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PIPELINE

THE CHEMENG SOC ULTIMATE NEWSLETTER

THE
WELCOME
EDITION

ChemEng & Uni in
times of Covid-19



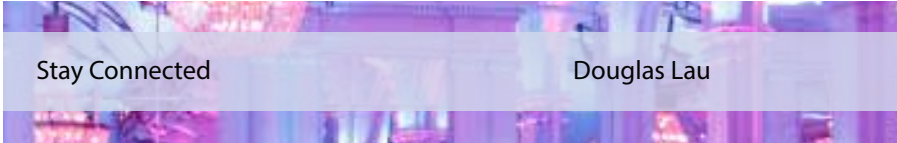
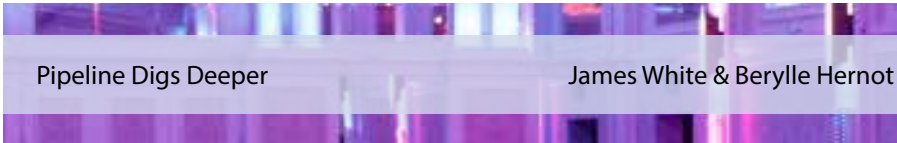

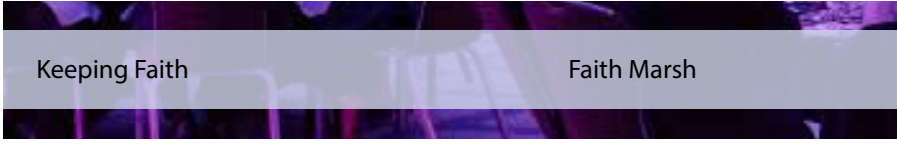

In Depth
Covid-19

BRINGING YOU NEW PERSPECTIVES ON TODAY'S MOST
PRESSING TECHNICAL ISSUES!



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Editor Notes

Hi Reader,

The past few months have been particularly challenging. A global pandemic is not necessarily how most of us would have imagined spending the large part of the year. And whether you decided to shelter in place or to head home, I'll be willing to bet you might have reconsidered the decision in the past couple of months. Feelings of isolation, loneliness, and general helplessness seem to have taken over much of our student population.

So, in this edition, we'll address the elephant in the room- Covid-19. At the time of writing, governments worldwide have had various degrees of success controlling the spread of the virus. But, the impacts of the virus itself has caused us all to reflect on both

how far we've come technologically and how far we collectively have to go to address the structural inequalities inherent in our societies.

Bearing this in mind, our talented writers have worked hard to bring a series of articles attempting to tackle these questions. These range from questioning what we now know about the virus, examining the strategies governments worldwide have undertaken in this public health emergency, and its impacts on various seemingly unrelated things, from the much-talked-about economy, to the environment and even on individuals and the university itself. To avoid over-delving into Covid-19, we also bring you news from your wider student community and the

Chemical Engineering Society itself. We've got updates from the Society. We talk to an alumnus and a current year student on the projects they're working on and reflect on the unique experiences this has given them. And, we've got you covered with some mental health tips, courtesy of Faith, and some student life hacks, courtesy of Fhai, so keep an eye out on those.

We've really enjoyed working on this complex theme together. I hope you find these articles both engaging and informative.

Until the next edition,
Karyshma
Editor-in-Chief



Unmuted!

Sorreeee.... I'm on Mute

...
...
...

Sorrr---rrrrreeeeeeeee, I was muu-uuu-uuttteeeeeeeedd. (Kicks internet router). Ahhh, that seems to have sorted it.

Well. This has been an “interesting” start to the academic year. I never anticipated being the first staff member to host a virtual welcome dinner – thank you to all of the first years who engaged, and thank you to the committee members who frequently stayed on for a long

time to chat with the students after the staff had turned into pumpkins and left. It was very nice to talk to so many of you (I hope that this was talking *to* not *at*). We have a very sparse in-person programme and a very heavy “cyber” program of events; we are REALLY hoping to get some in-person events sorted by the end of the year.

I hope that you are all GOING OUTSIDE occasionally – a constant refrain in my personal tutorials is that students need to go outside to get some vitamin E. I’ve since been informed that I meant vitamin D (thanks Paulina). For those of you in the UK, I hope that you are managing to occasionally meet up,

and for those who are still out of the UK, I hope that you are getting some societal interaction with your friends.

It’s weird, it’s no fun (it’s no fun for the staff either), but “these things shall pass”. The more competent your government, the faster.

Right, I’m off to work out how to demonstrate how to cook a roast chicken or beef (or vegan equivalent). Good luck with the coming year!

Paul

Behind the Scenes

Going Digital

DEAR CHEMENGSOCC,

Hi, I'm Alessandro. I will be your trusted Chair for this most extraordinary and challenging year. I just want to take the opportunity to welcome our new cohorts, welcome back our returning students, and talk a bit about the Chemical Engineering Society and what you can expect from us in these uncertain times.

Covid-19 has been an extremely turbulent roller coaster ride. And it's affected and will affect how we continue to deliver events and represent you in the near future. Social distancing restrictions, and now an outright ban on in-person gatherings, have made it significantly harder for us to engage with you. At the beginning of summer, we saw ourselves facing two problems: uncertainty, and preparing for a digital transition of our services.

