm afraid to say, is climate scientists. Every apocalyptic climate report is delivered with the message: 'Act now, because

“

UNTIL THE OCEANS THEMSELVES BOIL AWAY THERE WILL ALWAYS BE SOMETHING THAT CAN BE DONE

soon it will be too late!'. A narrative of 'Tipping Points' and 'Final Warnings' is effective in conveying a palpable sense of danger, but it has its weaknesses. If someone reads a headline proclaiming that the 'Point Of No Return' is about to be crossed, they may, after two more years of little progress, assume that

there is nothing more to be done. They may assume that we have, in a general sense, failed.

They would be wrong. The tipping points are setbacks, certainly, but until the oceans themselves boil away there will always be something that can be done. Change will always be possible, and it will always be fruitful. That is not to suggest that we be flippant about it; the time we waste is measured in future lives lost. But never think that it is too late to act. The best time for reversal may have been fifty years ago, but the second-best will always be the present moment.

The second cause of climate defeatism is the corporations that are the cause of climate change in the first place. It doesn't take a conspiracy theorist to see that pessimism benefits the companies that have been wringing the planet dry for decades. They are trying to shift the blame onto us, to make us forget who the true architects of this crisis are. We are admonished about our personal carbon footprint by people that fill our oceans with oil and clog the sky with their coal smoke.

Guilt and hopelessness flourish in

Credit: Wikimedia Commons



'We have to shift our focus away from what we failed to do, and towards what we can do.'

Credit: Wikimedia Commons, People vs. Fossil Fuels



'As long as us humans are willing to act for the greater good, there will still be hope.'

such an environment. Every time you don't recycle or forget to switch off a light, you blame yourself a little more, until you can no longer see any path to

“

THE PUBLIC, OUR INSTITUTIONS, AND OUR GOVERNMENTS ALIKE MUST START TO SEE THESE COMPANIES FOR WHAT THEY ARE – THE ENEMY

progress. They have overseen a transition from 'climate change isn't real' to 'climate change is inevitable' with no gap in between, laughing all the way to the bank. But make no mistake. This disaster is their fault, not yours. You should be angry — not forlorn.

It is by these routes, both inadvertently and intentionally, that climate defeatism has entered the social conscience. And it is along these lines, socially and politically, that it must be fought.

For it is a fight. It is a fight against despair, and against those who profit from it. Culturally, we are still in a phase of general camaraderie — that as humans, 'we're all in this together'. But we aren't. The people who are feeling and will continue to feel the most devastating effects of climate change, the people who are dying right at this moment in floods, in famines, in forest fires — they are the poorest of us. They are those with the least control over the direction of our global society. They are those whose carbon footprint is barely a smudge on the earth. Where is their platform? Where is their justice? And what of the people at whose heavy feet these deaths must be laid? They live in mansions, on yachts, in mountain chalets. Far from harm, and far from consequences.

For the last century, high-profile institutions such as Imperial have

maintained financial and political connections with many fossil fuel corporations. Our official policy claims that such enterprises 'demonstrate they are actively moving towards meeting Paris Agreement targets'. At best, this is laughably naïve. The idea that these multinationals can be cajoled or guilt-tripped into changing their ways at any level beyond the superficial has been disproven by years of stagnation.

What is needed, beyond cheaper renewables, beyond fancy carbon-capture technology, beyond lofty ideas of 'green growth', is a war footing. The public, our institutions, and our governments alike must start to see these companies for what they are — the enemy. Fossil fuels remain more profitable than renewables. In 2022 the five largest oil and gas companies made nearly \$200 billion, their highest profit margin in history. They are not going to stop on their own. They must be defunded, dismantled, and disgraced.

“

YOU ARE NOT TO BLAME, AND YOU CAN FIGHT IT ANY TIME YOU CHOOSE, IN ANY WAY YOU CHOOSE

A recent paper in the Harvard Environmental Law Review advocated for prosecuting these companies on the charge of homicide; this would hold them directly accountable for any deaths provably connected to anthropogenic climate change. Some may see such a route as radical or ridiculous. I see it as the harbinger of a cultural shift that will come to seem pivotal. Above anything else, this is the attitude that we lack, that we desperately need to acquire. This is the attitude that will turn the tide.

And the tide will turn. It might be this year, or it might be in forty, but we will see the damage halt and the repairs begin. All I can express is my certainty that the shift will only come when our jaws are set and our eyes are angry. When we start to

sneer at Shell, and BP, and ExxonMobil, and all the rest with the contempt and loathing that they deserve. When we start to shake the foundations.

No, do not freeze even in the face of such overwhelming danger. You are not to blame, and you can fight it any time you choose, in any way you choose. When Gene Roddenberry saw that engine catch fire high above the desert, he made a decision to act. He sat beside a crying woman and comforted her, watching the world tumble in freefall towards him. He stared into the abyss, and the abyss blinked first. Humans can do amazing things in a crisis. We can become what we always wished to be.

That was the fourth plane crash that

Roddenberry had lived through. He quit his job a year later and became a writer. Most people who know his name will know him as the creator of Star Trek.

Star Trek was his dream of a future in which humanity survives itself — in which we spread to the constellations and build great structures and projects in the light of self-knowledge. Optimistic? Perhaps. But our futures, ultimately, are up to us.

So keep fighting, out of love, out of spite, whatever works for you. One day, we will stumble, blinking, from the wreckage. And who knows? We may be surprised at what solid ground lies beneath our feet.

Credit: Wikimedia Commons, Paddy Briggs



“The only way for us to progress is to stop blaming ourselves for something that we could not control and had no say over, and instead begin to hold the companies that have and will continue to benefit from our misery accountable.”

