Imperial ENGINEER

VISIT TO NGI
CONFERENCES
BOTTLE MATCH
HIKING IN SWEDEN
VOLCÁN DE COLIMA
CHARITY SECTOR ENGINEERING
ALUMNI GUIDE TO BECOMING NED

For members of City & Guilds College Association
and The Royal School of Mines Association

ISSUE 42 *Spring 2025*

ISSUE FORTY-TWO
Spring 2025

In this issue…

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Kelvin Higgins

It is almost a year since I became president of the CGCA following Professor Anil Bharath stepping down from that role. I have found it to be a very rewarding experience, and I am looking forward to the year ahead.

In November, we held the Reunion Lunch which was extremely enjoyable with several individuals highlighting some of the antics from their time as students. It is debatable whether some of these activities would have been tolerated in the current environment. Nevertheless, it was great fun. It was good to get views on how the Association might develop to become more attractive to our target audience. The Committee are always open to suggestions so if you have any views on the matter please don't hesitate to get in touch.

In the past, the Lunch has focussed on specific years of graduation but while continuing with the theme we are opening the event up so that groups of Alumni that want to meet up can also attend.

The Annual Dinner was held in March at Saddler's Hall. The Speaker was the Master of the Worshipful Company of Engineers, Dr Dolores Byrne OBE. On a visit to the City and Guilds Building you will see the shields of the Worshipful Companies that were instrumental in the formation of the City and Guilds College. It took until 1993 for the next logical step, the granting of Letters Patent for the creation of a Livery Company of the City of London to be called "The Worshipful Company of Engineers". There is therefore an obvious link between us and the Company which we should aim to reinforce and develop. I would like to thank the organising sub-committee for their hard work and attention to detail particularly Peter Chase, Geoff Fowler and Martin Holloway. Colin Kerr who has organised the Dinner for a number of years has moved into a supervisory role overseeing the work of the sub-committee.

We have already started to plan for next year's event. As you will see elsewhere in this issue, the Dinner will be held in Grocers' Hall which is close to Bank, on the 13th March 2026. Please add the date to your diary.

Grocers' Hall is close to a statue of James Henry Greathead on Cornhill. He invented the Greathead shield which was a significant development in the construction of London's underground railway. It was used to construct the Central line and the Waterloo and City Line around the turn of the Century. The Greathead steel shield which was used during the tunnelling of the original Waterloo & City Line in 1898, like most tunnelling shields was abandoned, at Bank Station in the soil once the tunnelling was over. It now forms part of the structure of Bank Station.

Unfortunately, Anil's hard work to create an entry on Wikipedia for the Association has not yet come to fruition. We are still waiting to see if it can be posted.

Continues overleaf…

PRESIDENTS REPORT

Paul Holmes

It feels like the year has started at a rapid pace. However, this year, as we embrace the optimism that Spring brings, we must also acknowledge the unsettling global market conditions that have captured our attention. The renewed focus on rare earth minerals highlights the critical role that Geologists, Miners and Material Scientists play in helping us realise these essential resources. As the demand for these minerals grows, so too does the need for our expertise and innovation to ensure sustainable and responsible extraction practices.

Considering these challenges, our community at the Royal School of Mines stands ready to contribute our knowledge and skills to address these pressing issues. Our commitment to advancing the field of geosciences and materials science is more important than ever. By fostering collaboration, supporting research, and nurturing the next generation of scientists, we can make significant strides in securing the minerals that are vital to modern technology and industry. Let us continue to work together, leveraging our collective expertise to navigate these uncertain times and drive progress in our field.

Our Mentoring program for RSM students has entered its second year. Interest covering a range of topics, from CV writing, interview techniques, to specific industry sector knowledge and company introductions, have been requested from students. The mentoring process has been refined and any members that are able and willing to assist, please sign up via the mentoring page on the RSMA website. https://rsma.org.uk/mentoring/

Continuing the theme of preparing the next generation of students into industry, on Thursday 6th March, the RSMA supported the RSMU at the annual careers evening. Around 30 alumni and current students attended, as 7 past students outlined the transition from student life into industry and their careers to date. A fascinating evening across a wide range of careers truly demonstrated the worth of studying at the RSM. Our thanks go to the 7 presenters for sharing their professional journey so far.

Planning is under way for the 2025 Summer Beer & Bite for Final Year Students which will be occurring on Thursday June 19th in Eastside Bar, on the South Kensington Campus. Details to attend the event and if you are able, to sponsor a student, will be updated in my next monthly email to all members.

Whilst we have just entered Spring, we have already confirmed plans for the RSMA Annual Dinner on Friday 28th November 2025. Please put it in your diary now. It will be held in the Rembrandt Hotel, Knightsbridge. This year we are delighted to welcome Professor Mary Ryan, Vice-Provost (Research and Enterprise) and Brasier's Chair in Materials Science at Imperial College, as our guest speaker.

Continues overleaf…

DIARY

RSMA Toronto, Canada
Informal RSM meeting
Last Friday of every month, noon.
Jason George Pub,
100 Front Street East, Toronto
Contact: rsma.1851@gmail.com

RSMA Perth, Australia
Monthly Sundowner
First Friday of every month.
The Celtic Club,
48 Ord St, West Perth, WA, 6005
Contact:
Alan Dickson – alan@dickson.com.au
John Sykes – johnpsykes@gmail.com

Imperial Alumni, Houston, US
Alumni social
Third Thursday of every month, 6pm
Capital Grille, 840 West Sam Houston Pkwy N, Houston, TX 77024
Contact: Matt Bell – matt@in2oilandgas.com

Imperial Engineering Alumni, Johannesburg, South Africa
Quarterly Johannesburg Lunch
(21st May, 20th Aug, 19th Nov, 18th Feb)
Baron & Quail, Woodmead, Johannesburg, South Africa
Contact: Richard Gundersen – Gundersen@yebo.co.za

CGCA
AGM & President's Lunch
Saturday, 7th Jun, 11:15 for 11:30
Sth Ken venue to be confirmed:
AGM at 11:30
Energising Leadership presentation by The Venerable Roger Preece at 12:00
President's Lunch at 13:00

Great Exhibition Road Festival
Saturday 7th – Sunday 8th Jun
Exhibition Road
Free festival of arts and science led by Imperial College with other Albertopolis institutions.

RSMA
Summer Beer & Bite for Final Year Students
Thursday, 19th Jun
Eastside Bar, Sth. Ken. Campus
Details TBD

CGCA/RSMA
Traditional Reunion Luncheon
Saturday 22nd Nov, 12:30 for 13:00
Rembrandt Hotel, Sth. Ken. SW7 2RS
For all IC engineers who graduated in a year ending in a '5' or a '0' or groups from any set of years.
See enclosed booking form or visit https://www.cgca.org.uk

RSMA
140th Annual Dinner
Friday, 28th Nov, 7:00 for 7:30
Rembrandt Hotel, Sth. Ken. SW7 2RS

CGCA
112th Annual Dinner
Friday, 13th Mar 2026
Grocers' Hall, Princes Street, London EC2R 8AD

An up-to-date calendar of events is always available on the CGCA and RSMA websites.

Imperial College maintains a calendar of college events at bit.ly/IE-WhatsOn

The Friends of Imperial College regularly organise events of interest to alumni (see bit.ly/IE-FoI)

Please note that while many of these events are open to all and often free, they usually require registration in advance. Please follow the links in the entry to get more information including if and how to register and whether there is any cost.

For more information follow links, or see page 2 for contact details

Kelvin Higgins, continued from page 3

This year we decided to hold the AGM on the Saturday of the Great Exhibition Road Festival. Those attending will therefore have the opportunity to visit the festival which is led by Imperial (https://www.greatexhibitionroadfestival.co.uk/). I urge you to come along to the AGM and then enjoy the entertainment. Our speaker this year will be the Venerable Roger Preece who is currently the Association's Senior Vice President.

The future funding of Boanerges and other motorised mascots within Imperial, although not finally resolved, appears to be moving forward in the right direction; there appears to be a mechanism for funds to be made available from ICU. We are closely monitoring the situation and hope that the future funding of the mascots will not be a cause for further concern.

Department representatives act as a link between Imperial and ourselves. They therefore have an important role within the Association. There are normally 2 representatives for each department, and we have vacancies in Aeronautics, Design Engineering and Mechanical Engineering and so if you are interested in the Association and are affiliated to these departments please get in touch.

Photo: shutterstock/Chris Lawrence Images

James Henry Greathead statue on Cornhill

Paul Holmes, continued from page 3

In this edition there are several reports that I hope will be of interest to you. Over the weekend of the 22nd February 2025, the Bottle Match Weekend, the RSM hosted the Camborne School of Mines at Harlington. A successful weekend of sport well supported by the students and alumni, culminating in successfully retaining the Bottle by a clear margin and winning the Sharpley cup in Men's Hockey.

The committee continues to maintain a very active relationship with the RSMU and key societies within the RSM such as Geology, MatSoc and GeoPhysicsSoc. All of them are Represented on the RSMA Committee meetings and the RSMA provides financial support where needed. These Clubs and Societies are the life blood of the RSM and it is very pleasing to report that these organisations managed to maintain a very active schedule of virtual events throughout the year. As mentioned earlier, all organisations enjoy, and want more, interaction with the wider alumni group.

The RSMA International representatives in Western Australia continue to play an active role with Jasmine Crocker and Katie Bell continuing to organise events. Participation is growing and it's great to see the friendships made within the RSM family continued across the world.

In the 2024 Autumn term, the RSMA Trust awarded four £1500 bursaries to final year students. All this year's winners, as well as those from past years, are shining examples of students who have demonstrated true RSM spirit and uphold the values of the RSM by giving comradeship, help and advice. This is now the seventh year running that the Bursaries have been awarded, and 26 students have benefitted from the tremendous generosity of RSMA members. This is a significant example of how you are directly supporting students at the RSM. Remember ALL the funds for this Bursary have been raised by YOU through your kind generosity at events and specifically by those members who have supported the 100 Club. This is an amazing achievement and is a concrete example of former students of the RSM who want to give back to the current student body. Lastly the 100 Club, this is slowly growing, and I would encourage you, if you are able, to sign up and support the RSMA via the 100 Club or by a one-off donation.

I trust you will find this issue both informative and engaging. I eagerly anticipate the opportunity to welcome many of you to the Royal School of Mines and to our upcoming RSMA events. Your unwavering support is deeply valued and greatly appreciated.

The RSMA is continually seeking dedicated individuals to join our committee. If you can spare a few hours every couple of months, we would be delighted to hear from you. Please remember that you can always reach us via email at rsma@imperial.ac.uk. We encourage you to share your news with us, and we will ensure it is disseminated throughout the broader RSM community.

Warm regards, Paul Holmes. President, Royal School of Mines Association

Letter to the Editor

We recently received the following letter from Dr. Parvez Kumar (Aero 62).

FONT SIZE OF IMPERIAL ENGINEER

I have now been having trouble reading the small font being used in Imperial Engineer. Some years ago it was larger and much easier to read. Now I just look at the article titles and don't bother reading them. Using a magnifier is not an option for reading the magazine.

PLEASE INCREASE THE FONT SIZE!!

Dr. Parvez Kumar
Aero62

Dear Dr Kumar

Thank you for your letter and your comment. When I took over as editor of Imperial ENGINEER (issue 18 in 2013) we were using 9pt Adobe Garamond Pro for Feature articles and 8pt Gill Sans for news items. 12 years on we are still using those same typefaces and point sizes, and the magazine has increased from 32 to 36 pages.

If we were to increase the font size we would, of course, need either to reduce the amount of content in the magazine or increase the pagecount (for example, a news item that would currently fill a page would require an additonal half page if we were to increase the font from 8pt to 10pt – we would therefore either need to increase the magazine to 48 pages or reduce the content to the equivalent of 22 current pages.) Given the ever-increasing cost of paper, printing and mailing, increasing the pagecount of the printed magazine is not an economically viable option. Were the magazine to become an electronic-only publication (i.e. just the downloadable pdf version) then increasing the pagecount would be less of a concern. Currently, neither CGCA nor RSMA wish to abandon the printed edition in favour of pdf-only.

We have discussed your concern within the Editorial Board and with the Associations' Presidents, and, with the exception of one Board member, their views were that we should keep the size of the text unchanged, and hence the same amount of content and number of pages. One Board member remembered back to the predecessor journal (Imperial College Engineer) which as far as we can tell used 10pt in the 1990s, and the first issue of Imperial ENGINEER which appears to have used 10pt in 2004.

It was also suggested that I remind readers that each issue of Imperial ENGINEER is available in electronic form as a freely downloadable pdf, readable on a variety of devices such as desktop and laptop computers, smart phones, tablets, and ereaders, which allow the page to be zoomed for those struggling. Of course, reading on a screen is unlikely to be as rich an experience as reading the glossy printed magazine, but if it allows you to read articles you would otherwise not be able to enjoy it is an option worth considering.

The pdf edition of each issue of Imperial ENGINEER is usually available for download from the CGCA website as soon as it is published and a few weeks later from the Alumni pages on the Imperial website at:

https://www.imperial.ac.uk/engineering/alumni/imperial-engineer/

Yours sincerely
Peter Buck, Managing Editor Imperial ENGINEER

CGCA AGM and President's Lunch

The CGCA Annual General Meeting, AGM, and President's Lunch will be held on Saturday, 7th June 2025, starting at 11:30 am in a venue close to Imperial's South Kensington campus. This is also the date of the Great Exhibition Road Festival, and we hope you will be able to attend the AGM and enjoy all the activities of the Festival. As is traditional, the AGM will be followed by a presentation and then move on to the President's Lunch.

Details and tickets for the event, once finalised, will be available through our website at:

https://cgca.org.uk/agm

For more details of the Festival, please see :

www.greatexhibitionroadfestival.co.uk

The AGM will be chaired by our President, Professor Kelvin Higgins. The agenda includes a review of the past year and presentation of the 2024 Accounts. This will be followed by the election of all Committee posts (excluding President and Vice Presidents) and other AGM business.

If you wish to stand for any Joint Committee posts, please contact me by email (Guildshs2018@outlook.com) with your name, email address, and the post(s) you wish to stand for. Any member of CGCA is able to stand for a Committee post.

Following the AGM there will be a presentation by the Venerable Roger Preece, Master of the Royal Foundation of St Katharine and Senior Vice President of the Association. Roger's presentation is titled "Energising Leadership".

The schedule for the event is:

11:15 Tea / coffee / soft drinks available in the AGM room.
11:30 AGM starts.
12:00 AGM ends.
Roger's presentation begins, ending after a question and answer session around 12:50.
13:00 President's Lunch starts.
The lunch will be a seated two course meal, including vegan options and will be served with wine and soft drinks.
15:00 Event ends.

The AGM and presentation are free to attend.

Partners and guests are most welcome at the Lunch and it is an excellent opportunity to meet the Committee and other members – hopefully in the early summer sunshine!

Further details are on CGCA's website at:

http://cgca.org.uk/agm

The Venerable Roger Preece

"Many organisations struggle with a sense of bringing energy into their organisations. Remote working, increased uncertainty and economic pressure can all contribute towards this sense of organisational entropy. How can leaders understand the energy state of their organisation and also their own particular leadership strengths that can create the energy needed to deliver operational excellence and also the resilience to cope with significant change?"

Roger Preece has had an international coaching and mentoring practice over the last twenty years and has recently been working with colleagues in Strengths Unleashed, a network of former business leaders who are all committed to seeing energy restored to organisations. After Imperial (Elec Eng) Roger's first career was in investment Banking and Management Consultancy. He was one of the founders of Capco, that grew from inception to being valued at over £1b when it was sold in 2023. At Capco, Roger delivered major consulting projects as well as overseeing all the knowledge capital work, including research, training and mentoring. His second career has been in the charity sector and he has had roles in the Church of England, Health and Education. In 2019, he was appointed by Queen Elizabeth II to be Master of the Royal Foundation of St Katharine, an ancient charity (founded in 1147) that is now a retreat centre, meeting space and community charity in East London.

If you wish to join in the events of the Great Exhibition Road Festival, you can find out more and sign up for event emails at

https://greatexhibitionroadfestival.co.uk

Bottle Match 2025

This Bottle Match report was written by Lila Harrison, sports editor for *Felix*, and originally published in *Felix*, issue 1868 (28th February 2025).

I sat on the Piccadilly Line through West London down to Harlington last Saturday, for forty-five minutes, confused as to what 'bottle match' meant. I thought it was some sort of idiom. The 'bottle', in sport, signifies failure. To bottle a game is to 'throw it' when you are clear ahead, to bottle a league is to throw it when you are a significant number of points above your closest rivals to a title. Little did I know that the 'bottle match' was the colloquial name of the second oldest rugby varsity in the world, where the trophy is an actual three-foot-tall tin beer bottle adorned with two crests. It is the prize of the match between Imperial's Royal School of Mines (RSM) and Exeter's Camborne School of Mines (CSM).

Upon arrival at Fortress Harlington, I met Amelia, the President of RSM. She spoke of her sleepless nights preparing for the varsity weekend and explained the series of matches that had taken place over the last forty-eight hours, culminating in the rugby match unfolding before me. The adorned bottle was then fetched and presented to me, etched with the marks of post-match celebrations over the years, along with the RSM logo (I did not bother flipping it to check for the CSM one). As last year's varsity champions, RSM retained possession of it, and hurled it around amidst a vast sea of supporters clad in black and yellow. Thankfully, though it was clearly in need of some restorative work, the top had been secured with plastic bands – necessary, given the result.

After informing me it was tradition to drink out of it, Amelia introduced me to some of the other winning captains of the varsity. I had tried to talk to the (injured) rugby captain at half time, but this was clearly foolish as not only was he laden with nerves but was giving his team a vivacious talking to.

Photo courtesy of RSM

Men's Rugby Squad

Photo courtesy of RSM

Rugby's Post-match celebrations witn the ordained Bottle

Photo courtesy of RSM

Men's Hockey Squad. Oscar Cunningham is pictured top-left

I soon learned from Bell, captain of the mixed lacrosse team, that the sport is not historically RSM's strength. Lacrosse was only added to the varsity fixture list in 2017, and RSM lost every single game since 2018, including a crushing 26-0 defeat last year. IC was typically well-equipped for the sport, whereas RSM, with its smaller student body, faced greater challenges. Additionally, Amelia's 50-50 minimum quota for RSM players in varsity matches meant that some team members were new to the game and had only a month to train. Despite this, the sport is growing in popularity.

Bell recounted an incident at the start of the match when RSM specifically asked the referee whether goals scored by a goalkeeper were allowed. The referee confirmed that they were. However, when the RSM goalkeeper later scored, CSM profusely protested, and the referee overturned the decision. In the end, it did not matter as RSM secured an historic 14-1 victory.

I also learned from Harlan, the men's hockey captain, that he, too, had endured sleepless nights leading up to their big match. Last year, RSM won with a convincing 7-3 win, and the team was determined to defend their title. Their tactic was straightforward: dominate the midfield from the outset and control the pace of the game.

Things did not go entirely to plan. Exeter struck first with an open-play goal and, by halftime, RSM found themselves trailing 2-1, and were even down to nine men at one point. The half time message was then to stamp their authority, and so they did. RSM equalised before quickly taking the lead. From there, they managed the game expertly, holding on to secure a hard-fought 3-2 victory to win the Sharpley trophy. He made sure to emphasise the heroic effort from Oscar Cunningham.

Photo courtesy of RSM

Women's Hockey Squad

Photo courtesy of RSM

Mixed Lacrosse Squad. Bell is pictured bottom-left


Photo: Lloyd T James


Photo: Lloyd T James

Snapshots from the Men's and Women's Hockey matches


Photo: Lloyd T James


Photo: Lloyd T James


Photo: Lloyd T James


Photo: Lloyd T James

Action from the Men's rugby. RSM won 56-7.


Photo: Lloyd T James

Mixed Lacrosse team in action

Harlan could not resist a dig at Exeter, joking that their team was made up of students from "random degrees" compared to RSM's more specialised disciplines. Supposedly, environmental scientists and photographers are included in the CSM – hardly mines.

The second half of the rugby match was a relaxed affair. RSM scored try after try, effortlessly converting each one. I could not help but notice the many awkwardly shaved heads in the RSM squad, "a tradition frowned upon" by the union but willingly embraced by the players. After a flurry of swearing and unwavering support from the Imperial crowd, the final score stood at 56-7. The sound was a stark contrast to the Exeter crowd, with their carefully styled haircuts, glinting singular earrings, and attempted RP ringing out. While RSM embodied a rough-and-ready brotherhood, Exeter carried the air of a university old boys' club. One could say CSM 'bottled' the occasion.

