



# Imperial ENGINEER

**PICOCON**

**BOTTLE MATCH**

**ANNUAL DINNERS**

**CLIMBING IN CHINA**

**TRACKLAYING IN WALES**

**FASHION'S ENVIRONMENTAL COST**

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

ISSUE 32 SPRING 2020

# In this issue...

## ASSOCIATION NEWS & REVIEWS

- 3 Presidents Report
- 4 COVID-19; RSMU Careers evening
- 4-5 RSMA Final Year Bursary scheme
- 6 RSMA's 135<sup>th</sup> Annual Dinner
- 7 CGCA/Mech Soc Careers Event  
CGCA AGM / President's Evening
- 8-9 CGCA's 107<sup>th</sup> Annual Dinner

## FACULTY NEWS

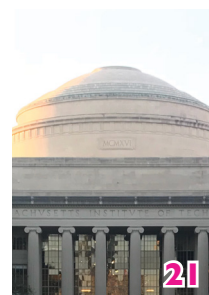
- 10-12 2020 Bottle Match Report
- 12 Low cost ventilator; Catch a falling star
- 13 Alumni Weekend cancelled; Imperial Plexus updated; Advice from a space pioneer

## FEATURES

- 14 Penguins can't fly..., *David Simmonds*
- 15 Epidemics and History, *William McAuley*
- 16-20 Climbing in Getu Valley and Yangshuo, China
- 21 MIT Exchange, *Dylan Hall*
- 22-24 ICRTS Volunteering Weekend in Wales
- 25 Wearing the Earth down, *Eloise Hunt*
- 26-27 ICSF and Picocon 7, *Peter Buck*



15



21



30

## ALUMNI NEWS & VIEWS

- 28-29 51<sup>st</sup> Triode meeting; Jurassic Fossils on the Move
- 30 New home for CGCA Shields; Spring Thaw
- 31 Inaugural Alumni Awards; Diary

## OBITUARIES

- 32 David Michael Curtis (Mech Eng 59-62)  
David Sidney Cheeseman (Elec Eng 58-61)  
Edward Vincent Stansfield (Elec Eng 67-70)
- 33 Mike (Slim) Coward (Metallurgy 61-63)  
Thomas John Gilbert (Chem Eng 48-53)
- 34 Prof Nicos Christofides (Elec Eng 60-66)
- 35 David (Dai) Thomas (Mining 55-58)  
Christopher Terrel Wyatt (Civil Eng 56-57)  
Alfred (Alf) Perry (Civil Eng 71-74)  
Bill Brandum (Mining 48-51)  
Peter Clark (Oil Tech 50-53)  
Michael Meredith Evans (Chem Eng 60-65)  
Trevor John Yates (Elec Eng 71-74)  
Bill Frankland



### Cover images

**Climbing in China**  
Front: © *Maxine Dillon*  
Back: © *Melanie Flury*  
See article pp16-20

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As I write this, we are entering week-two of the College Lockdown due to the coronavirus. Please read my message about the virus and how the College is dealing with it, on page 4.

Perhaps the most important change that has happened to the CGCA in recent years is its conversion from an Unincorporated Association to a Company Ltd by Guarantee. CGCA Ltd was formally created and registered on 19<sup>th</sup> December 2019. The transfer from the Unincorporated Association to CGCA Ltd occurred at midnight on the 31<sup>st</sup> December 2019/1<sup>st</sup> January 2020. Since then, the transition has run remarkably smoothly due to the efforts of Nigel Cresswell and Peter Chase, amongst others.

You may be aware that there has been an issue regarding the CGCA's shields, please read my news on page 30 about their new home.

The Annual Dinner was a high spot of the year. This was held at the Stationers Hall on Friday, 28<sup>th</sup> February and was attended by over a hundred Members of the Association, their partners and guests. The principal speaker was Captain David Henson, MBE. David is a British paraspport athlete who competes mainly in T42 classification sprint events. He has represented Britain at the Invictus Games, World and European Championships and in 2016 he was selected for the Summer Paralympics in Rio, winning a bronze medal in the 200m sprint. His connection with the College is that he is a member of the Department of Bioengineering and works in the department's Blast Centre. In 2011, Dave was serving in Afghanistan in the 22<sup>nd</sup> Engineer Regiment (Royal Engineers) leading a bomb disposal unit. On February 13, 2011, having cleared a number of landmines and IED's, he unfortunately, stepped on a hidden IED. Dave described his early army career (clearly a very promising officer, following his graduation from Sandhurst) and explained how he was asked to form a special bomb disposal unit. He talked movingly about his time in the army and how he was rapidly moved to a field hospital, where both his legs were amputated. The majority of his talk focused on the debt that he and others owe to engineering. In addition to his extraction from theatre by helicopter, he also explained other engineering devices that have transformed the life of soldiers in theatre – for example, a very effective tourniquet that can be administered with one hand.

The reply for the Guests was given by Anil Bharath, Professor of Biologically Inspired Computation & Inference in the Department of Bioengineering. Anil works on wavelet-based models to describe the spatial sensitivity functions of visual neurons. These models are similar in feel to Gabor models for describing simple-cell behaviour in the primate visual cortex, but were optimised for the properties of speed, precision of representation and adaptability. These properties make such models suitable for use in artificial intelligence, particularly for applications in image analysis and computer vision.

One of the highlights of the dinner was the number of students who attended. The Association is very keen to attract more student members and will make particular effort to increase student attendance at next year's Dinner. There is a report with some photographs on page 8.



## Richard Kitney

## PRESIDENTS REPORT



## Tim Cotton

Firstly, a huge thank you to all the members who support the 100 Club and who have been to an event in the last six months. The students really do appreciate the contact with the wider alumni network. This is especially the case with the Final Year Student bursaries. The RSMA awarded the second set of three £1000 bursaries to final year students in mid September 2019. This year the selection Committee had eleven worthy applicants from across the RSM. Read on pages 4 & 5 for a piece from the three new RSMA Final Year Bursars. 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 concrete example of former students of the RSM who want to give back to the current student body. Lastly, the 100 Club 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. The Committee is currently looking at different ways to allow members to support the 100Club, for example offering a monthly direct debit to spread the cost. Keep an eye out for more information on how you can help and remember your support is truly appreciated!

The 135<sup>th</sup> annual dinner was held on Friday 22<sup>nd</sup> November at the Rembrandt Hotel in Knightsbridge and saw 110 guests, of which 49 were current RSMU students, join the Committee and me. Once again the members of the RSMA were extremely generous and sponsored the vast majority of students attending. This level of support is very much appreciated by the students and I would like to personally thank all those members who supported the students. See page 6 for a more detailed report of the evening's festivities, including pictures.

Following the success of an RSMU/RSMA careers event in 2019, in early February 2020 the committee once again supported the students with an engaging careers evening. Megan Facey the RSMU HonSec organised a great event and has provided a brief report for you all to read on page 4.

Unfortunately success was in short supply in a wet and windy corner of Cornwall as the CSM pushed a home advantage to the maximum to win 7 out of the 9 sporting contests over the Bottle Match Weekend. RSM were unable to retain the Bottle, but the men's hockey team did secure the Sharpley Cup with a 2 – 1 win; Badminton was the only other win in an otherwise brutal weekend. See page 10 for a more detailed account of each and every game.

The committee continues to maintain a very active relationship with the RSMU and key societies within the RSM such as De La Beche, MatSoc and GeoPhysicsSoc. All of them are represented at 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 have a healthy membership and a very active schedule of events throughout the year. As mentioned earlier, all organisations enjoy, and want more, interaction with the wider alumni group.

There are a number of upcoming events for your calendars. Planning is already underway for the 2020 Annual General Meeting and Summer BBQ for Final Year Students and these will both be occurring on Thursday June 25<sup>th</sup>, the day before the last day of term at the Union Bar in Beit Quad. Also a date has been confirmed for the 136<sup>th</sup> Annual Dinner as Friday November 27<sup>th</sup> 2020 – the Friday before Mines and Money London starts.

The RSMA continues to work through our membership database to clean up our records regarding membership status, contact details and subscriptions paid. Big shout out to the Imperial College Alumni Office for their on-going support in this effort. You may receive a letter or email from myself asking you to update your annual membership to £15. Please consider doing so as with this small amount we can make a big difference to a student at the RSM.

I hope you find this issue informative and I look forward to seeing some of you in the RSM and /or at an RSMA event in the near future. Lastly, many thanks for your support, it is truly appreciated. The RSMA is always looking to attract more Committee members so if you can spare a few hours every couple of months please do get in touch. Remember you can all still use the email address [rsma@imperial.ac.uk](mailto:rsma@imperial.ac.uk) to contact the RSMA at any time. Please send us your news and we will look to share it with the wider RSM Community.

# A message about COVID-19 from Professor Richard Kitney

As I write this we are entering week-two of the College Lockdown due to the coronavirus. This had been a difficult time for everyone in College and, particularly, for the students. It is totally unclear at the moment exactly when College will reopen – but it is likely to be several months before this happens and there is the possibility that the students will not return until the beginning of the next academic year in October. As you probably know from the media, Imperial College staff are playing an important role in dealing with the coronavirus epidemic. Clearly, the whole of the medical staff is on the frontline and I'm sure we all wish them well and to keep safe. However, there is a range of other staff that are fully involved in the fight.

There are many examples, but here are three:

- **Prof Neil Ferguson** has been at the forefront of modelling the spread of the virus and is one of the Government's key advisers;
- **Prof Myra McClure**, a leading Retrovirologist at the Saint Mary's Hospital, Imperial Campus, has converted an Imperial lab for NHS COVID-19 virus testing that is able to handle 1,500 samples per day.
- My immediate colleague, **Prof Paul Freemont**, is leading a team of our researchers on a more rapid test for the virus using our Biofoundry.

Let's hope we can all get through this crisis safely. But I think you would like to know that all the Faculties of the University are working hard on dealing with the coronavirus crisis.

**Richard Kitney, March 2020**

## RSMA's Final Year Bursary Scheme into 2nd Year

I am very happy to report that, due to the success in 2019, the RSMA once again launched the RSMA Final Year Student Bursary Prize in June 2019. The scheme was created to reward students who show the true RSM Spirit and act as an ambassador for the RSM. Successful candidates must be able to show commitment,

achievement and excellence above that of their peers in areas such as academic excellence, community & RSM Union involvement, sporting prowess, or contribution to a sport or club within the RSM. Financial hardship will also be considered as a criterion. Working with Department Directors of Undergraduate Studies

at ESE, Materials and the Faculty of Engineering we have had eleven applicants and I am pleased to report we had three worthy winners: Marta Wolinska, Kaja Sillett, and Samuel Casement. For your information a short statement from each of them is presented on the page opposite. Remember the funds 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.

**Tim Cotton**

## RSMU Careers evening

On Monday 3<sup>rd</sup> February, the RSMU hosted a careers evening which aimed to introduce a range of industries to students from 1st year through to their final MSci year. The RSMU were lucky enough to have a huge number of RSMA volunteer speakers who covered the following topics:

- Chris Webborn** on "Manufacturing for the 2020's"
- Daniel Cole** on Management Consultancy
- Nicolas Corry** on Banking and Financial Investment
- George Decadaveine** on Environmental Consultancy
- Peter Whitehouse** on the Energy Sector and Designing Seismically Hardened Nuclear Facilities
- Steve Pope** on Health and Safety Consultancy
- Matthew Morris** on Catastrophe Modelling
- Ian Magness** on Finance and Treasury
- Ian Deans** on Geoengineering with



Photo courtesy of RSMU

Atkins  
**Jim Platt** on his time in the mining industry, entitled "The People Principle"  
 The talks were varied and extremely insightful, and students had the opportunity to network during the refreshment break, provided by the RSMA, and then later on, more

informally, at the Union.  
 After the event, the RSMU ran a feedback survey to gauge the response and see if there were any learnings for next time. In short the evening was a great success and based on the feedback it will be continued with another event next year.  
 On behalf of all who attended,

the RSMU would like to thank those who volunteered their time to speak and would strongly encourage other members of the RSMA to get involved at future events! RSMU/RSMA can't run these events without your support and all the students are incredibly grateful for the opportunity to get to know you and pick your brains!

## Kaja Sillett



"I'm a 4th year MSci Geology student, originally from London, in my final year at the RSM. Academically, this year I completed my MSci project entitled *Cosmogenic surface exposure dating of west Greenland ice-sheet deglaciation: implications for abrupt climate change during*

the 8.2 ka event as a part of the CosmIC research group with my supervisor Dr Dylan Rood. This required lab-based processing of glacial boulder samples from Greenland to extract beryllium which I then sent to Australia for measurement, using the data returned to calculate how long ago the boulders were exposed to the atmosphere. I greatly enjoyed completing the project, as I learned new lab work skills, and due to its topical relevance.

"Socially, as well as being a keen member of the RSM netball, hockey and cricket clubs, I have held the role of De La Beche Club (Imperial's Geology Society) president – a committee I have been a part of for 3 years now. This academic year we have run a weekend Geology trip to Norfolk

in November aimed at freshers and have another planned for March travelling to North Yorkshire, dedicated to all final year students. I was also involved in organising the annual DLB symposium. It was very successful this year and welcomed talks themed around *Sustainability – Geology for the Future* covering topics such as geothermal energy and the circular economy.

"On top of this, over the past three years I have held five other committee roles within RSMU clubs and the constituent union. For example, last year I held the role of Vice President (Activities & Events) of the RSMU, organising events for over 600 students such as formal dinners and freshers' week as well as coordinating arts and crafts welfare sessions.

"Receiving the RSMA Bursary

prize has been a great honour as I have always striven to be an active and enthusiastic member of the university community. I think it's great that the association rewards students for holding roles of responsibility and committing many hours to the organisation and running of the RSM. The bursary has helped me to afford rent in London over the summer during the compulsory summer lab work required for my MSci Project. It has also helped me to continue to be a part of (and afford ticket prices for) RSM sports teams, DLB trips and RSM events such as bottle match – all events/clubs I have been involved with throughout my degree and given up my time to organise in the past and/or this year."

## Marta Wolinska



"Parkinson's law states that tasks expand to fill the time available; knowing it's impossible to do everything I seem to have decided to test to what point it holds true. To give you a flavour here are some examples.

"In previous years I held several leadership positions, organising over 14 events for the Materials

Society and RSM Netball, as well as co-editing 8 editions of the RSMU student magazine – *The Pit*. I have also written in most editions of the MatSoc Magazine and was involved in the boxing and salsa clubs. Later, in my position as RSMU President, I was a proactive voice in increasing student engagement with outreach work, participating in events myself and proposing changes to our constitution to establish a permanent Outreach Officer. In recognition of my exceptional contributions to the RSMU, I was awarded Full Colours by my peers last year.

"I also aim to have an impact beyond our union. For instance, I participated in optional Imperial Horizons courses (this year I moved onto Psychology of Performance after taking French and prototyping courses in previous years) as well as other events such as the Dyson

Makeathon I competed in last year.

"In my final year however, I took a step back from leadership positions in order to focus on career development, personal goals and, most importantly, enjoying my last year at Imperial.

"Unlike some, I did not identify the path I wanted my career to take until quite late on in the game – October of Final Year. My goal became to work as a consultant, preferably in the strategy field. This is an extremely competitive area with probably less than 2% of applicants receiving offers (don't quote me on this), which meant I needed to work hard to even stand a fighting chance. A small testament of this work can be the 1st place I won with my team in the Capgemini Invent Cup Competition this February.

"Thanks to the RSMA's generosity I was able to freely pay

for tutoring and extra resources I needed to succeed in my quest. The bursary also allowed me to focus on my degree and preparation, as I wasn't concerned with straining my typical budget. The latter point may seem minor, but to a student every coffee counts.

"The bursary however, is not only a monetary reward. It is also a recognition of the impact we have had on the RSMU community and it was an honour to have received it. The RSMU has been a key part of my university experience. In my first year, I was awarded the Mick Moore Pot for most active fresher and over the course of my degree my enthusiasm for the RSMU has not decreased. I'm happy to act as a proud ambassador to our community.

"I remain very grateful to the RSMA for their generosity and support. Thank you."

## Samuel Casement



"I am a fourth year Geologist with an interest in mineral exploration and have loved my time here at Imperial, especially within the Royal School of Mines, through being involved in, and the organisation of, many events and activities. In my third year, I was Honorary Secretary of the RSMU which was

a great experience overall. It was a chance for me to help be a part of organising (a victorious) Bottle Match, to get to know a much larger cohort of the staff and student body and to have the opportunity to speak to many helpful and inspiring alumni. I am currently the Earth Science and Engineering Academic Department Representative and so this year I have been focussing more on the curriculum of the degree to ensure that students are enjoying their studies at Imperial. From a sporting perspective, I have been RSMU Tennis Captain, played for the 1st Lacrosse Team and also reinstated the RSMU Cricket Club.

"During my Geology degree I have always been most inspired in the field. The application of the theory

we have learnt inside the lecture theatre has been what has excited me the most about the subject and is what I hope to continue in the future. I have just completed my Master's project using satellite, airborne and drone multispectral and hyperspectral imaging data to look for rare earth elements in Namibia. I hope to use the skills developed in this project after I graduate in June as I hope to enter the mineral exploration industry.

"Without the RSMA bursary I would not have been able to attend the Geological Remote Sensing Conference this year. At the conference, I was able to present my Master's thesis, giving me an invaluable opportunity to speak to experts in the field of remote

sensing for mineral exploration, enabling me to develop my networking skills and get essential feedback to help improve my project, prior to submission. The experience definitely benefited my project, my overall understanding of the field, and my confidence presenting research. I am incredibly grateful for the generous contributions from the 100 Club which paid for my admission fees, travel costs and accommodation for the conference which I would have been unable to afford otherwise. Overall, the bursary has allowed me to focus more on my studies, enhanced my knowledge of the field I wish to enter after study, and encouraged me to be involved in the RSMA for many years to come!"

# RSMA'S 135<sup>th</sup> ANNUAL DINNER

The 135th annual dinner was held on Friday 22<sup>nd</sup> November 2019 at the Rembrandt Hotel in Knightsbridge. This year saw the Committee joined by 110 members and guests, of which 49 were current RSMU students. As is always the case the members of the RSMA were extremely generous and sponsored three quarters of the students attending. After a welcome drink or two all the guests sat down for an excellent festive dinner of a ham hock terrine, turkey and a fancy chocolate dessert. Entertainment was provided by Professor Sanjev Gupta, an Earth Scientist from the ESE Department, who gave his perspective on what being a student really means and some commentary on some of the research work that he is involved with as part of the NASA and ExoMARS 2020 rover missions to Mars.