COMMENT

A safer Imperial

► *Imperial College Union President Hayley Wong explains the latest changes to the College's disciplinary process.*

Hayley Wong Union President

The College's disciplinary procedure has been one of the prevailing issues raised to the Union by students. That is why both mine and Nathalie's manifestos prioritised pushing for improvements in this area. Whilst the procedure itself was structurally sound and compliant with guidelines from the Office of the Independent Adjudicator (OIA), students involved in disciplinary cases have lamented over a lack of

transparency, the length of time needed to conclude their cases, and the mental toll taken by going through the process.

Over 30% of students have experienced sexual misconduct, according to the 2021 Sexual Misconduct Survey carried out by Imperial College Union. However, over the 5-year period of 2016 to 2021, only 12 cases have been investigated under the College's Student Disciplinary Procedures, indicating a lack of trust in these procedures. It was also found that a significant majority of

Credit: Imperial College Union



Imperial College Union President Hayley Wong.

sexual misconduct survivors chose not to seek any support from the College or the Union, with the most common reason being that they 'did not think there would be any action taken'.

There were many issues with what the procedure used to be, for example:

- There were insufficient updates to students between the acknowledgement of receipt of the case and the conclusion of the case.
- There was no parity of appeal rights, i.e., the student responding to an allegation of misconduct (responding party) could appeal the outcome or sanction(s), but the person making the complaint (reporting party) could not do the same.
- Students were not allowed to go into hearings with a legal representative, even though it was ruled by a High Court judge in March 2020 that legal representation should be permitted on a case-by-case basis to ensure natural justice in these types of proceedings.
- The College always paused investigations if police become involved in the case – often this meant the case could not be concluded for years, leading to involved students graduating without an outcome.
- The length of time required to close a case (some have taken several years to be concluded).
- There was no opportunity provided to reopen a case once it was concluded, even when new evidence was presented.
- There was a lack of structured support for students going through the process.
- The available sanctions that the procedure could impose were limited, which meant that in some cases they weren't the most appropriate for those circumstances.
- Fining people as a sanction disproportionately punishes students from financially disadvantaged backgrounds.

And perhaps worst of all:

- The reporting party often did not get informed of the outcome of their case,

nor any sanctions put in place.

These issues were detrimental to students going through the process. This is why Nathalie, Jason and I have spent a significant amount of time this year attempting to elevate the student voice on this important issue. At the start of last academic year, Nathalie initiated a College-wide review of these procedures by conducting a survey of sexual misconduct (with over 600 responses) and bringing a paper to Union Council.

This prompted the College to put together a working group consisting of us three and staff from across the College, as well as a practicing barrister (who happened to be the Union President in 2000/01). After months of careful deliberation, we arrived at a final version of the procedure, most notably with the following changes:

- The reporting party may also now appeal the severity of the sanctions imposed.
- The option to bring a legal representative into hearings is now available to students with disabilities.
- College can continue with investigations even if the Police are involved (and will not disclose information to the Police) unless the Police directly ask the College to pause its proceedings.
- There will now be communications with all parties involved at regular intervals, even if no progress has been made.
- Cases can now be reopened in exceptional circumstances.
- Introduction of developmental requirements (restorative justice) as a sanction.
- Introduction of mediation (where all involved parties consent).
- The available support to students involved in the case is now more clearly laid out, with the option of continued support beyond the outcome of the case.
- Fines have been removed as a sanction, with the exception of financial compensation for damaged goods or property with a £500 limit.

• The reporting party will now be told about the outcome of the case and any sanctions imposed.

The final hurdle was to approve these changes at Senate, a College committee chaired by the Provost. Amazingly, it was passed unanimously by all members of

Senate. Further recommendations have also been made to increase the resources assigned to the Student Casework Team.

This is one of the most impactful

“

I'M THANKFUL THAT CHANGES ARE BEING MADE AND THERE ARE NEW MEASURES IN PLACE WHICH WILL MAKE THE PROCESS MORE TRANSPARENT

Academic Registrar and his team, and the College's Legal team.

A student who has experienced the process said:

changes in this area that has happened in recent times. We could not have done it without the help of our Liberation & Community Officers, Union Council, the

“As someone who has been through the College disciplinary process, it was incredibly frustrating and I felt very alone. It made me question my decision to submit the report in the first place. I'm thankful that changes are being made and there are new measures in place which will make the process more transparent, and give students the support they need throughout the process.”

Student casework needs more resource

These changes have been a long time coming, and we know that they will positively impact students that go through this process in the future. But the work is not done yet. Most of the issues that we outlined above can only

be fully resolved with the additional commitment of resource from the College. Waiting times can only be reduced by hiring additional casework administrators, and specialists on sexual violence, bullying, and harassment are needed to handle sensitive cases.

Moreover, we must regularly review the procedures and the resources surrounding them so that they are kept up to date. We must also look at how these new procedures intersect with other areas, such as the College's HR policies.

Finally, we must now also turn our attention inward and look at the complaints and disciplinary procedures within the Union.

If you have any feedback or comments regarding this, please email Hayley at union.president@imperial.ac.uk

Credit: Thomas Angus, Imperial College Union



The Imperial College Union building in Beit Quad.

BOOKS

Edited by: ZANNA BUCKLAND

BOOKS

Books Article

Reading *The Virgin Suicides* in a Post-Pandemic World

► Books writer Natasha Ali introspectively examines the parallels between Jeffrey Eugenides' 1993 coming-of-age novel and our experiences in lockdown.

Natasha Ali Books Writer

"With most people, suicide is like Russian roulette. Only one chamber has a bullet. With the Lisbon girls, the gun was loaded. A bullet for family abuse. A bullet for genetic predisposition. A bullet for historical malaise. A bullet for inevitable momentum. The two other bullets are impossible to name, but that doesn't mean the chambers were empty."