Annual Reunion Lunch

The Annual CGCA Reunion Lunch was held at the Rembrandt Hotel (opposite the V&A) on 23rd November. A gathering of some 28 alumni and partners, including six present-day students and the obligatory Spanner and Bolt, enjoyed a three-course lunch and much convivial conversation.

The proceedings were opened by CGCA's President, Kelvin Higgins, who gave a few words of welcome after which grace was said by Kelvin's intended successor, Vice President Roger Preece. As is always the way, a number of speakers from different years were then kind enough to say a few words between courses about life at College in their day. This included Stewart Morrison from Aeronautics 1974, whose group was the largest at this year's event. A running theme of such speeches seems to be mention of Mr Mooney and his very variable quality catering in days of yore at College. I do hope today's students won't be talking about their experience of College catering for similar reasons fifty years from now!

Stewart was followed by Chris Webb, who studied Chemical Engineering and graduated in 1979. Chris reminded us of the important (and entertaining) role mascots played back in his day, as was the case for so many of us. It was great to have Spanner and Bolt in attendance at the lunch, and to realise they are still so central to rag activities with today's students. To think that the self-same mascots have lasted down the years, makes for a very poignant demonstration of the continuity of student life and the spirit of camaraderie amongst Guildsmen, past and present.

Bringing us up to the present day, the current CGCU Alumni Liaison Officer Zelin Shao said a few words after the dessert course. Unaccustomed as perhaps he is to public speaking, those present felt he did a fine job and very much enjoyed what he had to say. Both he and his President Daniel Zhuo have been very supportive of CGCA activities during their term of office, and we wish them well as they complete their Civil Engineering studies this year.

After lunch, quite a few of those attending made the walk up to the Motor club garage next to the RCM to see Bo. Following his exertions to Brighton only a week or so earlier, he was receiving some "TLC" and not really in a fit state to journey down to the hotel. Seeing the garage and all its paraphernalia – including a drawer full of "bonk sticks" (lump hammers to the rest of us) was even more fascinating than to have just seen Bo himself.

If you're interested in attending this year's lunch, and graduated in a year ending 5 or 0, it will be held at the same venue, provisionally on Saturday 22nd November.

Peter Chase

CGCA 111th Annual Dinner

The Association's 111th annual dinner took place on Friday 14 March, at Saddlers' Hall in the City of London, when members, guests, staff and students gathered for their annual get together, to enjoy good food, wine, friendship and conversation.

The leadup to the dinner included the by now common concern about whether Boanerges, the 1902 James and Browne vintage car, would be able to make it to the Hall. In anticipation of this, arrangements had been made by the Bo Drivers' Team to set out for the Hall in the early afternoon and to have a trailer on standby in case Bo needed some help. I am pleased to report that this proved to be a very successful strategy, since Bo was in place at the main entrance to the Hall by mid-afternoon, well before the arrival of any members and guests.

The dinner proved to be a very good one, with the food and wine receiving many accolades from the diners. The caterers, Searcy's, who are based at Saddlers' Hall, certainly did us proud on the night. The wines also proved very acceptable. Echo, the second wine of Lynch Bages and Dow 1991 port, both of which had appeared on previous occasions, were on show for the last time, stocks being used up on this occasion, apart from some bin ends which remain in the cellar.

The gathering of 120 people included a good selection of members young and old, students and staff, along with their guests. The main guest of the Association was Dr Dolores Byrne, Master of the Worshipful Company of Engineers, who spoke about the Company, with its roots in the mediaeval Guild system, even though it is a relatively new Company, having been founded in the 1970s. Its main activities include fellowship, philanthropy and support for the activities of the Lord Mayor. Specifically, the Company is active in funding scholarships, keeping City of London people up to date with engineering and supporting the prestigious MacRobert Award for innovative engineering.

The speeches continued with an address by Kelvin Higgins, the CGCA President, who introduced the main guests, including representatives from City and Guilds of London Institute, the RSMA and members of the senior management of Imperial College, namely Richard Martin, Registrar and College Secretary; Kristin Blanchfield, the newly appointed Vice President (Advancement); and Professor Ian Walmsley, the Provost, who gave the vote of thanks on behalf of the guests.

Speeches were followed by the student awards, which were made by the College Consul for Engineering, Professor Ann Muggeridge, assisted in the case of the FCGI Centenary Award by Faiza Khan for CGLI and Commodore Barry Brooks for the Fellows. The awards are listed below.

Mr William Carter:
FCGI Centenary Award 2023-24

Mr Dylan Laird:
Holbein Memorial Award 2023-24, as Sportsperson of the Year

Mr Elliot Jullier:
Peter Moore Memorial Award 2024-25, as this year's Bo Driver

Ms Ciara Gibbs:
John and Frances Jones Prize 2023-24

Ms Anna Silver:
The OC Trust Centenary Enterprise Award 2025

Following the dinner, members and guests returned to the main reception room for a stirrup cup and a chance to chat with friends and colleagues. There was a buzzing atmosphere and everyone seemed to be having a great time. By 11.00 pm people were on their way home after a very successful evening, while the dinner organisers, having relaxed for a while, began turning their minds to the arrangements for the next time, in early 2026. We hope to see you all there!

Colin Kerr

Note: *There are no photographs from the Annual Dinner available yet.*

Photos courtesy of Chris Lumb

DEVELOPMENTS AROUND THE ENGINEERING FACULTY

Professor Brady's President's Address 2025

In February Professor Hugh Brady, used this year's Imperial President's Address to highlight the important contribution that universities can make to the UK Government's mission to grow the UK economy.

President Brady said: "Imperial's founding mission – as I never get tired of saying – is 'to be useful'. It was written into our royal charter of 1907 and it's what drives us today.

"In 2025, 'being useful' in the UK means, more than anything, growing the economy. As the Prime Minister wrote in *The Times* last week, growth is the 'only cure' for 'the disease of stagnation and decline'. So today I want to talk to you about what we can do to help, as an institution, as a sector and, ultimately, as a country. How can we harness the power of science and technology to make the UK a more prosperous and more equitable place?

"Now I'm sure there are some among you, perhaps of a certain age, who are already hearing echoes of Harold Wilson's 'white heat of technology' speech in Scarborough where he promised to 'harness' the 'white heat' of science and technology to 'forge' a new Britain in 1963. And perhaps you're even thinking yes, that's exactly what we did.

"In the 62 years since Wilson gave that speech the UK's universities and science and tech companies have given us: test tube babies, CT scanners, Dolly the sheep, MRI, the Higgs-Boson prediction, gravitational waves, neutron scattering, Graphene, pulsars, off-shore wind farms and the first Covid vaccine.

"The United Kingdom is home to only 0.8% of the world's population but produces 13% of the world's most highly cited papers, and I'm proud to say that Imperial, with its unique mix of science, engineering, medicine and business, sits at the very heart of this success story.

"Modern Britain has harnessed the 'white heat' of science. We are a world-leader in AI, we are a world-leader in electronics, we are a world-leader in aerospace and a world-leader in medicine, and that has made us a more prosperous country.

"Last year, the science and technology sectors contributed £164 billion to the UK economy. That's the equivalent of an entire year of NHS England funding. But the truth is that it's nowhere near what it could be. What you may not know about the 'white heat' speech is that Wilson based it on a lecture he gave here, eight months earlier, just a fortnight after he was elected Labour leader. Standing at a lectern like this at Imperial, Wilson said the biggest barrier to British science was our 'appalling complacency'. We were the nation of Newton, Darwin, Lovelace, Fleming and Kelvin but, to quote, we did 'not give science its proper place in our national life'. And sixty-two years later, we have made huge progress, but we still have more to do."

"The UK invests about 3% of our GDP into R&D. In Germany, whose economy is as sluggish as ours, they are targeting 3.5%. The OECD reports that China has been increasing its R&D investment by 10-14% a year, and the US invests ten times as much as we do: $200 billion dollars a year. Our 3% is a sign that we need to do more.

"Now, government spending on R&D has risen in recent years, but that increase has failed to keep pace with inflation and we're falling behind our competitors. As Rachel Reeves said in Oxford last week, the UK is 'at the forefront of some of the most exciting developments in the world.' We could be one of the world's great science and tech superpowers. The chancellor is right 'we can do much better'.

"This government's commitment to over £20 billion R&D investment in their first budget last year was a very welcome start. 'Research on a shoestring', Wilson said, is a threat to the UK's 'national survival', and investment, as Rachel Reeves says, 'is the lifeblood of growth'. But the UK is small. And our finances are challenged. We will never outspend the US or China.

"So in order to compete on a global scale for the talent, ideas and capital we need to 'kickstart growth', we need to play smart, to be strategic and to direct investment where it will make the biggest difference. And here, the UK's universities are among our greatest assets.

Imperial was ranked 2nd in the world this year in the QS World University Rankings, where we were joined in the top ten by three other UK universities. There are fifteen of us in the global top hundred and we deliver an impressive return on investment. Universities UK estimates that for every pound of public money invested in higher education, the sector puts fourteen pounds back into the national economy.

"The launch of the government's new Industrial Strategy this spring is the perfect opportunity to set out a long-term, national strategy to harness our universities to drive economic growth.

"It must begin with a laser-like focus on the UK's STEM talent pipeline. Research shows that skills and labour have been the only factor of the UK economy to have made a positive and consistent contribution to productivity growth in the UK since 2007. That's mainly been thanks to our increasing number of graduates, and the effect is especially clear in science and technology.

"But the UK's supply of excellent STEM graduates is under threat. Not enough young people in our schools are taking STEM subjects at A level. Current UK undergraduate tuition fees don't cover the cost of expensive STEM courses. Undergraduate biosciences enrollments have fallen by 15% in five years across the country and some chemistry departments are closing because they can't cover costs. We cannot afford to turn a blind eye to these trends.

"While international students have long helped offset these shortfalls, their numbers are also falling precipitously across the sector. That poses a triple threat:

"Fewer fee-paying international students that enrich our learning environment, help power our research and cross-subsidise costly STEM courses, fewer international founders driving high-growth UK businesses, and fewer skilled graduates for our industrial base.

"At Imperial, we are doing our best to reverse things.

"But universities simply cannot do this alone. If we are to compete internationally we need a system-wide response to address the crisis in maths and science education in our schools. We must address the Higher Education funding system to cover the costs of a STEM education, and the government's upcoming immigration white paper must make it even easier for us to attract and retain highly skilled people – both international students and researchers.

"The Chancellor was right when she said 'we're in an international competition for talent'. When it comes to attracting researchers, we are still very much in the game. The UK is home to some of the world's greatest research scientists, engineers and clinicians and many of them are here at Imperial. If she wants to experience 'the sounds and sights of the future arriving', like she said, the Chancellor need only pay them a visit at South Kensington, White City, Silwood Park or our NHS campuses.

Photo courtesy of Imperial College

"But the UK should not take its scientists for granted. In order to attract and retain world-leading researchers and in order to enable them to do their best work, the Industrial Strategy must recommit to excellence-based research funding and get the funding mix right."

Looking beyond Imperial, President Brady argued that the UK Government's Industrial Strategy could unleash the full potential of universities as catalysts of innovation within regions – taking advantage of existing innovation clusters, including biotech along the Oxford-Cambridge Corridor, quantum computing in Glasgow, and advanced materials in the North West of England.

Closing his address, President Brady said: "If there's one thing I want you to take away today, it's just how strong a position the UK is in already. There are headwinds facing the sector, of course, but we can navigate them. Our universities are a gold mine of research, expertise and vibrant ideas. We are well-equipped to face the world's greatest challenges head-on: climate change, AI ethics, pandemic resilience – these are questions we have been working on, already, for decades. So I am going to end my address today with an answer to the Chancellor's recent call to go 'further and faster' to 'kickstart' growth.

"My answer to the government is this: we're ready. We're ready at Imperial. We're ready as a sector. Ready to produce the best ideas. The best graduates. The best research. The best companies. The best ecosystems. We're ready to make Britain a science and tech superpower. Universities want 'to be useful'. So use us.

"Thank you for listening."

You can watch President Brady's full address on YouTube at https://dub.sh/IE42-Brady-video or read a transcript at https://dub.sh/IE42-Brady-text

DEVELOPMENTS AROUND THE ENGINEERING FACULTY

Spanish honour for Professor Rein

The King of Spain has awarded the Officer's Cross of the Order of Isabella the Catholic to Professor Gillermo Rein.

Professor Rein, a leading fire scientist at Imperial and Head of Research in the Department of Mechanical Engineering, has been recognised for his pioneering research in fire science and fire engineering. This is a prestigious honour recognising outstanding contributions to Spain and its international relations and cooperation with other nations.

Ambassador José Pascual Marco presented the award at a ceremony in the Spanish Embassy in London. Professor Rein said: "I am immensely proud that the work of an engineer is being recognised with this distinction. Engineering transforms the world and helps build a safer and better future".

Photos courtesy of Imperial College

Professor Rein celebrates with members of his laboratory group

https://dub.sh/IE42-Rein

King Charles visits Imperial's Centre for Injury Studies

His Majesty The King visited Imperial's Centre for Injury Studies to highlight the UK's support to injured service personnel in Ukraine and hear about the vital link between research and humanitarian efforts.

The King was joined on the visit by Ambassador of Ukraine to the United Kingdom of Great Britain and Northern Ireland, General Valerii Zaluzhnyi.

The Centre for Injury Studies is Imperial's convergence science vehicle for teams of engineers, scientists and clinicians to work together to develop new ways of protecting against, diagnosing, treating, and rehabilitating patients following traumatic injuries.

The Centre brings together different disciplines focused on understanding traumatic injuries, and studies injuries sustained in conflict zones, sport and everyday life, working to protect and rehabilitate people of all ages from injuries of all types.

Marking the third anniversary of the start of the Ukraine war, The King visited the Centre to see how Imperial applies lessons learned from previous conflicts, including in Afghanistan and Iraq, to support the wounded in Ukraine. His Majesty heard how the UK can learn from Ukraine's experience in combat medicine, rehabilitation and conflict-related injuries.

In the laboratory space, based at the Sir Michael Uren Hub at Imperial's White City Campus, Professor Anthony Bull, Centre Director, Dr Spyros Masouros, Associate Director, and Professor Shehan Hettiaratchy, Professor of Practice in Plastic and Reconstructive Surgery at Imperial and Director of Major Trauma at Imperial College Healthcare NHS Trust, explained the Centre's work.

His Majesty saw a demonstration of a machine simulating the creation of combat injuries to see how adequate protection can limit injuries. The King heard about current research on prosthetics and saw a device used for testing the durability of leg prosthetics.

His Majesty then viewed a demonstration using virtual reality biofeedback technology, to enhance rehabilitation following limb loss.

Professor Anthony Bull said: "Collaboration is part of Imperial's DNA; the partnership between the Centre for Injury Studies and colleagues in the NHS, defence and humanitarian organisations is an exemplar of how we are making a difference through our research. We are grateful and honoured to have been able to welcome His Majesty to meet with our researchers and partners."

Professor Hugh Brady, President of Imperial College London, said: "His Majesty's visit to the Centre for Injury Studies at our White City Campus underscores the critical work underway at Imperial to tackle one of today's most urgent medical challenges. Our pioneering research into traumatic injuries, advanced prosthetics and trauma care is transforming outcomes for military personnel and civilians in conflict zones. This is a powerful example of how science and collaboration can change lives, and we are proud to be leading such transformative work."

During the visit, The King had the opportunity to meet Ukrainian students at Imperial, as well as representatives of the NHS, humanitarian organisations including UK-Med, a humanitarian medical NGO providing aid in conflict and disasters, and UK government departments involved in an international medical partnership, including staff from the Ministry of Defence and the Department of Health and Social Care.

His Majesty also heard how Imperial College Healthcare NHS Trust has signed a memorandum of understanding with First Medical Union and Unbroken, Ukrainian healthcare providers in Lviv that the Trust has been working with for the last three years. This will formalise a collaboration which has been focused on surgical training but will now expand into a wider partnership, including research.

https://dub.sh/IE42-King

Photos: Thomas Angus / Imperial College London

DEVELOPMENTS AROUND THE ENGINEERING FACULTY

Funding to build safe and reliable AI

Imperial spinout, Safe Intelligence, has raised £4.15m seed funding for software designed to ensure that safety- and business-critical AI systems perform as intended.

The platform offered by Safe Intelligence is designed to validate the performance of AI models in a wide range of scenarios and make them more reliable.

It uses verification techniques developed in Imperial's Department of Computing to validate how models will perform under a broader set of conditions than standard testing methods can. It can also automatically improve AI systems to make them more robust to unexpected inputs that could otherwise disrupt their performance.

The company is working with partners in a range of industry sectors to help overcome a key barrier to the adoption of AI, namely insufficient trust that the models will perform as intended in applications where errors could be very expensive or threaten human safety.

These include AI algorithms that could be used by financial services companies to make lending decisions, and systems under development by the aviation sector to control autonomous cargo aircraft.

Dr Manjari Chandran-Ramesh of Amadeus Capital Partners, which led the seed round, said: "Banks, insurers and other corporates using complex AI models internally are holding back from applying them to frontline, customer-facing or regulated activity because of fears that their models are not robust enough. Safe Intelligence can identify fragilities, tackle them, and unleash the power of AI across industries from transport to finance."

The core of the problem is that to trust an AI, one needs to be confident that it will respond reliably to scenarios it has not encountered before. This is hard to verify, and the problem is compounded by the fact that more sophisticated AI models are more fragile, or prone to critical changes of behaviour in response even to very small changes in input.

Rather than testing how models respond to individual input perturbations, for example how an AI autopilot will land an aircraft under the illumination condition created by a specific sunset, Safe Intelligence's platform efficiently tests how they respond to whole libraries of input perturbations – for example, the full suite of illumination changes a sunset could create.

Photo courtesy of Imperial College

Professor Alessio Lomuscio

The technology builds on decades of research by founder Alessio Lomuscio, Professor of Safe Artificial Intelligence in Imperial's Department of Computing, who launched the spinout in 2021. Professor Lomuscio, now serving as Chief Technology Officer, has been joined by industry AI expert Dr Steven Willmott as the company's CEO.

"Our mission is to provide tools to radically improve our ability to validate machine learned components and get back to a world where we can have high confidence in our systems," said Dr Willmott.

The lead investor, Amadeus Capital Partners, is joined by OTB Ventures and Vsquared Ventures, who are helping Safe Intelligence bring its technology to industry partners. The company is currently offering its platform to customers via an early user programme.

Dr Simon Hepworth, Co-Director of Enterprise (Commercialisation) at Imperial College London, said: "With AI set to transform society, ensuring its safety and robustness is one of the most urgent challenges we face. By drawing on the academic expertise of Professor Lomuscio and the support of seasoned entrepreneurs and investors, Safe Intelligence is set to make an important contribution to this challenge.

"At Imperial, we're helping academics create commercial solutions through initiatives such as I-X and our forthcoming Schools of Convergence Science, and the regular backing of investors is a strong vote of confidence in Imperial's people and technologies."

https://dub.sh/IE42-SafeAI

Electric vehicle charging partnership for Imperial spinout

Any new technology faces a number of challenges when it goes out into the world, from satisfying safety regulations to attracting its first users. So it's good news when the innovation is embraced by a significant player in the industry, as has just happened for Go Eve, a joint spinout from Imperial and University College Dublin, which has developed a system that allows multiple electric vehicles (EVs) to be recharged from a single charger. Called DockChain, this innovation addresses the problem of limited access to charging, which is holding back the large-scale shift to electric mobility that is needed to reduce greenhouse gas emissions and improve air quality in cities.

After a series of trials and pilots, Go Eve has signed a partnership agreement with Zerova, a global manufacturer of customised EV charging systems, from Taiwan. This will see DockChain recommended for use with Zerova's rapid DC charger, designed for use in workplaces, hotels, depots and garages.

"We are excited to partner with Go Eve to bring this innovative solution to the market," said Bruno Guenka, Zerova Senior Marketing Manager. "Our DS Series chargers, combined with Go Eve's DockChain technology, offer a unique and efficient charging experience that meets the growing demands of EV users."

According to John Goodbody, co-founder and marketing director at Go Eve, this is a significant validation for the company, "This is the very first EV charger manufacturer to officially endorse and recommend our DockChain innovation being added to their rapid DC chargers," he said. "Having our technology hard-wired into an existing charger with the full backing of the manufacturer's warranty is a big step forward, both for the company and for our customers."

Go Eve's approach to multiple vehicle charging was developed by Professor Robert Shorten and colleagues at University College Dublin to address the 'one car, one charger' model that still limits the use of EV charging infrastructure. This is frustrating for drivers looking to plug in, and a serious headache for fleet managers who need to keep large numbers of electric vehicles charged and ready to roll.