The Association was pleased to be able to present in person the two RSMA awards announced at the June AGM. The Peter Harding Memorial Award was presented to John O'Reilly for his continuing hard work in supporting the RSMA, RSM and the Chaps Club. John was instrumental in getting the 100Club sponsorship scheme up and running which has allowed the RSMA to provide substantial financial support to the students of the RSM. Once again Rees Rawlings was able to personally give Hannah Baker, nee Bungey, the Professor Rees Rawlings Award for her hard work in supporting the RSM as a younger RSMA member. Hannah is the current Honorary Secretary for the RSMA and her ongoing commitment to the RSMA Committee and being an active member of the RSMA Trust are much appreciated. In addition, Hannah organised a Raffle at this year's dinner which raised over £630 from prizes donated by the RSMA Committee and Members.

To close out the awards, the third winner of the 100 Club Draw was drawn and this went to Dave Pearce in Moscow; Dave has very graciously re-donated the prize back to the Association. The support of the 100 Club members cannot be overstated as they have allowed the Association to be able to award three £1000 bursaries to penultimate year students, to assist them in completing their final years at RSM. See the article in this magazine on pages

4 & 5 describing these three bursars.

Finally, it was left to Chris Carter the RSMU President to close out the evening with a few words and the Mines Song. Initially Chris struggled to get the crowd going but a sterling effort by a chorister AKA David Bishop really got the crowd singing. All in all an excellent event and after the speeches and songs the members and guests stayed a while before dispersing to the usual places to continue the conversations.



All photos courtesy of Philip Lupoli, RSMU



# CGCA / Mech Soc Careers Event

CGCA and Mech Soc (the students' society for the Department of Mechanical Engineering) have once again jointly held their annual spring term careers event. On the first Thursday in March 2020, the CGCA's two departmental representatives – Owen Heaney (ME 2016-19) and Charles Parry (ME 1981-84) – and two other alumni – Mark Harris (ME 1982-85) and Clem Sayers (ME 1987-90) – gave up their evenings to be questioned by current students about their varied careers.

Whilst previous such events have usually had alumni with a spread of graduation years, this time two had graduated in the 1980's and one in the early 90's so it was left to Owen Heaney to provide a more recent perspective. Between his second and third years studying in the Department, he spent a year working in vehicle dynamics at the Red Bull Racing Formula One team. While at Imperial, he won the Autosport Williams Engineer of the Future Award, with the prize being a two-year graduate opportunity at the Williams Racing Formula One team, where, since graduating last year, he has been developing state-of-the-art vehicle modelling solutions for the company's next generation of simulation tools.

Mark Harris is no stranger to volunteering at the College: he has already mentored some students. He likes to create things that move, particularly products that link the physical world with automation, machine learning and AI. His career has seen him work in vehicle intelligence, healthcare analytics, smart cash management and automatic coffee machines,



(L to R) Ieuan Swainston, Mark Harris, Owen Heaney, Charles Parry and Clem Sayers

with technology leaders such as McLaren, Novartis, Glory and Costa, addressing common challenges that arise in modern technology such as establishing fact-based visions, navigating safely through development to launch and delivering desirable products that drive business growth.

Clem Sayers is a Chartered Mechanical Engineer with over twenty years' experience in the automotive and associated industries. He has been responsible for delivering numerous components into production on several major engine programmes and has considerable experience in developing dynamometer-based engines, lubrication and coolant systems, and turbochargers.

After graduating with a PhD in Nuclear Engineering, Charles Parry moved into IT as an analyst / programmer before eventually becoming a change management consultant and programme manager at PwC and latterly as a freelancer. He has led multi-faceted teams designing, building and installing systems and new operational structures for private and public

sector clients at home and abroad.

This year, Mech Soc decided to adopt the 'speed-networking' approach that had been used successfully in previous events. Student numbers were a little lower than usual but about twenty-five students still eventually braved the very wet weather and the threat from Covid-19 to find their way to Room 403A in the Electrical Engineering Building (!) where they arranged themselves around four large tables. After a brief pitch from Charles on the merits of joining CGCA and on the awards and grants available to students from the OC Trust, the 'speed networking' commenced with an alumnus visiting each table in turn for about fifteen minutes to answer sundry questions on and talk to the students about their careers and, in Owen's case at least, their transition from College to working life. The questions asked included:

- o What attracted you to your current/past industry/organisation?
- o What is/was your typical working day?
- o What are/were the best and worst things about your career?

- o Is work harder than College?
- o What lessons have you learned along the way?
- o What do you wish you had known earlier in your career or whilst you were studying?
- o What would you now do differently?
- o What's the best advice you can give to a current student?

The students and alumni were fortified with pizza and drinks provided by Mech Soc and funded by the CGCA.

Thanks are due to: Mech Soc's Alumni Relations Officer, Ieuan Swainston, and its Industrial Liaisons Officer, Amalie Kjaer, who advertised the event on campus and organised the students to attend, as well as arranging the venue and catering; Kellianne Bartley, the College's Alumni Volunteer Officer, for trying at short-notice to persuade College alumnae to attend; and to all the students and alumni who took part.

Careers events such as these can give to students a personalised view of life in industry that is a valuable alternative to that given by the staff of companies during their annual recruitment rounds. Judged by their positive feedback these events are much appreciated by the students. The CGCA always welcomes the opportunity to support joint activities between alumni and current students. We will also provide experienced alumni to mentor students and those alumni in the early stages of their careers. If you would like to help in that regard or would like more information on these events then please contact the CGCA at [cgca@imperial.ac.uk](mailto:cgca@imperial.ac.uk). We would especially like more female graduates to volunteer.

## CGCA AGM/President's Evening and Nominations

Come and meet your new President!



The CGCA Annual General Meeting and President's Evening will take place on the evening of Monday, 8<sup>th</sup> June. This year our President for the last three years, Professor Richard Kitney, will stand down and Professor Atula Abeysekera FCGI will take on the role for the next two years. Your Committee extend their thanks to Richard for his marathon stint at the head of the

Association and hope he will still be able to contribute as Immediate Past President for the next two years.

The AGM will start the evening off, beginning at 17:30 in the Billiard Room of 58, Princes Gate on the South Kensington campus. During the meeting Richard will hand over the Presidency to Atula, followed by the election of Officers and Committee members for the next Academic Year.

Once the formal part of the AGM is complete, Atula will make a presentation on Managing Black Swans, drawing on his publication 'Black Swans means Business'. The presentation will begin at 18:00.

The AGM and Atula's presentation are free to members and their guests.

The evening will then progress to the social part of the proceedings and retire to the Garden Room for a barbeque supper with wine. This

gives members the opportunity to catch up with colleagues and to informally meet Atula and the Committee for the next year. The BBQ will start at 19:00 with a drinks reception. Hopefully, if the weather is kind to us, you will be able to enjoy your meal on the Garden Room terrace, overlooking Prince's Gardens. To reserve your ticket for the President's Evening (pre-booking is required for catering) please visit the CGCA website or the Eventbrite link at the end of this article.

We hope to see you there!

### Nominations for Officers and Committee Members

If you wish to stand for a role in CGCA then you need to put yourself forward. By custom the role of President is filled for the next two years, but all other roles are subject to election at the AGM. We

would be particularly interested to find a Membership Secretary – the post has been vacant for a number of years. The role includes greeting new members, handling enquiries from members and managing the membership application process.

If you are interested in standing for any role on the committee please send an email to [GuildsHS2018@outlook.com](mailto:GuildsHS2018@outlook.com) with your details and identifying the role you wish to stand for. There are a limited number of 'co-opted' posts (a committee role without portfolio) that you may wish to take. Please note that roles like Vice President and Honorary Secretary carry legal responsibilities within CGCA Limited and the Old Centralians' Trust.

**Eventbrite Link:**

<https://bit.ly/IE32-CGCA-AGM>

# CGCA'S 107<sup>th</sup> ANNUAL DINNER

The Association's 107<sup>th</sup> annual dinner took place on Friday 28<sup>th</sup> February, at Stationers Hall, attended by 114 members and guests.



**Professor Dick Kitney**

It was hosted by the President, Professor Dick Kitney, in the company of guests representing the Engineering Council, the City and Guilds of London Institute and the Institution of Engineering and Technology, as well as our friends in the Royal School of Mines Association and the senior management of Imperial College. Spanner and Bolt were present and although Boanerges was due to appear, a last minute hitch, in which one of the bevel gears for the timing came loose and separated from its shaft, meant that this particular place of honour was taken by Derrick the motor bike.



**David Henson MBE**

The Principal Guest was Captain (retired) David Henson MBE, currently working as a researcher in the Department of Bioengineering, but with a double career before



Photos by Yifeng Zhang

that, firstly in 22 Engineer Regiment of the Royal Engineers, subsequently as a para-athlete. David described his career progression from student, to cadet to military engineer, working with plastic explosives as a demolition expert to a flood relief coordinator during the UK 2009 floods. This was followed by a posting to Afghanistan with the Counter Improvised Explosive Device squadron (Counter-IED), part of the Joint Force Explosive Ordnance Disposal group. In February 2011, he and his unit were clearing ground in Helmand Province when he stood on a hidden IED, resulting in the loss of both of his legs from the knee. He received treatment in Camp Bastion, and subsequently in the UK at the Royal Centre for Defence Medicine in Birmingham, and at the Defence Medical Rehabilitation Centre, Headley Court. Within eight weeks he had been fitted with prosthetic legs and was walking again.

David's second career developed during his rehabilitation, when he discovered a passion for sport. This soon led to his captaining the British Team in the inaugural Invictus Games in London in 2014, where he won 200m gold. In 2015, he represented Great Britain at the IPC Athletics World Championships in Doha, where he was given the honour of being the flag bearer for the opening ceremony. He was selected again

for the second Invictus Games in 2016 in Orlando, Florida, where he retained his 200m title, and later that year he was selected to represent Great Britain at both the European Championships and at the Rio Paralympic Games, winning 200m silver and bronze respectively.

In his presentation, he used his own experiences from combat injury and sporting achievement to speak about the role that engineering plays in the promotion and propagation of hope; tourniquets, satnav, helicopters, systems for medical responses and prosthetics are all engineering systems or artefacts which played a vital role in saving his life and helping him to move forward.



**Professor Anil Bharath**

The second Guest Speaker, also from the Department of Bioengineering, was Anil Bharath, Professor of Biologically Inspired Computation and Inference, who responded to the Toast to the Guests proposed by the President. He spoke warmly of the speech given by David Henson and his work to develop prosthetics for low to middle income countries, taking into account aspects of both engineering design and business development.

Following the speeches, a number of prizes and awards were presented by Professor Richard Jardine, Consul in the Faculty of Engineering.

The Holbein Memorial Award, CGCA's premier award, which commemorates Arthur Holbein,

Honorary Secretary of the Old Centralians for 31 years and President in 1960-61, is awarded to a student nominated by CGCU as "Sportsperson of the Year", signifying an excellent all round contribution to student life, not just excellence in sporting activity. The recipient of the 2018-19 award was Joshua Cheng, Department of Mechanical Engineering, and practitioner of Wing Chun (martial art), for his tremendous devotion and spirit, shown by the time and energy that he has put into both his own performance, from novice to high achiever in 18 months, and subsequently, as President, to running the Wing Chun Society.



**Joshua Cheng**

The second award went to Barty Pitt, from the Dyson School of Engineering Design, the Bo Driver for 2019-20, who received the Peter Moore Memorial Award. This award commemorates Peter Moore, who spent almost his entire career teaching at Imperial, and who was president of the Motor Club for a number of years.



**Barty Pitt**

The John & Frances Jones Prize, named in commemoration of John Jones, the first Registrar of Imperial College and his wife, recognises the best all-round contribution to College life by a postgraduate student during the previous academic year. The 2018-19 winner was Mr Fabian Sorce, a Year 3 PhD student in the Department of Mechanical Engineering, recognised for his work on dynamic mechanical and tensile tests for very thin polyester films, as well as for his contribution to departmental activities, such as student rep, liaison officer for PhD students, seminar organiser and



**Mobile mascot Derrick attracted attention**



mentor for younger students. He has also done a significant amount of outreach work with local schools and communities and is a volunteer STEM tutor with Grenfell United, supporting youngsters who were bereaved by the Grenfell fire tragedy.



**Fabian Sorce**

Although the award had already been made in September 2019, Mr Cai Linton, Department of Bioengineering, was present to be recognised for his Centenary Enterprise Award, for his project "Multus Media", a collaboration between Engineering and Natural Science Students, which aims to apply novel bioengineering techniques to the effective and sustainable production of cell culture media. This could have wide application in the food and healthcare industries and allow for the elimination of animal-serum culture media, which are both expensive and increasingly questionable on ethical grounds. The project has received awards and recognition in the Faculty of Natural Sciences and is now under consideration for a number of international prizes. It is a fine example of Engineers collaborating with Scientists to turn good ideas into industrially useful products.



**Cai Linton**

Finally, thanks to the kind sponsorship by Members of a number of student tickets for the dinner, we were able to invite three members of the El Salvador Project, Federica Meroni, Kayra Kaymak and Kseniia Protchenko. This Project is a student volunteer initiative dedicated to fight poverty in rural communities by implementing robust engineering solutions. The project originated in the Department of Civil Engineering in 2001, focusing then on earthquake-resistant design of adobe dwellings,

and has operated successfully ever since, receiving regular financial support from the OC Trust. The Project's annual summer expedition responds to immediate needs of the local communities, and the portfolio has now expanded to include sanitation projects such as latrines, to structural projects such as affordable housing and footbridges. Reports from the Project have been published in previous issues of Imperial ENGINEER.



**Professor Atula Abeysekera, who will be taking over as CGCA President at the AGM in June**



**Colin Kerr, who once again organised a very successful Annual Dinner**

Feedback from many of those who attended indicated that the evening was considered a great success and enjoyed by all (as evidenced by the photos included here). Some ideas are already under consideration for next year's event, planning for which will start round about the time of the Association's AGM in early June 2020.



**Francesca-Jo Burton and Sue Griffiths**



**Kayra Kaymak, Kseniia Protchenko and Federica Meroni, of the El Salvador project**



**Fatima Khan, CGCU President, leads diners in a Boomalaka**



**Current and recent CGCU officers with Spanner and Bolt**



**OC Trust Chairman Chris Lumb with Dan Lehmann, Treasurer, Professor Bob Schroter, vice Chair, and Gillian, his wife**



**Dr Stanislava Boskovic**



**Federica Meroni**

# 2020 Bottle Match Report

## Bottle lost but the Sharpley Cup retained!

### Squash (RSM 0-3 CSM)

Before the RSM Squash team headed down to Cornwall for the Bottle Match, some emergency training sessions were held in Ethos as it became apparent that 2/3rds of the team had never picked up a squash racquet in their lives. After some coaching in the tactics and niches of squash from the bottle veteran Meddings, we headed down to CSM, albeit with one racquet between all of us. However, as soon as the first game began, it became apparent just how far out of our depth we were when our opponents took pity and began to cheer for us rather than their own. Alfie put in a valiant effort in the second match, speared on by some lovely support from the Men's hockey team, and our top seed Alex was just short of registering enough total points to win a game, far more than Alfie or I achieved. Soon the slaughter was over, the games were gone 6-0 and the matches 3-0. Full credit to the CSM team and RSM Squash look forward to welcoming them back to London next year.

**Chami Gomez**

### Tennis (RSM 0-12 CSM)

After an early start, the RSM tennis team arrived in a very windy Falmouth, eager to put right the loss of the previous year. Backed by the raucous support of the hockey and badminton teams, the matches began with Beth, Teigan, Ian and James entering the singles courts. Beth and Teigan (who had both not played a match before) put in some great performances and had some tight games but in the end, lost their matches. Ian and James were both encouraged by the RSM-dominated crowd and made good starts but, in the end, lost their matches 6-1, 6-1

and 6-2, 6-3 respectively.

Despite the crowd heading to the hockey, the intensity on the courts was still high as Jasmine put in a player of the match performance before unfortunately losing 6-1, 6-2 and Cas played a great match before losing 6-1, 6-3. Toby and James Hamer also played well against much more experienced opposition, losing 6-1, 6-1 and 6-2, 6-2 respectively.

Our doubles specialists Sam, Olivia and Ananya played some great points in worsening conditions but again, all the doubles matches were lost to CSM's team (made up of only one actual 'miner'). Despite a 12-0 loss, the inexperienced team did brilliantly well in tricky conditions and can hold their heads high.

**James Wood**

### Badminton (RSM 5-4 CSM)

RSM badminton have struggled in recent years to reclaim the egg cup. The only let up being when the CSM team put forward their lacrosse team to play against us three years ago. With this in mind, we have undergone rigorous training to be able to stamp our force on them as RSM's biggest club. 10 minutes in, Parise and James (1st pair) had already won the first match with big scores: 21-8 and 21-9, lifting the team spirit. Louise and Adam(C) soon gave us the second win by running the CSM President around. However, the second round wasn't as easy. After a few tough matches with both sides providing some great shots and slick play, it came down to the final round of games at 3-3. With the determination to win and not to do the yard, Annie and Ben as well as the first pair pulled out some great net shots and smashes which led to 2 massive wins and gave



Photos: RSMU unless otherwise credited

the overall score of 5-4. Ben was so happy that he went on to break his best racket, celebrating. Since then I have personally had phone calls from Alice Gast to congratulate me as well as Boris Johnson and Sadiq Khan. Please join RSM badminton.

**Adam Cliff**

### Women's Hockey (RSM 0-21 CSM)

Well that was a weekend and a half! The RSM women's hockey team set off to Cornwall on Friday morning to face the CSM women in what was deemed to be an exhilarating game.

From the first whistle, every member of the RSM team played their hearts out, leaving nothing on the pitch. It was a fast and physical match, with the RSM being attacked from every angle. The RSM ladies were able to defend the CSM to the best of their ability, but the pressure was relentless with multiple short corners being awarded to the CSM. In goal, Antoinette did a brilliant

job at keeping out several close and difficult shots at goal. The RSM managed to catch a couple of breaks towards goal, with Nadia and Neha working well together to keep the CSM at bay.