The uncertainty came from the unpredictability of how the COVID-19 situation would evolve. In June and throughout summer, we were facing a lot of (misplaced) optimism in the UK. It seemed like the problem was getting better and could potentially quiet down, to the point of potentially restarting with some in-person events, with a few restrictions in place. At the same time, the effects of gradually alleviating restrictions were unpredictable. As a result, we had to prepare for both situations, carefully prioritising the time spent by our officers on gearing up for the possible outcomes. Based on the scientific predictions, and the trends in Spain and France, we made a call, deciding to minimise time spent on preparing for the eventuality of in-person events, and worked on transitioning to digital. For our industry events, we worked closely with our sponsors to mediate between their needs and the value we wanted to deliver to students. Career talks were easy to migrate, and

we just had to look into what platforms to use to host them and provide a structured form of Q&A. For networking, we explored ways of allowing small groups to easily communicate with breakout rooms and Teams channels. When it came to workshops and CV checks, it was definitely more challenging; there was a lot of trial and error involved with the companies, especially because each of them had different restrictions regarding what platforms we could use.

Finding ways to help people socialise was tricky. Nothing can beat in-person interactions, so we had to keep all our options open until the very last moment. It was a good entrepreneurship exercise; we brainstormed ideas as a team, bringing in formats that developed for other types of interactions in the past few months, like speed networking or remote team dinners and adapted them to suit our needs. For some of our other ideas, we tested demand with a survey and acted on the data and feedback we collected. So far, we have successfully delivered two remote welcome dinners for the new cohorts, and a speed mingling event that allowed Year 1 students to quickly introduce themselves to quite a few course mates. We'll even be having a virtual Among Us gaming session. The digital transition has been challenging, but a valuable learning experience for us to face a very atypical situation! We remain committed to supporting your university experience in terms of social events to peer support, initiatives, and even career development events and opportunities. We hope to continuously innovate and expand our event offerings. We ask for your continuous patience and support. And if you have any suggestions on how we can improve our event offerings, feel free to get in touch with committee members!



Stay Connected

Communications and Branding

HELLO THERE!

I'm Doug and as Secretary of the Chemical Engineering Society, I want to again personally welcome y'all back to the department and to the ChemEngSoc family. Before we go on, here are some things about me: I'm in my 4th year and I've made it this far by browsing Reddit during lectures (jk... do try to pay attention – but it's also important to take a mental break and revisit things with a fresher mind), I love to headbang to heavy metal – which may be the reason my hearing is starting to go, and I am a massive foodie.

By now, you should have received a few social newsletters from me. If you've read them (and hopefully you have (O - O)), you may be thinking, "Who is this guy? What does he

even do apart from sending emails?"

Well, I'm glad you asked!

As Secretary, I head the communications and branding branch of the Society. My team, consisting of Karyshma (Pipeline Officer), Zahra (Communications Officer), and Aris (Regalia Officer), are working hard to keep you in the loop on what the Society is doing and to foster some online interaction between you and your peers. This is especially important this year as we may not necessarily be able to meet in-person. The fact that you're currently reading Pipeline is a great start (shoutout to Karyshma for editing)! Here, we bring you the latest news from the department as well as the industry. We are also super active on our social media

channels (FB & IG: @icchemengsoc, Twitter: @ICChemEngSoc), which Zahra is directly managing. Check them out and come talk to us! Lastly, while you may not be able to come into the department, you can download and print our ChemEngSoc logo (lovingly crafted by Aris) as a reminder of home and to show off your ChemENG spirit!

Hopefully, this situation will all blow over soon and we can see each other!

ChemEngSoc love,
Douglas Lau
Secretary
Imperial College Chemical
Engineering Society

Pipeline Digs Deeper



The Vexing Vaccine Problem

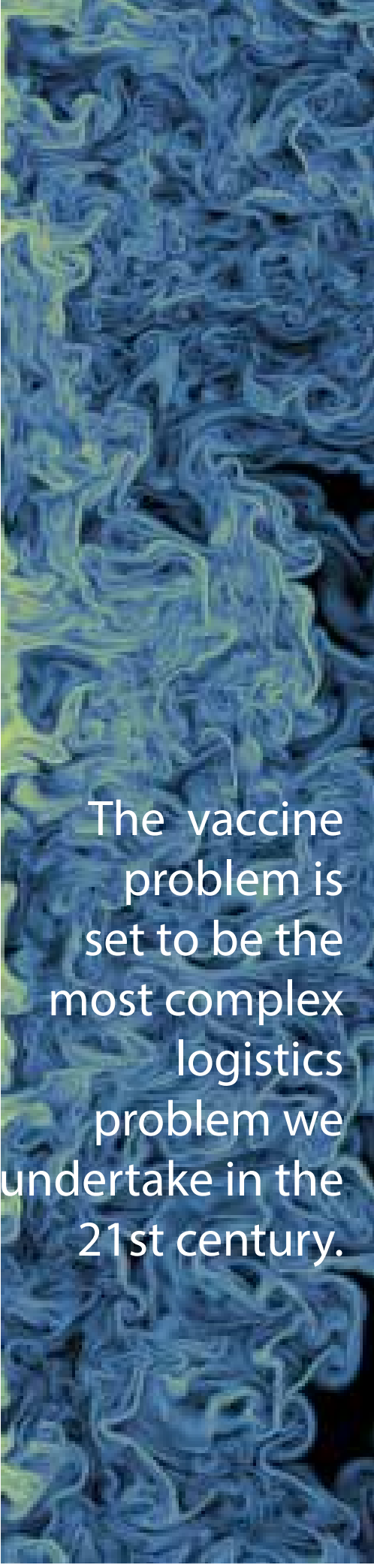
2020 has been dominated by talks about Covid-19. With over a million dead, economies paralysed and thousands facing all manner of restrictions in their day-to-day lives, it doesn't seem likely that we'll ever be rid of COVID and the havoc it has wrought. In these trying times, the vaccine has been touted as a solution to bringing a much-needed sense of normality. The development of a viable vaccine has been promisingly quick so far, but how long will it be until one is widely available?