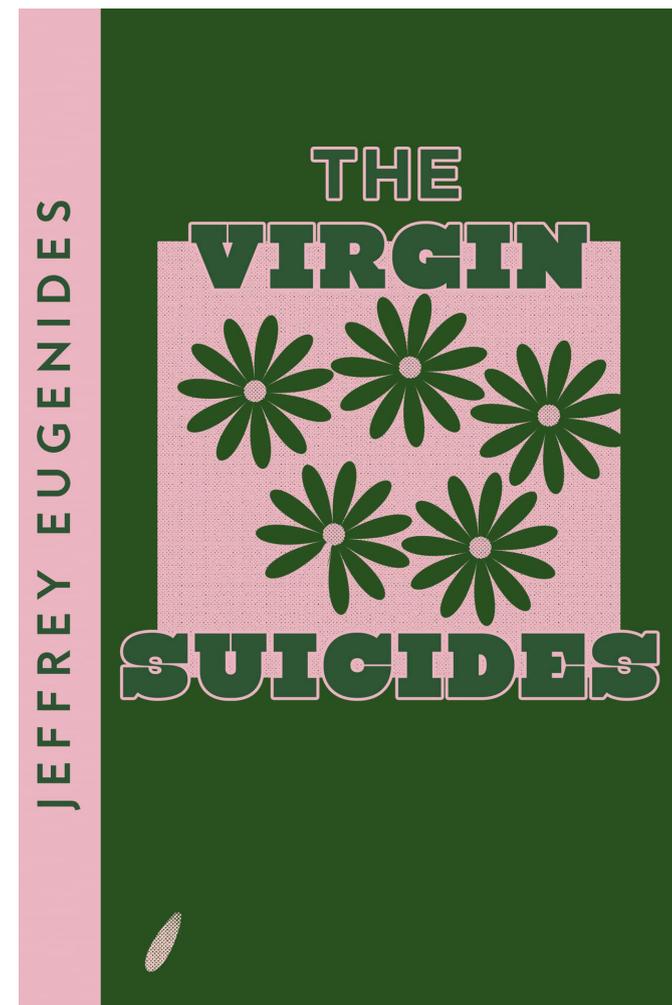
The Virgin Suicides by Jeffrey Eugenides is a tragic-but-beautiful tale, filled to the brim with rich prose and a hazy American-Dream-gone-terribly-wrong aesthetic. The novel tells the fictional story of the Lisbon girls; five sisters whom, over the course of one year, all commit suicide in their suburban Michigan home. It is told from the perspective of a group of boys who were hopelessly infatuated with the girls at the time of the incidents, and now, decades later, are still trying to understand why a whole family eliminated themselves in such a shocking, disturbing way.

The book is littered with contradictory facts, unreliable interviews, and the warped, slightly inaccurate memories that surface when grown adults try to recall their teenage years. These inconsistencies make for a surreal read, with the events in question coming across as highly ambiguous. The reasoning behind the Lisbon

girls' actions is left vague, making characterising them near impossible. And many, *many* reviews either praise or criticise the lack of a definitive conclusion explaining the suicides.

However, reading this in 2023, I find the confusion over why the girls did what they did a little ludicrous. Personally, even though it was never clearly explained, their actions seem obvious to me in a way they might not have been in 1993 when the book was published. And I imagine most readers now could better understand and empathise with the experiences of these five middle-class suburban girls and why they acted upon their suicidal thoughts. Because every single one of us has now experienced what it feels like to be trapped inside our own homes.

Without spoiling too much, a large portion of the book focuses on the Lisbon girls essentially being trapped within their house for months on end. Their parents are strict, unwilling to allow the girls a single ounce of freedom. They are especially restrictive with anything involving the transition from girl to womanhood; make-up, romance, magazines, music, and social events are heavily limited. Their clothing is controlled and censored, and so for a lot of the story the boys tend to blend the sisters together into a single entity of long dresses and old fashioned up-dos. They are unstimulated, with little to do in a house which is no longer being



taken care of, leading to decreasing hygiene, health, and quality of life. It gets to the point when they stop attending school, and all they have is that one building with seven people constantly occupying it. As the novel progresses, we learn that the home was observed obsessively by the boys, who witness it slowly rotting from the inside out.

While reading this, I could not help but think that if I too lived under these circumstances, with no books, electronics, friends, or identity of any kind, I would also start losing the will to exist. Their depression is obvious to me now in a way it would not have been pre-lockdown, because lockdown showed us all that boredom can cause pain, a lack of purpose can catalyse depression, and having nothing meaningful to do for months on end can result in a serious risk of suicidal thoughts.

Because of this shared experience, I urge people to read this book now, as I believe it truly captures how we all felt during the long lockdown periods. I believe people can get something more out of the work now than pre-2020. *The Virgin Suicides* beautifully highlights exactly how boredom can become a silent killer.



Still from Sofia Coppola's 1999 film adaptation of the novel.

FRIDAY 5TH MAY 2023

FILM & TV

Film Review

Alcarràs

Jonah Hewett Film Editor

Carla Simón's *Alcarràs* feels like a story being told some fifty years from now, bittersweetly remembered by those who have almost forgotten the land they grew up in and the taste of the fruit it bore. Set amidst the dust and sun of Catalonia's Lleida region, the film follows the expansive Solé family, who have grown and sold peaches by hand on the same land for decades. We find ourselves amongst them, as they are told by the son of the previous landowner that they must make way for the construction of a new solar farm by the end of the summer. The panels will be more profitable for him, and the jobs he offers to the men of the family will pay better than farming the acres of peach trees that have stood there for so long. For the three generations of Solés, it's not quite as simple as that. There follows a chronicling of the tension that this places on the family, and the whole community – it's not just their land that's being taken – as the summer, and the harvest season, move quickly towards their end.