Despite the RSM's best efforts, the CSM won the match 21-0, but the score line is far from being a fair reflection of the effort that every RSM lady put into the match. Despite the multiple bruises and injuries, the celebrations continued throughout the weekend, on Friday evening and throughout Saturday. Many thanks to all the players and supporters who kept the RSM ladies powering through the match. Hockey love!

**Elin Jones**

### Men's Hockey (RSM 2-1 CSM)

After some difficult competition earlier on the hockey pitch, it was up to the boys to put CSM in their place. Despite the terrible conditions, we started well, going 1-0 up through



Photo: Max Wilcox

# DEVELOPMENTS AROUND THE ENGINEERING FACULTY



Photo: Max Wilcox

a carefully placed flick from Nick Yiakoumi at a penalty corner. Solid defence at a number of CSM penalty corners, and good possession meant the lead stayed at 1-0 going into the second half. Right from push back RSM put the pressure back on CSM. Matt Kavanagh working hard to win us a penalty stroke, calmly converted by Nik again, to double our lead. Again, the RSM defence was solid for the majority of the second half. CSM pulled one goal back close to the end, but it was not enough for them to stop the Sharpley Cup coming home. A huge performance from all the boys involved saw RSM secure a 2-1 victory! Big shout out to Lekan for winning man of the match (voted by CSM). It's all about the hockey!

**Eddy Compton**

### Netball (RSM 2-109 CSM)

Well here we are. After a shocking defeat of 88-2 last year, we thought it wouldn't get any worse. We thought it couldn't be done. But we did it.

After a rocky start, with half of our members not being allowed to play and having to draft in spectators to make up a team (shoutout to player of the match Parise Lockwood who was a) hungover, b) not meant to be playing and c) playing in defense, a position she'd never played before), the match was no sooner underway than we were getting absolutely dicked. Despite our best efforts, we were no match for these beefy girls

and even the scoreboard couldn't keep up with what might be the worst score difference netball has ever seen (109-2).

Our girls heroically pushed on – contact lenses were lost, bodies were flying all over the court and there was nearly a full-on scrap for the ball, but nothing would stop our valiant miners from giving their absolute all. The effort and determination of our girls was amazing, and I couldn't be prouder of every single one of them, especially for a team that had never even played together before.

Even in all, not the best game of netball we've ever seen, but on the bright side, at least we don't care more about winning Bottle than we do about going to a decent uni.

**Nicola Maxwell**

### Lacrosse (RSM 3-28 CSM)

Bottle Match 2020 has come and gone, and it brought about a drastically different result than past years. Our 100% winning streak was finally broken, with an (admittedly demoralising) 28-3 loss. Our team put in a great effort, despite having the odds stacked against us; a pitch that would have worked as a demonstration of soil liquefaction, two players stuck at the football match after CSM altered the timetable the day before, a ball-to-face injury in the first quarter (shoutout to Niamh!) removing all options to sub off and a relatively



inexperienced team. It was always going to be an uphill battle, and our enthusiasm and our best efforts just weren't enough. A huge well done to Stephen Kwong on his hattrick, to man of the match Anthony Onwuli for taking every single draw, to Annie Mao for her unparalleled dedication to screaming "GOT BALL!" at every opportunity and to Alfie Baines for a fantastic effort despite his inappropriate choice of footwear and the fact that this was his first ever game. I'm sure we'll be back stronger next year, and make sure this is the first and only time CSM triumphs over the RSM in Bottle Match Lacrosse.

**Chris Carter**

### Football (RSM 0-2 CSM)

Kicking off the second day of Bottle 2020 was the football. The stage was set beneath the ominous clouds and the crashing winds atop a great hill, and what a stage it was: a pitch so boggy even a pig would rebuke it! Daring to stand in one place for too long would mean sinking to your ankles in mush. Good thing the boys were full of running and fight then, buoyed by the RSM supporter massive. Never once resting on their laurels and constantly hounding their opposition throughout the first half, the CSM were restricted to hardly a whiff of goal. Chances came for the RSM however, with searching balls in behind for strikers Campbell

and Hedley, the latter fashioning out a great shot inside the box matched only by the save of the CSM goalkeeper. Creative force in the middle, Fred Masure, had a fantastic 30-yard scorcher whistle just over the crossbar before the close of the first 45. Unfortunately, the half time whistle came too early for the boys. With winds turning and picking up to gale force speeds, the momentum swung to CSM in the second half. Despite the RSM maintaining their spirited performance from the first half, the opposition forwards managed to produce two goals worthy of winning the great battle: their second in particular being a screamer from 25 yards out that simply must be applauded. Nevertheless, "win or lose... on the booze" became the mantra of the day, and with their heads held high the boys in black and white went out into the night with the belief the Bottle will be regained once more next year.

**Daroon Ramadani**

### Rugby (RSM 7-10 CSM)

As they headed to the pitch, the wet, windy conditions and swampy Cornish ground were not in favour of the visiting team, who prefer to play a fast-paced, expansive game. However, the crowd did not disappoint; with the usual RSM vs CSM rivalry resonating between the fans and the players.



## DEVELOPMENTS AROUND THE ENGINEERING FACULTY

Both teams started well, with strong carries from CSM's big boys being matched by big hits from the likes of Animesh Misra, Jasper Mowatt and Oliver Adams. CSM often lacked creativity in attack, relying on kicking and RSM mistakes to obtain useful field positions. Following a few phases from the RSM forwards, man of the match Elliot Quigley saw the opportunity to send the ball wide, and an excellent backs move was completed with a try for Oliver Duffy, converted by Amin Omarouayache, for the first 7 points of the match.

From here, a series of mistakes and penalties conceded by the visitors gave CSM an easy way back into the game. They relied heavily on their dominant scrum, and dictated play well, which despite the best efforts of RSM's defence, led to them scoring a pick-and-go, to go into half-time drawing 7-7.

At this point we knew it was going to be a tough second half. Their scrum was dominant but out wide we had the beating of them. We didn't take advantage of the wind behind us in the first half as well as we'd have liked but were still confident that this game was ours for the taking.

In a scrappy second period, it was CSM who scored the first (and only) points of the half. They converted a penalty to make the score 10-7 in favour of the home side. The final whistle went in what had been a physical, competitive and largely enjoyable game of rugby. We look forward to welcoming CSM to London next year when hopefully the result will be different.

Unfortunately, this meant RSM could not retain the Bottle and get that elusive away win, but I trust CSM will look after the Bottle for us until it is inevitably returned home next year. Thanks to all the volunteers who made Bottle Match such a success once again, thanks to our sponsors (IMR resources and BP) without whom this event wouldn't have been possible, and thanks to the supporters for being so vocal. It was truly a day to remember, supplemented by a splendid evening throughout which multiple shandies were consumed, but the less said here the better. Port, songs, 17, dads, lips, 51, haircuts, Minnie, climbing and toys are just a few things that come to mind, but I'll leave all that to your imagination.

**Simon Thornton**

## Researchers design low cost ventilator

Imperial academics have designed a simple emergency ventilator that can be manufactured quickly and at low cost from generic components.

The researchers from the departments of Bioengineering and Surgery and Cancer have produced a ventilator design that they believe could support health systems during the COVID-19 pandemic, both in high income countries and low or middle income countries, where the pressure on resources is likely to be even greater.

Because the ventilator uses off-the-shelf components, its parts can in principle be sourced more quickly and at lower cost than proprietary components. The team estimates the cost of the components in the UK at £1,000 - £1,500. The design also makes it possible to avoid supply bottlenecks since equivalent parts may be available from a variety of manufacturers.

The design draws on the clinical expertise of Dr Jakob Mathiszig-Lee, a researcher and senior anaesthetic registrar at the Royal Brompton Hospital, and the engineering credentials of Dr Joseph Sherwood, Dr Michael Madekurozwa and

Professor James Moore Jr, medical devices experts in Imperial's Department of Bioengineering.

Professor Moore said: "Dr Mathiszig-Lee's expertise has helped ensure we have a thorough understanding of the technical requirements such as pressure and flow. He has also helped us understand what a clinician is going to expect to see in a ventilator design."

The team has produced a simple design that uses two pressure transducers, an airtight container and a series of solenoid valves to control the pressure of the air entering the patient's lungs, and avoids the need for a balloon to pump the oxygen. It is simple to assemble and operate and can be run from a standard PC.

The team is building the device to meet the Medicines and Healthcare Products Regulatory Agency's (MHRA) requirements. "When the MHRA guidelines came out, our initial finding was that we were already meeting or exceeding everything that they were asking for, with the early prototype at that time," said Professor Moore.

The team is working with academic collaborators to acquire further testing data.

Professor Moore said: "It's a credit to the environment and culture of collaboration we have at Imperial that we were able to quickly assemble a team drawing on our combined experience in engineering and medicine. The College has been very supportive and found the resources to get work started."

The team is looking for health organisations, manufacturers and other organisations interested in helping take the device from design to manufacture. Donations are also being welcomed to fund production of the systems, using manufacturers the team is already in contact with.

More information on the design can be found on the emergency ventilator webpage.

Dr Simon Hepworth, Imperial's Director of Enterprise, said: "This is an important project with life-saving potential. We would encourage any organisations who are interested in working with the researchers to get in touch."

[bit.ly/IE32-ventilator](https://bit.ly/IE32-ventilator)

## Volunteers wanted to catch a falling star

Imperial and Glasgow scientists are turning their eyes to the skies to track meteorites before they land on UK soil. The team are also looking for volunteers to help them recover the space rocks whenever and wherever they fall.

The UK Fireball Network, led by researchers from the University of Glasgow and Imperial, is setting out to place ten cameras across the country to catch glimpses of the spectacular natural firework displays caused when meteoroids enter Earth's atmosphere.

On 16 February 2020, the network's cameras in Lincoln and Cambridge both saw their first fireball, which dropped meteorites into the North Sea.

While those meteorites are impossible to recover, the network team expect that future sightings which fall on the UK landmass can be properly triangulated to determine a landing area so a search party can be sent out to find the meteorites.

When the researchers catch sight of a fireball dropping meteorites on land, they'll need the help of volunteers to help comb the countryside to find them. Anyone interested in volunteering can sign up to the mailing list.

Co-lead researcher Sarah McMullan, of Imperial's Department

of Earth Science and Engineering, said: "We're looking for volunteers to help us catch these falling stars. These meteorites could help us understand our own planet and solar system – and maybe even the wider universe."

Co-lead researcher Dr Luke Daly of the University of Glasgow said: "Meteorites provide scientists with invaluable insights into other planets and our solar system. A good deal of what we know about the surface of Mars, for example, comes from analysis of chunks of the planet that were blasted off its surface by asteroid impacts millions of years ago and then drifted in space before falling to Earth.

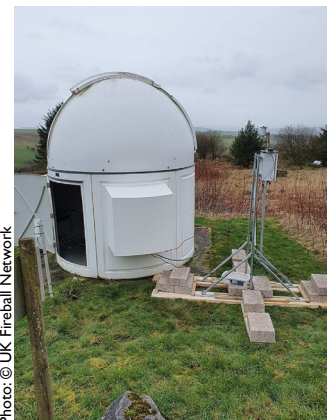
"Meteorites enter our atmosphere all the time, but the UK hasn't had a great track record of finding them in recent years – in fact, it's been nearly 30 years since one was last seen dropping into a back garden in Glatton in Cambridgeshire, and more than 100 since one was observed in Scotland.

"Camera networks like ours, and those of partner organisations, give us a great chance to capture fireballs on multiple cameras. Together we are building an integrated pipeline to use all the data from all the networks to track fireballs called the UK Fireball Alliance. Catching images

on more than one camera allows us to estimate not just where they land, but calculate the trajectory of their arrival, which allows us to calculate where in space they came from. Pooling all our resources maximises the chances of capturing these elusive events."

Currently, the UK Fireball Network has set up six of their ten cameras at sites in England, Scotland and Wales. Over the next couple of months, the remaining cameras will be placed in other locations, including Northern Ireland.

[bit.ly/IE32-stars](https://bit.ly/IE32-stars)



**A UK Fireball Network camera at the Spaceguard Centre in Wales**

## DEVELOPMENTS AROUND THE ENGINEERING FACULTY

# Alumni Weekend cancelled by COVID-19

Unfortunately, the Great Exhibition Road Festival, Alumni Weekend and Alumni Weekend Global Celebrations which were due to take place on 4 and 5 July will not go ahead this year. The rapidly changing situation along with new, stricter government measures, have made it impossible to plan and deliver these programmes this summer. As we write this, the situation is changing on a daily basis across the whole international alumni community with events worldwide through

to July being cancelled due to the uncertainty of the situation.

In a message to alumni, Nicola Pogson, Director of Alumni Relations, says "Our top priority is the health and wellbeing of our community. We will continue to monitor the situation and look for other ways to bring you back to campus at a later date. Please remember, we are always happy to help alumni reconnect and will continue to help you re-establish contact with your classmates so you

can celebrate your reunions when it is safe to do so.

"We'd like to extend our thanks to our alumni community for your understanding and support. We will keep in touch regularly over the coming weeks and months with further information.

"If you have any queries or concerns, please email [alumni@imperial.ac.uk](mailto:alumni@imperial.ac.uk) and we will do our very best to assist."

Eilidh Campbell, Alumni Engagement Officer and member

of the Imperial ENGINEER Editorial Board added, "We do want to support you as best we can and know that the same restrictions will not apply universally. Please let me know if there is something we can help you to promote, or a message you would like to share with alumni locally. We have launched some updates to Plexus [see below, left] – make sure you are signed up as we hope this will be useful in coming weeks with fewer physical meet-ups taking place."

## Imperial Plexus updated

If you haven't already joined Imperial Plexus, now would be a great time. It's been updated and is just the thing to help distract and inform you during COVID-19 imposed isolation. There was a recent announcement from the Alumni Office with details of the changes.

"The biggest difference is the discussion boards we've built in Collaborate. The current situation with COVID-19 means that for now physical gatherings are taking a back seat. We wanted to give you a space to come together online instead.

"Collaborate is a place for you to talk to each other. To share your knowledge, your ideas, your brilliance. Some of you may want to discuss COVID-19, some of you may want light relief from it. We've added a handful of discussion boards to start you off but if you have any other suggestions, please let us know.

"We're launching a Book Club in this section too. Books are a welcome form of escapism, reflection and learning and we would love to hear your recommendations. There's a board for your mouthwatering recipes. And we've added a General Chat board. This is where you can add your survival tips for working from home, Spotify playlists that

you love listening to, hacks to keep the kids entertained, your top three movies, or any other topics you'd like to share at this challenging time.

"You'll also notice that Live Feed has been renamed Activity. When we come through the other side of the pandemic and travel resumes, we invite you to share your trips here and connect with local alumni wherever you're heading.

"For this to work, we need your help. So, take photos, write blogs, make videos and don't forget to share it with one another.

"Tina is your go-to person for questions or Plexus-related chat. Drop her a message on Plexus, or an email to [t.schmechel@imperial.ac.uk](mailto:t.schmechel@imperial.ac.uk). She'd love to hear your feedback on the new structure, or any suggestions you have – it's your platform after all.

"She'd also love to hear from you if you're interested in becoming one of our new Plexus Ambassadors to help us create a buzzing online community of Imperial grads.

"Finally, you can follow the most recent College work on Coronavirus on our news site.

"See you on Plexus!"

You can contact the alumni team if you require assistance logging in.

## Advice from a space pioneer

Helen Sharman, the first British astronaut, travelled to the Mir space station in 1991 to undertake scientific research. She now works with the Outreach team at Imperial, encouraging school children to take up science, maths and engineering.

In an interview Helen shares some of the things she learnt during her space mission about dealing with isolation and confinement, and how those lessons could apply to isolation during the coronavirus outbreak.

"In space, we have the basics for life of food and shelter and crewmates for company. However, what astronauts miss most is friends and family, those personal relationships that we often take for granted on Earth.

"On long-duration missions, astronauts also miss the huge variety of people who we would usually meet in daily life on Earth, people who we interact with even if we don't talk with them. I was in space before satellite phones were available to astronauts so I relied on the radio for contact with Earth and it was really good to be able to chat, albeit for only a few minutes (we were travelling over the Earth's surface at 17,500 miles per hour so we were soon out of radio 'sight').

"[Under social isolation] there are many ways we can maintain contact with people now: old fashioned phone, video chat, Skype, text, email, and so on; we can wave at neighbours, smile and say hello when we pass people two metres away in the street.

"Living in a confined space with other people requires a bit more respect and tolerance than normal to maintain cordial relations. Astronauts do not select their own crew but the ability to cooperate and collaborate is a significant part of the selection process. As we don't usually choose the people we share our homes with on this basis, we have to work particularly hard

at open communication and active interactions.

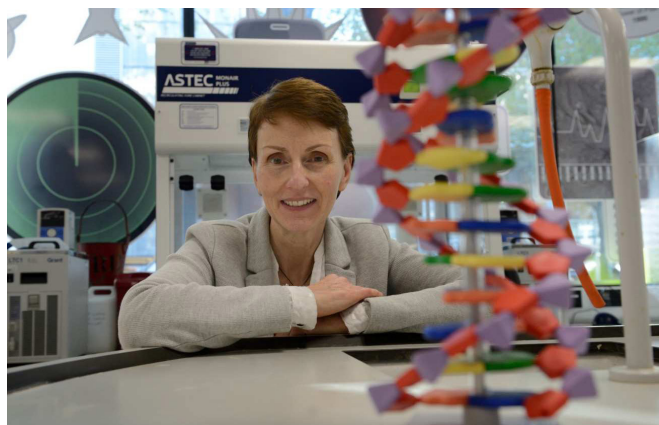
"We need to understand each other's frustrations, what annoys us and what helps us to relax. And it helps if the grotty jobs are shared (tasks like compacting the solid toilet waste and changing air filters are done on rotation in space).

"Mission Control scheduled my days to the nearest minute. I did not mind because I knew it was the most efficient way to use my time. However, I did take pleasure in the small elements over which I could exert some control, like what sort of fruit juice I drank and when I went to sleep. Now, we have been told to stay at home but we still have some control (no one is telling us which book to read or what time to get up, after all) and there is a huge purpose: to save lives.

"With time to spare, we can do what we have always wanted to do but were previously too busy for. Astronauts on long-duration missions enjoy catching up with films and books, for instance. On Earth, even just at home, we have a whole load of activity to choose from. And we can plan something nice to look forward to because this will not last forever.