Professor Shorten continued working on the idea when he relocated to the Dyson School of Design Engineering at Imperial in 2019. Go Eve was set up in early 2021 as a joint spinout between UCD and Imperial, with the goal of bringing the DockChain technology to the market.

The system allows a single charger to support multiple EVs through a daisy chain of compact charging terminals, each in its own parking bay. Instead of dividing the power from the charger, DockChain charges one vehicle at a time by prioritising where it sends the current. The system can be set to charge on a first come, first served basis, or to prioritise vehicles with the lowest batteries, or any other pattern the operator requires.

The first pilot for the new system took place in November 2022, with a four-station DockChain set up at Imperial's South Kensington campus. "We were able to charge the cars sequentially, in whichever order we wanted, at high power," says Mr Goodbody. "And that was the first manifestation of the lab idea in a real car park."

In 2023, Go Eve raised £3 million in seed funding to help bring its system to the market. Since then, it has tested DockChain at multiple sites in the US and Europe, including four with Zerova, charging a broad range of vehicles. The partnership agreement builds on the success of those trials, and the award last year of a CE safety and quality mark that allows DockChain to be sold throughout Europe.

Photo courtesy of Imperial College

The pilot at Imperial in 2022

"It is fantastic to witness the interest in the DockChain technology, and Go Eve, from major automotive equipment manufacturers, from the EV charging industry and from service providers," said Professor Shorten, who is now head of the Dyson School for Design Engineering.

https://dub.sh/IE42-GoEve

DEVELOPMENTS AROUND THE ENGINEERING FACULTY

Lithium can be harvested from salt-lakes

Demand for lithium is rising due to its use in batteries for mobile devices, cars and clean energy storage. Securing access to natural deposits of the mineral is now a matter of strategic importance, but lithium can be found elsewhere in nature.

As an alternative to mining, Imperial researchers have created a technology that could be used to efficiently extract it from saltwater sources such as salt-lake brines or geothermal brine solutions.

Conventional lithium extraction from brines takes months and uses significant amounts of water and chemicals, generating greenhouse gas emissions in the process. The alternative developed by Dr Qilei Song and his team in the Department of Chemical Engineering uses a membrane that separates lithium from salt water by filtering it through tiny pores.

The usual shortcoming with this approach is that the pores also let through magnesium and other contaminants, but the team have developed a class of special polymers that are highly selective for lithium. Details of the method, and how it can be scaled up for practical application, have just been published in the journal *Nature Water*.

For more than a decade, Dr Song has been working on a new generation of synthetic polymer membranes, based on materials known as polymers of intrinsic microporosity (PIMs). These polymers are shot through with tiny, hour-glass shaped micropores that provide ordered channels through which small molecules and ions can travel.

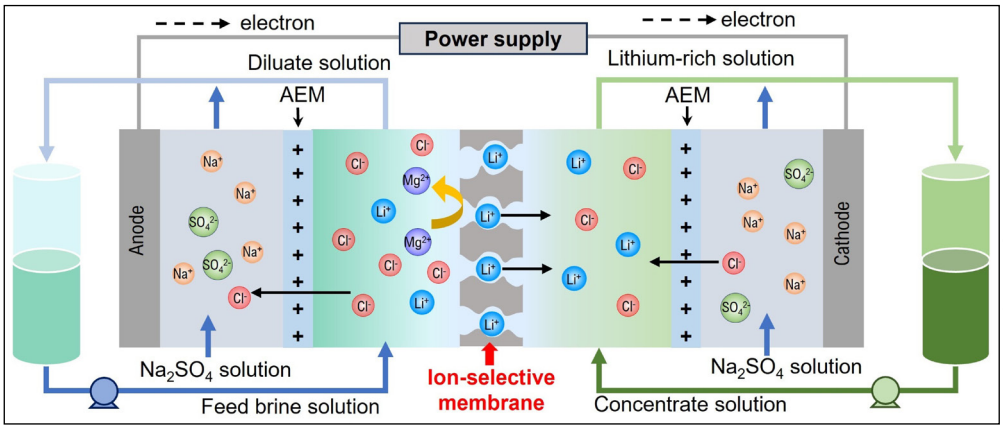


Image courtesy of Imperial College

In this new study, Dr Song's team fine-tuned the micropores to become highly selective for lithium. Used in an electrodialysis device, the lithium ions are effectively pulled through the membrane micropores by an electrical current, while larger magnesium ions are left behind.

Tested on simulated salt-lake brines, these PIM membranes were highly selective for lithium, and produced high purity battery-grade lithium carbonate.

If these membranes are to be of practical use, however, they must be produced in large quantities. Fortunately, the polymers are soluble in common solvents and can be turned into membranes using established industrial techniques.

"The polymer synthesis routes are based on commercially available monomers and simple chemical modifications, which makes scaling up the membranes relatively easy," said Dingchang Yang, a PhD student in Dr Song's group who led the experimental work. They can also be incorporated easily into commercial membrane modules and combined with other separation processes, which will also speed their use.

Imperial has filed patent applications for these membranes and a range of different uses, including lithium extraction. Dr Song is now working with Imperial Enterprise and ChemEng Enterprise, the technology transfer initiative of the Department of Chemical Engineering, to explore potential commercialisation of the technology.

"We are in the process of establishing a climate tech company and are keen to build partnerships with companies to extract lithium at a large scale using real brine solutions," he said.

Isolating lithium is just the beginning of the potential for these high-selectivity membranes. "This technology has tremendous potential in a variety of commercially important areas, from energy storage to water purification to recovery of critical materials in a circular economy," said Professor Sandro Macchietto, Director of Enterprise in the Department of Chemical Engineering.

One line of investigation will apply the ion-exchange polymers and selective electrodialysis to the extraction of copper and other metal ions from mining process waters. "This links well with the sustainable extraction of critical materials, which is being pursued by the Rio Tinto Centre for Future Materials at Imperial," Dr Song said.

Dr Song's team's lithium extraction research was carried out with support from Professor Magda Titirici and Professor Nilay Shah in the Department of Chemical Engineering, Professor Kim Jelfs' group in the Department of Chemistry, and colleagues from the University of Birmingham, University College London, the University of Edinburgh, the Institut Laue Langevin in Grenoble, and the University of Science and Technology of China in Hefei.

https://dub.sh/IE42-Lithium

BMO supports ESE student to attend mining conference

Financial support in the form of scholarships is a key factor in student success at Imperial. Bank of Montreal (BMO) took their support of Metals and Energy MSc student Freya Huang one step further with a trip to the 34th annual BMO Global Metals, Mining & Critical Minerals Conference in Florida.

The conference was attended by more than 1,400 global industry leaders and institutional investors over four days from 23rd to 26th of February. Freya Huang, who is the recipient of the 2024/25 Bank of Montreal Scholarship for the MSc Metals and Energy Finance, offered by the Department of Earth Science and Engineering (ESE), attended with Bill Smith, Managing Director at BMO Capital Markets in London.

On the first day of the conference, there were rapid fire recap sessions for attendees working in finance on all things mining, commodities, and critical minerals. Freya found this useful for linking modules she has covered in her Master's with industry examples.

Monday morning saw back-to-back presentations from CEOs of the world's leading mining companies, followed by a Q&A. This covered areas such as the latest updates, challenges and opportunities in the sector. The remainder of Freya's time at the conference was spent networking and taking one-on-one meetings with a range of mining companies and capital providers such as private equity firms. Ahead of the keynote session, Bill introduced Freya to the conference as BMO's scholarship recipient, providing a huge opportunity for Freya to connect with other attendees.

Photo courtesy of Imperial College

For Freya, the highlight was the exposure she gained to senior leadership at mining and finance companies from around the world. The networking opportunity presented by the conference cannot be overstated and provides a strong foundation for Freya's career post-Imperial. She was also able to meet three alumni from the MSc Metals and Energy Finance who have gone on to roles with both mining companies and capital providers.

BMO has been supporting women in the MSc Metals and Energy Finance since 2015.

https://dub.sh/IE42-BMO

DEVELOPMENTS AROUND THE ENGINEERING FACULTY

Royce appoints Research Leads and Academic Champions

The Henry Royce Institute was set up to push materials science research forward through national collaboration. Back in 2015, Imperial College started talks about joining The Henry Royce Institute and took the initiative to develop a collaboration with the Universities of Manchester, Cambridge and Leeds in the functional materials theme, in what is now called 'Atoms to Devices'.

Since then, Royce at Imperial has moved into the 8th floor of the new Sir Michael Uren Building, and become a new hub for materials innovation and access to cutting-edge facilities. The facilities are open to users from companies, start-ups, and academia to bring their ideas to life!

Imperial experts Professor Ifan Stephens, Professor Cecilia Mattevi, Dr Reshma Rao, and Professor Aron Walsh have been named among new Royce Research Area Leads.

A Royce Research Area Lead (RAL) will provide strategic leadership both across Royce and within their Research Area and support its wider development nationally and internationally.

Commenting on the new RAL appointments, Royce Chief Scientific Officer, Professor Ian Kinloch, said:

"I am delighted to welcome our fantastic new Research Area Leads as key champions of the research portfolio across the Institute. This strategic role is vital to Royce, as these experts not only shape our research direction but also galvanise their Steering Groups, collaborate with other national and international institutes and collaborate with our industry partners.

"I look forward to working with them as they join our other RALs in leading Royce research programs, bringing together research communities, and driving innovation at the intersection of academia and industry."

Meanwhile, Royce at Imperial has appointed two new Academic Champions.

Dr Shelly Conroy has been appointed Academic Champion for Thin Films and Dr Reshma Rao will lead as Academic Champion for Electrochemical Devices. Both academics will bring valuable expertise and leadership to Royce at Imperial, supporting innovation and collaboration in these key research areas.

https://dub.sh/IE42-Royce-RAL
https://dub.sh/IE42-Royce-3RAL
https://dub.sh/IR42-Royce-AC

Photos courtesy of Imperial College

Professor Ifan Stephens, Professor in Electrochemistry in the Department of Materials, has been announced as the new Research Area Lead for the 'Atoms to Devices' research theme at Royce at Imperial.

Asked about the future of research at Royce, Professor Stephens said, "The field is changing rapidly, especially with the prospects of developing materials for quantum computing. We believe this will become extremely important for computing in the near future, and this is where our 'Atoms to Devices' theme will play a crucial role.

"Another big focus is reviving the UK semiconductor industry. It's crucial for 'Atoms to Devices' to identify opportunities here, engage the community, and explore how the Royce Institute can contribute, through access to our facilities and opportunities for collaboration.

"It's also vital for Royce to act as a convener, reaching out to governments and influencing policy. The Henry Royce Institute recently published a National Materials Strategy, directly outlining to the government the importance of materials for the UK's future."

Dr Reshma Rao, Lecturer in the Department of Materials, Royal Academy of Engineering Research Fellow, and currently on secondment to the Grantham Institute for Climate Change, will be the Royce Research Area Lead for Electrochemical Systems.

Dr Rao comments, "With electrochemical devices playing a key role in the clean energy transition, this is a pivotal moment for our research. I'm excited to help drive innovation across this landscape, pushing boundaries in both fundamental understanding and real-world solutions"

Dr Rao will also take on the new role of Academic Champion for Electrochemical Devices at Imperial,.

Her research investigates how chemical reactions happen on solid surfaces that interact with gases or liquids, using advanced tools that let her observe these reactions as they happen. Her goal is to use this knowledge to design better, cheaper, and longer-lasting materials that can help produce clean energy.

Dr Rao said: "I am delighted to take on the role of Academic Champion for Electrochemical Devices. Imperial hosts a strong and diverse electrochemistry community, with over 400 members in the Electrochemistry Network, and an excellent track record in pioneering research across a range of technologies – including fuel cells, electrolysers, batteries, and electrosynthesis of commodity chemicals.

"This role presents an exciting opportunity to bring this vibrant community together and to ensure that the facilities and expertise at Royce Imperial continue to support both the advancement of current technologies and the development of new ones.

"From fundamental atomic-level understanding to scale-up and device testing, I look forward to helping drive innovation across the electrochemical devices landscape."

Professor Aron Walsh, Professor and Chair in Materials Design in the Department of Materials, will be the Royce Research Area Lead for Modelling and Simulation.

Professor Walsh comments, "Materials modelling is transforming, driven by advances in AI capabilities, growing materials datasets, and the emergence of a new data-centric digital materials industry. I'm excited to help shape this evolving field through the Royce role, connecting fundamental research with future technologies."

Professor Cecilia Mattevi, Professor of Materials Science in the Department of Materials, will be the Royce Research Area Lead for 2D Materials.

Professor Mattevi's research focuses on 2D materials in miniaturised devices to address challenges in energy storage devices and energy conversion systems.

Dr Shelly Conroy will take on the new role of Academic Champion for Thin Films at Royce at Imperial.

Dr Conroy works with ultra-thin layers of materials that have unique electrical and magnetic properties. These materials are used to develop tiny, advanced electronic devices that can interact with their environment, with potential applications in future computing and quantum technologies.

Her research group, funded by the Royal Society and an ERC Consolidator Grant, focuses on designing free-standing 2D thin films, pushing the boundaries of next-generation functional materials.

In her new role, Dr Conroy will lead the thin film community at Royce at Imperial and foster collaborations with Royce researchers across the UK and internationally. She will also coordinate initiatives through meetings, schools, and workshops, driving innovation to advance thin film materials and device development.

Dr Conroy comments "I'm excited to step into the role of Academic Champion for Thin Films at Royce Imperial, supporting new collaborations and opportunities to advance thin film research."

DEVELOPMENTS AROUND THE ENGINEERING FACULTY

Imperial startup to take joint replacements to US

Joint replacement patients could stay active for longer thanks to a 3D-printed material from Imperial startup OSSTEC, which has raised a further £2.5 million to take its technology to the market. Based on novel material that behaves like bone, the company's joint replacement system promises to simplify surgery, reduce implant failures and keep patients active for longer.

The funding means that the technology is now closer to entering clinical use. "This is our go-to-market investment round," explains Dr Max Munford, founder and Chief Executive of OSSTEC. "These funds will enable us to get regulatory approval in the US, carry out our first surgeries as part of a trial in the UK, and to earn our first revenues in the US."

The company's introduction to the US was supported by Imperial, which recently opened an Imperial Global hub in the San Francisco Bay Area. It included OSSTEC in a Venture Trek, one of its missions to pitch and network in entrepreneurial hotspots such as New York and San Francisco.

"We first met some of our most supportive investors in this round on the San Francisco Venture Trek from two years ago," Dr Munford says.

The funding round was led by Empirical Ventures, a UK-based venture capital firm that specialises in deep-technology. Due to the level of interest, the round remains open for further investment.

"OSSTEC is an excellent example of how scientific discovery can be transformed into real-world impact," said Dr Johnathan Matlock, co-founder and general partner at Empirical Ventures.

"The company has huge potential to completely reform best practices in this field of healthcare, with an impressive team of scientists pushing the boundaries of engineering and medical research."

OSSTEC was founded in 2021 from a PhD student project in the Department of Mechanical Engineering on how 3D printing could be used in surgery. In 2023, the company raised £1.2 million in seed funding from investors, including the Imperial College Enterprise Fund.

Since then, OSSTEC has been building its team of in-house engineers and a pool of surgeons to take the technology through to its first use in patients, which will be for partial knee replacements. While its lead surgeon and chief medical officer Alex Liddle is based in the UK, the company has been keen to build links with surgeons in the US, which is where the product will launch first.

"It was important for us to build a team of surgeons who are global leaders in their space, with a combined experience using a broad range of implants, surgical techniques and technology adoption," Dr Munford says.

The US is an attractive starting place because the market is large and the regulatory system can be supportive for a small company like OSSTEC. And there are potential partners and future investors who can help the company scale up. "The US is where a lot of the value is for a company like ours," Dr Munford says.

At the same time, he wants OSSTEC to maintain its strong relationship with Imperial, with the core team continuing to work with the laboratories in Mechanical Engineering where Dr Munford did his PhD research.

"There are a lot of benefits in having research and commercialisation teams side-by-side," Dr Munford says. "We get to have interesting conversations with the academic researchers, which you don't typically have as a product-focused startup, and researchers and students get to see the process of taking a medical product to market."

As OSSTEC matures, he hopes that further research partnerships will emerge. "The plan is to use our first product as a platform for further innovation, so I'd love OSSTEC to be sponsoring PhDs and working on other projects with Imperial researchers."

Having developed OSSTEC through the Venture Catalyst Challenge, the MedTech SuperConnector and other support provided by the Enterprise Lab, Dr Munford is keen to play an active part in Imperial's entrepreneurial ecosystem.

"When you build a strong ecosystem, as has happened with the Enterprise Lab, then every success makes new successes," he says. "I think that OSSTEC is on its way to being a success, so it is our duty now to help other people grow, and give back to that ecosystem."

He is currently co-organising the Imperial Founders' Round Table, which gathers together company founders, from pre-seed through to Series B, to share their experience. "Once a quarter, we tackle a new topic and look at best practices, shared learnings for the ecosystem, and publish our thoughts," he explains.

"I'm biased, but think we are a very good example of what happens when you have a strong Imperial ecosystem, and I would never want to stop engaging with that."

Dr Ben Mumby-Croft, Director of Entrepreneurship at Imperial, agrees. "OSSTEC's journey is a brilliant example of the kind of entrepreneurial venture we strive to support at Imperial – one that translates world-class research into real-world impact," he says. "Imperial Enterprise Lab is proud to have played a role in its growth, from early-stage support to connecting it with investors through our Venture Trek programme."

https://dub.sh/IE42-OSSTEC

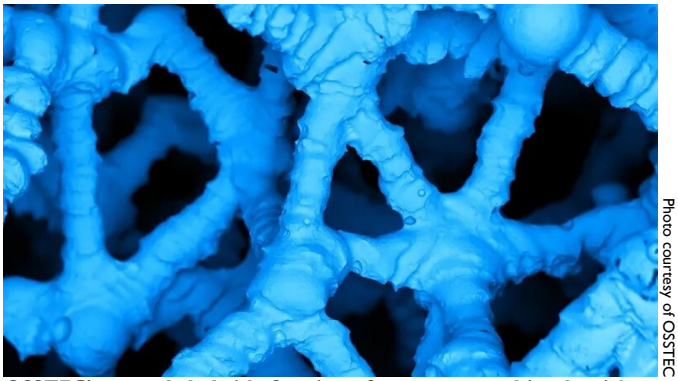


Photo courtesy of OSSTEC

OSSTEC's novel hybrid fixation features, combined with a 3D-printed porous lattice that mimics the trabecular structue of bone, ensures stable initial fixation while promoting natural bone ingrowth, delivering revolutionary fixation without the drawbacks of bone cement.

Photo courtesy of OSSTEC

Photo courtesy of Imperial College

The OSSTEC team works out of the Department of Mechanical Engineering where Dr Munford did his original research

DEVELOPMENTS AROUND THE ENGINEERING FACULTY

Robotic limbs that feel natural

Imperial researchers have decoded the signals between hand movements and the brain, paving the way for more natural-feeling prosthetics.

In the study, published in *Science Robotics*, researchers unpicked the connections between hand movement patterns and the control patterns from motoneurons in the spinal cord. They were able to decipher these patterns using technology that picks up electrical signals from the muscles as they contract. They then applied the same patterns to the actuators of a soft robotic hand so that it could mimic a person's natural movement and control.

The researchers' goal was to find an alternative to the current model of prosthetic limbs, which are often abandoned by users because they do not respond in a 'natural' way to their movement and control needs.

They tested the innovative design in real-time scenarios with three prosthesis users. The trials showed that users could control the prosthetic in a more intuitive way compared to current models, enabling them to perform tasks like gripping and manipulating objects with ease.

Professor Dario Farina, from Imperial's Department of Bioengineering, said: "Our innovative approach of combining bioengineering and robotic technology has opened the door to a new era of prosthetics. The increased freedom and independence limbs like our soft robotic hand offer could be transformational for the millions of people around the world who rely on such technology."

Professor Farina collaborated with Professor Antonio Bicchi at the Italian Institute of Technology in Genoa, on the project 'Natural BionicS', funded by the European Research Council.

The study focused on 'synergies', which in this context refer to the coordinated patterns of muscle activity and joint movements that the body uses to perform tasks.

Photo courtesy of Imperial College

When we move, different muscles and joints should work together in a well-organised way to produce smooth and effective motions. This coordination is not random; it follows specific patterns, or 'synergies', that the brain and nervous system have organised and that can be decoded.

The researchers found that the synergies at the level of spinal motoneurons and those at the level of hand behaviours are linked, which means the way we hold or move our hands can be traced back to certain patterns in our nervous system. These patterns can be detected by reading the electrical signals created by activity in the spinal cord nerve cells that control muscle movements. By decoding these signals, scientists can identify which specific groups of nerve cells are responsible for different hand movements.