At the time of writing, there are 213 vaccines and 319 treatments in development for the virus (Milken Institute, 2020). These vaccines are making use of every technology available, from the more traditional live attenuated viral vaccines used against MMR which utilise a weakened version of the virus, to modern nucleic acid-based vaccines that have yet to be used on such a large scale (Callaway, 2020). It is the latter, particular RNA-based vaccines that have dominated headlines so far as the fastest vaccines to be developed, with the US Company Moderna going from DNA sequence to first shot in 63 days (Moderna Inc, 2020). These vaccines involve RNA sequences that code for viral proteins entering cells, causing them to produce the viral proteins and trigger an immune system response (Callaway, 2020). This is the approach being taken by

the team at Imperial (Johns, 2020). Other vaccine approaches include using a dead version of the virus, using a viral vector to carry genetic material on the back of a harmless virus, or simply injecting viral proteins themselves (Callaway, 2020).

RNA-based vaccines are promising at present with their potential to provide a safe, cheap, and easy vaccine. Since RNA-based vaccines do not contain any whole virus in the way live-attenuated vaccines do, there's no risk that a vaccine could inadvertently infect somebody with the virus. Studies have also shown nucleic acid vaccines to be safe and tolerable (Ferraro, et al., 2011). Nucleic acid vaccines can also be produced easily (Ulmer, Mason, Geall, & Mandl, 2012) and don't require large quantities of the virus to be farmed.

However, comprehensive testing is still required to confirm the efficacy of current RNA vaccine candidates and ensure that the widespread distribution of a vaccine will slow or stop the spread of the virus. At the time of writing, even the most advanced vaccine candidates are still in phase III testing (Milken Institute, 2020). This stage is crucial, and rushing this stage or skipping it completely, as was done with Russia's 'Sputnik V' vaccine, could have significant consequences



The vaccine problem is set to be the most complex logistics problem we undertake in the 21st century.

from health impacts to diminished public confidence in vaccinations (Caddy, 2020). That said, the rapid development of RNA vaccines in response to COVID means that the first candidates should complete phase III testing and the initial batch of vaccines should become available in 2021 (Hogan, et al., 2020).

However, the challenge of getting a vaccine through testing is mirrored by the challenge of distributing a vaccine after testing. It's estimated that 60-70% of a population will require vaccination for the population to have herd immunity (E.Randolph & B.Barreiro, 2020). Of course, producing a vaccine on a scale anywhere large enough to meet the demand is going to be difficult whilst we still don't know which vaccines will pass phase III testing.

Furthermore, in the likely case that one or more RNA vaccines go into production, the new technology has many hurdles in getting the vaccines out to those who need them. RNA itself is inherently unstable and heat sensitive, and current vaccine candidates may need to be stored at temperatures as low as -20°C to -70°C (Zhang, 2020). These temperatures would need to be maintained during both transportation and storage. This may be possible for large hospitals, but for smaller health centres and remote areas it will be difficult, and in some areas of the world impossible. What's more, for the sake of speed current RNA vaccines are being formulated in large multi-dose batches and without preservatives, something doctors aren't used to (Zhang, 2020). This, as well as the short shelf life and the fact that (Zhang,

2020) means that doctors will need to efficiently deliver hundreds of vaccinations in a limited time frame. To further complicate things, several vaccine candidates will require multiple doses (Zhang, 2020). This multiplies the logistical nightmare, as health centres will need to ensure that they have vaccines ready for people's subsequent doses lest the first becomes redundant, and if multiple vaccines come onto the market they will need to track which one people have had, as mixing vaccines may not provide full immunity.

These are serious challenges that still need to be faced, although progress is already being made in tandem with vaccine development. Estimates suggest that even after a vaccine is found, it may take six months to a year until enough people are vaccinated (Gallagher, 2020). We're hopeful that it may only be a matter of months until the first vaccines come into use, and even an imperfect vaccine may have a significant benefit to public health (Elisland & Johns, 2020). However, logistical considerations and lack of suitable production capacity mean for the foreseeable future it's likely that the vaccine will be limited to front liners. In this situation, the most crucial thing is to do whatever we can to limit the spread of the virus, minimise the impact as much as we can, and look forward to a time when this pandemic is behind us .

Caddy, S. (2020, August 24). Russian SARS-CoV-2 vaccine. *BMJ*, 370. doi:<https://doi.org/10.1136/bmj.m3270>



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Ferraro, B., Morrow, M. P., Hutnick, N. A., Shin, T. H., Lucke, C. E., & Weiner, D. B. (2011, August 1). Clinical Applications of DNA Vaccines: Current Progress. *Clinical Infectious Diseases*, 53(3), 296-302. doi:<https://doi.org/10.1093/cid/cir334>

Gallagher, J. (2020, October 1). Covid: Vaccine will 'not return life to normal in spring'. Retrieved from BBC News: <https://www.bbc.co.uk/news/health-54371559>

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Moderna Inc. (2020). Moderna's Work on a COVID-19 Vaccine Candidate. Retrieved October 21, 2020, from Moderna: <https://www.modernatx.com/modernas-work-potential-vaccine-against-covid-19>

Ulmer, J. B., Mason, P. W., Geall, A., & Mandl, C. W. (2012, June 22). RNA-based vaccines. *Vaccine*, 30(30), 4414-4418. doi:<https://doi.org/10.1016/j.vaccine.2012.04.060>

Zhang, S. (2020, September 28). Vaccine Chaos is Looming. Retrieved from The Atlantic: <https://www.theatlantic.com/health/archive/2020/09/covid-19-most-complicated-vaccine-campaign-ever/616521/>

Double Whammy: Covid-19, Public Health and Environment

In case you've decided to give the news a skip during the Summer, the global coronavirus pandemic has now killed over an estimated 1 million people worldwide. Multiple studies have been conducted on the health impacts of the coronavirus on various age groups. This includes symptoms such as fatigue, coughing, shortness of breath, headache, and joint pain. What's less known however is the longer-term health impacts of contracting covid-19.