"During my entire space mission, I did not once think about possessions, the objects that we often strive to own, perhaps to show off our wealth and identity. Back on Earth and confronted by materialism, I downgraded the relative value of 'stuff' in my life and I think COVID-19 will have a similar effect on many of us.

"Being less of a consumer society will benefit the environment and reserve resources for what we really need, but I think we will feel the change in society that will be more communal, more cohesive and generally nicer. When the pandemic is over, the world will be a better place to live in."



**Dr. Helen Sharman CMG OBE FRSC**

Photo: Imperial College

# Penguins can't fly...

In the last issue of IE, Dominik Sznajder reported on Shell's UK North Sea Penguins Redevelopment Project. Dominik's story highlighted the team work required to convert the field development to a stand-alone facility. Back in the late 1990's, David Simmonds led the Shell team which looked at how these complex sets of discoveries could be developed. The first Penguin accumulation was discovered in 1974, and by the late 1970's the Penguins started to confirm their reputation that penguins can't fly! Here David Simmonds, Chemical Engineering 1970-73, highlights some of the earlier team work that got the initial project off the ground!

The history for the Penguin fields is long and challenging. The initial discovery in the Penguin cluster was back in 1974. Additional discoveries were confirmed later that year and in the following year, but further exploration / appraisal wells drilled in 1977 and 1978 were disappointing.

The nearby and much larger Magnus field was brought on stream in August 1983, and new 3D seismic data was acquired over the entire Penguin cluster area. Following this, further accumulations in the cluster were drilled in the late 1980's. Most of these confirmed that reserves were small and, at the time, uneconomic.

A detailed Penguin Evaluation Report was prepared in 1993, summarising all well results, geology and petrophysics. This report determined that an extended well test would be required to further determine the productivity of the main reservoirs. By 1996, a detailed extended well test report was completed which concluded that it would be cheaper to lay a pipeline to Magnus rather than pay for an expensive EWT vessel. However, when the oil price dropped to \$10/bbl, the pace of the development was reduced and a review of Shell's global portfolio revealed that the Penguin cluster development would not be part of Shell's core business.

In 1997, simulation and feasibility studies were carried out which confirmed that there was sufficient potential in the Penguin cluster to justify a cluster development as a subsea tieback to either Magnus, Murchison or Brent D.

In response to the challenges of the time, Shell UK restructured its exploration and development teams to integrate exploration and front end development, and I became Asset Manager for Northern and Southern North Sea exploration and development teams (the so-called Mature Areas, as distinct from the more active Central North Sea area). This new way of working brought together multidisciplinary skills into one team; these ranged from exploration, through reservoir / production technologists to engineering and commercial specialists. Working together, these experts were able to challenge and promote each other's studies, but more importantly apply latest seismic, reservoir engineering, well and subsea tieback technology to determine attractive lower cost/higher reward development options for our exploration portfolio.

As part of the Northern North Sea team,

a Penguins Cluster group was established to work on a development plan for the area. This team was led by one of our Production Technologists, but it integrated all our disciplines. As a standalone development was not considered viable, work continued to focus on tiebacks to other platforms. However tiebacks to third party fields had a high tariff / economic threshold, so efforts centred on a tieback to the Brent field, some 65 km away. This was longer than any other tieback at the time, and so our team had to really work the technology to confirm a viable solution.

The multidisciplinary team's early work on the development plan yielded results and their efforts were rewarded by winning Shell Expro's 1998 Technology and Innovation Award.



Multidisciplinary working provided challenge and growth for the whole team as they broadened their horizons.

The team subsequently refined its plan over the next three years, culminating in the original subsea tieback project being sanctioned in 2001.

Since then, I have always been interested to hear how the Penguins got on. Reading Dominik's story about their next life, demonstrates how teamwork is still a key part of today's solutions. It also proves that Penguins can fly.



David Simmonds is a semi-retired professional with extensive project and asset management experience, with special emphasis to contracting, LC/CSR strategies.

He graduated in chemical engineering and initially worked for an engineering contractor. Joining Shell in 1978 he managed assets in UK, Malaysia, Netherlands and Gabon. Moving to BG in 2000, David managed their project portfolio and Kazakh interests, before assuming key management posts in Nigeria and Egypt.

Following retirement David volunteered as LC/ Development Advisor with VSO Tanzania. More recently he supported an Independent with their Iraqi project, and has had discussions with Shell over their Licence to Operate strategies.



## Shell goes fishing with Penguins

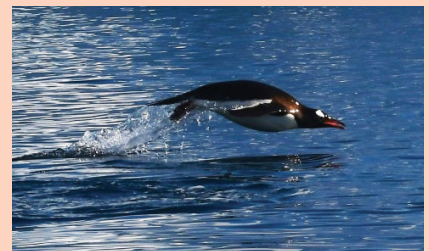
Britain gives supermajor nod for \$500m North Sea development

By David Simmonds and Christopher Hopson  
 from London and Aberdeen  
 The prospect of a \$500m North Sea development has been given the go-ahead by the UK government. The project, which has long been considered a viable option for the UK, will be developed by a consortium of Shell and other international oil companies. The project will be developed in the Brent D field, which is one of the largest oil fields in the UK. The project will be developed in the Brent D field, which is one of the largest oil fields in the UK. The project will be developed in the Brent D field, which is one of the largest oil fields in the UK. The project will be developed in the Brent D field, which is one of the largest oil fields in the UK.

My team really took the Penguins to heart and in mid-1999 produced a team effort wedding card, for my wife, Mary and I...



I also had the pleasure of seeing penguins in the flesh in Antarctica last year and wore my Penguins project tee-shirt. I also saw for myself that penguins can fly!



# Epidemics and History

In May 2014, I took some American friends on a tour of the Western Front in Belgium and France. Our trip was timed before the Great War commemorations were due to get fully under way. Nonetheless, our first stops along the British and Empire sector (Ypres, Arras and the Somme) were already thronged with visitors from Britain and the Commonwealth. Once we got to the French sector (Chemin des Dames, Rheims, Verdun) things calmed down somewhat but were still busy.

We then moved on to the American sector – the American Cemetery and Memorial in the Meuse Département. The cemetery is the largest American installation in Europe and contains the remains of those killed in the final offensive of the War.

To our amazement the memorial was completely deserted and the cemetery had only 10 or 15 visitors other than ourselves. This crystallised a puzzle I had contemplated before – why has the American experience in WWI fallen down a memory hole? After all, the entry into the conflict in April 1917 and the subsequent mobilisation of four million personnel was absolutely vital in bringing about the surrender of Germany. To the rest of the Anglosphere, the memory is huge. In the USA it is almost forgotten. The motion picture record is emblematic of this – against hundreds of WWII movies, the notable films of the Great War can be counted on your hands.

It took me a while, but I think I've developed a partial answer. Two factors play a major role. The first is easy and obvious. The USA entered the war with a major commitment to it, only to find it over after a few months' actual fighting. The effort is totally eclipsed by the tremendous and ultimately successful accomplishments of WWII, and this is the focus of the national memory.

The other factor is much more subtle and profound. The 'Spanish flu', of which remarkably few people were aware (until recently!), is barely documented in the



**The Meuse-Argonne American Memorial commemorating “the brilliant victory of the American First Army in the Meuse-Argonne offensive, September 26 – November 11, 1918, and pays tribute to the previous heroic services of the Armies of France on the important battle front upon which the memorial has been constructed”**

literature. It is now getting better known that it killed many more people than the War, but there is no accurate estimate of the actual number. It did not originate in Spain, but is now considered to have started with an outbreak in Haskell County, Kansas in February 1918. It would normally have ended there, but these were not normal times. Hundreds of thousands of young men were being drafted into camps for training before being shipped to France. These camps were perfect breeding grounds for the virus and it made its first widespread appearance in Camp Funston, Kansas. From there to the other camps, then the troopships and so to Europe. And of course into the civilian population. The epidemic finally abated in April 1919.

And very rapidly, it began to fade from collective memory, both in America and elsewhere. I own a set of *The Source Records*

of the Great War, which is an authoritative chronicle of the whole war experience from a US perspective. It was published in 1923 and I can find no mention of the disease or its impact. This is mirrored in virtually all other twenties or thirties literature that I have read, both fact and fiction.

So if your last memory is not of beloved Johnny dying heroically in battle but breathing his last in a military hospital ward, it is something to forget, not note with pride. Once it was eclipsed decisively by WWII (or Round 2, as I call it), that was that.

Closing observations. It is widely and erroneously assumed that the disease originated in Spain. This is because Spain, as a neutral in the Great War, did not censor its newspapers, which gave full coverage of its real impact. For reasons of maintaining morale during wartime, it was deliberately downplayed elsewhere – President Wilson is not recorded as ever having mentioned it.

Unlike most pulmonary epidemics, the disease's victims were largely the young and the healthy, not the old. Also, viruses generally mutate to milder forms as they spread, since the seriously sick tend to self-isolate, so limiting its ability to infect others. Because of mobilisation the reverse occurred in this case.

Total American military deaths were about 115,000. Only about half were combat related. Over 40,000 were due to the flu. However, this number was dwarfed by the civilian fatalities – estimated at 500,000 to 675,000.

Finally, an acknowledgement. I am indebted to Sandra Opdyke's *The Flu Epidemic of 1918 – America's Experience in the Global Health Crisis*. It helped me answer the question I had asked myself.

William McAuley, March 2020



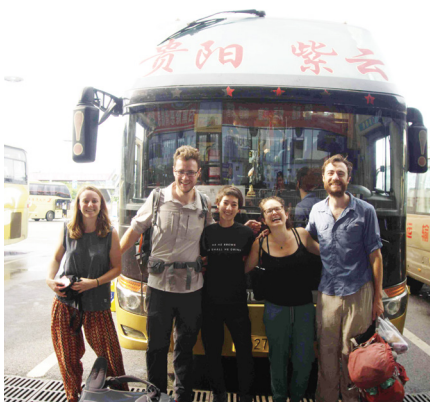
**Meuse-Argonne American Cemetery**

# Climbing in Getu Valley

In the Summer of 2019, a team of 5 Imperial students and graduates left London to travel to China on a climbing expedition, with funding support from both the RSMATrust and the OCTrust. The trip was deemed a success with everyone returning without injury (scratches, blisters and insect bites aside), having sampled a small portion of China’s rock and culture. Less climbing was done than expected due to a combination of recent imposition of bans in certain areas, and other challenges. However, the majority of these hurdles were overcome, and much was learnt in regard to logistics and climbing, in addition to a newfound appreciation for climbing accessibility in Europe and the US. This article is based on their expedition report.

## Expedition Overview

The base for climbing activity was Getu, a small village south of Guiyang, Guizhou Province. Our team of five departed on 2<sup>nd</sup> August 2019, travelling for four days via air, high speed rail, and local bus services to reach the valley. Upon arrival, we spent six days sport climbing crags including White Crag, Oliver’s Crag, Rastaman Crag, Divers Crag, Left of Red and the CMDI Wall. This included multi-pitch routes >80m in height on Left of Red and the CMDI Wall.



**Mel, Tristan, Maxine, Bailey and Geraint board the bus to Yangshuo**

Unfortunately, due to the recent imposition of a ban on climbing in the Great Arch area, it was decided to travel to Yangshuo, Guangxi Province. Yangshuo is more fully developed as a climbing area, promising more varied climbing. This proved a fantastic opportunity to develop our climbing abilities in more specialist sport climbing disciplines such as cave climbing, which are not widely possible in the UK or Europe. In Yangshuo we spent a further three days climbing on crags including Treasure Cave, Brothers Cave and Baby Frog. We wild-camped in Brothers Cave on the



**1: Getu Valley; 2: Yangshuo**

final night, making it possible to maximise the amount of time available to climb as the expedition drew to a close.

## The Team

- Melanie Flury**, 25, (Bioengineering 2018-19) *Expedition Leader*
- Geraint Northwood-Smith**, 26, (PhD Earth Science and Engineering 2018-present) *Technical Lead Climber / spider-monkey-mountain-goat*
- Tristan Dell**, 23, (Materials 2013-17, PhD Bioengineering 2018-present) *Treasurer / Lead Mountain Goat*
- Bailey Lathrop**, 26, (Phd Earth Science and Engineering 2018-present) *Logistics / Backcountry Expert*
- Maxine Dillon**, 23, (Biomedical Science 2014-17) *Medical Officer*

## The Location

We ended up climbing in 2 different locations: Getu Valley and Yangshuo. Our first climbing location was the Getu Valley, located in the Guizhou region of China. Getu is a small, one road village an hour and a half outside of the Ziyun. It first gained acclaim as a climbing location in 2011 when Petzl bolted routes in the Valley and used it as a location for one of its Rock Trips. The Getu Valley boasts huge limestone cliffs and caves, and hundreds of bolted sport routes, ranging from single-

pitch to 8+ pitches. A large climbing arena has opened up in the valley where national climbing teams compete. Despite its growing popularity in the international climbing community, there were relatively few visiting climbers, and the locals often seemed surprised to see us. Since Getu was so small, all of the crags were walking distance from the village.

Our second climbing location was Yangshuo, located in the Guangxi region of China. Yangshuo is a city of 300,000 people and is located near the larger city Guilin. Unlike Getu, Yangshuo is a bigger city with many options for food and drink. There are over 25 crags near Yangshuo and over 1000 bolted routes of all levels. Since the crags were fairly spread out, a motorbike was needed to get to the crags every day.

## Learning Outcomes

### Logistics in China

**Rushed timings:** Despite the almost total lack of information in English, a combination of translation apps and travel advice blogs enables fairly easy travelling on China’s major transport links. We made all of our planned transport links, getting us to the climbing area after about a day of travel from one of the closest major airports (Chengdu) however at points this was a fairly close thing because of a couple of factors not taken into account in planning. These were:



**View across the Getu Valley, Guizhou Province, China**



# and Yangshuo, China



Photos by Tristan Dell, Maxine Dillon, Melanie Flury, Bailey Lathrop, Geraint Northwood-Smith

**Geraint climbs Mini Pee, Brothers Cave**

**Faff at railway stations:** despite generally being huge, airport-like buildings, China's major railway stations are commensurately busy, and an hour can easily be spent queuing to pick up tickets, going through the airport-style ID and security check and queuing again at the departure gate. In addition, Chinese cities are all very large and one may not be prepared for the time it will take to get to the station, which may be well outside the city centre. Even walking along the huge platforms to the correct train carriage takes a while. Therefore, it's important to put aside more time than the one and a half minutes it takes to buy a ticket, run through the barriers and leap through the closing doors at a tiny British train station!

**Lack of central organisation at minor transport hubs:** the rules for provincial bus stations are somewhat different to those in the major transport hubs. While most buses will run in the same way, the bus we wanted to get from Ziyun to Getu was one of a few minibuses which were seemingly unaffiliated with the bus station, and so asking at the ticket desk only led to confusion. The key was to find a young, student-aged local, who therefore spoke some English, to help us out, and we then quickly found a minibus driver. Once we knew what the minibuses looked like, and where to find them, it was easy to get back and forth from Ziyun.

**SIM cards and cash:** Our thus fairly rushed transport schedule had a knock-on consequence in that we had little time to complete other tasks before we left the major cities. The two most important tasks were to acquire Chinese SIM cards and to draw out enough cash. Without SIM cards, we could not access the public WiFi, which always asks for a Chinese number to which to text an access code, and so we were reliant on those who had fortunately downloaded maps of the area and the language for the translation apps in advance to get around. As for cash, this was easy to draw out in cities where ATMs that accepted Visa, Amex etc. were often close by, but once in Getu we found ourselves low on cash and perilously close to not being able to afford the minibus ride back to Ziyun, where a single suitable ATM existed. The solution to this would have been to draw out all the cash we'd need in advance, since China is very safe and pickpocketing is a low risk.

**Cash and ATMs:** That said, we had drawn out enough cash to last us a few days, or so we thought, but we ran out much sooner because of the number of taxis we had to take to get between train and bus stations on our rushed schedule. A pool of money for cross-city taxi journeys, which are usually approximately ¥30 per car and take a maximum of four people, would be a good idea for future journeys.

## FEATURES

**Train bookings:** A final thing that would have greatly aided our transport plans would have been to book our trains weeks in advance. Although we did book several days ahead, Chinese trains can sell out very quickly and so we were relegated to trains that were either non-direct, at awkward times or, as in the case of our last, seven-hour journey back to Chengdu, standing tickets, which was sub-optimal.

### Climbing

**The fear:** A recurring challenge to our efforts to push ourselves while climbing, for a few members of the expedition, was the fear of falling. This was partially a natural part of the transition from mostly indoor climbing, where climbs are shorter and straighter, bolts are generally regularly-spaced and closer together and the fear of the unknown (the quality of the rock etc.) is reduced, and partially a result of climbing on uneven surfaces, with frequent tufa prominences, which make a clean fall somewhat less probable. As normal as this is in climbing, it is something which must be overcome as it significantly hinders climbing ability and often leads to unfinished routes which must be then cleaned by someone else, reducing the overall time available for climbing at the top of everyone's ability.

This fear was overcome to varying degrees by fall training – a method whereby the climber deliberately takes safe falls at increasing fall distance to become comfortable with the notion of falling and trusting of the rope and their belayer. However, this was only after



**Geraint at the top of Clean Heal, Left of Red, Getu**

losing significant time to hesitant climbing and, in future expeditions, fall training should definitely be part of the pre-expedition training.

**The approach:** Secondary losses to climbing time were due to time taken to get to the crag, and setting up there. This became most apparent in the middle of the expedition when the team split into two to complete multi-pitch climbs, both of which had difficult approaches. Tristan and Geraint climbed at Left of Red – fortunately an approach had been discovered there the previous day but this took the whole team half a day. Melanie, Maxine and Bailey climbed at the CMDI Wall, the approach to which, that Geraint had previously used in 2016, had become completely overgrown resulting in the approach taking three hours of

cutting through vegetation using sticks. While this is an unavoidable part of climbing in infrequently visited areas where the vegetation is thick, perhaps the use of machetes and/or drones could be considered for future expeditions, to cut through the vegetation and/or find existing paths, respectively. If one is lucky with crag placement, they could also bring binoculars or a good camera up a route that overlooks an approach to search for a path.