The members of the ensemble cast bring each character to life beautifully, with a realism that is rarely found outside of smaller, less 'mainstream' films like this one. A realism owed, in this case, to that carefully chosen cast, comprised entirely of non-professional actors. The focus of this film is people; those affected by the changing technological landscape. We follow each individual equally, seeing them in private moments that contextualise their interactions as a family. Simón's command of character with minimal dialogue is masterfully done. Scenes of Quimet, the father, are energetic, stressful, and loud; he characteristi-

cally controls the frame in much the same way as he tries to control his family. His interactions with the land – itself becoming as much a character as a background – are efficient, and centred on production; the rush to finish the harvest before the fruits turn bad. Rogelio, the ageing patriarch of the family, presents a different portrait of age and a certain helplessness, but containing enormous reverence for the land and the life it has sustained for him as he walks alone among the trees. The younger children appear to struggle to understand the situation – the rural landscape has always been their playground, but it's clear from the way they find solace in each other that they are well aware of the coming changes. Then there are the older teenagers, secretly growing weed amongst the crops and raving in the village and trying to find their own future away from the land they grew up in.

There's another character too, slightly more remote but saliently omnipresent. The changes occurring in this rural community are a direct result of climate change, and progress to try and halt it. Droughts and fires are a huge risk to farming in dry, warm climates like those of Spain – but how do our efforts to prevent them affect the livelihoods of the people living and working there? This particularly includes the numerous North African migrant workers who arrive looking for work during the harvesting season – although the fates of these people are only briefly touched upon

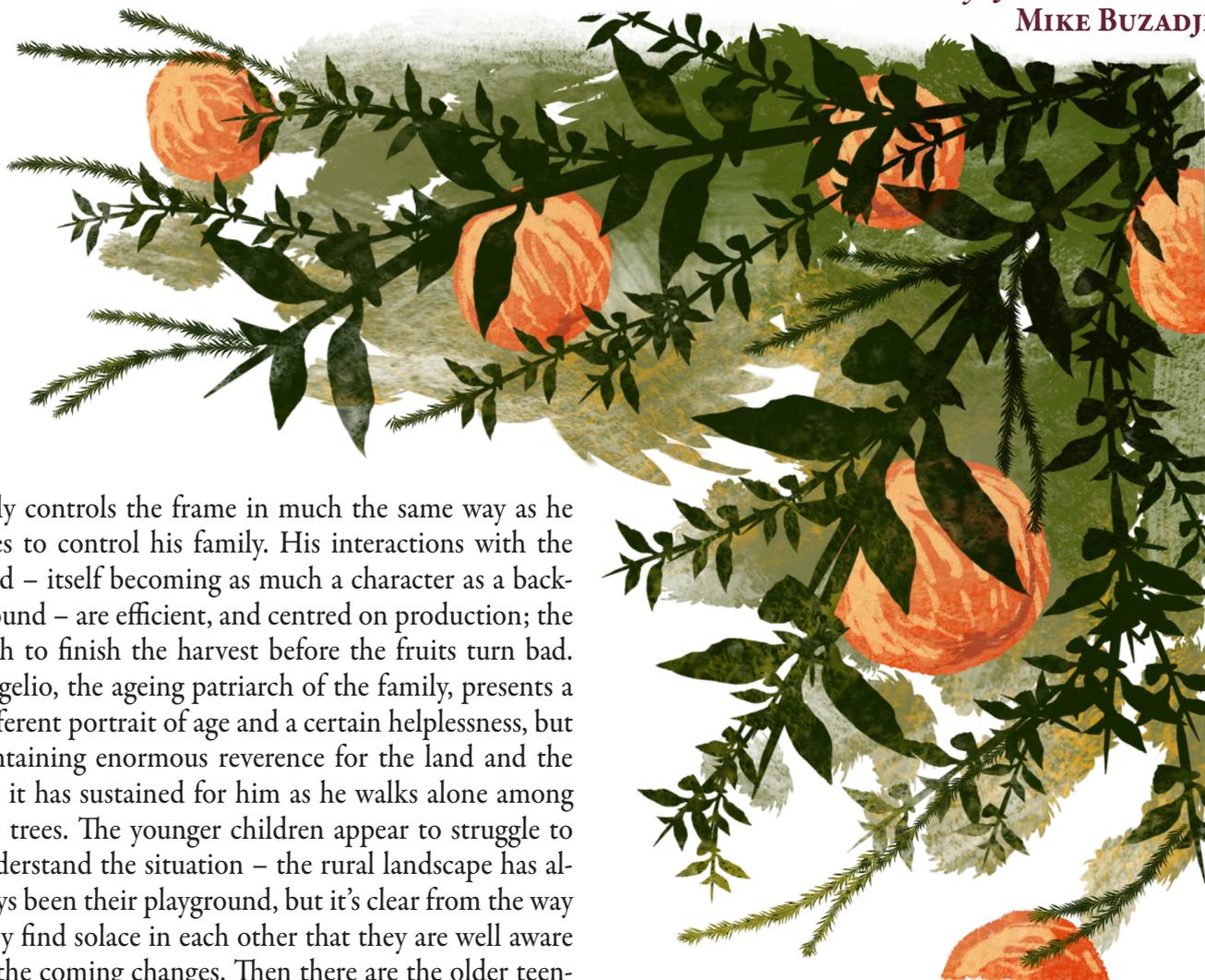
in the film. Simón's films (including her similarly-set *Summer 1993*, released in 2017) encapsulate Catalanian culture, exhibiting the local fiestas and sense of community in the pueblos of rural Spain. Since the 1960s, these areas have been getting smaller as people migrate to the cities – a phenomenon known as *España vaciada*, or 'emptied Spain' – with profound effects on the economy and culture of the country. There is a sense of nostalgia for these places in *Alcarràs*.

Despite this, it's clear that eco-industrialisation isn't necessarily just the faceless enemy of the film. Jobs are provided – to some extent – for the displaced farmers (although, notably, not for the migrant workers) and there is a sense of inevitability that many members of the family accept. But for the most part, the way in which the progress comes about is tragic. Nowhere is this more apparent than in the film's painfully beautiful final moments, each shot framing a different member of the family as they watch – and we hear – the peach trees being torn down by an excavator, one by one.