Ongoing research shows that organ operation is likely impacted by covid-19. For example, image testing taken months after recovery from a mild case reveal damage to the heart's

muscles. This likely stems from Covid-19 increasing the chances of blood clotting which gives rise to future risk of heart failure and other complications.

It is also known that Covid-19 attacks the lungs and the type of pneumonia associated with the virus can cause long-standing damage to the tiny air sacs (alveoli) in the lungs. However, the most worrying of all is brain damage. Even in young people, covid-19 can cause strokes, seizures, and Guillain-Barre syndrome – a condition that results in temporary paralysis. It is also suggested that Covid-19 may increase the risk of developing Parkinson's disease and Alzheimer's disease. (Mayo Clinic

covid-19 (coronavirus): Long-term effects)

Noting the results from these studies, it is unsurprising that most governments' have been forced into action to protect the health of their citizens. Some of the common measures implemented include border closures, lockdowns, institutionalising curfews, and intensifying track-and-trace models. A common concern about these measures is its predicted impact on the nation's economy. In this article, we will aim to compare various government strategies in managing this public health crisis and in mitigating the resultant economic impact.



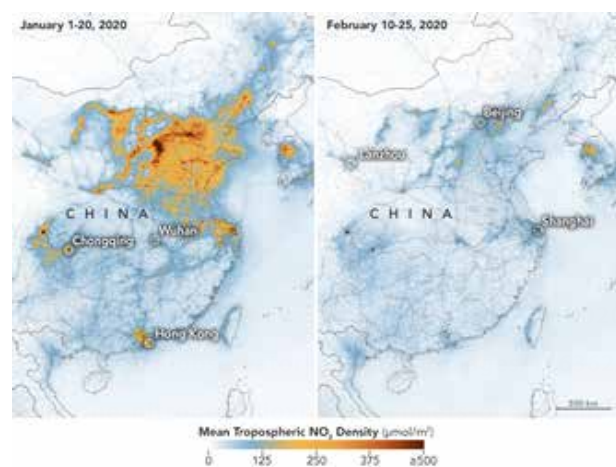
	The UK	Sweden	New Zealand
Population	68 million	10 million	5 million
First Official Case	29th January 2020	31st January 2020	28th February 2020
First Official Death	5th March 2020	11th March 2020	29th March 2020
First Travel Ban	Nothing until June	Advised against trips to Hubei, China on 17th February 2020	Borders closed to non residents to 29th March 2020
Nationwide Lockdown	23rd March 2020	N/A	25th March 2020
Death rate per 1 million people	637	587	5
Economic Performance in Q2 2020	-19.8%	-8.6%	-12.2%

Above is a comparison of the UK's Covid-19 response with that of Sweden and New Zealand. Sweden and New Zealand were on the opposite ends of the spectrum in terms of responses as one didn't officially go into lockdown whereas the other went full lockdown before there was even a single death. The most striking difference is the deaths per million people as there are (at the time of writing) only 5 deaths per million in New Zealand which is significantly lower than both the UK and Sweden. This suggests that if a country locks down early enough, the spread of the virus can be rapidly stopped. The effect of population density on this remains uncertain. In terms of economic impact, the lack of a lockdown allowed Sweden to be hit less hard than the other two however the contraction of New Zealand's economy wasn't much larger. In comparison, the UK had its worst economic performance on record and was the worst hit G7 nation. (BBC News UK hardest hit by virus among G7 nations)

Building Back Green

Though Covid-19 continues to threaten millions of lives, it can be credited with one positive impact: the reduction of global emissions. The worldwide anthropause, induced by the decision of many governments to introduce lockdowns, has

led to a significant decrease in air pollution. According to an international team of researchers, global CO2 levels from the first 6 months of 2020 fell by 8.8% compared with the same period in 2019. This decline was larger than that experienced during the 2008 financial crisis, the 1979 oil crisis, and even World War III! (Science Daily Biggest carbon dioxide drop: Real-time data show COVID-19's massive impact on global emissions) Similarly, a drop by 50% of nitrogen oxides emission in China has been credited with having saved up to [77,000 lives!](#)





Finally, the lockdown has allowed a [rebirth of wildlife in territories](#) that were once avoided for instance sea turtles laying eggs in the Bay of Benegal.

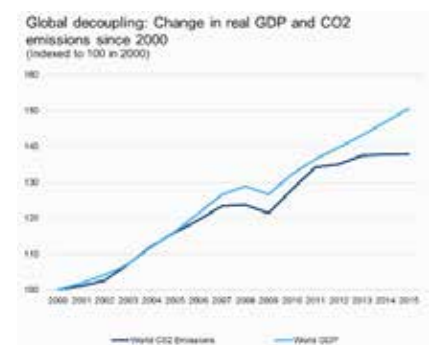
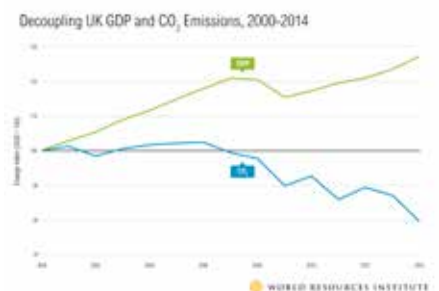
Despite the aforementioned merits of lockdown, this period has also acted as cover for illegal activities. During lockdown, South Africa witnessed a surge in poaching of rare and expensive goods such as rhino horns and ivory while [Brazil was the centre of illegal deforestation](#).