**Personal admin:** With regards to preparing to climb at the crag, Tristan and Geraint noticed that two climbers who joined them at Left of Red were much faster than them in getting set up and on the wall. These were experienced climbers who climbed mostly multi-pitch near their home in Spain, and so it was surmised that their self-administrative skill was a result of experience with a style of climbing that required it. However, perhaps rapid set up could be encouraged with maximising preparation the previous night and timing the tasks that take up the most time to see what could be improved. For example, we realised that ordering breakfast took up a lot of our time in the mornings, and it was better to eat a breakfast of snacks at the crag.

**Camping:** One thing that saved time on the trip was camping at the crag. This was only done on one of the last nights due to being in a particularly suitable cave, but was an entirely positive experience and perhaps more opportunities to do so could be sought out in future.

**Heat:** Another limiting factor at the crag was heat – during the hottest days climbing was very taxing if the crag was in the sun, and more so if there was not a shaded belay spot



**Tristan on Babylon, Rastaman Crag with Pussa Yan in the background**



**Campsite in Brothers Cave**



**Makeshift shelter (hammock)**

to recover in between climbs. In future, more time could be spent planning to visit crags at times they would be shaded, and perhaps adopting a siesta approach to scheduling by getting up early and napping in the shade over noon time (as long as protection from mosquitoes could be afforded). In particular, climbing earlier and investigating approaches in advance for the multi-pitches would have saved long periods in the sun without respite.

**Route navigation:** One final note relates to a route climbed on the second-to-last day of climbing, which crossed a cave roof through an inverted forest of large stalactites. There was an erroneous placement to the second-to-last bolt before the anchor on this pitch, which was both difficult to clip and dramatically increased the rope drag, making it difficult for Melanie to lower Geraint off at the end of the climb. After multiple failed attempts to remove the clip by Geraint, Melanie seconded the route and had to leave the draw behind as it was in such an awkward position. In future, much more attention will be paid to bolt placement rather than clipping every unnecessary bolt along the route.

**Interaction with Authorities**

**Bans on climbing:** While interactions with locals were both essential and positive highlights of the expedition, despite the usually large language barrier, interaction with local authorities was not. Climbing is still a niche sport in China, and not seen as important for tourism or China's future and, both in Yangshuo and Getu, there is conflict between those responsible for developing these beautiful areas for tourism. In both places, the most famous climbing areas (both,

perhaps not coincidentally, being large rock arches) were officially closed to climbing – most significantly this meant no climbing in the Great Arch at Getu. This may have had an actual positive or at least net neutral effect on the trip, as it resulted in our decision to go to Getu and experience a different and very vibrant part of the country and some more world-class routes. Nevertheless, the Great Arch was one of, if not the, central reason to choose Getu to climb in and it would have been good to know about this in advance.

**Backup plans:** Unfortunately, this is easier said than done – climbing in these areas has been banned in the past, but this was very much an unenforced rule, and it is not clear how we could have found out that the authorities had started to enforce this rule in advance. Nevertheless, the persistent encroachment of fenced and ticketed, 'no playing' zones in areas of natural beauty in China, which is still rapidly developing and changing year-on-year, is predictable and perhaps backup plans could have been made. Indeed, the group met a worker at the hostel in Chengdu who is an avid climber and highly recommended a lesser-known part of Lijiang for climbing, where he promised we could find free food and even coaching and some excellent big-wall climbing. With some research, perhaps we could have diverted there.

**Informing the community:** One thing that can be done now is to advertise the change in situation at Getu to other climbers. The group are discussing plans to write a blog post or article to join the few out there on climbing in Getu, to update the community on the situation, and getting in contact with the existing campaign to stop development in the Great Arch and with Petzl, to see if anything can be done to open up the area for climbing again, perhaps even as an alternative



**The Great Arch, Getu**



**The Great Arch – No Climbing!**

## FEATURES



**Maxine on Babylon, Rastaman Crag**

to the very intrusive and destructive mode of tourism that is being developed in the Great Arch currently.

### Concluding Remarks:

From the outset, our objective was to individually develop skillsets required to plan and execute more ambitious exploratory expeditions. We split this into a list of actionable technical objectives, relating to improving climbing ability, as well as personal objectives focussed on the more logistical aspects of executing an expedition in an unfamiliar country, with the language barrier being a particular obstacle.

The most significant of the technical objectives was to learn multi-pitch climbing – that is sequentially climbing multiple sections of a crag in a continuous effort to reach the top, securing oneself and one’s partner at anchor points in order to pull-up the rope and climb higher than the limitation typically imposed by the length of a rope. This involves increased levels of exposure due to the height, and requires good rope admin, communication and stamina. All members of the expedition team climbed a multi-pitch route, with preparation including fall training. This was critical to managing the fear which naturally comes with increased levels of exposure on higher routes.

Other technical objectives included climbing on a wide variety of rock types, which was definitely the case, with varied limestone routes in different settings featuring slabs, tufas, overhangs and cracks. Climbing in caves was critical to further broadening the range of climbing styles engaged in, as routes are typically more overhanging, and rock can often be less featured.



**Bailey on Babylon, Rastaman Crag**



**CMDI wall, Getu Valley**



**Mel and Bailey in high spirits after climbing multi-pitch on Blue Spirit, CMDI Wall**



**View from White Crag**

Overall, the team returned to the UK without any injuries, having all notably developed our climbing abilities and experience. Experience is a crucial factor in outdoor pursuits, as unexpected situations can often arise in remote locations due to

unpredictable factors such as the weather. As such, this in itself was a valuable basis on which to measure development and success, laying the foundations for team members to lead future expeditions with more ambitious objectives and in equally culturally unfamiliar settings.

# MIT Exchange

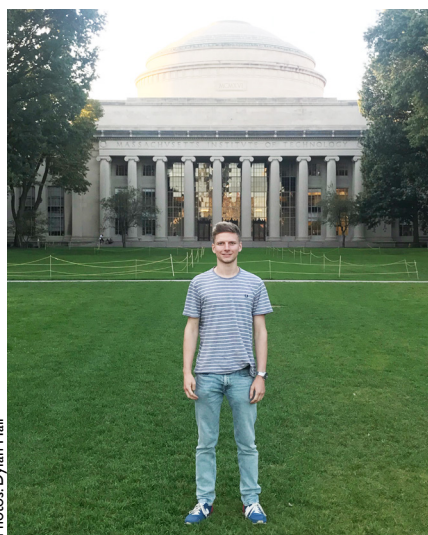
Dylan Hall is a 4<sup>th</sup> year MEng student studying Materials Science and Engineering. Having read about the MIT exchange opportunity prior to starting university, he was “incredibly excited” to find out that he had the chance to take part in this himself. Along with three others in his year at Imperial, Dylan spent 4 months living in Boston and studying at MIT: taking classes as well as undertaking an experimental research project. This was made possible with support from the RSMA Trust.

Studying for a semester at the Massachusetts Institute of Technology (MIT) has undoubtedly been the highlight of my university experience. The programme lived up to my expectations and I am extremely grateful for the help of the RSMA Trust and the Armourers & Brasiers Company who supported me to make the most of the opportunity.

MIT is a really special place. The combination of extremely bright, hard-working people and state of the art facilities make it a very conducive environment for world leading research and innovation. The opportunities for students are seemingly endless and people have a lot of choice and freedom there. If you want to launch a rocket to space, you can. If you want to build a second floor in your student accommodation, you can. If you want to build an electric skateboard to commute to college on, it's actively encouraged.

I took two main classes during the exchange; ‘Ceramics: processing, properties and functional devices’ and ‘Fundamentals of Programming’. The ceramics class was taught by a leading professor in functional ceramics and electronics, Jennifer Rupp, and focused on the use of advanced ceramics for energy storage and sensor applications. As a graduate class, much of the content concentrated on recent research in the field and unique activities such as a tour of the solid-state battery deposition lab were included as part of the course.

Fundamentals of Programming is the best class that I have ever taken. The course was a fast-paced and challenging dive through many of the key programming concepts that underpin computer science. But it was the way that the class was taught that really left an impression on me. Each lecture concentrated on a new concept which would be explained first on the blackboard and then put into context through live programming demonstrations. This was then cemented through a tutorial, in which a TA would run through a series of



Photos: Dylan Hall

coding problems that applied concepts from the lectures. A weekly coding project would then follow, which allowed you to apply new knowledge to solve fun problems. Examples included photoshop-style image processing, optimising the strategy to win an arcade game, and creating an interactive tower defence game with customised characters. These projects were challenging and time-consuming but extremely rewarding because they involved lots of fun problem-solving and facilitated continuous learning and reinforcement of ideas. I learned more from the weekly projects than from anything else, which was partly down to the extensive support network of TAs who provided help sessions 6 days a week. It was this huge support network that allowed me to push myself to the limit and gain so much from taking the class.

The majority of my time at MIT was spent working on my MEng research project. I joined the Tasan group in metallurgy, led by Professor Cem Tasan. I collaborated with one of Cem's leading post-docs, Jinwoo, who works primarily on developing novel methods

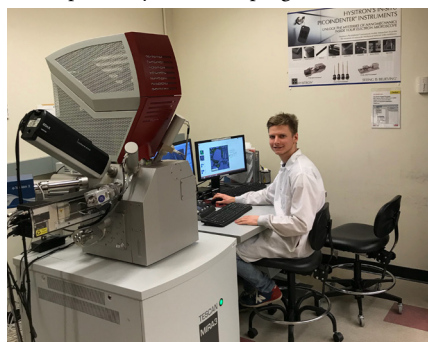
to study hydrogen-induced damage in alloys. In particular, he has developed an *in situ* electrochemical charging setup where he can force hydrogen into a material while studying its effects in real time through scanning electron microscopy. This is a big deal in the field because hydrogen is classically the hardest element to track due to its absence of energy transitions and its rapid diffusion kinetics. I worked closely with Jinwoo to investigate the effect of surface condition on the hydrogen embrittlement of titanium, making use of his setup. I felt welcomed within the group and had many great opportunities, including a 3-day trip to carry out research at the national synchrotron facility in Chicago.

Living in Boston was a great experience in itself. I chose to live in Fenway House, which is an independent living group with space for up to 18 students to stay. My best friends from the trip were made through Fenway and this made adjusting to life in America and at MIT much easier. Living in this environment meant that I got to meet lots of different MIT students and enjoy the social benefits from living in such a large group of people. We went on day trips, for meals, ice skating and to parties amongst many other things, which made for a great social life whilst I was there. I also really grew to like Boston as a city because it has lots of interesting history and many nice places to visit, eat and drink.



Fenway House

I feel very lucky to have spent some time studying at MIT and I would greatly encourage others to do the same if given the chance, whether it is at MIT or a different university. An exchange gives you the chance to broaden your perspective and learn from people outside of your usual environment, which can only be a positive thing if you approach it with an open mindset.



The Tasan research group (left), and me using the scanning electron microscope (right)

# Imperial College Rail and Transport Society

## Volunteering Weekend in Wales

### Friday 13th December 2019

On the last day of the Autumn term, we headed to Euston railway station with a festive spirit. Catching the 14:03 Avanti West Coast train to Birmingham New Street, we were able to see a 'naked train' as a result of a change in train operating company. At Birmingham, we suffered from delays due to trespassing. We also suffered from an unexpected change of trainset at Shrewsbury. To recover the situation, dwell time at one station along the route was reduced from ten to three minutes. That helped us to get to the destination on time.

We were welcomed warmly by Kim Winter, who has been helping coordinate Imperial College Rail and Transport Society (ICRTS) Wales Trips for years. After settling down at Penrhyn hostel, we went to a local Kebab shop and local pub to enjoy food and drinks. Fully charged, we were ready for the volunteer weekend starting tomorrow.

### Saturday 14th December

It seemed like the Welsh weather was nice to us, the temperature was warmer thanks to earlier rain. After finishing our first breakfast of the trip, we rode the special steam work train from the Penrhyn hostel to Boston Lodge workshop.

After a safety induction and handing in forms, we were assigned the first task of the volunteering weekend, which was pulling in the new main power supply and earth cables to the new carriage shed. Once rolls of power and earth cable were set in the correct position, we were split into two groups: sending group and



Photos courtesy ICRTS

**The special steam works train from Penrhyn to the Boston Lodge workshop**

receiving group.

The sending group was responsible for sending cables through a flexible pipe, applying lubricant and stopping the cable feeding if they moved too fast. On the other hand, the receiving group was responsible for pulling the pilot rope, which connected to the front end of the cables. Both teams needed to constantly communicate to get sending and pulling synchronised.

From the existing power access point to the new shed, cables needed to go through two manholes for a 90 degrees turn. At each manhole, extra lengths of cables were pulled out to get to the new shed. The pilot rope was also untangled to allow for reuse.

Three hours later, power and earth cables finally reached the new shed. Soon after that, the manholes were closed to mark the end of our first task.

We enjoyed reading railway related magazines during a lunch break in the common room. Then, we finally got to work

on the task we were waiting for, tracklaying. As the new shed was constructed to safeguard thousands of pounds worth of carriages from harsh Welsh weather, three tracks would be laid so that the carriages could be pulled in. We were honoured to lay the first pair of rails in this shed with our own hands.

During the task briefing, we learned that high spec rails were not required for the shed as the carriages were moved at low speed and most of the rails would be buried in concrete anyway. Most of the parts, especially rails, were recycled so it was important to get the less-cornered more-squared edge outside so that the concrete will not overflow to the area between rails.

While the rails were dragged in by the loader, we got the chance to see the heritage vehicle storage. The vehicles inside were enriched with history and devotion of railway people from many generations. We also discussed how turnout, crossing and token signalling systems work. The discussion went smoothly as clear examples were in front of our eyes.

We did not wait long until the first pair of rails were dragged in. We then fixed the rail in the x-axis using the starting position of a straight track section, then y-axis using the shed wall and gauge width as a reference. As the rail was heavy, all attendees needed to act as one unit to move each rail to the desired position. Due to the cold weather, it was not suitable to drill holes to fix the rail permanently, but we could leave that for the next gang joining in the upcoming volunteer weekend. At this point, we focused on using our manpower to lay as much track as we could.

We finished off the first day by taking a group photo of ICRTS trip attendees. Then, we headed back to the Penrhyn hostel to have dinner.

### Sunday 15th December

In the morning, the Welsh weather was still kind to us. No rain in the morning. We continued our tracklaying task. We began with fixing the first pair of rails in the z-axis by putting a metal plate under each rail at approximately 1.3m interval. Once completed, a second and third pair of rails were dragged and fixed in all axes. We could not continue further tracklaying as the concrete layer supporting the curved section was not fully poured.

We then focussed on connecting each pair of rails together using mechanical fasteners. After we found out that the plates would not fit, the work was suspended until the correct



**Cable pulling**

plates were acquired from the store.

While we were waiting for the correct plates, we were given a workshop tour by the staff working on the restoration project. We were also given a quick lecture about steam locomotives and narrow-gauge railway.

After the correct plates arrived, we got back to work. We cleaned the rusted surfaces of bolts and plates, then applied the grease on surfaces in contact. Finally, we mechanically connected the two pieces of rails together using a spanner.

Unfortunately, we encountered a problem due to misalignment when we tried to connect the second and third pair of rails. This problem would take hours to solve. Unfortunately, we did not have much time left. As we could not continue tracklaying any further, we were assigned to move steel structures which would be used for future extension of the current carriage shed. We also removed dirt from the floor.

It was at this moment that the Welsh weather showed its true form. We were hit by a sudden wind gust and hail shower. After the harsh weather went away, we started packing away equipment and cleaning. The moment we threw our working gloves away marked the end of our volunteering weekend.

After we got changed and cleaned up at the Penrhyn hostel, we went to have dinner at Spooner's with Kim Winter. We discussed the enriched history of narrow-gauge railways and a continuation plan for next year's trip and beyond.

**Monday 16th December**

There was no work assigned to us this morning. We spent our morning enjoying the last breakfast of the trip, and packed up.

As the UK train timetable changed yesterday, we needed to check twice before we travelled to make sure that we would not miss a train or connection. At Penrhyndeudraeth railway station, we saw railway staff pulling cable using the same pilot rope as we did. This reminded us how relatable our tasks were. Since we had worked on narrow-gauge railways for the whole weekend, we felt standard gauge railway was too wide on the way back.

We changed at Shrewsbury to secure the table seats on the 15:24 Avanti West Coast direct to Euston with enough room for our luggage. We enjoyed the last section of the trip by playing cards, reading novels or sleeping until we arrived at Euston railway station safely just before 18:00.

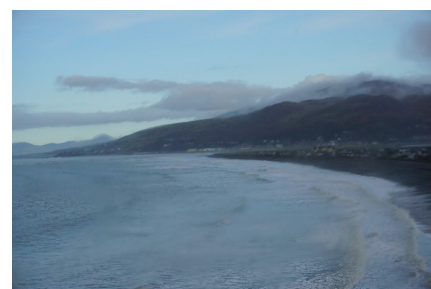
Although it rained, the amazing Welsh coastline and scenery always captured our attention, especially for someone who has been here for the first time. This could be considered as a reward of our hard work. The other highlight of the journey was observing train coupling closely. These were indeed priceless memories, difficult to forget.



**Tracklaying**



**Other tasks**



**The Welsh coastline**



**Train coupling**

## FEATURES



**Dinner on Sunday with Kim Winter**

### Comments from Attendees

“This is now my third time going on the Wales Trip, where we trek up to North Wales, volunteering to maintain the Ffestiniog Railway. This piece of railway actually pre-dates the steam locomotive. It was built to transport slate from mines at Blaenau Ffestiniog down to the port at Porthmadog. Now, the slate mines are long gone, and the railway is a heritage line, passing through some beautiful landscapes. Volunteer groups from all over Britain help maintain this line, including the Imperial College Rail Society.

Most of the time, volunteering involves replacing old ballast, tracks, rails etc. with new ones (quite an experience in themselves), but this time we were tasked with a new project; the new train shed. Up to this point, much of the heritage steam locomotives and carriages have to be stored out in the open as there is not enough space inside the current depots, leaving them exposed to the elements outside. The new train shed should be able to accommodate the current fleet.

Our work initially involved laying down the cable for the new shed which actually involved a lot of manpower (i.e. all of us plus the people there). But the bigger task after that was to lay down some rail track inside the shed. This involved quite a lot of lifting and moving around of pieces of rail, each weighing close to a ton. We had to line up the rails to the right gauge and fastened them using fishplates. The next volunteer group will fix these rails permanently in place.