Where can I watch it?

Alcarràs is available to watch on Mubi, or on Amazon Prime with a subscription to the Mubi channel. Free trials are available for both!

Illustrations
by Natalie Yu



FOOD & TRAVEL



In the winter, take a shot while you ski – in the summer, sing a song and hug a tree!

► *A personal review on the European upper-class world that resides in Kitzbühel, Austria.*

Charlotte Probstel Travel Editor

7:15am; my alarm sings its typical seaside song and wakes me in the little floor-level bed labelled the “Love Corner” by my dad – a name almost as uncomfortable as the “Holy F***” room, which is a cathedral renovated into a small apartment at his property in Spain. 7:45; I have my base layers on, then my

honourable ski races: the Hahnenkamm Ski Race. Skiers reach a velocity upwards of 90km/h (56 mph), and a record average speed of 107km/h (66 mph) was set in 1997 by Austrian Fritz Strobl. The course is called the ‘Streif’ (‘streak’ in English), a fear-inducing strip of snow that commands respect upon viewing it. I skied the Streif many times as a young child – not the main runway, but the

the first two sections.

Going back to that Wednesday morning, I take my usual walk across the valley to the base of the Streif. I lock myself into my skis, press play on my *Crime Junkie* podcast – which I highly recommend – and start to slowly walk along the piste. Every so often, I take a small break to turn around and enjoy the view. It is incredible to be able to see your

That day I stupidly took two routes with a high slipping probability. You have to consider that I wasn’t wearing many thick layers or a helmet, as the body produces enough heat during the exercise to boil potatoes with. Slipping with little support is quite dangerous, and I’ve slipped at times in the past, hitting my head. Do I remember these times? No. Did my family tell me

Credit: Charlotte Probstel



View of the Alps from the Kitzbuehler Horn, one of the mountains connected to the ski resort.

ski jacket. Everything to keep me warm on my descent. 9:00; I leave the house and head towards Hahnenkamm.

Each winter in Kitzbühel, Austria – a small town in Tirol, a region south of the German-Austrian border – the locals host one of the most dangerous yet

family route beside it with many more turns and blue or red direction to avoid slipping. There are a few rules to follow – staying on the side of the piste, always positioning yourself such that skiers can see you from afar, and never taking the stupidly steep route. I tend to listen to

slow increase in elevation. You can really see your progression and feel proud. You pay attention to your warm breath and your shooting heartbeat. Every step is a challenge – especially when the piste is really icy – and your focus becomes razor-sharp.

this? Yes. I was also alone, so as I was listening to stories of young women being kidnapped or found dead in the woods, my mind started to wander off as I passed the thick trees and walked along narrow paths. Nevertheless, I survived – shocking, I know – and I can’t wait to

Credit: Charlotte Probstel



Me while skiing up the mountain.

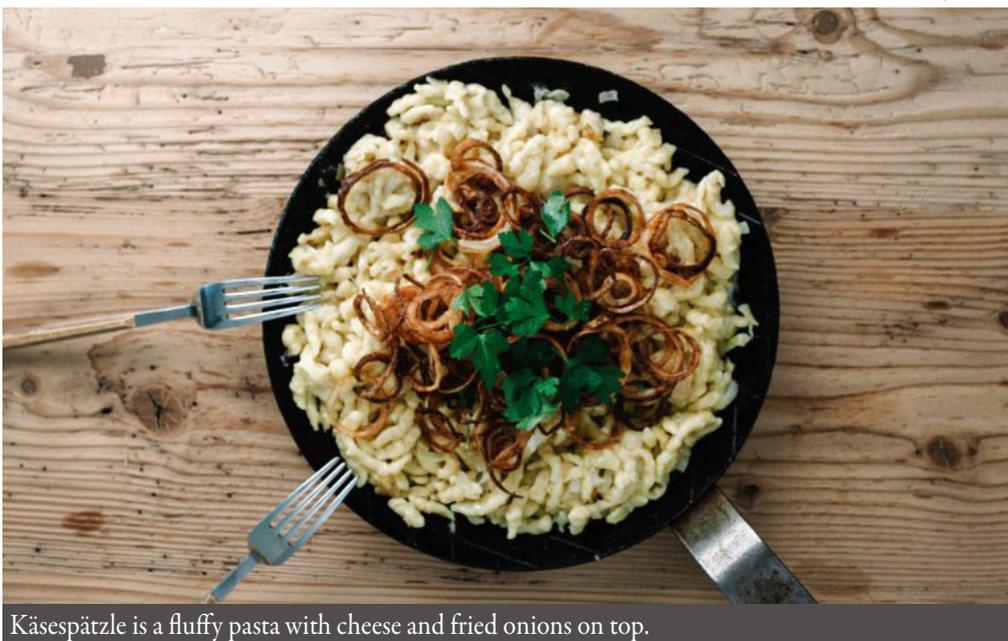
do it again next year.

Three and a half hours later, I made it to the top to meet my family for lunch. Kitzbühel is well-known for the après-ski partying culture. Many visitors from Munich, Germany spend their winters here partying on the top of the mountains, or in the many nightclubs such as 'Take Five' or 'The Londoner'. Some restaurants serve buckets of champagne at three-figure prices or caviar at €365 per serving. The restaurants are booked months in advance and large groups of socialites meet there, wearing their pelts and leather bags from Hermes. If you wish to learn a little bit more about this, the Netflix show *Kitz* – a fictional show with a *Gossip Girl* vibe – embodies the relationship between the Austrian locals and the affluent guests. While the characters and drug use seem plausible, the murder is only added for dramatic effect! I watched the show as if I had lived it, because my classmates lived such a lifestyle while I had only heard about

it.