For the central nervous system to recognise a bionic limb as 'natural', it is essential for the prosthesis to interact with the environment in the same way a human limb would. Plus, it is the combination of novel synergy based control and postural synergy based prosthetic hand that enables us to mimic human dexterity. This led the researchers to combine the theory of sensorimotor synergies and robotic technology in their design of a bionic hand that can be controlled using the same patterns.

The bionic hand was also designed with two degrees of actuation that controlled a much greater number of degrees of freedom. The actuations controlled two postures or synergies that could be linearly combined to obtain an infinite number of postures in a two-dimensional space. This combination resulted in a prosthesis that closely mimics the functionality and fluidity of a human limb, allowing for more natural movement and coordinated control.

Co-first author and Research Associate in the Department of Bioengineering, Dr Deren Barsakcioglu said: "Our research aims to create prosthetic hands that not only look natural but also feel intuitive to use. By integrating design elements inspired by natural hand postures with control systems that decode synergistic neural signals, we're taking an important step toward enhancing everyday quality of life for users."

In the future, researchers believe this could lead to prosthetics that feel even more natural and the findings could even pave the way for integrating humans with robotic parts in new ways, benefiting a wide range of applications beyond prosthetics.

https://dub.sh/IE42-Robotic

Adjusting fit of prosthetics

The latest advance in wearable robotic technology promises to solve a 200-year-old problem by revolutionising the fit of prosthetic limbs.

A new material, 'Roliner,' offers amputees the power to change the shape, volume, and stiffness of the liner that is used to attach a prosthetic limb's socket to a residual leg. Amputees could make these tweaks using their smartphone in real-time, providing a more comfortable and personalised fit.

After eight years of prototype development and clinical investigation, researchers at the Department of Bioengineering have published the details of their patented new material in *Nature Communications*.

Principal Investigator Dr Firat Guder, said: "Prosthetic limbs are often uncomfortable because they have a fixed rigid shape. Even though this shape can be moulded to fit the individual's body as it is at the time of fitting, it cannot adapt responsively to how our bodies change. Ultimately, no matter how sophisticated the limb itself is, if it cannot connect closely and comfortably with the human body, it becomes unwearable."

Dr Guder added: "Up until now, researchers have tried and failed to solve this problem by trying to improve the limbs and sockets themselves. But we took a different approach by developing a dynamically adaptive interface for the liners used between the body and the rigid prosthetic socket."

Dr Ugur Tanriverdi, an Imperial graduate and co-founder of the wearable robotics company Unhindr that produces Roliner, said: "Badly fitting prosthetic limbs are a constant struggle for amputees. They increase the risk of blisters and sores that can become infected, and the situation can become so painful that there is no choice but to go back to using a wheelchair.

"Alongside causing extreme physical pain, problems with prosthetics not fitting can also impact on a person's mental health as they are unable to live as independently and freely as they deserve."

Roliner can incorporate artificial intelligence so each liner can 'learn' the personal preferences of their amputee. It can automatically adjust its properties according to how the human body changes in response to variables such as the time of day, weight loss or gain, and hormonal fluctuations. An amputee's desired fit may also change due to the type

Photo courtesy of Imperial College

Dr Ugur Tanriverdi

of activity being undertaken. For example, they may prefer a looser fit while sitting and a tighter, more controlled fit when walking.

Roliner is made from silicone elastomers with channels that can be pressurised to change the material's properties, meaning its volume and shape can change. "Just like a basketball, it becomes bigger and more rigid when it is inflated, and smaller and softer when it is deflated," Dr Tanriverdi said.

Guglielmo Senesi, the Imperial engineer building Roliner's electronics and clinical data architecture, and the Chief Technology Officer at Unhindr, said: "Currently, most prosthetists still rely on plaster casting and moulding techniques that have been used for centuries to determine what socket shape and size will give the most personalised fit. Roliner's data-driven approach standardises the quality of prosthetic fittings."

Tarek Asfour, an Imperial Master's graduate and Chief Operating Officer of Unhindr, said: "Roliner marks the shift from rigid mechanics to soft, adaptive robotics, proving that the future of prosthetics isn't just about movement – it's about seamless human integration."

The researchers hope that Roliner will be available for use in the UK by the end of 2025. They also believe that the technology could have applications beyond prosthetics, because it could be used in any situation where rigid materials must touch the human body.

For example, Roliner could be used to increase the flexibility of exoskeletons used in rehabilitation, to modulate the pressure points of hospital beds, or to improve the personalised fit and safety potential of protective gear such as ski boots and even wearables used by astronauts in space.

https://dub.sh/IE42-Roliner

Engineering in the Charity sector

The Venerable Roger Preece (Elec Eng 1983-86), is Senior Vice President of CGCA. After graduating from Imperial, Roger worked in the City, but subsequently followed a vocation to become an Anglican priest. Now he is Master of the Royal Foundation of St Katharine, a charitable organisation in the City of London with a long history. Here Roger introduces himself and tells us about life as an engineer in the charity sector.

What does a degree from Imperial prepare you for? Does it qualify you to lead an ancient Royal Charity that now operates as a retreat centre, event space and community charity in East London?

I was very grateful for all my electrical engineering training the other month when at 1am I had a call. The alarm has sounded in reception. On investigation it seemed to be the possible failure of the sewage pump of our rather complex drainage system. With my head literally in the sewers, checking sensors, control circuits and flow rates, I was able to calculate that we had a good 12 hours before the cistern would fill and all the loos would stop working! No immediate need for panic but, for our 60 guests that night, it meant their night and their trips to the bathroom would not be interrupted. Even more electrical engineering knowledge was needed, when the fire alarm sounded on another night after someone had pressed a call point by mistake. For some reason, the call point could not be reset and the very effective sirens in each bedroom kept sounding. How to switch it off? There was no obvious solution. I had been trained to reset the panel, but this was a higher level problem. With back-up batteries in place, turning off the power would not have helped, and I had a panic attack imagining the horror of the alarms sounding all night with no way to silence them. I dug deep back into my electrical circuit training. There must be a way to isolate the call point. Could I find the administration password to get into the control menu? Eventually the bypass controls were found and the alarm silenced, and the guests were able to resume their sleep. For our retreat centre in East London, the guests in our 45 rooms generally have an excellent sleep in our urban oasis in East London. But these two problems reminded me of the value of an Imperial Education even in the charity sector.

Photo: Mark Weeks

The Venerable Roger Preece, Master of the Royal Foundation of St Katharine, in the Foundation's chapel

I left the world of investment banking and management consultancy age 38 to start on a new vocation as a trainee priest in the church of England. It seemed to be a letting go of the commercial, technical and business world to enter the esoteric world of theology, with three years of study at Oxford University in order to prepare for Ordination. After training, I was sent to the North West of England to serve as a priest initially in Stockport and then South Manchester. It was an enormous privilege to be a local parish priest. For all the challenges, facing the Church of England at present, it was good to see the excellent grass roots work that takes place in local churches day to day. The daily life of a vicar is very much woven into the heart of the community. As well as the regular church worship to organise, there were the services for families revolving around rites of passage; christenings, confirmations, weddings and funerals all gave a privileged view into families' lives, and the rituals and ceremonies of the church provided a framework for daily life. The celebrations of the seasons and the rhythm of the year were also important community touch points and times for celebrations, from harvest festivals, Mothering Sunday to Remembrance Day and All Souls remembering people's loved ones. Each service had a particular energy and connecting point for individuals and the community. And then the run-up to Christmas with thousands of people enjoying carol services, nativity plays and all the events leading up to Midnight Mass and then the gathering with families and their presents on Christmas morning.

Although managing buildings and processes was still a challenge, it was the social constructs that Anglican Christianity gave that was the most intriguing. Peter Berger described in his "The Sacred Canopy" – that religion can provide a socially constructed world view that provides meaning and order for human existence. The sense of transcendence and of shared experience through worship was a profound moment at times, from the quietness of an 8am communion service to the joyous celebration with choir and organ of an evensong service. There were many moments that felt that they were truly heavenly.

My life now as Master of St Katharine's still is about facilitating the space to allow people to experience quietness and peace through our retreat programme that are open to people of all faiths and none. We also host around 1500 meetings and events for charities and not-for-profits as well as welcoming business use. Each group comes to St Katharine's to do their own creative work through board meetings, management training or corporate retreats. All our hotel standard bedrooms are available online worldwide and every day brings different visitors to stay with us. We like to say that everyone is here on retreat, but they may not know it yet.

Many guests appreciate staying with us, especially knowing that as a charity any surplus income is ploughed back into community work in East London dealing with complex and profound needs in the local area around us such as wrestling with food poverty, isolation or basic education needs.

Each day as Master here is different and the Imperial degree disciplines of problem solving, systems thinking and diagnostics come in handy every day. If I had imagined my own career direction when I was finishing my course at Imperial all those years ago, I would never have imagined they would lead towards running a charity retreat hotel in East London, so we never know where our training and vocation might take us.

Photos: Mark Weeks

The Yurt café was opened in 2016

The cloistered garden is a peaceful place for reflection and meditation in the City

The Royal Foundation of St Katharine is the oldest religious charitable trust in Great Britain, with a history spanning nearly 900 years.

It was founded in 1147 by Queen Matilda, the wife of King Stephen. In her Charter, Matilda described the Foundation as, "My hospital next to the Tower of London". The duties of the Foundation lay in celebrating Mass, especially for the souls of those mentioned in the Charter, and in serving the poor infirm people in the Hospital. Matilda obtained a site on the east side of the Tower of London and the Church and Hospital were built there among open fields beside the river.

In 1806, when John Nichols drew up a history of St Katharine's, he noted that, "The Hospital consists at present, as it originally did, of a Master, 3 Brothers (priests), and 3 Sisters (single women), besides 10 poor bedeswomen, usually nominated by the Master, and some other officers." He added that "The Queens Consort of England are by law the perpetual Patrons" and that they appointed the Master, Brethren and Sisters. He wrote, "The business of this house is transacted in Chapter by the Master, Brothers and Sisters, and it is singularly remarkable that the Sisters have therein a vote equally with the Brothers; and that no business can be done there without the votes of 4 of the members, one at least of which must be a Sister."

In 1824, a Bill was brought before Parliament providing for the old church to be demolished to make room for an extension to the docks next to the precinct. Following a public outcry, the Bill was withdrawn. But it was reintroduced in the next Parliamentary session. The second Bill was more successful than the first, largely because the Master and the Chapter were tempted by the offer of alternative accommodation in the more congenial atmosphere of Regents Park. Queen Caroline had died in 1821, so the Foundation was without a Patron at this crucial time. The King took over the patronage of the Foundation himself and agreed to the destruction of the old buildings. The Dock Company paid for the Foundation to be transferred to new buildings in Regents Park. No compensation was paid to the people who had lived around the old church and looked to it for help. Their houses were demolished and no alternative accommodation was provided. They were dispersed and added to the overcrowding of the surrounding area, where there were "30 souls to each small house".

Photo: Arthur Sullivan

Roger with Her Majesty The Queen, current Patron, in her last Royal Visit

Under the patronage of Queen Mary, the widow of George V, it was reconstituted in 1948 as the Royal Foundation of St. Katharine and returned to its home area. The premises in Regents Park were sold to the Danish Church and the Foundation moved on to the site of St. James Ratcliff, which had been blitzed and was not to be rebuilt. Queen Matilda's Foundation had come home. About the same time as the Foundation returned to its own area, St. Katharine's Docks, for whose sake the old buildings had been destroyed, were closed. They were unsuitably situated for twentieth century trade, being too far up river, and the quays were too small and narrow for modern ships.

In 1969 St. Katharine's once more passed into the care of a religious order. The Patron, Queen Elizabeth the Queen Mother, entrusted it to the Community of the Resurrection, an Anglican order whose mother house was at Mirfield in the West Riding of Yorkshire.

In the late 1960s 'SK Group', was established as the first known gay social and support group in the UK, set up by the then Master Rev. Malcolm Johnson with the support of The Albany Trust. The group continued operating until 1994. Rev Johnson was also one of the founders of the Lesbian and Gay Christian Movement in the 1970s, and he controversially, secretly and independently performed many gay commitment ceremonies in the St Katharine's chapel, in the decades before civil partnership existed. There was also pastoral support given and many funerals taken for victims of the early Aids crisis.

In 2011, St Katharine's opened its doors to the general public by being available via "online travel agency" sites. It provides an oasis of calm within the heart of East London centred on the "well" of daily worship in the Chapel. It has become a place where groups and individuals can stay, meet, reflect and retreat.

In 2020, during the Covid-19 crisis, St Katharine's offered itself to become part of the NHS provision for The Royal London and Barts, to give 'step down' support for non-covid patients who were, for various reasons, unable to go home. The Yurt Café transformed into a much loved grocery store, enabling the local community to continue to feel connected despite the social isolation required. A dynamic volunteer network, Limehouse Aid, also joined St Katharine's, which now hosts a food bank distributing food to vulnerable families in the local area.

Find out more about the history of St Katharine's and the facilities available at:
www.rfsk.org.uk

All CGCA and RSMA alumni are welcome to come and stay at RFSK and have their meetings and events here. With 45 bedrooms, 14 meeting rooms around a garden, cloisters and chapel – along with a community café in a Yurt. It provides a place for accommodation, meetings and community work.

Hotel Accommodation – Alumni can get a 10% discount with the code IMPERIAL on the web site.

Hiking in Sweden

In Summer of 2024, two students decided to hike in Sweden on the 'King's Trail'. The OC Trust helped support them. This was the friends' report of their trip.

The Kungsleden or King's Trail is Sweden's longest and most famous hiking trail winding through the mountains in the far north. The hiking trail covers four national parks (Abisko, Stora Sjöfallet, Sarek, Pieljekaise) in the World Heritage Site Laponia and is more than 450 km long. The route is diverse with impressive mountains and birch forests and colourful heaths. We were aiming to walk the far northern part of the trail from Kvikkjokk to Nikkaluokta, a distance of around 150 kilometres.

Kungsleden is one of the most remote hikes in Europe, with dramatic and diverse scenery which changes along the route. The trail passes through uninhabited areas with untouched wilderness and no cellphone reception, enabling a rare chance to disconnect from modern everyday life and enjoy nature. The indigenous Sami people also continue to herd reindeer in the far north, so there is a chance we would encounter this along the route. The unique isolation and terrain being very different to anything we had experienced before, along with the chance to meet like minded people along the way, drew us to this trail in particular.

This trip enabled us to undertake our first longer thru-hike over the duration of ten days, building on our prior experience of shorter multi-day treks. The Kungsleden, although remote, is well marked and has many mountain cabins with basic facilities for the night, where we can easily resupply. Due to the presence of mountain glaciers, it is easy to refill water safely along the way, so we are not restricted to camping near these huts. Due to the location of the trail, the main limitation in this expedition was the cost, as the transport to and from the far north of Sweden is very expensive.

On the trail to Teusjaure

The Team

Our team is a duo of very good friends with different backgrounds but a common passion for hiking. We had previously completed two, two/three-day hikes together along the English Southwest Coastal Path, wild camping and also stopping at campsites. The first from Swanage to Ringstead Bay and the second from Seatown to Budleigh Salterton. These hikes provided valuable experiences in long distance multi-day hiking and gave us confidence to undertake a longer hike in unfamiliar terrain. Over the two trips we reduced our pack weight significantly, whilst still carrying a tent and food supplies, enabling us to walk longer distances.

Owen Brook (22) was a 4th year student in Aeronautical Engineering at the time, now studying for a PhD at Imperial, and the expedition leader. He is a keen outdoors enthusiast who enjoys climbing, running, and hiking.

Martin Haamer (25) graduated from Imperial in May, finishing his studies in MSc Transport. He is now a 2nd year PhD student at the University of Tartu in Geography and has a bachelor's and master's degree in the same field. Martin completed a first aid training course in 2017.

Owen (left) and Martin (right)

We saw the hike as a unique opportunity to advance both our physical and mental capabilities. The hike was physically challenging, required significant preparation beforehand and a hike of this length was a new milestone in hiking for both of us. The new environment, unique nature and conditions above the Arctic Circle, which neither of us had previously experienced, broadened our horizons and was valuable to our education.

Kvikkjokk Fjällstation

Saltoluotka Fjällstation

Kebnekaise Fjällstation

Photos courtesy of Owen Brook and Martin Haamer

Our objectives were as follows:

- Hike from Kvikkjokk to Nikkaluokta, 150 km, across 9 days – including one rest day.
- Summit the Skierfe (1179m), on the stretch Akse–Sitojaure, through taking a small well-trodden detour from the Kungsleden.
- Gain further vital experience in adapting plans depending on trail and weather conditions – distances walked and camping spots could easily be changed.
- Learn about the culture and history of the Sami people and the nature and geography of the area along the route.
- Practice skills in wildlife photography.
- Build stamina and mental resilience needed for longer thru-hikes, through walking longer days and dealing with pests such as mosquitoes.
- Environmental focus through creating minimal waste and avoiding flying where possible – travelling by train, bus and boat within Sweden.
- Learn basic Swedish in advance of the trip to better engage with locals.

Weather and Trail Conditions

Our plan was to hike along the Kungsleden from Kvikkjokk to Nikkaluokta. The hike covers around 150km and we planned nine days for the hike, including one extra day which gave flexibility in case of unsuitable weather for hiking, or physical fatigue. We hiked in July when the average daily temperatures are highest, with average daily maximums at 12°C and minimums at 6°C. The temperatures could be higher during the day and also vary based on the current altitude. July is however the month with the most rainfall, with on average 87mm of precipitation, so we took full waterproof outer layers.

The parts of the trail at lower altitude in the forest around Kvikkjokk can have significant amounts of mosquitoes from the end of June, necessitating that we take mosquito repellent and head nets, as well as being vigilant about the presence of ticks along the trail.

Accessing the Trail

Since we now live and study in different countries (Owen in the UK and Martin in Estonia), we met in Stockholm, which is easily accessible from both countries. This is the only part of the expedition which required flying, but for the rest of the expedition we travelled by train, bus or boat. From Stockholm Centraal we planned to take the SJ-operated overnight train to Murjek from where a 4.5 hour bus ride would take us to the start of our hike at Kvikkjokk. At the end of our hike at Nikkaluokta, we took the bus to Kiruna and then the overnight train back to Stockholm.

Expedition Diary

Day 1: Arrival in Sweden

On the first day Martin flew in from Tallinn and Owen from London, and we met in Arlanda Airport. In order to pick up the Garmin inReach Explorer, and supplies for the expedition, we took the train to Uppsala, a large university town north of Stockholm. This involved taking out local currency and getting many snacks for the journey.

Originally, we were meant to take the overnight train to Murjek in the far north, however due to engineering works this train was cancelled and, as we experienced a few times on this trip, the Swedish rail network can be quite unreliable. Instead, we took the 5.5 hour high speed train, which was delayed, to Umeå, where we arrived at midnight and slept in a fantastic YMCA hostel for around 5 hours.

Day 2: Umeå to Kvikkjokk

On the next morning at 7am we took the early morning train to Boden, a large rail interchange, but this was also delayed. The conductor on this train was fantastic in helping everyone and declared, "I love my job", after we thanked her. Fortunately, this train turned into our next one, to Murjek, so we did not miss the connection. In total this was a 4 hour train journey.

Once in Murjek, we waited in the small waiting room with other hikers, and boarded the 4.5 hour bus to Kvikkjokk. There were only a total of 5 people on the bus, and here we chatted to a young Swedish woman, who planned to go into the remote Sarek wilderness for a few days alone. There are no huts, roads, or phone signal at all in Sarek and we were very impressed by people taking on this challenge alone. We gained valuable insight on where we might camp during the first few days, and potential weather conditions we might experience during early July. Speaking to those hiking in the area or who had before, proved invaluable through the trip, as well as providing an opportunity to meet new people and learn about Sweden and many other countries that the people we met were from. As this part of Sweden is so remote, the bus also operates to take supplies and post to the remote communities it passes through.

The trail towards Kebnekaise Fjällstation

Once we arrived in Kvikkjokk, a small hamlet of around 10 houses, we were immediately greeted by a swarm of mosquitoes. Little did we know, this insect would prove to be perhaps one of the most challenging aspects of our trip. At Kvikkjokk there is a so called Fjällstation, a larger mountain station with electricity and hot water and a restaurant and small shop. We pitched our tent near to the station with a few other hikers nearby. We sat inside the Fjällstation until 21:00 and had a warm shower. This was a relief as despite wearing full-length clothing, hats and headnets, you would still be bitten by mosquitoes within a few minutes.