Overall, this was an exhausting but rewarding trip, especially as we had contributed to basically new infrastructure to this already historical railway. It is nice that something we worked on will be used by generations to come. I highly recommend anyone to come on this trip in future years.”

“This was my second time on a volunteering weekend with ICRTS. Once again, I learned something new about railways and got hands-on experience from working alongside railway people. I realised that you need to experience something yourself in order to master it. It was indeed hard work but completion itself



**Ffestiniog Railway workshop**

was a reward. Apart from the technical point of view, I also appreciated the enriched history of this heritage railway. Being a small part of the continuation process to keep history alive made me proud. In addition, working and sharing views with people who share the same love for railway was inspiring and fulfilling.”

“This was my first ICRTS trip to Wales and it did bring me joy and unforgettable memories. First of all, I would like to express my sincere gratitude to all the folks who travelled along with me, especially on the first day, when I encountered some problems in travelling there. I was glad that I could see the real-world engineering practices and compare those to what I have learnt in class. For example, I could now understand the different types of steel beams used and details of joints in a portal frame structure which was used for the carriage shelter. Lifting and aligning the rail is not an easy job and the level of precision surprised me, considering it is a tonne of steel being shifted a couple of millimetres.”

“As a rail enthusiast, I enjoy being on trains and observing their operations. Having spent most of my life in Hong Kong, I do not have a necessarily strong attachment to railways elsewhere in the world. That said, I have always looked forward to witnessing the grandeur of steam railways in the UK, as I see it as an integral part of the country's heritage and culture. I have never been beyond outer London, let alone Penrhyndeudraeth in Wales. Indeed, it was a delight volunteering in the Welsh Highlands, seeing the gorgeous mountains day and night.

It was a joy to see so many steam train locomotives, but the hands-on engineering experience was undeniably the best part of the trip. We got the chance to lay a couple of tracks in the shed and to install a few underground electrical cables. The work was laborious, but it was a pleasure to learn basic practical skills using relatively primitive tools. While most of the work we performed was not directly related to my electrical and electronic engineering studies, it was the first time where I experienced engineering in a workplace environment. I also saw how different volunteers utilise knowledge from different disciplines to optimise and to increase the efficiency of maintenance within the shed.

Down time was fulfilling as well. During tea time, we had a wonderful time conversing with experienced volunteers; they talked quite a bit about the history of the country's railway as well as their volunteering experience at the



**One of the locomotives**

Ffestiniog Railway. A fun down time game that we played a few times was the GWR game; we learnt more about the history of the Great Western Railway, and it sparked many funny and insightful discussions throughout!”

“During the ICRTS trip to Wales in 2019, the club members went on a journey together from London to Penrhyndeudraeth. On both working days, a steam train picked us up from the volunteers' hostel and took us to the railway shed, where we've had a tour whilst learning some technical and historical background of the iconic railway, and did some practical work. We helped pull new underground electric cables to the new part of the shed, moved structural steel beams before assembly, and laid a section of tracks. All these activities were performed under supervision and with very helpful instructions from the project manager – not only did we help the railway, but also learned valuable engineering and teamwork skills.”

“As it was my first time attending this trip, I was extremely excited to get some hands-on engineering experience. I was exposed to the works of the Ffestiniog Railways and delighted to provide genuine support to the railway shed at Boston Lodge, which is planned to contain the precious carriages. The trip is such a useful and beneficial experience, and I strongly recommend it to all the engineers and scientists to come and experience it yourself.”

“This was an experience beyond any usual enthusiast activity. Working alongside my passionate peers from the Rail Society as well as experienced volunteers from the Ffestiniog Railway was satisfying. We developed a closer bond with the country's railways, and strengthened our cross-generational ties with experienced veterans of the rail industry. I found the trip very rewarding, and if given the opportunity, I look forward to participating in this again in the near future.”



# Wearing the Earth down: The environmental cost of the fashion industry

This was the winning entry for the RSMA Trust Essay Prize, from Eloise Hunt, a third year BSc Earth Science student.

When we think of pollution, we imagine raw sewage pumped into rivers, open-caste mines or oil spills. We don't often think of our inconspicuous white shirt or new jeans. But, the overall impact that the fashion industry has on our planet is shocking. The production of clothing has been estimated to account for 10% of total carbon impact (Huffington Post, 2019). The fashion industry is arguably one of the greatest polluters in the world, second only to oil (Gunther, 2019). Following the Paris Fashion Week 2019, I wanted to take this opportunity to reflect on the environmental impacts of the fashion industry. Whilst geoscience does not superficially link to fashion, once you look more closely at the production and environmental costs of fashion, you can see that the fashion industry is coupled with situations where geoscientists may be involved. Geoscience alone cannot improve the world. But, through collaborations between geoscientists, engineers and policy makers, real changes can take place.

The lack of sustainability in fashion can be blamed on four major factors. Firstly, there is enormous energy consumption associated with clothing. Production is concentrated in countries such as Bangladesh and China. Factories are powered by coal before garments are shipped to the rest of the world. It is difficult to find reliable data on how much fuel is guzzled transporting clothes. Yet, we do know that in the US only 2% of clothing is domestically produced and globally 90% of fabrics are transported by cargo ship (Gaitho, 2017). One of these ships can produce as much atmospheric pollution as 50 million cars in one year (Corbett and Koehler, 2004).

Another major issue is cheap synthetic fibres replacing natural cotton or wool. Polyester and nylon are both synthetic, non-biodegradable, energy intensive and made from petrochemicals (Claudio, 2007). Polyester is rapidly increasing in value and is now in over half of all clothing. Nylon is absorbent and breathable making it a popular choice for sportswear manufacturers. But, nylon production forms nitrous oxide, a greenhouse gas 310 times more potent than carbon dioxide (Trogler, 1999). Viscose is another synthetic fibre which is derived from wood pulp; the material's popularity in fashion has caused deforestation in Brazil and Indonesia. These countries are home to rainforests often described as the 'lungs of the earth', acting as our most effective carbon sink and oxygen source.

Even stepping away from synthetics, cotton is hardly innocent. It is incredibly water intensive, accounting for 2.6% of global water use. It takes 2,700 litres of water to produce



Photo: B.Forenius / Shutterstock.com

the average cotton t-shirt (Waterfootprint.org, 2019). Further, 99.3% of cotton growth uses fertilizers, which can cause runoff and eutrophication of waterways (Conley et al., 2009). Uzbekistan, the 6<sup>th</sup> largest producer of cotton in the world, is the poster boy of cotton catastrophe (Micklin, 2007). In the 1950s, two rivers were diverted from the Aral Sea as a source of irrigation for cotton production. As the sea dried up, it also became over-salinized and laden with fertilizer and pesticides as a result of agricultural runoff. Contaminated dust from the desiccated lakebed saturated the air, creating a public health crisis with this region having the highest rates of throat cancer in the world (Shukman, 2004). Groundwater up to 150m deep is polluted with pesticides and regional climate has become more extreme with colder winters and hotter summers. Currently, water levels in the Aral are less than 10% of what they were 50 years ago (Micklin, 2007). Whilst this is a dramatic example of cotton farming, similar environmental mayhem can be seen globally.

The final environmental problem associated with fashion is the overwhelming garment greed driving consumption. Water problems in cotton producing areas cannot be fixed without consumers being held responsible for the ecological impacts in the producing areas. Globally, 44% of water used for cotton growth and processing goes towards exports (Chapagain et al., 2006). High demand produces 150 billion items of clothing annually, which equates to 20 new items per person every year. Then, on average, each garment is worn only 7 times before being dumped in landfill. Worse still, in the UK alone £30 billion worth of clothing is buried unused in our closets (Barnardo's, 2015).

Faced with issues of energy consumption, the rise of synthetics, water consumption and fast fashion, it's easy to feel powerless but with increased scrutiny come sustainable solutions. The UK James Dyson Award was bestowed upon the student inventor of Petit Pli, innovative children's clothing with pleats which allows it to grow with children from four months to three years old (James Dyson Award, 2017). This could help tackle clothes waste and is a small yet significant thread of hope. On an individual level when you need new clothes, opting for Fair Trade or organic fabrics is a simple way to minimise pesticide pollution (Baier, 2006), and, in the case of cotton, reduce water consumption (Chouinard and Brown, 1997). Or, better yet, choose second hand, vintage or upcycled items to prevent processing of more virgin fibres. Above all, fashion is not yet sustainable but we as consumers hold enormous power to persuade brands to make products that are clean, of high-quality and worth wearing. People need to be taking fashion more seriously, not less.

## References

- Baier, A. (2006). *Organic Cotton Projects in Africa*. <http://bit.ly/IE32-AfricanCotton>
- Barnardo's (2015). *Once worn, thrice shy – British women's wardrobe habits exposed*.
- Chapagain, A., Hoekstra, A., Savenije, H. and Gautam, R. (2006). The water footprint of cotton consumption: An assessment of the impact of worldwide consumption of cotton products on the water resources in the cotton producing countries. *Ecological Economics*, 60(1), pp.186-203.
- Chouinard, Y. and Brown, M. (1997). Going Organic: Converting Patagonia's Cotton Product Line. *Journal of Industrial Ecology*, 1(1), pp.117-129.
- Claudio, L. (2007). Waste Couture: Environmental Impact of the Clothing Industry. *Environmental Health Perspectives*, 115(9).
- Conley, D., Paerl, H., Howarth, R., Boesch, D., Seitzinger, S., Havens, K., Lancelot, C. and Likens, G. (2009). ECOLOGY: Controlling Eutrophication: Nitrogen and Phosphorus. *Science*, 323(5917), pp.1014-1015.
- Corbett, J. and Koehler, H. (2004). Considering alternative input parameters in an activity-based ship fuel consumption and emissions model: Reply to comment by Øyvind Endresen et al. on "Updated emissions from ocean shipping". *Journal of Geophysical Research: Atmospheres*, 109(D23).
- Gaitho, M. (2017). *How Far Do Your Clothes Travel to Reach You? – Fabric of the world*. <http://bit.ly/IE32-ClothesTravel>
- Gunther, M. (2019). *Pressure mounts on retailers to reform throwaway clothing culture – the Guardian*. <http://bit.ly/IE32-Throwaway>
- Huffington Post. (2019). *Shocking Environmental Fast Fashion*. <http://bit.ly/IE32-FastFashion>
- James Dyson Award. (2017). *Petit Pli – Clothes that grow with your child*. | James Dyson Award. <http://bit.ly/IE32-PetitPli>
- Micklin, P. (2007). The Aral Sea Disaster. *Annual Review of Earth and Planetary Sciences*, 35(1), pp.47-72.
- Shukman, D. (2004). *BBC NEWS | Science/Nature | Aral catastrophe recorded in DNA*. <http://bit.ly/IE32-AralDNA>
- Trogler, W. (1999). Physical properties and mechanisms of formation of nitrous oxide. *Coordination Chemistry Reviews*, 187(1), pp.303-327.
- Waterfootprint.org. (2019). *Home*. <https://waterfootprint.org/en/>

# ICSF and Picocon 37

## Or, the irresistible power of synchronicity

Our editor, Peter Buck, who also spends time as a publisher of SFF books as well as an IT security consultant, has written in IE before about the joy of attending genre conventions around the country. This time he was much closer to home.

The universe (or fate, or whatever you want to call it) recently seemed to decide that Alison and I should go along to Picocon, the annual convention that is organised by the Imperial College Science Fiction, Fantasy, and Gothic Horror Society (ICSF for short) every February. I say that the universe decided, rather than us, because: we were first told about Picocon by Dave Lally, a friend (and previous Guest of Honour at an early Picocon) last November, having never heard about it before (despite the fact that it has been going for 37 years); we had already been thinking about a possible article on ICSF for a future issue of IE; and then we got an email to tell us that one of the authors that we publish in our Elsewhen Press imprint, Juliet Kemp, had been asked to be a Guest of Honour at Picocon 37. The synchronicity was too much to resist, so on February 22<sup>nd</sup> we went along to the Blakett Building to join in the fun.

### ICSF

ICSF was formed in 1976, the same year that I started studying at Imperial. Unfortunately, while at college I was never aware of it – rumour has it that the first few meetings were just a few friends in someone's bedroom in Southside, so that may be why. One of the core features of the society is a library, which has grown from a few books in a cupboard to almost 10,000 titles along with 2600 DVDs and videos and 500 graphic novels in a dedicated room in the Media Centre in the West Basement of Beit Quad. Members of the society produce a (usually) annual magazine, *Wyrmtongue*, and a weekly show on IC Radio, *Whispers from the Basement*. They also hold cinema nights, book crawls (like a pub crawl but visiting bookshops around London) and, of course, monthly bar nights.

### Picocon

Since 1984, ICSF have held a convention every year – called Picocon, because it is a small convention – attracting around 200 attendees. Like most conventions, it is run by a volunteer committee each year, but while most committees have a Chair and Vice-Chair, Picocon has a Sofa and Bean-bag (because they're more comfy!). This is the only significant convention that regularly takes place in London, so it is frequented not just by Imperial students but by a wide range of other London-based fans.

Over the years, the Guests of Honour have included many of the best-known and most-loved (not to mention award-winning) authors

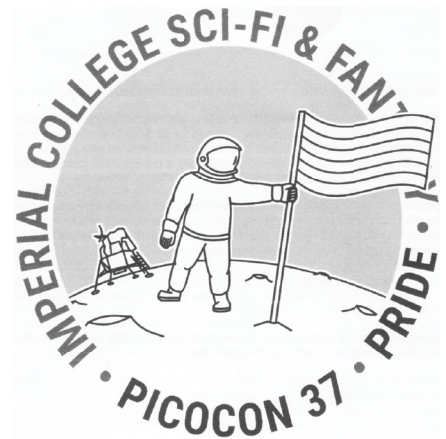
in SFF, including Iain Banks, Stephen Baxter, Pat Cadigan, Cory Doctorow, Jaine Fenn, Peter F. Hamilton, Gwyneth Jones, Dave Langford, Stephen Lawhead, Ken MacLeod, Juliet McKenna, Farah Mendlesohn, China Miéville, Sarah Pinborough, Terry Pratchett, Christopher Priest, Robert Rankin, Alastair Reynolds, Charlie Stross, and Ian Watson; as well as space artist extraordinaire, Dave Hardy; biologist and alien designer, Dr Jack Cohen; space scientist (and president of the British Interplanetary Society), Gerry Webb; and SF buff and global ambassador, Dave Lally. Indeed, those last two (Gerry Webb and Dave Lally) were also in attendance this year, despite the best efforts of TfL to make it hard for anyone to get to South Kensington on the day.



The theme of this year's convention was Pride. Picocon Sofa, Harry Black, explained: "Picocon falls within LGBT History Month in the UK. I myself happen to be asexual, and have found a good number of my fellow ICSF members fall somewhere in the LGBTQ+ community. Science Fiction and Fantasy, as genres, often seem to me to be about exploring our world, but through the lens of a very different world: it is unsurprising then,



Picocon 37 Sofa, Harry Black



that these genres are used to tell the story of LGBTQ+ characters more than are other genres. With this in mind, I decided (before Picocon 36 had even occurred) that I wanted Picocon 37 to be about highlighting LGBTQ+ characters and creators in the genres Picocon has always been about celebrating."

The day's events started with the more serious sessions in Blakett LT1, a talk by each of the three Guests of Honour, authors Juliet Kemp, Roz Kaveney and Tamsyn Muir. This was followed by a panel discussion with all three authors. All three talks were well received, and Juliet, despite having just returned from a damp holiday with virtually no voice, was still able to keep the audience spellbound – the Blakett Building was a very familiar location for Juliet who had previously worked there, in Astrophysics, for a few years.

There had, of course, been an adjournment for lunch in the Union Bar. After the panel discussion, everyone decamped to the Queen's Lawn for the *Destruction of Dodgy Merchandise* – a bidding war where bids to rescue (or destroy) misguided merchandising were made, with all proceeds going to charity. This year, the charities were the LGBTQ+ helpline, Switchboard and the LGBTQ rights charity, Stonewall. Merchandise that was not rescued was destroyed by way of liquid nitrogen and a giant hammer. After this, silly games were being played in Blakett LT1, while tabletop games and consoles had been set up in Blakett 1004 for those who wished to play into the evening. Back at the Queen's Lawn, more silliness ensued, and the evening was rounded off with a Pub Quiz in Blakett LT1.

Alumni are welcome to join ICSF (but you have to rejoin ICU first). Anyone is welcome to attend a Picocon.

<https://www.union.ic.ac.uk/scc/icsf/>



Photo: Alison Buck



Photo: Alison Buck



Photo: Alison Buck

**A banana is sacrificed as proof of concept**

**Dodgy merchandise is introduced to the liquid nitrogen...**

**...and then hit with a big hammer**



Photo: Peter Buck

**Guests of Honour: Juliet Kemp, Tamsyn Muir and Roz Kaveney**

**Juliet Kemp** is a queer, non-binary, writer (pronouns they/them). They live in London by the river, with their partners, kid, and dog. Their recent works include the fantasy novel *The Deep And Shining Dark* (featured on the Locus 2018 Recommended Reads list, under 'first novel') and the YA SF novella *A Glimmer Of Silver*. At Picocon, Juliet also launched *Shadow and Storm*, the sequel to *The Deep and Shining Dark*.

When not writing, child-wrangling, or dog-wrangling, Juliet knits, indulges their fountain pen habit, and goes bouldering.

**Tamsyn Muir** is a horror, fantasy and sci-fi author whose works have appeared in *Nightmare Magazine*, *F&SF*, *Fantasy*

*Magazine*, *Weird Tales*, and *Clarkesworld*. Her fiction has received nominations for the Nebula Award, the Shirley Jackson Award, the World Fantasy Award and the Eugie Foster Memorial Award. She has spent the majority of her life in Howick, New Zealand, with time spent living in Waiuku and central Wellington. She currently lives and teaches in Oxford, in the United Kingdom.

**Roz Kaveney** in her own words:

"I'm a bit older than most people in the fandom – I just turned 70. I have a long and complicated personal history which I am in the process of turning into a huge memoir; crucial facts are that I was reared Catholic but got over it, was born male but got over it,

stopped sleeping with boys about the time I stopped being one and am much happier than I was when I was younger.

"A UK resident who has lived in the US a bit, I have a certain distinction in the SF field as a critic, have at various points been seriously involved in civil liberties and anticensorship politics and write for various reasonably reputable newspapers and periodicals.