Outside of its social world, Kitzbühel is a wonderful place to mountain bike, in the winter as well as in the summer. As a family, we would bike up towards a restaurant to enjoy a platter of Käsespätzle (similar to mac-n-cheese) or Kaiserschmarrn (cut-up pancakes with apple sauce and cranberries). My family loves one restaurant in particular, owned by a female cook and run by her two waitresses. The cook runs the whole show, yet always has time for a little conversation with the guests. The locals

Credit: Tyrol.com



Käsespätzle is a fluffy pasta with cheese and fried onions on top.

make excellent food – 1000 meters above the valley – and their hospitality always makes me smile.

As you might expect in the Alps, cows roam the sides of the mountains, the air is fresh, the sun shines from one end of the valleys to the other and everyone minds their own business. Grandmas and grandpas spend their days hiking, biking, skiing, walking, or going on a run – the lifestyle keeps everyone fit and healthy – and the food quality is superb. I don't mind being overtaken by someone three times my age or someone ten years younger than me. I don't ever compare my athleticism to the locals, because

Credit: Netflix

Poster for the Netflix show *Kitz*.

Credit: Charlotte Probstel



My dad biking in the summer months. The bike paths are sometimes easy, sometimes hard. The view is always worth it.

they live and breathe daily exercise.

I mentioned the food before, but here is a rundown of the local cuisine. It is primarily meat- and bread-based, with a little bit of bacon ('Speck') or beef in every dish.

The classic soups are: Tiroler Speckknödel – large bread dumplings filled with bacon in some chicken stock – and my childhood favorite Frittatensuppe – a chicken broth soup with cut-up pancake strips.

Typical mains are Tiroler Gröstle – a bacon, onion, and potato stir-fry with a fried egg on top – or Kaspressknödel – a bread dumpling filled with cheese. There are many more bread-dumpling variations that include spinach, other meats, or dessert styles.

Popular desserts include a cheese platter with hard cheeses and bacon strips, and Germknödel, which is – surprise, surprise – a bread dumpling served with vanilla sauce.

The town of Kitzbuehler-Horn is accessible by train from Munich Airport or the airport in Innsbruck, Austria. While everything tends to be on the pricier side, such as €50-per-day ski tickets for the six-mountain ski resort, the town is very safe and beautiful. A blend of traditional and modern style is prevalent in the architecture and food. The tiny town is packed in winter and the party never stops. So if this is your kind of winter holiday, be sure to book months in advance, and I look forward to seeing you there.

FOOD & TRAVEL

You don't want to snooze on this mousse

► *A chocolate mousse recipe that can be the hit at your next party.*

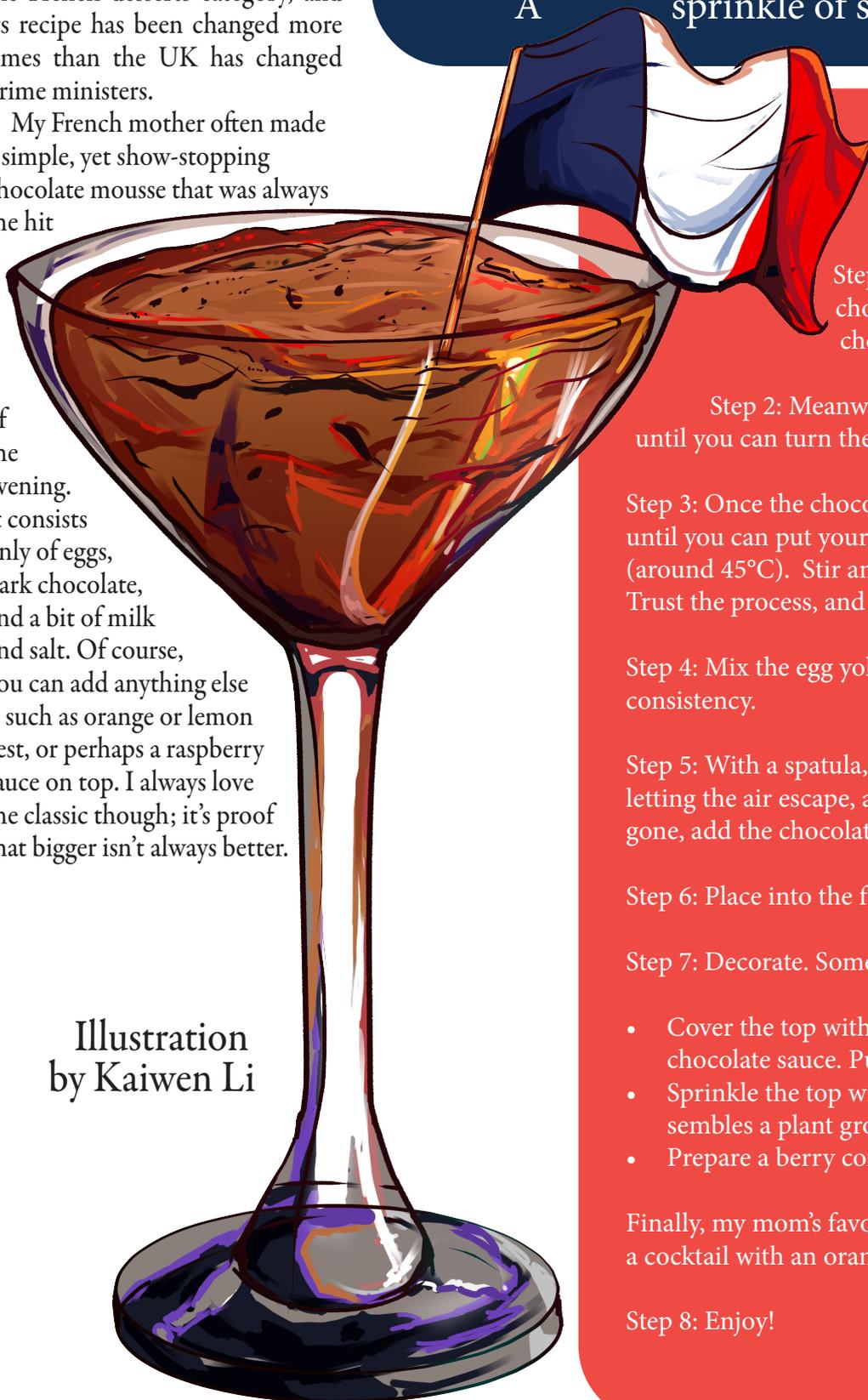
Charlotte Probstel Food Editor

In these times when the French community is split between the government and its people on the topic of retirement, there is one thing they can all agree on – their mother makes the best chocolate mousse. Originally named ‘mayonnaise de chocolat’ by its inventor Henri Toulouse Lautrec in the 19th century, it has become a staple in the French desserts category, and its recipe has been changed more times than the UK has changed prime ministers.