Following the positive and negative environmental impacts of lockdown, the issue of climate change has once again resurged. Thus, a fresh emphasis is being placed on building an economic recovery plan that goes

hand in hand with environmental action. As governments have emerged from lockdown, they have tried to build not just short but also long term plans to reboot the economy and minimise job losses (among 300 million are at risk globally). Despite the easy approach that a non-environmentally friendly economic recovery would represent, it is in times like these that environmental action has to be taken as it will unavoidably shape the future of environmental action.

According to a study published in August 2020, an economic recovery focusing on fossil fuel investments could avoid a future warming of 0.3 °C by 2050 . Sadly, this route of the facility has always been favoured

in the past as shown by the jump in emissions that accompanied the recovery from the previous 2008 economic crash. Although the UK has eschewed this trend in the past, it is uncertain if it will continue to do so.





Change in real GDP and CO2 since [2000](#)).

The need for environmental action is not a new subject as average global temperatures on the Earth have been rising since the beginning of the industrialisation era. An anthropogenic impact has been witnessed with key challenges arising such as the melting of glaciers, rising sea levels, and an increased frequency of natural disasters. In addition to these pre-existing challenges, new ones have been added due to covid-19. For example, the unprecedented use of disposable face masks has induced an increase in littering and many people favoured cars over public transportation post confinement due to an overarching fear of the virus. In the short term, actions were taken post quarantine to take into account environmental concerns. To counter

the expected increase in car usage post lockdown, governments boosted investments in public transportation and cycling infrastructure. An example of this includes Paris' Mayor Anne Hidalgo introducing major cycle routes throughout the city. Such a plan functioned as it occurred in unison with a spike in bike sales. Similarly in the UK bike sales soared by 60% in [April 2020](#).

Many governments around the world have decided to pursue long term green economic recovery packages to help prevent a resurgence in CO2 emissions while the actions of others are still ambiguous or undetermined. For example, on the 30th of June 2020, UK Prime Minister Boris Johnson promised an American style "New Deal" of £5bn to "build build build" as he put it. Included in this is

the building of two carbon capture and storage clusters (based on our Pilot Plant) by 2030. However, the historians among us will know the US "New Deal" from the 1930s involved spending 40% of GDP yet Johnson's £5bn amounts to a paltry 0.2% of GDP. (The Guardian's Comparison of the US New Deal and Johnson's New Deal). More recently on the 22nd of July 2020, the UK government announced a £350 million budget to fund the decarbonisation of heavy industry and the construction, transportation, and aviation sectors. This in turn is also part of the UK's net zero by 2050 target. (BBC News Coronavirus: Government promises a green recovery)

At a supranational level, the European Union put in place a €750 billion coronavirus recovery package. It is stated that €500 billion of the €750 billion is

in turn is also part of the UK's net zero by 2050 target. (BBC News Coronavirus: Government promises a green recovery)

At a supranational level, the European Union put in place a €750 billion coronavirus recovery package. It is stated that €500 billion of the €750 billion is grants with 30% dedicated to climate action. This came after 90 hours of intense negotiations between the 27 member states and is considered the world's biggest 'green recovery' pledge. Several European countries are also starting to set up new measures to boost the transition to clean energy. This is the case of the Netherlands which is currently undergoing a legislative process to put in place a national carbon tax or of Germany which has put in place incentives for the purchase of electric and hybrid vehicles.

Other governments have also implemented clean energy and the reduction of greenhouse gas emissions in their recovery plan. The South Korean government aims to achieve

net-zero greenhouse gas emissions by 2050. China has started additional investments in vehicles using renewable energy and infrastructure surrounding their use. In Indonesia, the government has confirmed its desire to pursue the regulation on renewable energy it had introduced before the pandemic. Other administrations are providing support to vulnerable households and businesses by making possible the deferral of energy bills as illustrated by Togo's offer of payment deferral to households having installed [solar panels](#).

However, such regard for the environment in economic dealings has not been the trademark of all governments. Namely, the US, Russia, and China have announced bailouts and plans to support carbon-intensive businesses that risk locking in high emissions for many years to come. For instance, the Trump administration suspended the enforcement of certain protection laws via the Environmental Protection Agency.

Even the EU's big recovery

package still isn't without its flaws. In March 2020 the European Central Bank (ECB) announced the Pandemic Emergency Purchase Programme which entirely disregarded climate in its policymaking. With the rapid spread of covid-19, the EU's focus on the aforementioned green deal was diminished. On a global scale, climate diplomacy was greatly impacted by the pandemic namely with the UN Climate change conference being postponed to 2021.

From this analysis, it is difficult to predict what will happen next as a second wave is on its way and is already leading to more lockdowns and restrictions. However, it can be concluded that the global pandemic has shed a spotlight on the environment. Yes, progress has been made to building back green but there is still a lot more that needs to be done.



Career Hacks

Internships and Work experience: Navigating Risky Waters

Experience: companies demand it, we are all told to get it, and this creates an overwhelming demand side compared to the readily available opportunities. Interesting fact – the situation vastly changes from country to country! In Italy, my home country, there is nowhere near as much pressure to get yourself out there before you graduate, and I would say that both situations have positives and negatives. Nevertheless, in the UK the expectations are high, especially for students at a top university. But how should you go about finding opportunities to get experience, and what should you look out for when doing so?

Many students try to make use of the long summer break to save some money while gaining valuable experience. There are many full-time paid work opportunities out there; most large

companies have internship schemes for penultimate year students, and smaller companies often have placements that are also accessible to other year groups. Jobslive, Gradcracker, and LinkedIn are all great ways to scout the job market; for smaller companies, an effective way of generating those opportunities is through networking and contacting the companies directly. They can benefit from increased flexibility, and will often be able to either tailor a position to your needs or create a dedicated one! A great alternative, mainly for Year 1 and Year 2 students, is Undergraduate Research Opportunities – also a great way to understand if research is something you would enjoy pursuing further.