Day 3: Kvikkjokk to Parte

The first day of hiking was finally upon us, and in full mosquito gear, we set off on a 22km day. Both our packs started off at 16kg, mainly due to all of the freeze-dried meals we were carrying for the trip, as well as an excessive amount of snacks. The terrain this day consisted of mainly spruce forest with a few birch trees, as well as wetlands, which had boardwalks over them. There were many mosquitoes throughout, although by the first lake we encountered, there was a breeze which kept them away. We had a fantastic view of the snow capped mountains to the south. This was our first experience of the huge openness we would encounter for the first 5 days of walking – you could see trees until the horizon, interspersed with lakes of all sizes, smaller hills, and mountains.

After a long day of walking, we arrived at the Fjällstugan – a small hut with no electricity, signal, or running water – of Parte. Here we spoke to the friendly hut warden who told us we could camp there for a fee or walk a kilometre to camp near a stream. Whilst considering our options, we ate our first dinner of freeze-dried meals inside the hut, and then decided to walk on. Two other groups also had the same idea, and we found a suitable campsite about 200 metres away from the stream. Here, the mosquitoes were so bad you could not stand still at all, and we made a small fire, which acted as a small deterrent and helped pass the time. Washing our feet in the river proved problematic as mosquitoes would instantly attack! Since we were in the Arctic Circle, sunlight lasted 24 hours at this time of year, but this did not prove to be an issue, since we were so tired and used eyemasks. We actually really enjoyed not having to use flashlights.

Campsite for the night, tent in background

Day 4: Parte to Aktse

We got up the next morning past 7am and got going around 9am. We started hiking through pine and birch forests for a few hours, and were surprised by some ground-nesting birds, with some chicks. The mother would continue along the trail for some time whilst her chicks disappeared in the undergrowth. At around midday, whilst on our first steep climb, we met a Dutch woman and her son, who declared to us that we must row across all the lakes as we were young and that rowing across 3 times was fine in the event there was only one boat on your side. We met this with some cynicism and continued to the top of the climb, where our first major views appeared, on a small plateau between the peaks of Huornnasj and Favnoajvve.

As far as the eye could see, it was a huge open expanse of forest, lakes, and mountains. The open nature of the area meant you could see many different weather fronts coming in and so, with a large rain cloud approaching,

we stopped to eat lunch. Walking in the rain was not particularly fun, especially once the views disappeared and we were back in the forest, and listening to music helped to keep spirits high. We arrived at the lake Lajtavrre in time for the 17:00 crossing over to the Aktse hut, where we chatted with a few people. We would become good friends with one of these people, Ken, who was a solo hiker from Antwerp, and encounter another group of two people regularly – whom we referred to as "the Aussies" – an Australian and a Swede.

We then walked the kilometre up to the Aktse Fjällstugan, and paid a small fee to camp and access the facilities. This included an inside area to sit away from the mosquitoes, a small shop, and a fantastic wood-fired sauna. This was a huge boost after walking two days with heavy packs, and many mosquito bites. Here we chatted with other hikers who were hiking north to south, and got advice on good camping spots and the terrain to come over the next few days. The sauna allowed us to also wash with hot water, as you could heat water up in a container which was part of the stove. It must be noted that in Sweden, at least up North, all the saunas are taken without any clothing! However, there were separate times designated for men, women and mixed sauna.

View from Aktse Fjällstugan

Day 5: Aktse to Avtsusjvagge

Poor weather was forecast for the morning, so we decided not to take the detour to Skerife, although we would later hear the views were clear from the top. We set off at around 10:30 and climbed up and over some mountains that were around 1000m high. Once descending the other side, we stopped for lunch, realising we had plenty of time to spare before the boat crossing at 17:00 from Svijnne. Once we arrived at the lake, we pitched the inner tent to stay out of the mosquitoes and were reunited with Ken, and the two others who had been on the boat the previous day.

The only option at this crossing was to take a motor boat as the rowing boats were removed due to many people getting stuck in the shallows. Here Martin almost lost his mosquito headnet due to the wind, but by some luck, the boat driver grabbed it as it flew off. The boat dropped us off at a small Sami settlement, where we bought some traditional bread filled with Reindeer cheese. From here, we decided to walk on, joined by Ken before he sped ahead, as it was only 17:30, and there were many mosquitoes and we were not yet tired.

Waiting for the boat crossing

We walked for about an hour and a half before we came across a suitable stream to collect water. Though we were well above the tree line, at around 770 metres, there was no wind at all, and we decided, in vain, to carry on walking to pitch where there were no mosquitoes. The mosquitoes never stopped and we walked until around 20:30, where we saw that Ken had pitched his tent as well, and at this point, we called it a day. This evening we experienced some fantastic views of the sunlight coming through the clouds at around midnight.

Day 6: Avtsusjvagge to Saltoluokta

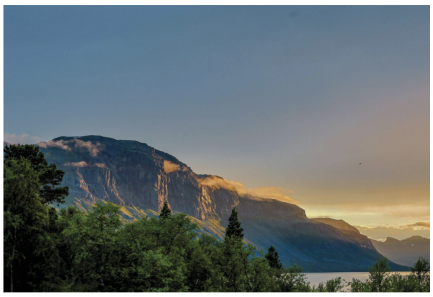
We woke to a pleasant breeze (and no mosquitoes) and sun starting to hit the tent at around 8:00. With only 16 km left to the Fjällstation Saltoluokta, we did not walk fast and enjoyed the views. We came across one of the many emergency shelters on the route, a small wooden cabin with a wood burner, and a toilet in an outhouse. At around 13:00 a large shower came in, so using the tent footprint, pegs, guy ropes, and some walking poles, we made a shelter and ate lunch out of the rain.

We continued our descent into Saltoluokta with stunning views passing through a thin birch forest followed by a lush pine forest with beautiful undergrowth. Very suspiciously, there were no mosquitoes. Arriving at the Fjällstation we were shocked with how fantastic all the facilities were, and we paid 350 SEK to pitch the tent and for access to all the buildings and sauna. We arrived just in time to buy dinner, a buffet including meatloaf from locally hunted moose, and we received a demonstration of a huge traditional Swedish mountain horn made from birch. We were once again reunited with our trail friends, Ken, and "the Aussies", and met people from Germany and Sweden as well. A rather funny juxtaposition was a local Swedish man from Gallivare who had come to stay for the weekend, sitting across from us in a suit and tie whilst we had yet to shower after two days!

We made the decision to rest a day at Saltoluokta as planned, as bad weather was forecast the next day, and we were grateful for the rest. It was only when we started emptying our bags to find out what food we had that we realised we had carried way too many snacks, especially as there were some small shops on route – perhaps increasing our pack weights by a kilo each. We then enjoyed the sauna all to ourselves after dinner, with the view of the lake and mountains behind it, whilst we enjoyed a well-earned cold beer and saw a reindeer running past. Chatting with the other hikers in the kitchen was fantastic and we met two new people whom we would end up seeing again. It was interesting to learn of a different route a group of 5 German guys were taking further west, off the Kungsleden, starting at Ritsem – perhaps inspiration for a future expedition.

Day 7: Saltoluokta Rest Day

On our rest day, we took the chance to sleep in and bought some pasta and sauce from the shop, to have for lunch and dinner that day. We took full use of the sauna again, explored the lake shore, played Swedish trivial pursuit, and made some calls home. Here we decided to change our plans to arrive at the Kebnekaise hut in two days rather than three, so that we might be able to ascend the Kebnekaise itself, or have another walk in the surrounding area. The highlight of this rest day was the evening light, where we spent a few hours just watching the sun move across the horizon on a small hill behind the huts.



Spectacular views around midnight from a small hill near Saltoluokta Fjällstation

Day 8: Saltoluokta to Kaitumjaure

We were up early the next morning to catch the boat over the lake and get on the bus that would take us further into the mountains, to Vakkotavare. Due to our rest day, we were now walking a day behind our main trail friend, Ken, who was continuing all the way to Abisko. From here, we ascended onto a high

View from Teusjaure Fjällstuga

mountain plateau at around 900m, where we walked the 16km to Teusjaure. We arrived with half an hour to spare at the lake and paid for the short ride across, as there were too many people to fit in the rowing boats, and the weather was quite windy. Once across the other side, we spoke to the hut warden about suitable camping spots and bought some more chocolate from the small hut. Here we learned that this lake is particularly famous for fishing, and the terrain began to feel slightly more alpine with steep-sided valleys.

We climbed steeply onto another plateau, which sloped slowly down to Kaitumjaure, reaching the top at about 18:00. From here, we continued walking down into the valley where we hoped to camp, speaking to a group of three hikers who we found had encountered our friend, Ken, earlier that day about 20 km ahead of us. Views of the mountains we would encounter in the following days emerged, with a huge cliff seen in the far distance.

We were told of a good camping spot just before a bridge, which we were assured would have no mosquitoes. On arriving at this spot about 1 km before Kaitumjaure, we were greeted with plenty of mosquitoes, as there was no wind, and this was rather demoralising as 4 km back, we had passed plenty of spots without them. This was one of the balances that was hard to strike between pushing on or stopping earlier at a camp spot, meaning more distance for the next day. There was a rather impressive waterfall near our campsite.

Day 9: Kaitumjaure to Kebnekaise

The next morning we set off past 9am and walked through the forest of mosquitoes to the Kaitumajure Fjällstugan. We arrived there at 11am and had a brief stop at the shop. From here, we entered the main valley towards Abisko and the scenery started to change drastically. We gradually ascended back above the treeline and thankfully left the mosquitoes behind. We had lunch at the crossroads, from where we would embark on our shortcut to Kebnekaise, shaving off a few kilometres from the distance along the main trail.

The hike along the shortcut offered dramatic views of massive black mountains rising straight into the clouds. We got the feeling of being on another planet or as if in a scene from Star Wars. The scale of the mountains was unfathomable. Weatherwise, we got both occasional downpours as well as the occasional ray of sun.

Once past the shortcut, we joined the most popular section of the Kungsleden trail from Abisko to Nikkaluokta. We expected many hikers, however the trail was still relatively empty. We passed along through the valley towards Kebensekaise Fjällstation and suddenly came across a rainbow after passing a bend in the trail. The valley opened up and sun came through the clouds, offering beautiful views of the wide mountainous landscape ahead.

There were however a lot of people at Kebnekaise Fjällstation. Compared to the quaint and peaceful mountain stations at Kvikkjokk and Saltoluokta, Kebnekaise felt like a bustling town. There were a lot of hikers either returning from their ascent of the Kebnekaise mountain or those preparing to summit it the following morning. We decided to eat and go to the sauna before starting to look for a tenting pitch as the areas surrounding the station were teeming with campers. Unfortunately, Owen slipped and cut open the bottom of his toe whilst wearing flip-flops after the sauna, and hence we only put our tent up past midnight, in a beautiful secluded location above the station once the toe had been attended to and our plans for the next two days laid out.

Since we arrived at the Kebnekaise a day earlier than planned for the chance to summit it, we were keen on ascending the following day, a total of over 1800m of ascent. The weather seemed promising, however Owen's injured toe meant this would not be a wise choice, along with us being quite tired from the 50 km in two days. Instead, based on our guidebook and asking the guides at the station, we decided to do a hike up to the nearby Tarfala glacier, which offered beautiful views of the Kebnekaise mountain. The hike would also allow Owen to test how comfortable he was walking out with his injured toe.

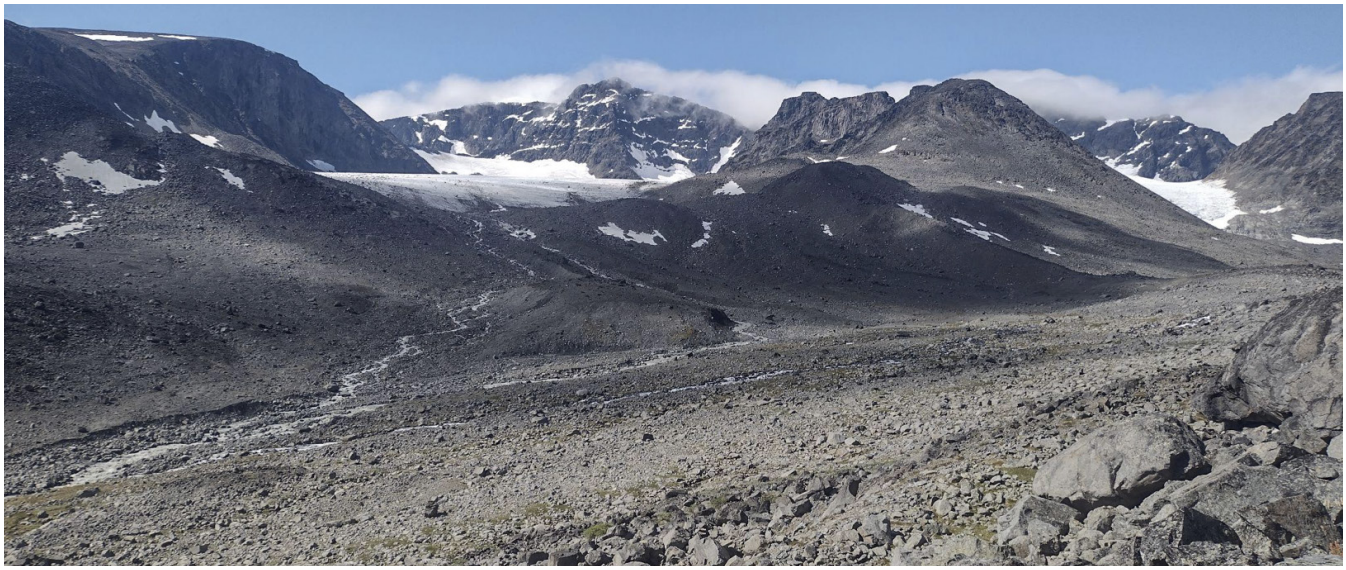
Day 10: Kebnekaise to Tarfala and towards Nikkaluokta

The following morning, we set off towards Tarfala, leaving our tent behind and taking only our lunch with us on the short expedition. The trail followed a glacial river upstream with two large cable suspension bridges. Once we got to the glacier, we enjoyed lunch in the sun while taking in the beautiful view of the Kebnekaise mountain and Tarfala Glacier.

We then returned to Kebnekaise mountain station, ate dinner, packed our tent, and headed on towards our final destination, Nikkaluokta. As the weather was supposed to be very poor for the next day, we wanted to cover as much distance as possible beforehand. Neither of us were tired from our detour to the Tarfala glacier and hence we walked another 7km before we set up camp and enjoyed a spectacular final 'sunset'.

Waterfall we camped next to

Dramatic views and variable weather on the way to Kebnekaise



Tarfala Glacier

Day 11: The final stretch to Nikkaluokta

The rain started around 5am and would not end until the evening. Begrudgingly, we got up and packed our wet tent and equipment in the rain, keen to make it on the night train back to Stockholm and relax. The short hike to Nikkaluokta was mostly easy going, however, the constant rain didn't help lift our spirits and the hike seemed to take forever. Once we finally arrived at Nikkaluokta completely drenched, we celebrated the end of our hike with a nice piece of cake and coffee at the welcome centre.

We got the last seats on the bus to Kiruna, where we would have to wait a few hours before the long-awaited night train journey to Stockholm. Unfortunately, to our dismay, while eating a proper meal at a restaurant in Kiruna, we received the dreaded info that our train would be replaced by a rail replacement bus from Kiruna to Boden – a journey of four and a half hours. The bus was however rather nice and comfortable and we enjoyed a few local beers on our journey towards Boden. The bus driver also helped keep spirits high with his very ironic humour. Our night train was waiting for us at Boden station and we finally got to our compartment. We relaxed, had a shower and then met with our Belgian friend Ken in the restaurant car.

Whilst in the restaurant car we also chatted to a man whose father was indigenous Sami. He explained to us that despite sites such as Laponia, a protected UNESCO world heritage site, the Sami people's land continues to be taken away. This is largely through new mines being opened, which significantly disturb the reindeer, meaning large areas of land are no longer usable for herding. Additionally, he argued that the government was still seeking to erode the traditional way of life of the people, and that not enough has been done to apologise for previous persecution nor prevent it today. This is clearly still a major issue in Nordic countries, and it is clear from our discussions with Swedes this is not something they are proud of, and efforts are being made to have more dialogue to create solutions.

The final 'sunset' on our hike

Conclusion

This expedition was an incredible experience for both of us, and has taken us a huge step forward in our ability in thru-hiking. We gained significant experience in planning a hike in another country, from navigating the complicated Swedish rail system, through to renting a satellite messenger. A note for anyone else attempting to travel to the North of Sweden would be that the train system, in its current state, is not reliable at all and it is impossible to contact the operator VY. For this reason, being prepared to take a different route completely, or be significantly delayed is essential.

Throughout the hike, we pushed ourselves mentally and physically, significantly beyond what we had done before. We were able to walk long distances, each day with heavy packs, sometimes in bad weather, as well as dealing with the extremely challenging numbers of mosquitoes. Additionally, we were able to deal with the isolation, 24 hours sunlight, and adapt our plans based on the weather.

We also experienced walking across many different types of terrain, sometimes on boulder fields for 5km, highlighting the importance of high ankle and robust walking boots on treks like this. Finally, we also learnt how to reduce our pack weight further for this trip, whilst not compromising on our preparedness. In the future we hope to return to the north of Sweden, and conduct another expedition in Sarek. This would be another step further, as there are few to no paths there, and no huts.

We would like to express our thanks to the Imperial Exploration Board for partially funding this trip, and in particular Lorraine and Philip for their advice, and supporting our application to other funds. Our thanks must also extend to Kiaran, who organised loaning the water filter and solar charger as well. Additionally, we would also like to thank the Old Centralians Trust for partially funding this expedition as well as the Lord Mayor's Anniversary Trust.

Study visit to Norwegian Geotechnical Institute (NGI)

Emilia Castillo Fuentes is a final year PhD Student in the Civil and Environmental Engineering Department. The overall aim of her research is to develop a design methodology for offshore wind turbine foundations in deep waters, focusing on floating systems and particularly suction anchors. To this end, realistic examples of anchors embedded in sand are analysed with the bespoke numerical modelling platform ICFEP (Imperial College Finite Element Program), developed by her supervisors, Professors Lidija Zdravkovic and David Potts. The work simulates the appropriate ground conditions and loading combinations that these foundations face during their operation. Emilia is in particular focusing on developing a simpler material model for sands so that it can be easily transferred to, and used by, industry. The model is rigorously benchmarked against more complex material modelling frameworks.

The progress of her research led to two conference papers, which she delivered as oral presentations in 2023 (NUMGE 2023 and OSIG 2023). The conference presentations attracted attention from the Norwegian Geotechnical Institute (NGI), an international consulting and research organisation. They have a wealth of experience in offshore geotechnics and proposed a collaborative visit during which she was invited to present her research outputs in more detail and in turn have the benefit of sampling some of their wind turbine case studies for the validation of her numerical analyses. While her supervisor funded her return flight to Oslo, and NGI funded her accommodation, the OC Trust supported her with funding for her subsistence in Oslo for the duration of her trip. This is Emilia's report of the visit.

The Norwegian Geotechnical Institute is the key Norwegian and international consulting and research institute with vast experience in offshore geotechnics, which is the area of my PhD research. Concretely, the topic of this exchange was the design of foundation systems for floating wind turbines, in particular the suction caisson foundations. The objective of the visit was to present my research outputs in more detail, but also start a collaborative work where I will have the opportunity of validating the numerical modelling of suction caissons, developed in my research at Imperial, against the experimental laboratory and field data from case studies conducted at NGI. This is an essential step in computational geomechanics to gain confidence in the developed numerical twin of the real problem. This visit took place from 1st to 29th of February, in a full in-person format, where I attended the NGI office in Oslo every day.

During this period, I worked primarily on back-analysing a field-scale experiment conducted by NGI, using the finite element method of analysis. The experiment investigated the pull-out capacity of a suction caisson in a dense sand while active suction was being applied (Johansson et al., 2003). To this end, the Imperial College Finite Element Program ICFEP (Potts and Zdravkovic, 1999) was used, together with the NorSand constitutive model for sands that I have been exploring during my PhD research. The progress of the simulations carried out were discussed with Dr Hans Petter Jostad and Dr Sparsha Nagula from NGI in the format of weekly meetings, as well as with my Imperial supervisor Prof. Zdravkovic, also in weekly online meetings. In the course of this work, several challenges arose and the results of this collaborative work will be presented in the International Symposium on Frontiers in Offshore Geotechnics (ISFOG) this year.