"I like moonlighting as a committed fan – I never had that much serious credibility to lose, and haven't lost what I had anyway.

"I spend too much time listening to an unholy mixture of Bach, Shostakovich, Springsteen, Patti Smith, Ella Fitzgerald and Lotte Lenya."

# 51<sup>st</sup> Triode meeting – 3<sup>rd</sup> January 2020

## *Ideas for the 50<sup>th</sup> Year after graduation*

Eight Triodes (i.e. Electrical Engineering graduates of 1973) appeared at the George for our 51<sup>st</sup> reunion/meeting (we always meet on the first Friday after 1<sup>st</sup> January). Some Triodes arrived early and took a prime position in the middle of the bar as, amazingly, the pub was quite quiet. Below is what the Triodes have been up to over the last year.

Much discussion was had about the fact that 2023 will be the 50<sup>th</sup> year since we graduated so, as that will be a bit special, we should do something different. We have had a number of suggestions ranging from a DIY function somewhere to a very special party with the CGCA 5&10 Reunion Lunch in November 2023. We need not only suggestions but, of course, volunteers to help. Martyn has agreed to talk to CGCA about something special at the decade reunion and we will see how that goes.

Because the pub was fairly empty we got a picture taken by an innocent bystander.

## *The next two Triode Yearly Reunions*

The next yearly Triode reunion (it will be our 52<sup>nd</sup> as we had two meetings in year one, two in 2003, two in 2013 and 2 in 2018!) will be on Friday 8<sup>th</sup> January 2021 at The George, Fleet Street, from about 7 pm. The following year's reunion (53<sup>rd</sup>) will be on Friday 7<sup>th</sup> January 2022. So mark up your diaries now! Then of course there will be our 50<sup>th</sup> year in 2023.

## *Those who came on the 3<sup>rd</sup> January (there were 8 of us!)*

### Peter Cheung

The news about Peter having retired is exaggerated. He may be a pensioner but he is also back full-time at Imperial College dividing his efforts between Elec Eng and running the recently-formed Dyson School of Design Engineering as its Head. He also now has a granddaughter and has been building special toys for her. But the big news is that Peter has been awarded the Imperial College Medal in recognition of his contribution to Electrical Engineering and the College over 40 years! Well done Peter, you deserve it!

### Phil Harris

Phil and Lina continue to enjoy their retirement, with frequent 'childcare' visits to their two young grandchildren to keep them fit (often fit to drop!). Not quite as exhausting (but still good training) are their twice-weekly sessions of



**From left to right: Martyn Hart, Peter Wright, Pete Marlow, Dave Mansfield, Sid Seth, Phil Harris, Peter Chung and Alice Spain.**

country dancing. Phil also enjoys a monthly day out walking with his daughter and visiting his son's micropub, usually for quiz night! In June/July they joined Lina's family in Indonesia at a big birthday celebration for Lina's aunt, meeting some people that Lina hadn't seen for many years. After the party they relaxed in Bali (as you do!).

### Martyn Hart

Martyn stills works two days a week (often four or five) in the public sector, mainly in the commercial area on large outsourcing/framework contracts. He is a Parish Councillor for his village (Ingatstone) and also the business rep for village businesses within the local district council. He is still cycling, photographing, etc. and has also been busy redecorating the Triangle House.

### Dave Mansfield

Dave overcame jet lag to get to us, as he was in New York for Christmas and New Year, arriving back in UK at around 8.20 on the morning of the reunion. He and his wife Liz had a great time and sent me photographs of them sitting in the UK delegate's and the Secretary General's seats of the UN Security Council! Their son is now working at the UN for the FCO for 4 years and hence the visit there over Christmas (and the special pass to get into the Security Council!).

### Peter Marlow

Peter Marlow became a grandparent for the first time in March via his daughter and in the same week his son announced his engagement! Peter and his wife Sally travelled to South Africa in July for a safari followed by a visit to the Victoria Falls, fortunately before it had nearly dried up. Peter continues to work with PM4NGOs, a non-profit organisation that promotes

and sustains the professionalism of project management in the international development sector.

### Sid Seth

Sid is working on many new projects; he still won't tell us what they are but there's something to do with using the latest technology, particularly AI, to help improve lives. In fact he is writing a book that plans to help older people maintain their health using technology. We look forward to publication.

### Alice Spain

Alice is continuing work on the Norfolk house. It now has heating and the remaining part of the roof has been replaced; it's plastering the bedrooms and finishing the kitchen next! Progress on the garden has been quicker than on the house, probably because she likes to spend time outside enjoying the sun and the sound of the wind rustling in the trees. She recently acquired two flat-coated retriever puppies. They're great fun and get her out walking them in the country and seaside. She's joined the Parish Council, which has made her aware of many more local issues including representations to the Planning Inspectorate about a huge substation that could be built very close to her village.

### Peter Wright

Peter is now using Python to play with various low power radio communications (433/868 MHz) around the house – looking at encryption methods used in Internet of Things devices, etc. However he is still spending a lot of his time in his local Scout District as Secretary, Webmaster and various other roles including lead interviewer and handyman.

## *Those who couldn't make it and we've heard from*

### Addy Adesara

Addy sent his apologies as he has not managed to get back to London yet. He is still working at Vodafone on a transformation project, which he expects will finish sometime in 2020. Then he'll look at what to do next! Both his daughters, who are training as GPs, have left home so now it is just the two of them there. His younger daughter is also quite active in politics, especially in the media about protecting the NHS, so that keeps him busy as well. We should be looking out for her?

### Geoff Banks

Geoff was sorry he missed the reunion but health issues are preventing him travelling too far at present; he is undergoing hormone therapy for prostate cancer which was diagnosed in November 2019. Radiation treatment is proposed for later this year and hopefully Geoff will make it to the George next year. We are all thinking of you Geoff – fingers crossed.

### Paul Cheung

Paul wasn't able to make it but continues to invite any of us (and family) to dinner if we visit Hong Kong (provided that he is around at the time of course). He has retired and is travelling a lot and maybe even will see us again soon! What about November 2023 Paul?

### Joan Clemow

Joan couldn't make it but wished us all a Happy New Year. She said she still has grandparent duties and spends her time shared between those and volunteering. She volunteers at her local National Trust property, Montacute House, and also at her granddaughter's primary school. Apart from that, being retired means that she has more time for friends and hobbies.

### Hugh Culverhouse

Hugh couldn't make it as he had other family commitments in Munich. He said that sport preoccupies him at present. Last year he completed just over 4,000 km running in the year, a new personal best! He is now in the middle of a winter race series which he is (at present) leading in his age category. However 2020 will see less running and more cycling. He has also started some drastic renovation work in his flat, although the work itself is largely outsourced! He still goes to his physio practice where he works out all day every Monday; then on Tuesdays he gives English lessons; and, on Friday

mornings, he and Margret go to French Conversation classes. After all that, and the sport, he still likes to meet friends and have a pint or three! Also he has now got into a bit of hiking – never a dull moment!

#### George Gabrielczyk

George wished us all the best for the New Year from him and his 1,000 ungulates! George couldn't come to London because the winter has been mild so far and he was starting the ground works for the building of the Manor House at Jelenino following approval. He has not been idle whilst waiting for State permission of what to do with the original building; he has completed work on three outbuildings and the frontage, rebuilt from utter ruins according to George's design. He has also another motor project on his 1978 Sill Lightweight Land Rover. This is now in bits and will receive power assisted steering and a 200TDi diesel engine. Plus he has re-welded the bulkhead and galvanised it to go with the existing galvanised chassis. It also has lots of other goodies: Maxidrive difflocks front and back, disc brakes and a mechanical twin drum winch. Just the project for those long winter evenings!

#### Tony Godber

Tony said he was sorry he had to miss this year as his 89 year old father-in-law was visiting him in Perth. He added that so far in Western Australia they haven't been too severely hit by the fires but it is very hot and dry so the risk is still there. They are all keeping a watchful eye on the situation. He continues to work four days a week with Rio Tinto's iron ore rail network but will be taking a short break soon to have a knee joint replaced.

#### Chris and Daphne Giles

Chris & Daphne are both fine and Chris reported that he has actually retired (at the 4th attempt) and is now building two obsolete computers – a Difference Engine from the 1820s and a Digital Differential Analyser (DDA) from the 1940s – using TTL! Wow, that will be interesting to see. He is also trying to write a book on the history of DDAs.

#### Steve Glenn

Steve said he couldn't make it because, following Christmas with six little ones, he and Anne had an opportunity to escape to a hotel for a few days before their volunteering onslaught began. They are both starting volunteer work with local charities, including driving old folk to medical appointments, running a charity café, manning an information desk, and working in a

charity donation warehouse. Steve is also training as a Portable Appliance Tester, the aim being to do PAT testing for charities. Wow, some retirement!

#### Nick and Sue Hiscock

Nick reported having unearthed his soldering iron to re-learn some of his old practical electronics skills and has had fun playing with micro controllers, albeit to 1<sup>st</sup> year lab standards! Further progress was stopped by him becoming Rear Commodore House to Warsash Sailing Club. Family-wise, his eldest daughter Jenny is now a Reader in Chemistry (and Director of Innovation) at the University of Kent; other daughter Pippa has now moved from Roke Manor to Lockheed Martin to apply her mathematical skills; and wife Sue still does the occasional day as a Veterinary Surgeon.

#### Richard Lewis

Richard sadly couldn't make as he was in France for the New Year. His supposed big news was that he has finally "retired" but not quite! He is going to be doing occasional work for the Advanced Maths Support Project, running problem-solving workshops for Year 12 students and also CPD for teachers on how to teach Further Maths. That said, he just told me that he has been talked back into also teaching Further Maths for a (flexible) day and a half at his old teaching school as they've found their existing staff don't have the necessary depth of knowledge to teach it!

He also acquired a Tesla Model 3 (long-range all-wheel drive) in October and is having huge fun with that including burning people off at the lights! Richard and his wife drove the Tesla down to their house in the south of France after Christmas, with only a couple of 20-30 minute breaks each day of the two-day journey to top up the battery, followed by some touring in the region including a visit to Andorra to get some totally duty-free gin. Am I jealous? No this is green!

#### Patrick Mason

Patrick is still with the internet international payments company he co-founded – GlobalWebPay.com – and is working with a development team to implement a completely new company system in 2020. When not working, he enjoys a new role as a recent grandfather, which he loves; playing tennis, which he's gone back to after 30 years and wishes he was a lot better at; and wine tasting, he got suckered into running his local wine tasting society but he is looking forward to the society's visit to vineyards in Chablis this April.

#### Rut Patel

Rut has been busy going to watch Spurs now that their new stadium has opened. They say it is the best football stadium in the world. He won't mention the fact that Spurs lost to Liverpool in the final of the Champions League! In between, he managed to go with his family to Croatia, Dubrovnik and Split, for a week. Unfortunately, it rained for most of the time. However, his highlight was meeting Luka Modric who used to play for Spurs but is now at Real Madrid. He tried to persuade him to come back to Spurs but clearly lacked the necessary negotiating skills. (The Croatia football team were staying at the same hotel in Split.) In the summer it was all about cricket, World Cup and travelling around England to watch India and England play. At Trent Bridge, Nottingham, he watched the rain all morning and early afternoon when the umpires called it a day without a ball being bowled. He enjoyed watching England thrash Australia in the semi-final at Edgbaston. The year was capped off nicely with the arrival, in September, of his fourth grandchild, a baby girl. So now he has two grandsons and two granddaughters.

#### Hari Singh

Hari reported that not much had changed from last year, just another year older and his golf handicap has gone up to 12. That was even though he is the Seniors' Captain and plays golf three or four times a week, plus he has had a couple of golfing trips abroad! He is heavily involved with his daughter's boys whom he sees almost daily (as they live close by) and sees his son's boys monthly as they live some 40 miles away. He said that he is not pursuing any technical projects, other than trying to keep up with new social media apps, but he did have a long break in Goa during the winter months – lucky chap!

*And those who didn't make it and we haven't heard from:*  
(Can anyone help?)

John Baird, Jacquie Buzzard, Graham Castellano, Martin Clemow, Tim Dye, Al Farbridge, Chris Gaukroger, John Harding, Ian Heap, John Macfarlane, Keith Marshall, Alistair Rogers, Richard Wysome.

Have a great 2020

**Martyn  
Arch Triode**

## Jurassic Fossils on the Move



**Left to Right: Brian Wallace, Barry Lanz and Roger Fisher**

"Have you had your pills this morning?" is just one example of the concern shared by three 84 year old RSM alumni as they bonded during an epic walk around the entire Coastal Path fringing the Isle of Wight in September 2019.

Brian Wallace, Barry Lanz and Roger Fisher were fellow mining graduates in 1958. Having survived the mining industry in Southern Africa and sundry other career moves over the 60 odd years since graduation, these musketeers were looking for another challenge. Bespoke red T-shirts proclaiming their status as RSM Alumni and 'Jurassic Fossils on the Move' might have been an embarrassment but instead created a fan club from amongst other Coastal Path walkers.

From a base in Bembridge, local pubs provided sufficient nourishment to keep our gallant trio going for 70 miles over 8 days of glorious late summer weather. And so, this epic circumnavigation was completed as they strode across the heights of Tennyson Down overlooking the Needles and recalling Lord Alfred Tennyson's own assertion that the air one breathed was "Worth sixpence a pint".

There is a Guinness Book of Records entry here somewhere. Certainly, it is unlikely any three from Guilds, RCS or the Medics could come anywhere near this achievement.\*

**Brian Wallace**

\* [That sounds to me like a challenge – The Editor]

# New home for the CGCA shields, at last!

You may be aware that there has been an issue regarding the CGCA's shields, which were removed from their place in the atrium of the City and Guilds Building (formerly Mechanical Engineering) some time ago, due to extensive building work.

There has been an ongoing discussion with College about where the shields should be rehung. Having looked at various sites, we have been able to agree that the shields should be rehung in an area immediately adjacent to the main lecture theatre at Level 2. Referring to the photographs, the first photograph shows the Level 2 Atrium, with the entrance to the main lecture theatre at the end. The area where we intend



City & Guilds Building Level 2 Atrium



Shields will be hung here.

to hang the shields is immediately adjacent to this entrance on the right. This is shown in the second of

the two photographs. Of the various positions where we might have been able to hang the shields, this is, in my

view, by far the best.

**Professor Richard Kitney**

## Spring Thaw:

# Climate Change, Greenland and Rare Earth Minerals

Back in the seventies I spent what was probably the most interesting and challenging period of my working life with a mining group in the City of London. In part, my job entailed looking at, evaluating and implementing investments. Some, similar to Kvanafjeld in Greenland which we will talk about later, were remote and difficult ventures and included one in Northern Canada that was ice bound for six months of the year.

With global warming softening the climate factor, some of these project constraints are becoming less of an issue, take Rare Earth Minerals (REM) for example. Those of you who take the *Sunday Times* may have read a major article on this subject (Greenland thaws into a global hotspot p19/25 August 2019). Quite amazingly, the cover of the American magazine, *Bloomberg Businessweek*, featured a picture of a REM deposit in Greenland on the front cover of its 2 Sept 2019 issue, leading to a six page spread. Greenland and REMs are hot topics!

Why all the hype? In a decade or so, global warming will defrost a number of mineral deposits in Southern Greenland and they will become viable and potentially productive. The general geology is favourable and they have the potential to seriously alter (improve?) the economic and political future of the Greenlanders, if they want it.

Quick geography lesson. Greenland is big but described as an island and is the massive piece of ice you cross when heading west from Iceland before crossing into Nunavut (the newest, largest,

and most northerly territory of Canada). It is an autonomous territory within the Kingdom of Denmark. The Greenland flag is red and white and its current population is about 56,000; the capital Nuuk has a population of about 18,000.

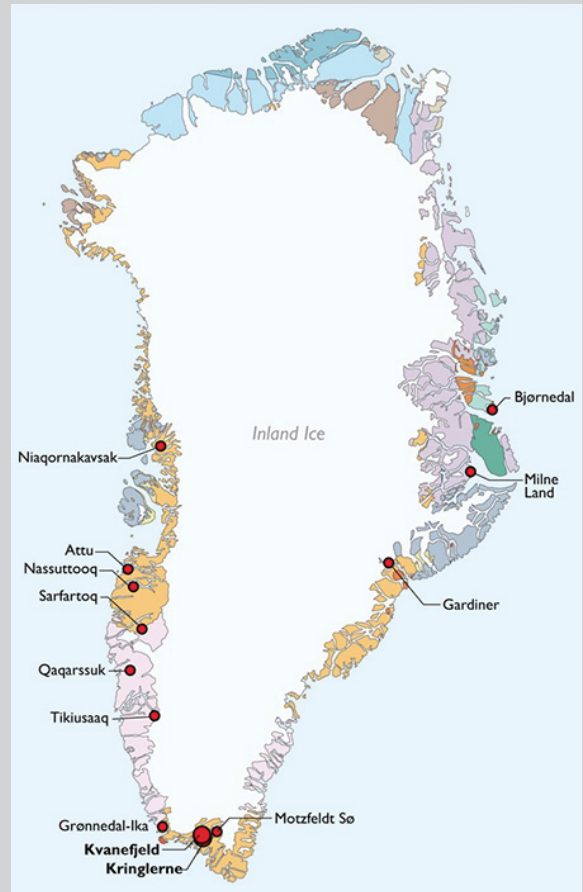
One of the more prospective REM projects in Greenland is the Kvanafjeld Project not far from Nuuk. It is a mining venture in the extreme south of the country with a reported large mineral reserve of REMs. It has the potential to provide a significant part of the world's coming demand for these essential raw materials needed for electric vehicle manufacture and its related developments. Kvanafjeld has access to the sea all year round, unlike many parts of the country. The project is currently being promoted by an Australian Group with some Chinese involvement. The Chinese are very keen as they are becoming very important for their role in the manufacture of electric vehicles and there are indications that China could be in a controlling position in their mining and primary production of REMs. Strategically, an alternative major source of supply is of considerable interest. Interestingly, Donald Trump is wading in, trying to do a deal for the same reasons.