When it comes to unpaid experience, you need to be more careful, as what you can find online can cross into grey areas; it is really important to get

informed on your rights as a worker to critically evaluate what you stumble upon. You will find innocuous, self-paced “Virtual Internship Experiences”, such as those offered by InsideSherpa, designed to give you a taster of what working in sectors like Consulting and Data Analytics (recommended to kill some time in Year 1!). You will then find a large number of volunteering openings with nonprofits and charities, some of which can be really interesting experiences abroad. You do, however, need to pay attention to the many companies that try to exploit the high demand for experience by requesting unpaid, or underpaid work, potentially to the point of illegality.

In general, structured schemes with bigger companies are really safe, and you mainly need to be



In general, structured schemes with bigger companies are really safe, and you mainly need to be careful with smaller companies and nonprofits. A good approach is:

1. Inform yourself of work retribution regulations in your country. These can vary and are usually in the function of the level of responsibility in a placement. In the UK, the general rule of thumb is that if your work brings a benefit to the company, it must be remunerated. This excludes things like work shadowing or volunteer work for a charity. Regulations can change from country to country, so make sure

you check your local government website! In some European countries, for example, interns are guaranteed a right to a benefits allowance, rather than a wage.

2. Have a full understanding of what responsibilities a job opening involves. If you are working for a charity, or just shadowing an employee, you will most likely not be entitled to a wage. If the job is with a for-profit and involves actual responsibility towards the productivity of the company, then it should be paid! If the job opening is unclear, act carefully, and ask for clarifications.

3. Ultimately, make an informed

decision. Once you know more about your rights, are aware of what type of organisation you are facing, and the level of responsibility of the job, decide whether you want to consider applying. Many unpaid openings out there are for charities operating for good causes; if after a bit of research you are still unsure, it is probably a good idea to just avoid it.

Some quick resources for the UK for learning more about [UROPs](#), [your rights as a worker in the UK](#), and a [safe portal](#) for finding charity work opportunities.



ChemEng Conversations

In Conversation with Dr Chiara Heide

Episode 9 of ChemEng Conversations was indeed a special one, not least as it was the final episode filmed before the COVID-19 pandemic took the world by storm and completely altered the norms of our daily lives! When I watched the episode back whilst handling post-production during the lockdown, my attention immediately focused on the fact that I was standing within 1 m of my guest, without wearing a facemask, with no qualms about shaking hands. Those times seem like a completely different era!

Right, that's enough reminiscing – now time to get to the conversation itself. It was a real pleasure to have my fellow PhD colleague in the Department of Chemical Engineering, Dr. Chiara Heide, on ChemEng Conversations to promote her new start-up, Brightcure. Chiara first started her tenure in the Department as an MSc student, after which she was awarded the prestigious Marit Mohn Scholarship to fund her PhD. She very recently completed her PhD under the guidance of Dr. Cleo Kontaravdi,

working on cell-free protein synthesis factories – an interdisciplinary project between bioengineering, chemistry, and synthetic biology.

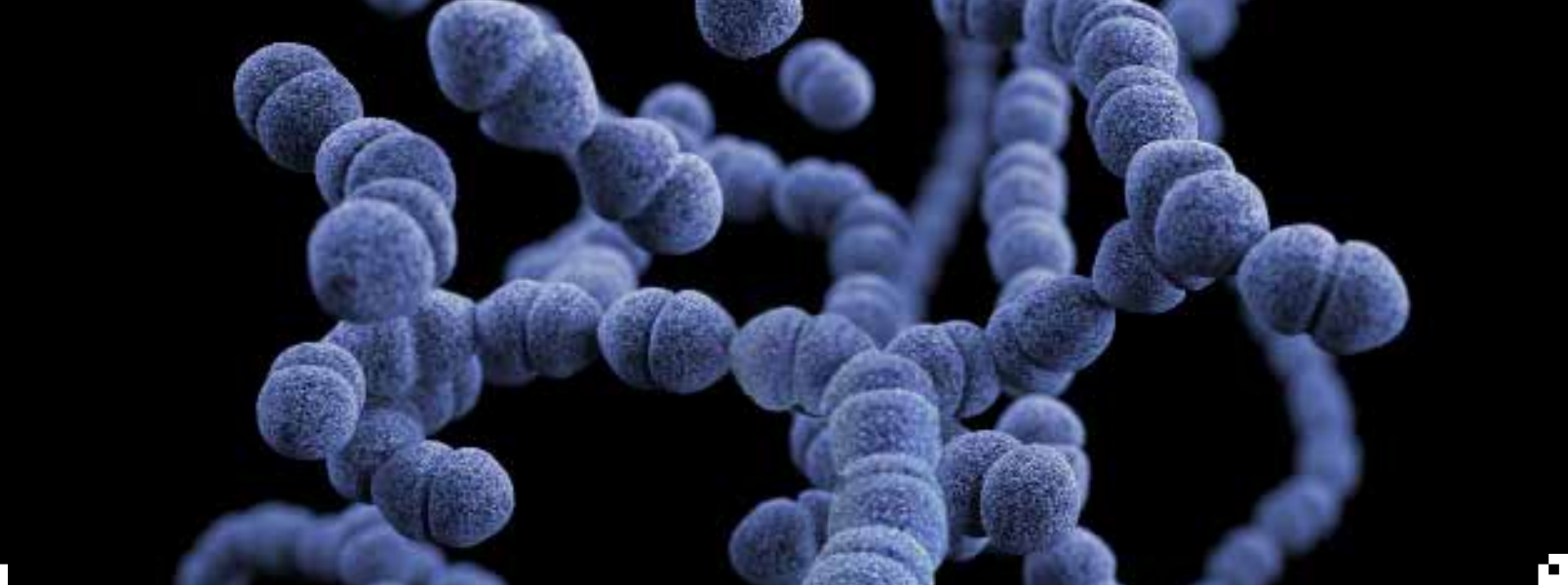
During her PhD, Chiara founded her start-up company, Brightcure (www.bccure.co.uk), which aims to treat recurrent urinary tract infections (UTIs) without relying on antibiotics, which can cause side effects or prove ineffective due to UTIs exhibiting antimicrobial resistance. Brightcure's novel technology would use localised light therapy as a targeted treatment to kill bacteria in the bladder. In light of the potential of this revolutionary technology, Chiara and the Brightcure team were awarded the Imperial White City Innovator's Programme – a £6,000 prize package, including £4,000 cash to support the business's growth.