Photo courtesy of Emilia Castillo Fuentes

The experience of NGI in the design of these structures indicated that there is a high degree of uncertainty in the state of the sand after the installation of a suction bucket, primarily due to the application of suction, which generates a significant level of disturbance of ground conditions. It was a great benefit to me to understand from the source how big this effect can be as this is not usually discussed in the written literature. This uncertainty has led me to develop a series of parametric analyses involving variations of relative density of the sand inside the caisson plug (and in consequence, its permeability), but also the friction between the caisson skirt and the surrounding soil. This study has certainly enriched my research outcomes. The results of this back-analysis are expected to be written up in a technical paper and are going to be part of the results shown in my PhD thesis, as a case study and validation.

Besides the day-to-day work I conducted during the visit at NGI, I had the opportunity to present the progress of my research work to their offshore division. I also presented from a critical point of view, the formulation, advantages, and pitfalls of the NorSand constitutive model, which was of great interest to NGI as this is an industry-oriented constitutive model and they have interest in using it.

Coming from Chile, it was also a great experience for me to meet the Nordic culture and to participate in their typical weekend activities of cross-country skiing exercises – I managed to follow my co- workers albeit with some discomfort!

I wish to express my gratitude to the Old Centralians' Trust for enabling me to gain this invaluable experience.

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Volcán de Colima Volcanology Internship

Sophia Marr, a fourth year Geophysics student in the Department of Earth Science and Engineering, was offered a 2-month unpaid internship with CIIV (Colima Intercambio e Investigación en Vulcanología) at the University of Colima in Mexico. Thanks to financial support from the OC Trust she was able to take up the offer and go to Mexico. This is her report on that experience.

I'm grateful to have had the opportunity to spend time in Colima in August 2024, where I joined a small team researching and monitoring Volcán de Colima, Mexico's most active volcano. It was an incredibly interesting experience – academically, allowing me to learn and develop numerous skills: from data collection in the field, to understanding technical instruments, to picking seismic traces; as well as bringing to my attention many of the obstacles inhibiting research and continuous monitoring of the volcano.

A trans-continental bus journey is a good way to start any trip. I was already on the other side of the Atlantic, and to my mind was already exceeding my annual quota of air miles getting there and back, and so the only logical way of upholding any semblance of environmental integrity was by making the journey from Canada to Mexico by coach.

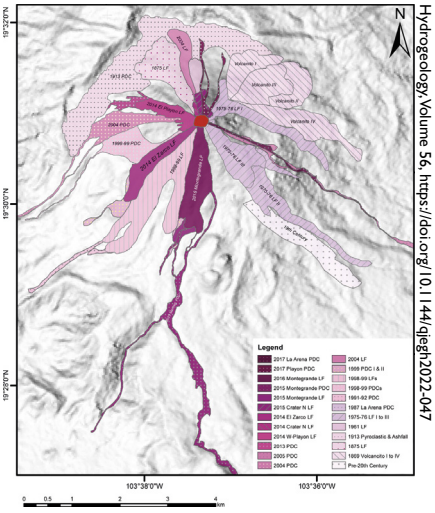
It didn't take long to question my decision-making. The first bus was delayed, causing me to miss the subsequent seven. The next five days were an adventure, if nothing else, full of interesting characters and gritty US bus stations. It was a relief to cross the border into Mexico, with the caveat that the bus didn't stop at said border (supposedly one of the highest-security borders in the world), leaving my passport unstamped and my presence in the country very much unauthorised.

I eventually stumbled off the final coach when it arrived in Colima, everything whirring from my whistlestop tour of North America. I was met by Nick, the eccentric volcanologist who runs the lab and the exchange program (Colima Intercambio e Investigación en Vulcanología, CIIV), who gave me a lift to the local house-share where I was to live for the next several weeks.

The next morning, I walked over to the university to meet the other volunteer interns currently working with Nick: Mieke, Charlie and Kristin, as well as Marco, Nick's only part-time employee. The volcanology lab was a chaos of shelves stacked with boxes and a handful of desks, half of which were covered with rocks and various other equipment. The disorganisation was somewhat comforting to me, as were the smiling people. I liked it.

Photos courtesy of Sophia Marr

In the lab



Map: Mason et al. 2022. Quarterly Journal of Engineering Geology and Hydrogeology, Volume 56. https://doi.org/10.1144/qjegh2022-047

A map of lava flows (LF) and pyroclastic density current (PDC) deposits on the slopes of the volcano. The PDC deposit that extends all the way to the south of the map (in dark purple) is the one I studied, in an attempt to discern the nature of the eruption and why this PDC travelled so far.

So began my time in Colima. I found a free desk, claimed a fan (essential to survival), and slowly got to grips with the many facets of work going on in the lab. We rarely saw Nick, who was spread so thin that his presence in the lab was always fleeting. We as volunteers had little supervision or direction – I was taught about the workings of the lab and its various instruments primarily by the others, who had been there barely a few weeks, and instructions written by past volunteers. It was an exciting combination of independent and collaborative work, but the many obstacles to the continuous monitoring of the volcano were evident.

Volcán de Colima is an active stratovolcano that is part of the trans-Mexican volcanic arc, formed by the subduction of the Cocos plate beneath the North American plate. It has been frequently active in the past several decades, prompting periodic evacuations of nearby villages. Activity is characterised by lava extrusion and occasional larger explosions, which can cause pyroclastic flows and significant ash clouds. The volcano is currently in a period of quiescence, having experienced no eruptions since 2017. However, the history of large, destructive eruptions of Volcán de Colima further back in time, causing debris flows travelling over 100 km, and its proximity to significant population centres including the city of Colima (~300,000 people live within 30 km of the volcano), make it a highly dangerous volcano. Its danger is such that it warrants a position on the list of 'Decade volcanoes', 16 volcanoes in the world singled out for study due to their potential to cause significant damage and loss of life.

In spite of this, and the very real implications of the work for the local population, research and monitoring of Volcán de Colima is hindered by a severe lack of funding, something that quickly became clear upon arriving there. For me, it was an insight into the interplay of academic research with socio-economic issues, something that is prevalent worldwide, particularly when it comes to the management

Fieldwork taking SO_2 measurements of the volcano (seen in the distance in the left photo). A direct, cloudless view of the summit is required, so conditions here were sub-optimal. Right: setting up instruments (ScanDOAS and 'SO_2 camera', which have different ways of measuring SO_2).

Spring sample collection. The rainy trek to the site at the base of the volcano, which is hidden behind the clouds.

Collecting water samples from the spring (muddy puddle, at first appearance). We measured temperature and pH in-situ, and sent samples for chemical analysis.

of natural hazards. Developing countries are often at an increased risk of significant destruction as a result of geohazards such as volcanoes and earthquakes, owing to a lack of resources and funding for better preparations and infrastructure. Working there, this was evident day-to-day and only compensated by motivation and belief in the work being done. There is a lack of time and manpower – Nick, without the funds to hire anyone full-time, is torn teaching, researching, and managing volunteers and their work himself. Broken equipment was unable to be fixed or maintained, and these factors, combined with political problems, mean a high frequency of fieldwork and data collection is not possible. Even so, data is slow to be processed, resulting in years of backlog, and in reality, little in the way of real-time monitoring, at least during this quiet period.

While I was there, the rainy season was in full swing. We left the lab most afternoons straight into a downpour, complete with some spectacular shows of thunder and lightning. This provided a further reason for the limited fieldwork opportunities. We grasped at any chance we got, however, and did manage to get out on occasion, to take water samples from springs for geochemical analysis (which can be indicative of volcanic activity), and to take SO_2 measurements of the volcano, to see if there is any active degassing (in reality, the main goal in this instance was to work out if the instruments were working).

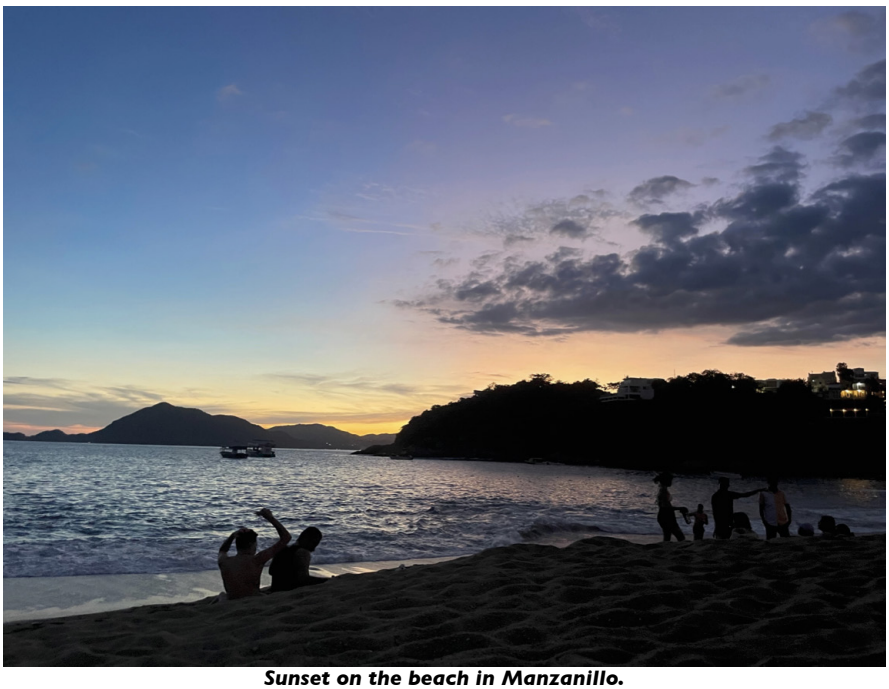
In addition to fieldwork and carrying out day-to-day instrument and equipment testing and maintenance, I worked on some other projects while in Colima. My independent project involved beginning work to conduct granulometric analysis of PDC (pyroclastic density current) deposits from a major 2015 eruption, to understand more about its unique eruption and transport mechanisms. While I didn't have the time to see the project all the way through to interpreting the results, I made a start on calculating various grain-size statistics for the hundreds of samples.

I also assisted with working through seismic data to record and classify volcano-generated seismic events. This will hopefully ultimately lead to a better understanding of the volcano's patterns of behaviour and possible eruption precursors.

When we weren't in the lab, we managed to do some exploring of this rich region of Mexico. My first weekend was spent at 'La Feria del Hongo' – a mushroom festival – in a remote village in the mountains, where we camped and ate our way round a huge variety of mushroom-themed Mexican dishes. In contrast, another weekend was spent in the seaside resort town of Manzanillo.

An unfortunate family situation sadly cut my time in Colima short of the planned two months, but it remains an incredibly influential experience which allowed me to develop a host of academic skills, as well as show me some of the realities of research and geohazard mitigation. I'd like to express my enormous thanks to the Old Centralians' Trust for their financial support which made this internship possible, allowing me to play a part in this crucial research effort.

A weekend at 'La feria del hongo'. Left: an array of mushrooms that can be found in this mountainous region. Right: A walk through the forest.



Sunset on the beach in Manzanillo.

In Imperial ENGINEER we often feature exciting student expeditions or impressive projects that have been supported by the OC Trust and the RSMA Trust. But many students are also supported by the Trusts to attend and present their research at conferences around the world or collaborate with other institutions. Although the support may only be small, financially, the students are always grateful and are encouraged to write a short report on their experience. We have collated a few of these, often quite brief, reports to further illustrate the support that the Associations' Trusts provide to students.

3AF 2024, Orleans, France

Kazuki Ozawa, Department of Aeronautics.

In this report, the attendance experience in 3AF 2024 is documented. I obtained oral presentation experience and feedback from aerospace EU/US researchers. I appreciate the Old Centralians' Trust from CGCA, which allows me to present our research in 3AF to discuss the hypersonic control method towards the future sustainable hypersonic vehicle and to recognize our research in the community.

Experience in 3AF 2024

I presented "Temperature measurement of non-uniform surface temperature distributions for delaying high-speed boundary layer transition" in a session: High-speed flow on 27th March 2024.

Through the presentation, I received feedback from researchers to improve and clarify our research, which is the following:

Q1: After measuring surface temperature and streak amplitude, what is the measurement method to assess the impact on transition?

Q2: Causing transition is inevitable. So, instead of delaying transition, can we control transition point by temperature input?

The following is my answer:

A1: We have several ideas to assess the impact on transition by our method. For example,

- Using FLID help to assess the growth of instability and transition location directly.
- Using IRT it is possible to show the heat transfer amount on the surface. After transition, since heat transfer increases, we can assess the location depending on the heating amount.

A2: Delaying transition has a direct impact on the performance of the hypersonic vehicle. Thus, we should keep focusing on the delaying; however, in the future, we should consider stable transition control after delaying transition.

In the social session, researchers showed their interest in our concept and progress. Several researchers remembered my presentation of last year and mentioned quite positive comments to encourage our research. They looked forward to joining my talk in the future.

Overall, the conference gave me a chance to get feedback on our research globally and also improved my presentation skills, especially my smoothness in the delivery of presentations. After experiencing two conferences, I am able to use critical thinking and audience angle in my presentation to explain my research. Before each section, I repeated the question with the aim of reminding the audience what I was tackling. Besides, I tried to include my illustrations and plots to give the audience a more intuitive understanding. Attending this conference was a good opportunity again to remind the author to keep a vast passion to dedicate the research to achieve the project's goal.

SciTech Forum 2025 in Orlando, US

Kazuki Ozawa, Department of Aeronautics

Abstract

In this report, the attendance experience in SciTech Forum 2025 is documented. I obtained oral presentation experience and feedback from aerospace EU/US researchers. I appreciate the Old Centralians' Trust from City and Guilds College Association, which allowed me to present our research in SciTech to discuss the hypersonic control method towards the future sustainable hypersonic vehicle and to recognize our research in the community.

Experience in SciTech 2025

I presented "*Generation of streaks by non-uniform surface temperature distributions for hypersonic boundary layer transition control*" in a session: Flow control: Methods and Applications II on 6th Jan 2025. Through the presentation, I received feedback from researchers to improve and clarify our research, which is the following:

Q1: Why do you impose different wall temperature profile?

Q2: Why do you test in hypersonic wind tunnel?

The following is my answer:

A1: We aim to generate local boundary layer condition along spanwise direction. Different wall temperature is able to directly influence the boundary condition.

A2: Our proposed control method is a new idea, never proposed in the past. So in order to establish the control methods, it has been expected that numerous test would be required. Thus, firstly we try to establish the control device at low cost tunnel but similar conation, therefore we tested in supersonic wind tunnel. In the future, as a next step, we will conduct hypersonic wind tunnel tests to assess the control methods with measurement of transition location.

During the social session, I engaged with researchers specializing in hypersonic flow, sharing our project's concept and progress. This interaction provided a valuable opportunity to stay updated on the state-of-the-art advancements in hypersonic flow technology. Given the significant investments the U.S. has made in this field, fostering communication and collaboration with these researchers is highly beneficial. The conference offered a platform to receive global feedback on our research and further refine my presentation skills, particularly in delivering content smoothly and confidently. Having attended three conferences, I have developed the ability to incorporate critical thinking and consider the audience's perspective when presenting, ensuring clarity and engagement. Additionally, I utilized illustrative diagrams and plots to provide a more intuitive understanding of our research. Attending this conference reaffirmed my passion for advancing our research and reinforced my commitment to achieving the project's goals.

VCS – CES Zurich Exchange Trip

IC ChemEngSoc, March 2025

The exchange was a collaborative effort with VCS based in ETH Zurich to bring together students across borders to broaden students' horizons and foster a sense of community. This endeavour is designed to provide our students with a transformative experience, fostering academic growth, personal development, enhanced education, and community building.

The trip involved 30 students from Imperial, and 30 students from ETH Zurich hosting the stay for the Imperial visiting students.

The visit started with an ETH Hönggerberg campus tour, followed by a Sika company tour around surface materials, corporate testing, & 3D printing labs. On Saturday, a walking tour of Zurich city centre hosted by VCS committee, passing Einstein's locker in ETH Zentrum campus, and other tourist sites. Then a hike up to Uetliberg mountain. On Sunday, a visit to the Kunsthaus (art museum). On Monday, a visit to Metrohm in Herisau, with tours of manufacturing sites and assembly floors.

Photo courtesy of IC ChemEngSoc

First European Interstellar Symposium, Luxembourg.

Debdut Sengupta, Department of Aeronautics.

The cause of my trip was to present some findings on space sails at the First European Interstellar Symposium in Luxembourg in December 2024, as well as network with the other presenters and attendees at the Symposium. My talk was titled "From Interplanetary to Interstellar: Current Status of Exploration using Space Sails and Required Developments". The research I presented, performed together with five coauthors, was on the technological development of space sails (such as solar sails and laser-sails) required to make future interplanetary and interstellar missions possible.

Impact of Trip

I believe that the trip has had a great impact on my academic / professional career, on the future of the engineering society I am leading, and on the research I presented. Firstly, I gained a lot of knowledge in the field of interstellar flight and space systems, and met many influential people in the field. This has helped me gain a better understanding of what I would like to work with after graduation, as well as grow my professional network. Secondly, I have established new connections on behalf of Project Svarog, a student-led team at Imperial with many students from the Departments of Aeronautics and Mechanical Engineering, where our aim is to construct and launch a solar sail that will escape the solar system. The new connections from the conference could help us gain more insight into the engineering problems we are faced with in the project. Finally, I gained valuable feedback on the research that I presented from specialists in the field, which I wish to use to enhance the study. The aim is to publish this research with the modifications in the near future.

Once more, I wish to thank the Old Centralian's Trust for their support for this trip.

Report on the CGOM15 Conference

Deniz Etit, Department of Chemical Engineering

Attending the 15th International Workshop on Crystal Growth of Organic Materials (CGOM15) was very fruitful for me from various aspects. Firstly, my presentation on my ongoing work on post-breakage crystal regeneration was very well received. I received very positive comments that enhanced my confidence on my research, as well as constructive inputs that will be valuable to improve my research. Moreover, I had the opportunity to meet our collaborators from Curtin University (Australia) and University of Manchester, in-person for the first time. In addition, I met many leading researchers in my field from various parts of the world, with whom we discussed interesting research aspects and future collaboration possibilities. Therefore, CGOM15 was excellent to extend my academic network. Furthermore, I attended two workshops during the conference that were highly relevant for my current projects. First, the workshop on crystal growth kinetics was very useful, to implement the concepts I learnt into my current investigations on post-breakage crystal growth kinetics. Second, the workshop on CrystalGrower simulation software was very insightful, given that one of my ongoing projects is on experimentally validating computational outcomes sent by our collaborators, who produce their results using the CrystalGrower software. All in all, CGOM15 was a marvellous event that enabled me to gather valuable feedback on my research, network with leading researchers in my field and our collaborators, and learn about very useful concepts that are highly relevant to my ongoing projects through the workshops. I am very grateful to The Old Centralians' Trust for their generous support that enabled my attendance to this conference.

The Magnetic Carrier Meeting 2024, Barcelona, Spain

Sofia Patri, Department of Materials

Attending The Magnetic Carrier Meeting 2024 in Barcelona was an invaluable experience that significantly enhanced my professional skills and expanded my research perspectives. This international conference provided me with the opportunity to present my work on magnetic nanogels, engage in stimulating scientific discussions, and establish meaningful collaborations with leading experts in the field of magnetic materials and biomedical applications.

Poster Presentation and Scientific Communication

Presenting my poster on magnetic nanogels was a highlight of the conference. The research attracted considerable attention, with numerous researchers engaging in discussions about my work. This experience greatly improved my ability to communicate scientific concepts effectively, particularly in presenting complex ideas in a concise and accessible manner to a diverse audience. I learned to tailor my explanations to suit varying levels of expertise, ensuring clarity without compromising the technical integrity of my research. The enthusiasm and constructive feedback I received reinforced the relevance of my work and motivated me to pursue new avenues for its development.

Building Collaborations and Networking

A particularly rewarding outcome of the conference was securing a collaboration with a researcher specialising in decorating iron oxide nanoparticles with DNA brushes. This partnership offers exciting possibilities for integrating these functionalised nanoparticles into my research, potentially advancing its biomedical applications. Additionally, the conference allowed me to connect two colleagues, Dana and Giovanni, whom I had met at separate events. Dana, who had been struggling to synthesise her particles, was helped by Giovanni, a postdoctoral researcher and expert in iron oxide nanoparticles, who generously offered to provide her with the materials she needed to progress her project. Facilitating this connection highlighted the importance of collaboration and strengthened my skills as a networker and scientific mediator.

Inspiration and Future Directions

The presentations and talks at the conference were another source of inspiration. One particularly noteworthy talk was delivered by Professor Pané Salvador on Magnetic Small-Scale Robots for Biomedical Applications. This session was directly relevant to my research and introduced several innovative approaches that I could incorporate into future experiments. The breadth of ideas presented at the conference underscored the importance of remaining informed about the latest advancements in the field and demonstrated the potential for interdisciplinary insights to elevate the quality and impact of my work.