My French mother often made a simple, yet show-stopping chocolate mousse that was always the hit

of the evening. It consists only of eggs, dark chocolate, and a bit of milk and salt. Of course, you can add anything else – such as orange or lemon zest, or perhaps a raspberry sauce on top. I always love the classic though; it's proof that bigger isn't always better.

Illustration
by Kaiwen Li



Ingredients

Serving method: prepare individual bowls, champagne glasses, or glass cups for individual serving portions.

30g of dark chocolate per serving (i.e., 1 serving = 30g, 2 servings = 60g, 3 servings = 90g,...)

1 egg per serving.

A splash of milk (measure by eye – and heart!).

A sprinkle of salt.

Instructions

Step 1: Chop up the chocolate and melt in a water bath, i.e., place the chocolate into a metal bowl over a pot of boiling water. Avoid melting the chocolate directly in a pot, to prevent burning.

Step 2: Meanwhile, separate the eggs and beat the egg whites with a little sprinkle of salt, until you can turn the bowl upside down without the egg whites falling out.

Step 3: Once the chocolate has melted, take it off the heat and wait for the chocolate to cool down until you can put your (thoroughly-washed) hand inside the chocolate without burning yourself (around 45°C). Stir and mix the chocolate with a little milk until the consistency is silky smooth. Trust the process, and stir, stir, stir. Add more milk if the chocolate looks too thick.

Step 4: Mix the egg yolks into the chocolate. Add milk if necessary to further silken the consistency.

Step 5: With a spatula, gently fold the egg whites into the chocolate mix. Don't over-mix, to avoid letting the air escape, and you'll get another batter-like consistency. Once all white clumps are gone, add the chocolate mousse to your bowls/cups/glasses.

Step 6: Place into the fridge for at least 4 hours.

Step 7: Decorate. Some ideas are:

- Cover the top with a single layer of blueberries and lightly cover the blueberries with a chocolate sauce. Put into the fridge again to allow the chocolate to harden.
- Sprinkle the top with some chocolate chips/sprinkles and add a mint leaf so the mousse resembles a plant growing out of soil.
- Prepare a berry compote (melt berries with a little sugar in a pot) and add to the top.

Finally, my mom's favourite: prepare the chocolate mousse in a champagne glass and serve it like a cocktail with an orange slice on the edge of the glass.

Step 8: Enjoy!

FRIDAY 5TH MAY 2023

SPORT & SOCIETIES

Edited by: ISABELLA WARD
CHARLOTTE PROBSTEL

SPORT & SOCIETIES

Formula Student: the motorsports team leading the charge for change

► *As they count down to Silverstone, Formula Student gear up to meet green challenges.*

Claire Bonniseau Guest Writer

Three years ago, Formula 1 set ambitious targets as part of a wider sustainability strategy to reduce the sport's carbon footprint. In Formula Student, a club where students build an F1 car, this ambition has been at the heart of the project for years. Members learn transferable skills such as critical thinking or project management, and gain experience on a hands-on project while driving environmental change in one of the biggest sport industries in the world.

Formula Student: a new approach to sustainability

Formula Student is part of Racing Green, an overarching group of car development teams in the Mechanical Engineering Department. It comprises two

teams of Imperial College London students working in the Pit Garage, located on campus. Conor Leo, Team Principal, claims: "The biggest team is Formula Student, which designs and builds the fastest car possible to compete in a race at the end of the year at Silverstone." The Formula Student competition is essentially Formula 1 at university: what better way to get your feet into the field!

Since 2010, Imperial has competed in the electrical engine section of Formula Student, as pioneers of environmental change. Conor elaborates, "Imperial was one of the very first. A lot of people are catching up, but the electrical category still has a reputation because of the added difficulty of building the battery." Racing Green members learn how to combine engineering skills with sustainability aims throughout the project.

Rev up your skills by building a car

From technically minded mechanical engineers to marketing students, there is a place for everyone in the team: whether designing the car or managing the business side. Conor explains that "[they] split the teams [...] geometrically based, but there are parts of the car which naturally became a sub team. The chassis [...] is quite a large sub team involving a lot of people, and you can put a lot of workers with less experience on that". In an iterative process, students add parts to the chassis recycled from previous years.

Conor adds: "We'll test [each part] in isolation, test it with another part connected, and slowly build it up. That's the easiest way to do it." With limited funding, every aspect

of the design must be carefully studied through simulations and research.

The most exciting time of the year is towards the end of the second term, when all the individual parts come together, and the car finally looks like a car (and more importantly: moves).

Formula Student uses an interdisciplinary approach to address sustainability challenges in F1, taking its roots in students' degrees. "The construction of the car was made to correspond with the 3rd year Mechanical Engineering coursework deadlines, with students using the CFD software - discovered in class - for flow simulations." Alongside them, computer sciences students help develop MATLAB or Python codes for simulations. From the expertise of Electrical and Electronics Engineering students, Daniel Gutierrez, President of Racing Green, tells us that "students from other backgrounds have acquired a strong knowledge in batteries, which remains one of the greatest difficulties in the building of the car. You learn not just the technical skills which you touched on in the course. You learn those better in an applied way and you learn other technical skills which you would never experience on the course".