It was a pleasure to have such an interesting conversation with her on the show and find out more about her story leading up to Brightcure and how she

envisions the future of her company developing.

Could you tell us about yourself and the story behind Brightcure?

Sure! Hi everyone! My name is Chiara and I'm the CEO of Brightcure. I suffered for a long time from recurrent urinary tract infections (UTIs) caused by harmful bacteria in my bladder. However, I'm not alone as this is a huge problem for a lot of women. In fact, every second woman worldwide, across all age groups, suffers from recurrent UTIs. If you look at the statistics – there are around 34 million women in the UK. 15% of these women get UTIs every year – that's 5 million women in the UK alone! To put that into context, around 3 million people live in inner London. So that's a huge and eye-opening number. Currently, UTIs are only treated with antibiotics. However, antibiotics can cause harmful side effects in patients, destroy the gut and genital flora, and/or prove ineffective due to UTIs exhibiting antimicrobial resistance. Unfortunately,



there are no alternatives out in the market. However, there is a pressing need for patients like me, who look for alternative treatment options. Large pharmaceutical companies are not addressing this as they continue to sell their tried-and-tested, traditional antibiotics. Therefore, we came with Brightcure, as I became traumatized, not only with my own health struggles with UTIs but also after hearing the stories from my female colleagues and what they were going through.

Could you tell us a bit more about the science behind this technology developed by Brightcure?

Basically, the science behind the technology is a revolutionary probiotic therapy that is completely different from what is out there on the market. It is a predator bacterium that eats and thereby kills, the harmful bacteria causing the infection in the bladder. It's antimicrobial efficacy and safety has been tested in labs and also in animal studies. We're currently in the proof-of-concept testing phase and already, we have seen that the predator bacterium in the probiotic can survive in

human urine and can clear an infection.

When you complete the safety testing, how do you envision your product and customer experience to look like?

Sure – so initially, the product will be delivered as a food supplement as this is the easiest route from a regulator pathway for the patient to ingest the probiotic. In the next 5 years, we envision that we will have two products that sell B2B (Business 2 Business) and B2C (Business 2 Customer). Out of these two products, there will be one product, which can be purchased online or in stores, tailored to patients that suffer frequently from infections, such as myself. It would be a food supplement in a capsule that you would take daily, which basically rebalances your genital flora, to reduce the likelihood of harmful bacteria invading the bladder. The second product would be a stronger one for the acute case. So once you already feel this burning sensation in the bladder and you have this constant need to painfully urinate, then you can go to the pharmacy and you can purchase this product which has a higher concentration of the predator

bacterium, which is kept in cold storage.

What makes Brightcure's products unique and what do you think will be the impact on the market?

I think the main difference is that the predator bacterium in our products doesn't prey on the healthy gut and genital flora that is needed in our bodies. This means that you can take it on a preventive basis every day, which you can't do with antibiotics. Through our products, we are counteracting the spread of antimicrobial resistance, which is one of the biggest threats of the 21st century. At the same time, we're really hoping that Brightcure will empower women, a cause that I am very passionate about, and provide them with a much better quality of life by removing the fear/anxiety of recurrent UTIs.



INGENA

Inspiring Sustainable Investors

[Ingena](#) is a sustainable finance news and insight platform founded by two chemical engineering students between their penultimate and final years in this department. Built upon an appreciation for the value financial markets and services provide to our society, driving efficiency and allocating capital where it is most deserving. This appreciation, combined with an understanding of the urgency of climate action instilled on Imperial's Chemical Engineering degree lead to the natural conclusion that financial systems would have to grow to adapt to reflect these realities (as they are beginning to).

Ingena focuses on shining a spotlight on developments on the cutting edge of sustainable finance and business, with a particular focus on energy. Our mission is to inform the next generation of young professionals and inspire individuals to adopt sustainable strategies in their future employment.

We aim to foster this profound appreciation of the benefits and returns of sustainable investing, finance, and business practices by:

- Providing unique insights into ESG

investment strategies to challenge traditional perceptions.

- Creating an environment for innovative thinkers and dedicated researchers on the subject of ESG to discuss their ideas and insights of the industry.
- Generating a domino effect – by spreading knowledge about the value of ESG investing and continue to influence investors in engaging these principles in their enterprise thus increasing its profitability and ethical practice.

Our team is a community of passionate individuals who share a common interest in spreading awareness and recognition for all things ESG and sustainability. These include [Miles Guilliford](#), [Henry Orlebar](#), [Hamza Hussein](#), [Malinya-Wijekoon](#) and [Darshil Dholakia](#). Our writers and analysts all understand that collective initiative is necessary for achieving a sustainable future, and it's this forward-thinking that makes Ingena so distinctive.

Beyond spreading insights and news, Ingena strives to guide our team in their professional development and personal growth. Whether it be to expand their

expertise in the industry or assist them in their respected career aspirations, we want to inspire throughout Ingena's internal culture and values. Therefore, we offer frequent networking sessions, workshops, and webinars to really ensure that our team is the best that they can be.