Industry Collaboration Prospects

The conference also provided a unique opportunity to engage with industry representatives. I had the privilege of establishing a connection with the CEO of Nanotherics, a company specialising in instruments for magnetic drug delivery. This interaction was particularly exciting, as I am exploring the possibility of using their MagTherm machine for experiments central to my research. This potential collaboration exemplifies the value of linking academic research with industrial expertise to drive innovation and practical applications.

Personal and Professional Growth

Beyond the tangible outcomes, this experience allowed me to refine several personal and professional skills. Engaging with an international community of scientists improved my confidence in public speaking, active listening, and articulating my research objectives. Managing my schedule to attend relevant talks, meet collaborators, and foster new connections also helped me develop time management and prioritisation skills.

In conclusion, The Magnetic Carrier Meeting 2024 was a transformative experience that not only advanced my research but also honed my professional skills. It underscored the importance of collaboration, effective communication, and remaining at the forefront of innovation. I am eager to build on the connections and insights gained from this conference as I continue my academic and professional journey.

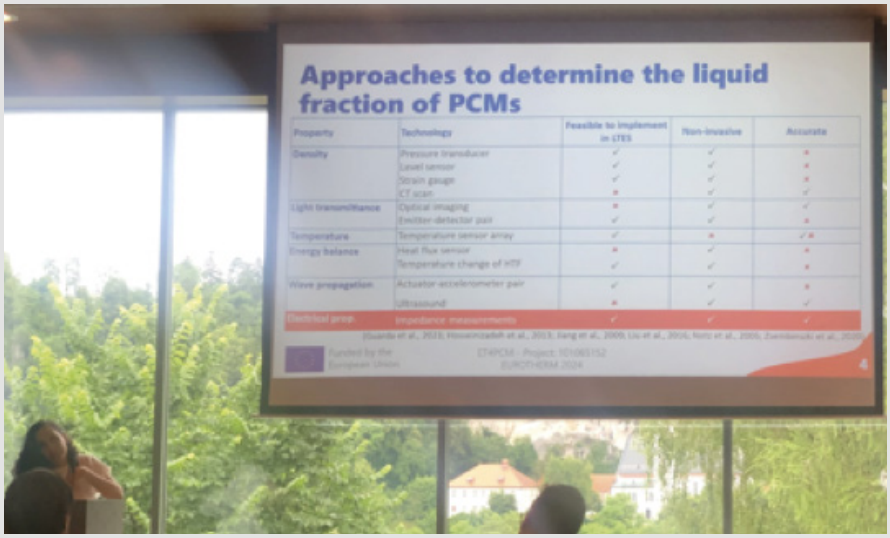
9th European Thermal Sciences Conference, 10th–13th June 2024, Bled

Jada-Tiana Carnie, Department of Mechanical Engineering

With the generous financial support of the Old Centralians' Trust, for which I am most grateful, I was able to present my research at the 9th European Thermal Sciences Conference in Bled, Slovenia. The 4-day conference was an enlightening experience, and this report summarises my activities, key learnings and developments that I encountered on this scenic, unforgettable trip.

On Saturday, 8th June 2024, I arrived in the capital city of Slovenia, Ljubljana. I travelled onwards to the beautiful Lake Bled, the location selected to be the backdrop of the 9th European Thermal (Eurotherm) Sciences Conference 2024. Originally established in 1986, Eurotherm was created to bring together researchers in the thermal sciences and heat transfer domain via seminars, meetings, and a quadrennial conference. As the conference was not due to start for another two days, amidst applying some finishing touches to my presentation, I was able to enjoy some peaceful walks around Lake Bled.

Peaceful walks around Lake Bled



The evening before the conference, I attended a welcome reception organised by the Faculty of Mechanical Engineering, University of Ljubljana, the hosts of the 9th Eurotherm Conference. As this was my first conference, whilst I was very excited to be able to share my research and learn about new developments within my field, I was very nervous. This was a huge conference with over 300 attendees, including PhD students, academics and industry sponsors. Therefore, the reception was a great opportunity to get to know fellow researchers in a relaxed environment which helped me to settle in. I met some wonderful people who enriched my conference experience, and with whom I enjoyed many dinners and excursions around Bled during my stay – we have remained in contact since.

The following day, Monday, 10th June 2024, marked the official start of the conference. Following a morning of introductory plenary lectures, I successfully presented a paper that I co-authored titled '*Exploring the potential and challenges of phase change materials for future sustainable energy storage systems.*' Over 50% of the energy consumed globally is used to support our heating and cooling demands. The decarbonisation of this sector is a challenge given its current dependency on the combustion of fossil fuels, namely natural gas. The significance of thermal energy storage systems, particularly phase change materials (PCMs), to enable not just sustainable but reliable cost-effective heating and cooling solutions, cannot be overstated. In my talk, I discussed the computational and experimental methods that I use as part of my PhD research to understand the macroscale and microscale processes that influence the charge and discharge heat flux profiles of PCMs as they melt (to store thermal energy) and solidify (to release thermal energy). This was an incredibly valuable experience that enabled me to improve my public speaking skills, gain confidence in presenting my research, and learn how to communicate and engage with a broader academic audience. Furthermore, watching presentations delivered by fellow researchers was particularly insightful, not just from the knowledge that I gained but also, in establishing how the audience best perceives and engages with unfamiliar concepts in terms of how data is presented, and how the presentation is structured.

Photos courtesy of Jada-Tiana Carnie

For the remainder of my time at the conference, I attended talks relating to PCM research where I learned about alternative applications of PCMs as a heat storage medium. A really interesting example that I learned about was from a talk delivered by Dr André Malaquias, who discussed how PCMs could be used to improve the thermal performance of fire-protective clothing. I also learned about different techniques that researchers were developing to try and characterise the liquid-solid interface behaviour during phase change processes of PCMs, with this being essential to the successful implementation and optimisation of future PCM thermal energy storage systems. I had many fruitful discussions during the networking sessions and conference dinner, gaining new ideas and perspectives on what is required for the development of not just my own research, but our wider understanding of PCM behaviour.

Overall, I had a wonderful time at this conference. I would like to thank the Old Centralians' Trust committee for awarding me this travel grant, which has allowed me to participate in a very important aspect of a PhD student's development as a researcher.

Designing digital musical instruments with bidirectional audio-tactile interaction

Anna Silver, a Design Engineering student, was required to do jury service a few days into the second year of her course. She was stuck serving on the jury for a murder trial from October 2023 until February 2024, and as a result was forced into taking Interruption of Studies from February 2024 to finish at the end of September, and to subsequently repeat her second academic year. To ensure a productive use of her time, she arranged to undertake a research project from April to June, in the Augmented Instruments Laboratory, a team within the Dyson School of Design Engineering led by Professor Andrew McPherson. The OC Trust awarded her funding to cover the cost of her daily travel from her home in Kent to Imperial as the Interruption of Studies meant she was no longer eligible to reside in Beit Hall.

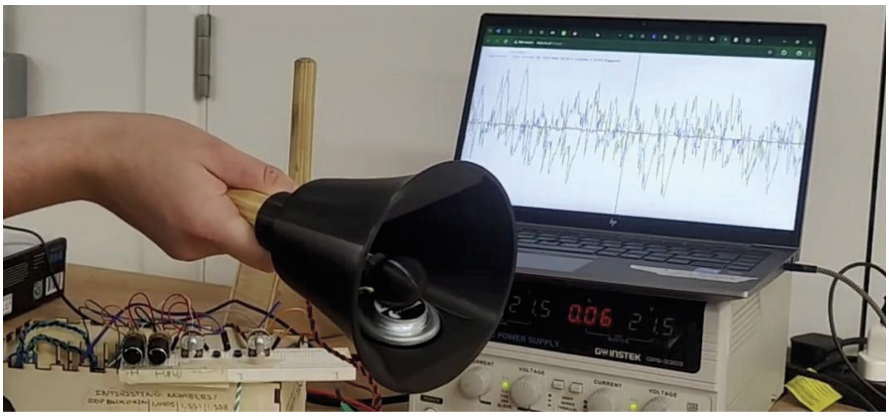
Project Overview

This article outlines the key findings and outcomes of the UROP summer project, focusing on the development of novel digital musical instruments and the exploration of haptic feedback mechanisms for musical performance. The project, which ran over the course of four months, involved rigorous experimentation with various actuator configurations, software-hardware integrations, and feedback systems to create interactive musical interactions.

Key Project Developments

- **Exploration of Chaos and Stability in Musical Instruments**: This part of the project investigated how controlled chaos could be incorporated into instrument design, inspired by Tom Mudd's work on nonlinear dynamical processes. The study revealed that certain actuator configurations led to feedback loops that could be both predictable and unpredictable, creating an interesting interaction with the instrument. The concept of a 'chaos bell' was developed, where users could interact with the instrument to influence unpredictable yet intriguing sonic behaviours.
- **Haptic Feedback and Interaction Models**: Extensive testing was conducted on actuators of varying sizes, leading to insights into how weight and force application affect vibration response.

Photos: Anna Silver



- **Prototyping and Fabrication**: Various bell designs were 3D-printed and tested, integrating different actuators to evaluate their musical potential. Modifications were made culminating in a functioning demo setup.

Presentation at CHIME Annual Conference 2024

After the research opportunity concluded I had the opportunity to share the findings and prototype developed at the CHIME Annual Conference 2024.

During this conference, I was able to go to attend many insightful talks as well as gain contacts within the field of Digital musical instrument design and discuss my work and findings with many different people.

OHMI/Drake Sustain-a-thon Participation

Following the new contacts met through the conference in December, I had the opportunity to attend an OHMI/Drake Sustain-a-thon event, focusing on disability-inclusive musical instrument design with a focus on sustainability and repairability (linking back to current work being explored through my degree courses). The project's insights into haptic feedback and non-traditional interaction models were particularly relevant for accessible music technology and gave me a good base knowledge to contribute constructively to the event.

Concluding Remarks

The research project has had a significant impact beyond its initial scope, contributing to academic conferences and real-world applications in accessible music-making. The research into haptic feedback in digital instruments has opened pathways for future studies and applications in both experimental performance and assistive music technology.

Ongoing collaborations are planned to broaden the impact of the bell. Including a collaborative concert with Trinity Laban in February.

Acknowledgements

I am grateful to the Old Centralian Trust for providing me with part of the funding to take on this opportunity, which has both contributed to my continued studies as well as my future plans. I also extend my appreciation to the EPSRC for also part funding, as well as Professor Andrew McPherson for providing valuable guidance throughout this experience.

An alumni guide to becoming a Non-Executive Director

In November, the Alumni Engagement team organised the first in a series of events for mid and senior career alumni who are exploring NED (Non-Executive Director) opportunities and portfolio careers, to discuss how Imperial alumni's knowledge and skills could bring a much-needed new perspective to private and public sector boards. Part of Imperial's lifelong career development programming for alumni, the event featured a diverse panel of Imperial graduates representing different sectors, backgrounds and experiences. Panellists shared their pathways to NED positions and an insight into what the role really entails with an audience determined to make a difference, develop their skill portfolio and take the next step in their careers.

Bringing an insight into the public sector, the panel was joined by Cabinet Office representatives Shernett Ranson (Head of Public Appointments Talent & Outreach), who chaired the panel session, and Luke Hughes (Deputy Director, Inquiries, Reviews & Public Appointments) who provided the keynote. Luke shared an overview of public sector roles, practical tips for applications, and the encouragement that the public sector needs the experience and skills of the people in the room more than ever.

Photo courtesy of Imperial College

The panel consisted of (from L to R)

- **Jo Gardner**, Director of Alumni Engagement
- **Justin van Wijngaarden** (Physics 1989). Executive Director at StoneXFinancial. NED roles: Chair of the Board at Reliance Bank, Committee Chair at UCAS and Vice-Chair at West Hatch Academy Trust.
- **Dr Hande Côté** (PhD Materials Science & Mechanical Engineering). Former Head of Engineering & Operations Excellence at JM Chemicals. NED roles: Industrial Advisory Board Member for the School of Mechanical Engineering at the University of Leeds, and the Women in Manufacturing UK Initiative.
- **Luke Hughes**, Deputy Director, Inquiries, Reviews & Public Appointments , Propriety and Ethics Team, Cabinet Office
- **Shernett Ranson**, Head of Public Appointments Talent & Outreach, Propriety and Ethics Appointments Unit, Cabinet Office
- **Dominique Allwood** (Medicine and Management 2002). Chief Medical Officer at UCLPartners, Director of Population Health at Imperial College Healthcare. NED roles: Board Member at Patient Revolution, Governor of University College Hospital NHS Foundation Trust, former NExT Director.
- **Rimla Akhtar OBE** (Chemistry and Management 2005). Founder and Managing Director at RimJhim Consulting. NED roles: Chair of Audit and Risk Committee at Bettys and Taylors Group.

WHAT?

A Critical Role Across All Sectors

A NED is a non-executive director. A board member, there to provide independent oversight, knowledge, experience and strategic advice and, if necessary, to challenge the executive team.

Unlike an executive director, NEDs are not involved in the day-to-day running of the business – a distinction noted by Justin van Wijngaarden and Dominique Allwood.

Justin: "The most important thing about being a non-executive director, is to not be an executive director. You're not the captain of the ship. You don't steer it. That's what the executive team does. The people at the coal face who are doing the day job know more than you, but you're there to work out whether they're helping you sail in the right direction."

Dominique: "You're not a consultant and you're not there to run things. You need to ask questions, to use curiosity and wisdom rather than consulting and executive powers. You are there to challenge, support and assure. It's about understanding where the organisation is going and seeing evidence that they're doing the right things in terms of strategy and culture."

WHY?

The Value Of Different Perspectives

NEDs bring their own experience, particular expertise and skills to an organisation, and it's the diversity of these experiences that has the most impact – including on the bottom line.

Rimla Akhtar pointed out that Mckinsey's

'Diversity wins' report shows that diversity in leadership improves the bottom line. The companies in the top quartile for gender diversity on executive teams were 25% more likely to have an above-average profitability than companies in the fourth quartile. That rises to 36% for ethnic diversity. "You don't want group think" she explained.

Tapping into that personal experience is critical to a NED position. Hande Côté brings her extensive industry expertise from her 'day job' to her NED role, an invaluable perspective that helps to shape how the next generation of employees and leaders in the manufacturing space will be educated. "The manufacturing industry is trying to navigate digital trends and new technologies, from cyber security through to AI. There are many challenges around that. The University of Leeds has an incoming graduate programme in manufacturing and I have the opportunity to bring my expertise from Johnson Matthey and the technologies I worked with and knowledge of trends in the industry to set out the context of this course."

It's not just the board and company that benefit from NED positions – it can be just as valuable for the NED themselves, providing an insight into how to work with and influence a board, a way to develop critical leadership skills and a way to diversify your career and develop a portfolio of roles.

Dominique spoke of the altruistic reasons for becoming a NED – to bring her skills and knowledge to the health sector, but also that there is a strong non-altruistic motivation. "I was knocking around exec and sub-exec level roles and really wanted to understand how boards work better so I can influence them."

And the benefits don't end there. Dominique was able to negotiate time off her regular role for her NED responsibilities because of the value she was able to bring to her team. "I took a NED role in the field that I work in. We're busy doing our jobs every day, and in the NED sessions we have a chance to be a bit more future-facing in terms of the strategy – how we plan for tomorrow, today. The way in which you facilitate that thinking was something I brought back to my role. My organisation was keen on the content I would hear but also the skills, context and strategy I would develop and implement in my team. Skills like how to listen, understanding how a board makes decisions, and writing good papers. You get to see really good examples of great chairing, great teamwork and how to ask good questions, interrogate and scrutinise. We spend time in my teams now answering the questions 'what?', 'so what?' and 'what next?'."

WHO?

"People Like Me"

When you picture a board, who do you imagine sitting on it? Luke highlighted one of the biggest myths in the NED world is a feeling that "it's not for someone like me". Not true, according to Luke. There are about 4,000 people in public appointments at any one time, and around 1,000 positions recruited every year. "I can guarantee to everyone in this room that there is a public appointment you would do brilliantly at. They need diversity of skills, experience and background."

This was a mindset Rimla identified with when she became a NED for the Football Association. "I wasn't aware that someone like me could join or be elected to a body that was so influential and impactful. At the time, the council was made up of about a hundred people. I had just turned 30 and I was easily the youngest person ever to have been on the council at less than half the average age. I was one of four women and one of three people of colour. I was walking into it thinking it wasn't going to be a space for me, but you have to follow your passion, take opportunities that are presented to you and step into things that might not be comfortable."

So, difference in perspective can be a USP when it comes to NED roles.

Rimla explained, "I didn't know anyone on the board when I was interviewed for my current NED role at Bettys and Taylors Group. They were looking for a chair of the audit and risk committee. I had a bit of experience but they had ex-CFOs and ex finance directors they were interviewing alongside little old me. They chose me because they knew they already had the right skillset there. What they were truly looking for was diversity of thought, perspective and experience, and that's what they get with me. They're getting the audit and risk expertise but they're adding to that by getting difference of opinion and a challenge from someone who comes from somewhere totally different to what they're used to around the table."

Chatting with alumni during the networking part of the evening, Justin was very open that imposter syndrome is something he still deals with, a statement met with agreement from alumni at all levels of their career. His advice? "You have to do it anyway, take the risk, try it."

HOW?

Top Tips For Succeeding In A NED Role

How do you go about finding, securing and performing well in the right NED opportunity? Here are some key takeaways from our panellists.

Find The Right Role:

"*You have to align three things: Your passion for what the organisation does. Does their values statement and what they're about align with your own values? Culturally, does it fit and is the culture in the organisation something you could jump in to and even take further?*" Justin

Know Your Strengths:

"*Understand what you care about and what your strengths and your unique abilities are. For me, working from demanding offshore environments in the Gulf of Mexico to the jungles, to North America where I managed extreme operations, managing over 80 personnel with zero facilities or experience, all honed my leadership skills and crisis management skills which is what most organisations are looking for.*" Hande

Pay Attention To The Detail:

"*Read the criteria! You must demonstrate how you meet all the key criteria or you won't be considered. Public appointments clearly list essential and desirable criteria, pay attention to it.*" Luke

Make The Time To Do It Well:

"*There are the board meetings themselves, and if you're a member of a committee that ramps up. But also, as a NED I was taught to 'go to the street corners where the organisation hangs out'. There were a lot of visits to different parts of the organisation to get to know it better. You could be cutthroat and just attend the bare minimum of board meetings but my feeling is that if you want to do the role well, you do need to commit to some of the other activities. It's not insignificant so be mindful when you sign up about what you're getting into.*" Dominique

Build Trust:

"*It's so important to have positive relationships right across and deep into the business – outside the board – because that's where you'll hear information you might not hear at board level. You need people to trust you to support them if they bring issues to the surface.*" Rimla

Connect With The Business:

"*Be connected with the business. Go to the sites, talk with people to understand their challenges. You need to stay connected from top to bottom, and also from bottom to top. It's important to listen beyond the board and understand what the people on the ground want. Not just because it looks good on paper but for your integrity.*" Hande

Take Responsibility:

"*You need to emphasise around the board table that you're all in it together. It's a collaborative effort to move the organisation forward to a better place. It's the chair's responsibility in the private sector to call out where the executives are failing. It's about not sugarcoating, just giving the truth so the board can make a collective decision to make a change. You need to hone all your talents and skills and not be afraid to call it out, even if sometimes you get it wrong.*" Justin

Most importantly? Luke says, "persist". Don't be put off, don't expect to get the first thing you apply for. There is a need for people like Imperial alumni, with the knowledge, skills and experience they possess, to take on these roles. And as Justin concluded, 'Amass all your experience, knowledge and know-how to become a non-executive director and make a difference to society."

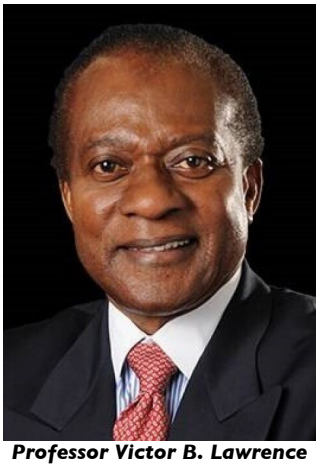
https://dub.sh/IE42-NED

If you wish to be kept informed about this series of events, sign up to the events email by updating your communication preferences at https://www.imperial.ac.uk/alumni/contact-us/update/

US National Medal for Alumnus

In January, then US President Joe Biden announced the recipients of the prestigious US National Medals of Technology and Innovation. Only nine such medals were awarded this year. One went to Electrical Engineering alumnus, Professor Victor B. Lawrence, to recognise his pioneering work in digital signal processing and communications technology.