The best part: you don't need to be an F1 addict to be part of the team. George Worledge, Technical Director, tells us about the soft skills he acquired in the team that will be useful in his consultancy career plans. "The longer you spend in it, the more responsibility, the more you pick up those additional skills. Personal management, dealing with delegating to people, taking strategic decisions, and the politics of the department. Overall, it's about learning how to take a more strategic view at the competition, building a plan around it."

Why should you join?

Formula Student welcomes any stu-

dent willing to commit. George adds that "the Mechanical Engineering department is funding most of the project in exchange for promotion and communication, and the team goes to schools to get pupils interested in engineering and the university." For non-STEM students willing to be part of the team, the newly created Business team provides experience in marketing and communication as they work to find new sponsors.

With some members working with in F1 teams such as Williams Racing during their year in industry, the club is the perfect place to launch a career in motorsports. However, Conor declares: "A lot of members also got into the manufacturing field after graduating. In fact, a lot of them are still willing to help us out when we need some specific pieces."

The team is now working towards reaching self-sufficiency. Daniel says: "The department funds each Racing Green project the same amount but not from the same pool. I ensure both teams are joined so that we can access those extra resources and help each other. The aim is to make the project long-term to achieve success over the years."

Formula Student is the best way for Imperial students to develop and apply transferable skills while developing sustainable approaches for one of the most popular sports in the world. Now recruiting more and more students from every background, the team hopes that by becoming self-sufficient and achieving success in their races, they can drive change in the F1 industry. As members build lifelong relationships and skills, Formula Student welcomes motivated students to help them take their success a step further.

You can contact the team at: icracing@ic.ac.uk, [@imperialracinggreen](https://www.imperial.ac.uk/racing-green/) on Instagram or visit <https://www.imperial.ac.uk/racing-green/> to find out more.

Credit: Thomas Angus



A student member of Racing Green in the pit garage.

SOCIETIES

Gamble your studies, or gamble your money?

► Meet the Poker Society and the weekly tournaments they host, which are open to both newbies and experienced players.

Charlotte Probstel Societies Writer

“It’s not about the rarity of the hand but the money you make with the hand,” revealed Thom, the current president of the Poker Society and 4th-year Chemistry student. “[It’s] an impossible game to master, but easy to learn,” mentioned Dom Goddard, next year’s President, and a current 2nd-year civil engineering student. When asked about the best strategy, all they said was “Play it. The best way to learn is just to play it.” Of course, there are strategies, but those are best played when joining the poker society during their weekly tournaments.

The Tournaments

Every week in the Autumn Term, the Poker Society hosts weekly Texas Holdem Poker tournaments from 6pm to latest 12am in Skempton 301, where players play in groups of 6-7 players. The buy-in’s are either £5 or £10 per session. Members get a +10% bonus for their buy-in. The membership will cost £5 next year, for the entire year. The pot is split among the winners. So if roughly 40 players show up, that is a range of £200-£400 to be split. First place takes 50%, sec-

ond place takes 25%, etc. The pot may increase for those who decide to buy in again. Students, alumni, friends, and other guests are welcome to join for a session or so. You can expect talks about strategies, social conversation, and discussions about the game.

Cashing Tournaments

A second tournament is also offered

“

IT’S AN IMPOSSIBLE GAME TO MASTER, BUT EASY TO LEARN

at the same place and time. The cash-in tournament allows players to buy in with as much as they want and leave whenever they want, paying out their wins or losses once they leave. It usually starts 8pm and players can play for 30 minutes before leaving. Some players only come for that game. I plan on coming, will I see you there?

Freshers Tournament

The Freshers Tournament is a massive tournament at the beginning of the academic year and it hosts normally around 90 people. Everyone is welcome to attend, not just freshers. The buy-in: £5. The pot thereby can be upwards of £450. The pot splits exactly, as in the weekly tournaments.

Future Plans for the Society

First, you must maintain before growing, hence the society will work hard next year to keep people coming. At the beginning of the first term, an average of 90 people showed up, which then breaks down to 30-40 regulars. How will they



A weekly tournament hosted by the Poker Society.

grow? More socials. More food nights. Tournaments with the poker societies of other universities. They aim to rent out a conference centre hall for these events, expecting many attendees.

Previous Events

There have been such events where companies would sponsor the event and the top ten players get a special prize. This ranges from interviews with the companies, or to playing the final round at their head office. Such companies are scouting talents for risk management and invaluable trading skills in trading companies. Companies such as ‘JumpTrading’ and ‘GameStreet’ understand that poker is a big culture at their companies. Skills gained in poker range further than “playing the man opposite of you” or knowing the basic mathematical probabilities. It is knowing when to take a risk and when not to.

Charlie Carrel and Game Theory Optimal

“Poker is a solved game. Like chess, it has been solved by computers. There is an optimal strategy called GTO (Game Theory Optimal). It’s perfect but it’s impossible for any human player to re-create that. We can try. It is better to exploit the imperfection of the opposition.” said Dom, to which Thom added “For example, we invited Charlie Carrel, a world-class player who has won 9 million dol-

lars playing. He is now retired but still plays. He gave a talk last year and we spoke face-to-face. He plays exploitatively. Being a professional player, he understands the GTO style inside and out. The options are infinite.”

Personal Enjoyment

For Thom and Dom, the Poker Society is a place to hang with friends and play a game they both enjoy. They play more in private than they did before joining. Dom especially enjoyed “winning. Making lots of money”. Thom doted on the “infinite number of strategies and the flexibility of play.” The “complexity of the game” allows players to “basically bet anything you want”.

What would they say to you, my dear reader?

“We look forward to meeting you in the fresher’s tournament next year. We will have one final leaving tournament at the end of term 3. Come and give it a go. There is nothing to lose. You will be playing with 6 or 7 people at a table. Just give it a try.”

Until next time,
Charlotte