Therefore, we hope that our culture to inspire all allows us to reach our next set of goals and help our generation be one step closer towards sustainable business practice. Whilst we are currently providing insights and analysis to our audience on a frequent basis, we are immensely excited about what the future for Ingena holds and how we will continue to grow. Our articles will continue to provide specialised insights at a business level, and we aim to continue expanding our knowledge by developing relationships with industry leaders and professionals. By doing so, we hope that the articles we publish will continue to be full of impactful, relatable, and stimulating information so our audience remains to be engaged in the world of finance.



Keeping Faith

You're Not Alone!!

With social distancing, the latest restrictions and self-isolation this year, being isolated, or feeling lonely has become a reality for many of us. Feeling alone can also bring on other feelings such as sadness or anxiety which can in turn make it more challenging to overcome. This article aims to cover some of the ways that might help, there are lots of different things to try and this article does not cover them all. For any students who would like further support I am now running a regular check-in system. Basically, I will call/email you to see how you are doing and hopefully help any feelings of isolation. Please let me know if you would like to sign up for this through send me a message on Teams, WhatsApp, or email. f.marsh@imperial.ac.uk +447821856848 You can sometimes spend time with people and still feel lonely- this may be as generally speaking we are looking for a meaningful and enjoyable connection with others. This is more challenging now, however, there are some activities that you can hopefully still enjoy and engage with other people. It is important to try and maintain a regular sleep schedule and as much routine as you can as this will help to manage the situation. Having a plan for what you will do each day can help. Think about activities that you enjoy that you can still do in isolation such as playing games, watching movies, cooking, and plan some time each day to do this.

If you are allowed outside under the restrictions, I would recommend at least 30 minutes a day walk or other exercise to help boost the mood. For those who must remain inside, perhaps try out a yoga class or low-intensity exercise that you can follow inside. I know sometimes it can be hard to motivate to try this, so why not sign up with someone else to help your motivation. I have mentioned affirmations before, these are little sayings which you can repeat/write down or think to help disrupt negative thinking. Some for isolation which could be helpful are:

1. I'm allowed to rest
2. I do not have to be productive to feel worthy
3. My feelings are real and they are allowed to be present
4. I am doing enough
5. I can take a break from the news cycle
6. I deserve to share my feelings with loved ones
7. I can spend extra time on myself

Finally, please do reach out to someone if you are struggling. There is lots of support available, one place to start is the Student Space set up by the Student Minds Charity especially for finding the support you need during the pandemic. You can access it here: <https://www.studentspace.org.uk/>



Let's Have Chat

Less "Me", More "We"

Despite all the memes, you'll quickly learn from being an engineering student that teamwork REALLY makes the dream work. Notice how the ChemEng department is super close-knit relative to other subjects- that's because our course demands closeness and support from our peers. Over the 4 years, we're given a million projects that require good team working skills, so we're here to give you top team working tips to get you through your degree!

Divide and Conquer

It's crucial to divvy up the workload equally among your group so that everyone is clear on the task and all the main sections are covered. Talk to your team, find out each other's strengths, and assign the tasks accordingly. With that said, always make sure that your final project is cohesive and coherent. Leave a few days before the deadline to format the document and read through the project so that it's seamless!

Communication is Key

Communication is one of the main pillars of teamwork, especially during COVID times. Without a good channel of communication, you will go nowhere. MS Teams, Google Drive, and OneDrive are particularly good since you can communicate, collaborate, and store your files in one place so everyone has simultaneous access. Have regular meetings for progress updates and be honest about which sections need more work.

Call. Them. Out.

There's always one... The person that shows up to the first team meeting and goes AWOL until the deadline: the person that airs the group chat, the person who's name that no one reeeeeaaally wants to put on the front page because they contributed zilch to the project. Don't be THAT guy (or girl). Don't be afraid to call out the slackers on your team- reach out to ask why they aren't contributing and remind them of the deadline. If it comes to it, the department

has a formal procedure to help.

Ask and you shall receive

As with most problems you run into in ChemEng, ask your seniors! Most people will not hesitate to send you their projects to use as a guideline- although it is important not to plagiarise their work, use it as ~inspiration~ for your own! With design projects and labs, the GTAs are usually super friendly and incredibly helpful so definitely make the most of their expertise.

As Andreas always says about the 80/20 rule, there's no such thing as perfection. Don't overstress, stay chill- sometimes it might feel like you'll never reach the end. Take each day as it comes...until the deadline, in which case make sure you submit on time!



UG Dinner

How to Stay In Touch

CHEMENG SOC SOCIAL MEDIA

Freshers Facebook Group: www.facebook.com/groups/1168071353401582/

General Facebook Group: www.facebook.com/icchemengsoc

Flickr: <https://www.flickr.com/photos/chemengsoc/albums>

Email: chemengsoc@ic.ac.uk

Website: www.chemengsoc.com

LinkedIn Page: <https://www.linkedin.com/company/imperial-college-chemical-engineering-society/>

DEPARTMENTAL SOCIAL MEDIA

Website: www.imperial.ac.uk/chemical-engineering

Twitter: twitter.com/imperialchemeng

LinkedIn page: <https://www.linkedin.com/showcase/department-of-chemical-engineering/>

OTHER STUDENT MEDIA OUTLETS

ChemEng Conversations: [https://www.imperial.ac.uk/chemical-engineering/news/chemeng-conversations-/](https://www.imperial.ac.uk/chemical-engineering/news/chemeng-conversations/)

Felix: <http://felixonline.co.uk/>

Energy Journal: <http://energyjournal.co.uk/>