A Ghanaian-American engineer, Victor is a Research Professor and Director of the Center for Intelligent Networked Systems (iNetS) at Stevens Institute of Technology. He earned his PhD in 1971 as a member of the Communications and Signal Processing Group in the Electrical and Electronic Engineering Department at Imperial, where he studied under Professor Tony Constantinides.



Professor Victor B. Lawrence

Photo: Khyang (https://commons.wikimedia.org/wiki/File:Dr._Victor_Lawrence.jpg), https://creativecommons.org/licenses/by-sa/4.0/legalcode

After working at General Electric and as a postdoctoral researcher at Imperial, he was recruited by Bell Labs in 1974, where his work in digital signal processing was key to the creation of high-speed internet and the advancement of multimedia communications.

The National Medal of Science and the National Medal of Technology and Innovation are the US nation's highest honours for exemplary achievements and leadership in science and technology. The National Medal of Technology and Innovation was established in 1980 and is administered for the White House by the U.S. Department of Commerce's Patent and Trademark Office. It recognises individuals and organisations for their lasting contributions to America's competitiveness and quality of life and helping to strengthen the nation's technological workforce.

https://dub.sh/IE42-Lawrence

New scholarship

A new scholarship will support financially disadvantaged Sikh students pursuing a Master's degree at Imperial.

The scholarship honours Imperial Alumnus Dr Narinder Singh Kapany (PhD Physics 1955) – widely known as the 'father of fibre optics', whose pioneering work laid the foundation for high-speed internet and pulse oximetry – and his wife Satinder Kaur.

"My parents dedicated their lives to education, innovation and service to the community. Their belief in the power of knowledge to uplift and transform lives is at the heart of this scholarship," said daughter Kiki Kapany.

"I hope it provides aspiring Sikh students at Imperial with the support they need to pursue their dreams and continue the legacy of curiosity, creativity, and generosity that defined their lives."

https://dub.sh/IE42-Kapany

Photo courtesy of imperial College

Since 2023, a portrait of Dr Singh Kapany has been displayed in 170 Queen's Gate at Imperial's South Kensington Campus, in recognition of his scientific achievements and impact on the Imperial community.

Paper-based alternative to RFID tags

RFID tags, such as those attached to new clothing, have a microchip embedded in them that stores information about the item, and a metal antenna that allows the information to be accessed through a radio frequency reader. Together they make it possible for retailers to track inventory, operate self-checkout systems, and reduce theft.

But the multi-component tags are expensive to make and a nightmare to recycle. In the global fashion industry alone, more than 12 billion single-use RFID tags are produced each year, most ending up in landfill.

Startup PulpaTronics, has a solution: all-paper RFID tags that are cheaper to make and can be dropped in a regular recycling bin once they have served their purpose. After over a year of R&D, the company has just raised £430K in pre-seed funding to accelerate product development and launch its first pilot studies with leading retail and packaging companies.

"This investment not only kickstarts the growth of our vision but also empowers us to accelerate our R&D for commercialisation, so that we can do our part to make an impactful contribution towards climate change," said Chloe So, co-founder and chief executive of PulpaTronics. This contribution could be substantial. "If a major retailer like Zara switched to our tags, we could already help them save 2% of their entire year's greenhouse gas emissions," she added.

The PulpaTronics approach dramatically reduces the components needed to make an RFID tag, cutting costs and simplifying recycling. In place of the metal antenna, the company uses a laser to convert carbon in the paper substrate into a conductive material, essentially etching an antenna onto the paper. The microchip can then be replaced by encoding data in the shape of the antenna, in much the same way that a QR code holds information in its pattern.

The result is a paper tag that can be recycled along with other paper and card. Costs are cut in half, and there is a 70% reduction in carbon footprint compared to a traditional RFID tag.

"We check the sustainability box, and we check the price-point box, and I think that's why investors were so excited about this product and willing to give us their money," said Ms So.

The idea came to company co-founders Chloe So and Barna Soma Biro during a group project for the Master's programme in Innovation Design Engineering, run jointly by the Dyson School of Design Engineering at Imperial and the Royal College of Art. Together with two colleagues from the course they then entered the 2023 Venture Catalyst Challenge, Imperial's flagship entrepreneurial competition, going on to win the Creative and Consumer track prize.

"The VCC competition kept us thinking about the idea while we were also busy completing our studies," Ms So recalled. "It helped us hone our pitch and gave us a lot of resources on how to build a company from the ground up."

Meanwhile, they were able to use resources at Imperial to start optimising a paper substrate for use with lasers, and to test their first tags in the Department of Electrical and Electronic Engineering's near-field communication lab.

"We are in the last phase of our first round of R&D, which is all about substrate optimisation, looking at off-the-shelf materials and different paper pulps to see what higher levels of connectivity we can achieve," said Barna Soma Biro, PulpaTronics' chief technology officer. The company has already built its first prototype chipless tag reader.

Meanwhile, the company has picked up numerous prizes for its technology. This exposure has generated high levels of interest from retail and packaging companies, and pilot trials involving hybrid tags with carbon-based antennas that function similarly to conventional UHF RFID tags. "That allows us to work with existing store infrastructure and have a more seamless integration when working with different brands," said Ms So. "And that will help us get to the market quicker."

https://dub.sh/IE42-RFID

Photo courtesy of imperial College

PulpaTronics founders Barna Soma Biro and Chloe So

Research on Façade Fires wins Fire Engineering Award

A Mechanical Engineering research project has received an award from the Society of Fire Protection Engineers.

The project led by Dr Matthew Bonner and Prof Guillermo Rein was recognised for its outstanding achievements on fire safety engineering. It explored experimentally the global diversity of fire testing standards for building façades, aiming to understand why so many different national approaches exist and whether there was consistency among them.

Dr Bonner, now a fire engineer at Trigon Fire Safety of UK, said: "It is an honour to receive this award for the research started during my post-doc at Imperial that I have also continued at Trigon. I feel very lucky to work in a role where I can continue doing research and also have first hand experience of designing fire safe buildings".

Initiated and completed during the COVID-19 pandemic, and funded by Berkeley Group of UK, the research completed a series of 25 large-scale façade experiments according to the standards from UK, Germany, USA, Poland and ISO. It highlights the challenges posed by the lack of global harmonisation and offers insights to guide future improvements in understanding façade fire standards.

The project was carried out in collaboration with Dr Wojciech Węgrzyński of ITB Poland, whose testing grounds were key to the conduct the experiments. He said: "While seeking the new, biggest and most comprehensive test is perhaps attractive, I find immense value in finding out the test that gives maximum knowledge, but does that in a cost effective manner."

The award was presented at the SFPE European Conference on Fire Safety Engineering, held this year in Edinburgh. Organised by the Society of Fire Protection Engineers (SFPE), the conference is a leading event that brings together experts and practitioners to share advances in fire safety science and engineering.

Professor Guillermo Rein said: "Everyone has the right to safety, no matter where they live. That is why effective and consistent fire standards, grounded in science, are essential to building a safer world for all."

This recognition celebrates the team's commitment to rigorous, relevant research and marks a significant contribution to global fire safety.

https://dub.sh/IE42-Fire

Photo courtesy of Imperial College

Dr Matthew Bonner receiving the award at the SFPE Conference on Fire Safety Engineering

Imperial spinout Polaron wins £1M Manchester Prize

Imperial spinout Polaron has won the very first Manchester Prize, a government-run competition supporting breakthroughs in artificial intelligence for the public good. The company will receive £1 million in funding to continue developing AI tools that promise to accelerate the design of advanced materials for applications such as batteries and high-performance alloys.

"Polaron exemplifies the promise of AI and shows how, through our Plan for Change, we are putting AI innovation at the forefront," said Peter Kyle, the secretary of state for science, technology and innovation, announcing the award.

The technology will help manufacturers create stronger, lighter, more efficient components for clean energy, transport and key infrastructure, contributing to the UK meeting net zero targets.

Professor Mary Ryan, Vice Provost (Research and Enterprise) at Imperial College London, said: "Polaron's success using AI to create advanced materials is a reminder that AI is not only about data on a screen, but is set to dramatically transform our physical world. With the UK Government driving a resurgence in sustainable industrial growth, it is great to see our spinout receive major recognition and funding to make better wind turbine blades, batteries for electric vehicles, and metal alloys for bridges and skyscrapers. At Imperial, we're providing ever more support to turn research into the deep technologies and companies that will change the world."

Nearly 300 companies applied for the award, with ten finalists selected last year. "We are thrilled to have won the first ever Manchester Prize," said Dr Sam Cooper, co-founder and chief scientist of Polaron and Reader in Machine Learning for Materials Design at Imperial's Dyson School of Design Engineering. "It has been an extraordinary team effort."

The conventional approach to improving materials design involves a mix of engineering instinct and rules-of-thumb about what works. However, this trial-and-error approach can take years to complete.

Polaron's approach is much faster. Its algorithms learn the relationship between the microscopic structure of a material and the way it is made, directly from image data. These models enable a rapid exploration of the possible designs, taking the design cycle down from hundreds of weeks to hundreds of hours.

Because this optimisation is applied to products that a manufacturer can already make with its existing production line and materials, the results can be implemented much quicker than switching to a completely novel material.

A further advantage is that Polaron's models are relatively small, and can start work with a modest amount of information about a process. The level of data collection that most companies are already doing for quality control purposes is often enough.

Polaron was set up in 2024 by a team working in the Dyson School of Design Engineering. Working closely with Imperial Enterprise, a plan to spin the company out developed. Its business plan was honed in the Venture Catalyst Challenge (VCC), Imperial's flagship entrepreneurial competition for students, alumni and early career researchers.

Run by the Enterprise Lab, the VCC takes 25 teams of aspiring company founders through an intensive programme that supports the development of their innovative ideas and their entrepreneurial skills. During the 2024 final, Polaron took home one of two Moonshot prizes, recognising teams who are pushing innovation to the limit.

Being shortlisted for the Manchester Prize brought the company an injection of £100,000 to continue work on its system, plus further business and technical support. Additional recognition came when co-founder and chief technology officer Dr Steve Kench won the 2024 Faraday Institution Community Award for Innovation.

Meanwhile, Polaron has continued to benefit from Imperial's enterprise ecosystem, for example by taking part in a Venture Trek delegation of AI startups to Singapore. This programme gives Imperial founders the opportunity to visit global startup hubs and take part in a series of meetings and events to gain vital skills for growing their business outside of the UK.

"In the last year, we have turned the research we pursued at Imperial into a commercial product, using our AI to reduce years of materials development into days," said Dr Isaac Squires, a PhD graduate from Imperial's Dyson School of Design Engineering, and the third co-founder and chief executive of Polaron. "We are now working with our first manufacturing customers in the electric vehicle and battery space to apply Polaron to extend the life of batteries and improve the performance of EVs."

This is just the beginning, he explained. "While these have been our core markets to date, Polaron is material agnostic, and we are already bringing our rapid design capabilities to industrial manufacturing more widely."

https://dub.sh/IE42-Polaron

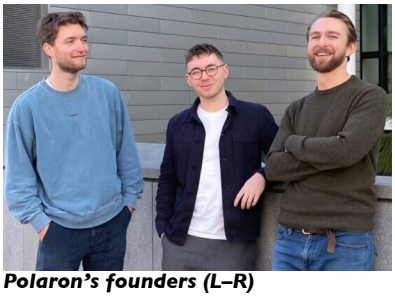


Photo courtesy of Imperial College

Polaron's founders (L–R) Dr Steve Kench, Dr Isaac Squires, Dr Sam Cooper

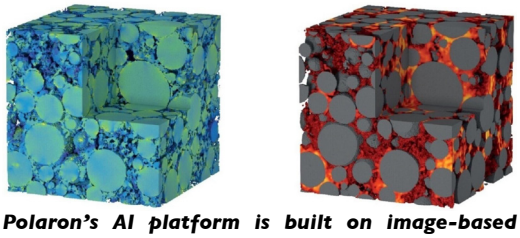


Image: Polaron

Polaron's AI platform is built on image-based generative AI algorithms, with microstructural image data at its core

South African branch quarterly lunch, November 2024

Above (L to R): Rod Milne, Andrew Smith, John Baker, Richard Gundersen, Colin Bachelor, Charles Lewis

Right: Spanner Bearer John Baker 1963-64 maintains tradition with our local mascot at the South African Branch's quarterly lunch in Johannesburg on 20th November 2024

Alumnus awarded 2024 Workman–Malpas Medal

The Workman–Malpas Medal is a joint award established in 2023 by the Hong Kong Regional Group of The Geological Society of London (HKRG-GSL) and the Geological Society of Hong Kong (GSHK) to recognise individuals who have provided outstanding service to geoscience in Hong Kong. The award is named in honour of Dr David Workman, a pioneer in the promotion of geoscience in Hong Kong, and Professor John Malpas, the founding Chair Professor of Earth Sciences at The University of Hong Kong. The first 20 medals awarded were donated by Professor Malpas and comprise a silver medal featuring the logos of both The Geological Society and the Geological Society of Hong Kong. Award recipients are recorded annually in the registers of The Geological Society of London (GSL) and acknowledged at the GSL Annual Awards presentations each June.

Nominations for the Workman–Malpas Medal were called by the HKRG-GSL and GSHK in July 2024. Following a thorough review of the submissions received by the end of the nomination period, it was announced that the recipient of the 2024 Medal is Professor Wyss Yim.

Wyss Yim (Geology 1971-74) has been a prominent figure in Hong Kong's geoscience sector since joining The University of Hong Kong as an Assistant Lecturer in 1974, rising to the position of Professor in his 35-year career. He is one of the founding members of both the Geological Society of Hong Kong and the Department of Earth Sciences at HKU. Following his retirement in 2009, he continued his contribution as a Senior Research Fellow in the School of Energy and Environment at the City University of Hong Kong, and as an Adjunct Professor at the Institute of Space and Earth Information Science at the Chinese University of Hong Kong. Additionally, he is a lifetime member of the Chinese Society of Mineralogy, Petrology, and Geochemistry, as well as the Quaternary Research Association of China. In addition to these achievements, Wyss has served in various capacities within numerous national and international organisations.

As noted in his nomination, "Wyss has provided outstanding service to Hong Kong Geoscience in his 35-year career since joining HKU in 1974 and even after his retirement." This dedication was greatly appreciated and celebrated by the members of the Medal Award Committee, who extended their warmest congratulations and heartfelt thanks to Wyss for his outstanding contribution to geoscience in Hong Kong.

Photos courtesy of HKRG-GSL

The medal, with the logos of GSL on one side and GSHK on the other

The formal presentation of the Workman–Malpas Medal took place at the Annual Dinner of the HKRG-GSL on 21st March 2025.

Wyss' acceptance speech:

"Good evening.

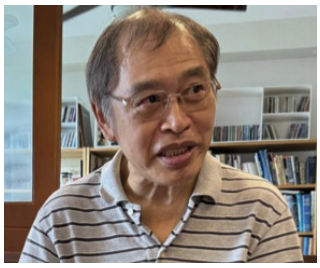
I am grateful to my nominators – Paul Cheung, Prof. Andrew Malone, Dr Richard Hale, and the Committee for this prestigious award.

In retirement I have continued to pursue my research interest on volcanoes and climate based on the maxim – 'Present is a key to the past'.

Present advantage – since the late 1970s satellites are available for tracking volcanic clouds. The first cloud observed to circle the globe was for a 1982 eruption in Mexico. This took 21 days and resulted in Hong Kong's second wettest year since records began in 1884. Other observations include extreme weather, sea-surface topography, sea-surface temperature and polar sea ice. Since the early 2000s the detection of submarine eruptions is improved by ARGO data buoys measuring ocean temperatures to a depth of 2000m at some 4000 locations.

Three findings:

1. *The record rainstorm on 7th June, 2008 in Hong Kong which triggered 2400 landslides on Lantau Island. This coincided with the arrival of the volcanic cloud from an eruption in Chile after 35 days which is the e-folding time of sulphur dioxide. The previous evening Professor Malpas was chairing the International Year of Planet Earth meeting at HKU when Dr Richard Hale walked into the room soaking wet!*



2. *Polar sea-ice reduction can be explained by ocean warming caused by submarine volcanic eruptions e.g. El Hierro in the Canary Islands for 6 months was responsible for record low Arctic sea ice during September 2012 as well as Hurricane Sandy which devastated New York. This finding has been endorsed by Dr Claire Parkinson polar sea-ice expert at NASA.*
3. *Victoria Harbour's 71-year long tide gauge record since 1954 shows two pauses of sea-level rise of 32 years (1959-1991) and 25 years (1999-2024) separated by 8 years of accelerated sea-level rise (1991-1999). Because of the Pearl River mouth location, sea level is strongly influenced by atmospheric pressure and river discharge. The abnormal low and high sea level during the driest year in 1963 and the wettest year in 1997 since record began in 1884 respectively are in agreement. 50 more years are needed to confirm the 60-year cyclicity.*

In conclusion volcanoes are responsible for both regional cooling and warming. The latter through the release of geothermal heat which is known in geoscience but is poorly studied.

Thank you for your attention."

He diffused unexploded bombs when the regular Royal Engineers were overworked

COLIN CHAPMAN
(Mining 1955-58)

Colin was born in London, on 10 July, 1934 and went to school at the St Marylebone Grammar School.

In National Service, he became an officer in the Royal Engineers and worked on bomb disposal. Colin came to the RSM in 1955, just in time to exercise some of his skills in retrieving Clementine from her descent into a bomb crater at the rear of RSM. On occasion, Colin was requested to defuse unexploded bombs when the regular RE men were overworked.

Colin spent his leisure time climbing, with Pete Tress and Mike Mellish, mainly in North Wales.

Colin loved sailing and would later help to deliver two boats to clients in South America and the Indian Ocean.

On graduation, in 1958, he went to the Kilembe mine in Uganda for two years, working as a shift boss and a surveyor when the Manager sacked most of the survey department.

Colin was reduced to using a Miner's Dial due to the work load with the diminished survey department. The holing of some drives was not without difficulty as the Dial is not the most accurate instrument.

From Kilembe, Colin went on to Ashanti for two years. He then went to Demerara Bauxite, where he became stripping supervisor and head of corporate planning.

From there, Colin went to join, as chief engineer for Freeport, the team working on the Grassberg (Copper Mountain) project with its unique problems of access and tailings disposal.

In 1968, Colin married Yvonne, who was a nurse in the Royal Navy. They went on to have two children.

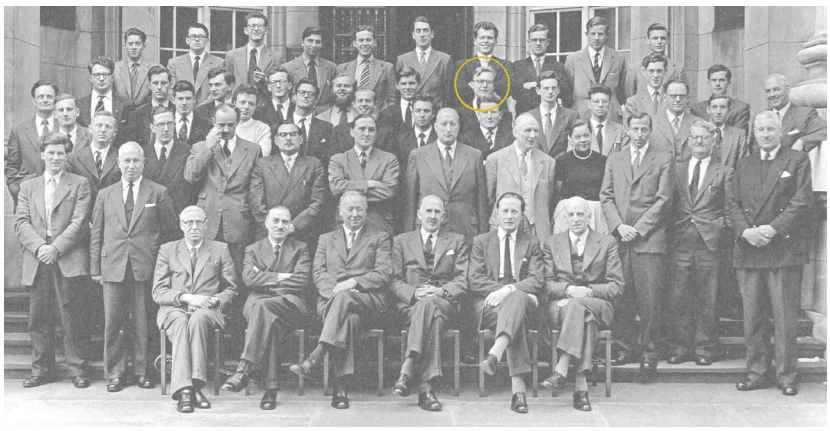
In 1974 Colin went to Canada, where he worked as chief mining engineer on two oil sand projects, the second of these being a Shell project.

Colin joined Billiton in The Hague for some time before going to Brazil and Surinam on Bauxite projects. Shell then withdrew from mining and, after a short while, Colin retired to the UK, buying a house in Tenterden where he carried on consultancy work until 2018.

He finally moved to be near his daughter in Stanford-in-the-Vale.

Colin died on 9 October, 2024, after a long illness

He is survived by his wife, Yvonne, a son, a daughter and five grandchildren.



Left: The Mining Department, staff and final year students, 1958 (Colin circled)

And above, sixty years later, Colin (left) attending a reunion, in 2018

Below: seated, precariously, top right on graduation

Right: surveying with fellow students (Colin left)

IN BRIEF

ANTHONY JAMES (TONY) REYNOLDS
(Elec Eng 1957-60)

Tony, born on 25 July,1936, died on 18 Aug 2024, at the age of 88.

MALCOLM JAMES (BEN) BENNETT
(Aero 1950-53, 53-55)

Born on 25 September, 1931, Ben died on 31 December, 2024, aged 93.

BASIL EDMUND EVANS
(Aero 1952-56)

Basil was born on 13 January, 1934. He died on 2 October 2024, at the age of 90.