You may fear climate change, but it is happening and to me the smart thing is to mitigate it where we can but to take advantage of it where we can't: in this case, access to raw materials that make green technology. Mining currently has a negative image and, sadly, incidents like the recent Vale iron ore tailings dam failures in Brazil reinforce those

sentiments. Mining of coal was the basis of the Industrial Revolution that kick-started a global economy, oil and gas have taken that further. Mining technology these days is very sophisticated, computerised and environmentally aware and will

likely be the basis of Greenland's immediate future development and wealth for its people. REMs are good news for them and us!

**RSM's own John Simpson  
Jan 2020**



REMs in Greenland.

Map © GEUS

(The Geological Survey of Denmark and Greenland)

# Inaugural Alumni Awards

The new Awards programme is part of Imperial's overall commitment to celebrate outstanding achievements within its community. The inaugural awards were presented at a ceremony on the 18<sup>th</sup> February. In her opening speech, President Alice Gast said: "To find out what our alumni have done with their Imperial education and to watch their successes is truly inspiring and it makes us remember why we're all here and what it's all about. As an institution that is dedicated to excellence, it is an honour to recognise that excellence amongst our alumni with an award, and to have you all sharing your stories with us."

During the ceremony, guests heard from the two winners of the *Distinguished Alumni Award*, Professor Angela Vincent and Harris Bokhari. Both stood out to the judging panel due to their dedication to improving other people's lives and their ability to approach big challenges head-on.

**Professor Angela Vincent** (Westminster Hospital Medical School 1966) has made an outstanding contribution to the field of neuroimmunology through her research. One of her most significant research achievements was the finding that maternal antibodies can be pathogenic to the development of the fetus.

**Harris Bokhari**, the second winner of the Distinguished Alumni Award, devotes most of his time to voluntary projects, which have earned him numerous awards including an OBE. Since graduating from Imperial with a BSc in Mathematics with Management in 1999, Harris has established two charities: the Naz Legacy Foundation and the Patchwork Foundation, which has helped over 40,000 young people from communities that are typically under-represented in UK politics, raising their aspirations and equipping them with vital life skills.

The *Emerging Alumni Leader Award* recognises and celebrates alumni under the age of 40, who are remarkable leaders in their field, have demonstrated outstanding achievements or are making a substantial impact on society. The diversity of backgrounds and achievements among the six winners of the category reflects the diversity within the College's alumni community itself. What all of them have in common, however, is an exceptional degree of intellectual curiosity for the world around them that goes beyond degree qualifications and professional background. The 2020 winners of the category:

**Arjun Panesar** (MEng Computing 2006) is the Founding CEO and Head of AI at Diabetes

Digital Media, an organisation which provides evidence-based health interventions for people with diabetes and other long-term health conditions. With over 1.4 million active members, the organisation is redefining the understanding of chronic disease and wellness.

**Aula Abbara** (MBBS Medicine 2005, MD(Res) 2017) has gained an international reputation in the fields of refugee and humanitarian health. She led a project which provided primary healthcare for refugees in Greece for the Syrian American Medical Society, led and completed a consultation for WHO EMRO on healthcare access for refugees and is on the advisory group for the Code of Practice on Healthworker Migration for WHO.

**Ayesha Ofori** (MSci Physics 2007), driven by her ambition to "democratise property investment" and make the UK property market more accessible to under-represented groups, launched Axion, an investment business for property investors, which is also focused on helping to deliver more affordable housing in the UK. She is also the founder and CEO of PropElle Network, a property investment community for women and Black Property Network which aims to improve financial literacy in minority communities.

**Mohammedabbas Khaki** (MBBS Medicine 2010), an award-winning doctor and TED speaker, is recognised as one of Pulse's Top 50 most influential UK GPs. He is dedicated to inspiring change on a global level through his roles in media, humanitarian aid work and as the founding chair of the international charity Who is Hussain, a global NGO spanning 30 countries that tackles social injustice through positive action.

**Veronica Bray Durfey's** (PhD Earth Science & Engineering 2009) research in the field of planetary science has led to significant advances in the analysis of surface features on planets, moons, asteroids and comets. An emerging leader in both science and spacecraft mission design, planning and operations, her work has been integral to the development of future missions to the Moon, Mars and beyond.

**Veeru Kasivisvanathan** (MBBS Medicine 2009), a world expert in the field of prostate cancer diagnosis, was awarded the British Medical Journal best research paper of the year in 2019. His work in prostate cancer research has led to changes in the NICE guidelines and paved the way for a new standard of care across the UK and internationally.



President Alice Gast with the winners

## DIARY

**As a result of the worldwide COVID-19 pandemic, events in most locations have been cancelled for the next few weeks. It is not clear, at the time of going to press, when restrictions will be lifted and normal life will resume. We have therefore not included events below that have already been cancelled or are likely to have been cancelled by the time this issue of IE is published. Before considering attending any event, please contact the organisers to check whether the event is still taking place.**

**Please note that the the Great Exhibition Road Festival, Alumni Weekend and Alumni Weekend Global Celebrations which were due to take place on 4 and 5 July have all been cancelled (see page 13 for more details)**

### RSMA Toronto, Canada

Informal RSM meeting, noon, Last Friday of every month.  
Jason George Pub, 100 Front Street East, Toronto  
Contact: rsmat1851@gmail.com

### RSMA Perth, Australia

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

### Imperial Engineering Alumni

Quarterly Johannesburg Lunch  
Baron & Quail, Woodmead, Johannesburg, South Africa  
Contact Richard Gundersen@yabo.co.za

### Mon, 8 Jun CGCA AGM & President's Evening

17:30 AGM; 18:00 Presentation on *Managing Black Swans*, by new CGCA President Atula Abeysekera  
The CGCA AGM will go ahead but will be an audio/tele conference. In addition from 18:00 to 19:00, Atula will use the same facility to give his talk, based on his very relevant 'Black Swans' paper.  
Details of the conference facility will be posted on the CGCA website, Facebook page and LinkedIn as soon as possible. Both telephone and internet access will be available. As the AGM is going ahead as scheduled, members are reminded that nominations for committee roles should be lodged with the Hon Sec by 7<sup>th</sup> May.

### Thurs, 25 Jun RSMA AGM & Final Year BBQ

18:00 AGM; 19:00 Final Year BBQ  
Both events are scheduled to be in the Union Bar, Beit Quad, Imperial College.  
Obviously, given the current situation these dates, times and venues may change. As and when the situation becomes clearer a further communication to members will be made. For example options may include a Webex or similar video conference type arrangement for the AGM.

### Sat, 21 Nov CGCA Reunion lunch

Polish Club, Exhibition Road  
The three course lunch with aperitifs and wine will be open to anyone graduating in a year ending 5 or 0 and 4 or 9 too.  
Tickets are £47.50 each or £45 for groups of five or more. Booking form and an Eventbrite page will be available shortly.

### Fri, 27 Nov RSMA 136th Annual Dinner

Rembrandt Hotel, South Kensington, London  
Details: TBD

An up-to-date calendar of events of interest to CGCA and RSMA members is always available on the CGCA and RSMA websites. Imperial College maintains a calendar of college events at [bit.ly/IE-ImperialEvents](http://bit.ly/IE-ImperialEvents) and the Friends of Imperial College regularly organise events of interest to alumni (see [bit.ly/IE-FOI](http://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**

## OBITUARIES

### An early fascination with engineering: harpoon guns, gun powder and rockets!



DAVID MICHAEL CURTIS (Mech Eng 59-62)

David was born on April 30, 1940, and had a very lucky escape; the delivery room in which he had been born was completely destroyed when a German bomber crashed on it only a few hours later (sadly the crash did cause the first civilian casualties of the Second World War).

Growing up in Clacton-on-Sea, David showed an early talent for engineering. At the age of 12, he rigged up an alarm in his bedroom that would allow him to put out his light and feign sleep when his parents returned home after bed-time. He later built a harpoon gun with which he accidentally demolished the garden fence. He went on to create his own gunpowder and construct rockets which were fired using an old drainpipe, reaching an altitude of a hundred feet or more. When aged about 16, he built a canoe, and invited a girl from school to accompany him in it on a sea trip – that girl was Jenny, whom he went on to marry some seven years later.

Not being interested in joining his father's business, David decided to leave school at 16 so that he could obtain a job as a lab assistant, and go on to become a scientist. But his head teacher thought otherwise, persuading his parents to let him remain in school. He went on to achieve excellent A-level results, a State Scholarship and a place at City & Guilds College to study mechanical engineering. Jenny followed him to London a year later, having obtained a place to study at Goldsmiths College.

David and Jenny were married in 1963 and their son Michael was born in 1965. In 1967, the family moved to the Netherlands, where David headed up the computing section of a US company. Part of his work there involved using computers to assist in complex calculations in structural engineering projects, and in 1969 he wrote an article for the

Times, on this avant garde work.

By 1968, the family had moved back to the UK, where daughter Nicole was born. David was now working for Oscar Faber Computer Operations Limited in St Albans, and by 1969 was Managing Director of that operation. Some ten years or more later, a subsequent move took him to Essex County Council where he became the Energy Manager, responsible for ensuring energy efficiency across a large portfolio of schools and public buildings, which included his old school in Clacton (where, on an official visit to the school he was somewhat taken aback to see his name on the 'Roll of Honour!'). David subsequently moved on to take up a position as a Section Head in the Building Research Establishment at Garston, and it was from this position that he retired.

David & Jenny had bought a plot of land in the South of France, and in the 1980s they started to build a house there, where the family had many happy holidays. David had excellent DIY skills, and these were put to good use both in the UK and in France. He also learned and became fluent in French, holding his own with the natives in their Catalan accent. A life member of CGCA, David threw himself into various roles, including organising the Annual Dinner for a number of years, and serving as a member of the Old Centralians' Trust Board, as well as an all-important job as a member of the Association's Wine Committee. In retirement, he enjoyed being a member of the British Section of the 'French Civils' – now known as the 'Ingénieurs et Scientifiques de France' (IESF), and he and Jenny were enthusiastic participants in the twice-yearly 'Voyages' around that country.

David died on October 25, 2019, at the age of 79. He is mourned by Jenny, their two children and five grandchildren.

### A career in telecomms research

Prof DAVID SIDNEY CHEESEMAN (Elec Eng 58-61)

David Cheeseman was born in London in 1931, and brought up in Wembley.

As a young boy, David enjoyed going to see Speedway Races at Wembley Stadium where his father would often be on duty as a member of the British Red Cross Society.

He was a pupil at Wembley Hill School, which was destroyed, albeit not completely demolished, by a German 'doodle bug' bomb (a 'V1') in 1944, although by then he had left school to study at Willesden College of Technology.

David left Willesden in 1947, at the age of 16, taking up a traineeship with Post Office Telephones. It can be assumed that he will have carried out National Service, before taking up training at the Post Office Research Centre in Dollis Hill. In 1958, at the age of 28, he attended City & Guilds College from where he graduated in 1961 with his BSc (Eng) (Hons) in Electrical Engineering, and the Associateship of the City & Guilds of London Institute (ACGI). Professionally, he became a full Member of the Institution of Electrical Engineers (MIEE) in 1964. He later received an Honorary Fellowship from Liverpool John Moores University.

David spent the remainder of his career with the Post Office Research Department (subsequently known as British Telecom), and worked for



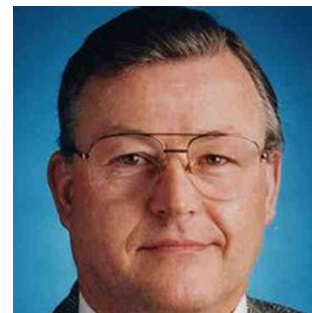
BT until his retirement at the age of 60. He rose to a senior level in telecommunications research, and, amongst other things, worked on digital exchanges and cellular networks, as well as being in charge of the microprocessor development group.

In the latter part of his career he travelled the world attending international standards conferences, something he continued after retirement as a consultant to a US telecommunications company.

Outside his professional life, he chaired the local parish council for many years and edited the BT retired section newsletter.

David is survived by his wife Dera, his sons Philip and Nigel, and by his two grandsons.

### Engineer, Mathematician and Scientist



Eur Ing Prof EDWARD VINCENT STANSFIELD (Elec Eng 67-70) PhD, DIC, BA, FIMA CSci CMath

Edward Stansfield was born in August, 1946.

After gaining a first degree in electrical engineering from UCL in 1967, Edward spent his summer vacation working on an aircraft blind landing system. Between 1967 and 1971 he studied speech recognition at Imperial College for his PhD. Between 1971 and 1980 he worked in The Netherlands on military voice

and data communications, after which he joined Racal Research (now Thales) in Reading.

In more than 31 years with Racal and Thales, he worked on the design and analysis of algorithms for communications, navigation and other systems. During this period, he filed one patent on Direction Finding Systems, and was co-author of another patent on a similar area of expertise.

In his spare time he studied pure and applied mathematics for his BA degree from the Open University. In his retirement, he continued to be active as a Councillor for the Institute of Mathematics and was a Visiting Professor in the School of Systems Engineering at Reading University. Edward was a Chartered Engineer, Mathematician and Scientist, and had been a member of CGCA for over 30 years.

Edward died very recently, at the age of 73.



# Always kind and ethical, a philanthropist



MIKE (SLIM) COWARD (Metallurgy 61-63)

Many will be saddened to hear of the death of Mike Coward, who died at his home in Pawley's Island, South Carolina on December 7, 2019, surrounded by his family.

Michael Coward was born to Dorothy and Ronald Coward in Finchley, London, during 'The Blitz', when the German air force was dropping bombs in an attempt to destroy the city. As his mother struggled alone in a hospital bed to give birth to her breech baby, on September 14, 1940, a bomb fell nearby but miraculously failed to detonate.

Mike 'Slim' Coward attended High Wycombe Royal Grammar School, and won a scholarship to Imperial

College. At school, he was good friends with Nigel 'Gravy' Gravette and David 'Ghosty' Craft, who also won scholarships to Imperial at the same time. Mike and Nigel both studied Metallurgy at RSM, while David studied Physics at RCS. Another RSM metallurgy student, John 'Ben' Goode, who came from the Bristol region, also met and joined this close group of friends.

The group enjoyed many escapades together while at college, including founding an Imperial College Caving Club, going on multiple weekend trips to explore caves in Yorkshire and the Mendips, delving into the Deneholes, in Thurrock, near London, and even investigating the South Kensington sewer system late one night, entering via a manhole in the pavement close to the RSM entrance, fortunately just out of sight of the RSM night security guard's office!

Mike, David, Nigel and John all shared accommodation in London at various periods during their time at Imperial, and subsequently all remained in touch, even though later separated by great distances. Fortunately, all four friends happened to be in the same continent on the occasion of Mike's 70th birthday, and were then all still in more-or-less reasonable health, so they met

up once more with their respective wives at Mike's beautiful house in South Carolina, for a reunion.

Shortly after Mike graduated from Imperial with a BSc in Engineering in 1963, he was accepted for a three-month work program in Australia. He enjoyed Australia so much that he stayed there for two years.

Returning to the UK, Mike was offered a research position at Cranfield University, in welding metallurgy and, after two years, was awarded an MPhil in Engineering from Imperial College for his work there. During this time, he met his future wife, Janice, and they were married on March 18, 1967. Mike was subsequently accepted into Sheffield University's doctoral program and in 1970 was awarded a PhD. By then, their first daughter, Holly, was part of the family.

In 1970, Inland Steel offered Mike a job in their research department and the family relocated from England to Chicago, Illinois. A year later a second daughter, Juliet, was born. In 1975, what was then Georgetown Steel, owned by Willy Korf of Germany, offered Mike the position of Manager of Research and Development with the goal of working with all Korf steel mills internationally.

In October, 1978, Mike left

Georgetown Steel to start his own company, Coastal Wire. Originally located in Andrews, South Carolina, the manufacturing company initially made high carbon spring wire. After a year, they moved into the growing recycling industry, producing high strength annealed wire used for tying up bales of recyclable products such as paper and cardboard. Forty-one years later, the company is located in Georgetown, South Carolina, is very successful, and is managed by Mike's son-in-law.

In 2015, Janice and Michael decided to give something back to their community by founding the Coward Family Vision Center at Smith Medical Clinic, in South Carolina. It serves low-income residents of Georgetown County in need of vision care, and provides eye glasses and any needed surgery.

Mike was always a kind and ethical individual, treating his family, his friends, his professional associates, and his employees with the greatest courtesy and respect. He is a credit to his school, his university and his local community.

In addition to Janice, his treasured artist and philanthropist wife of 52 years, Mike leaves his two wonderful daughters and four grandchildren.

He will be greatly missed.

## A passionate rower, skier and windsurfer

Eur Ing THOMAS JOHN (TOM) GILBERT (Chem Eng 48-53) DIC MSc

Tom was a life member of CGCA and a regular attendee at Annual Dinners until a few years ago.

Born on May 4, 1929, his early education was in German, as his father was working in Vienna. The family later moved to Paris, where he attended a French school, learning French and even receiving a prize for his spoken French. Before the start of WW2 the family, now including a younger brother, John, returned to London where Tom started at prep school. On the outbreak of war, the school was evacuated to the South Coast, but Tom's father sent his wife and the two boys to live near Derwentwater, so Tom attended school in Keswick and gained a lifetime love for the Lake District. Back in London after the war, he attended St Paul's School, then came to City & Guilds College to study Chemical Engineering.

As a young child, Tom had learned to ski and to sail and, at St Paul's, he took up rowing as his chosen sport, making rapid progress. By 1947, he was rowing at Bow in the school's First Eight, which became known

as 'The Champions of the Tideway', winning the Schools' Head of the River and competing at Henley Regatta. At Imperial, Tom joined both the City & Guilds and Imperial College Boat Clubs, and served as Secretary of the City & Guilds club for two years. At various times throughout his subsequent career, rowing, skiing, and windsurfing comprised a large part of his recreational life. He regularly attended Henley Regatta and spent many holidays skiing.

After National Service in the REME, Tom continued as a member of the Territorial Army and was awarded the Territorial Decoration, which he wore with pride – including when he attended the Centenary celebrations of the Imperial College Boat Club in Spring 2019, receiving a standing ovation from 340 club members and alumni as – just short of his 90th birthday – the oldest veteran oarsman present.

In his professional career, Tom worked as a process engineer for ICI, Power Gas Corporation and Pritchard Rhodes, before joining Bechtel in the mid 1970s, rising to be a senior project manager. Apart from UK projects, his work also took

him to Indonesia, Norway and Saudi Arabia. In the mid 1980s he took the opportunity to work in Oslo for a year with John Brown, on the design of Norsk Hydro's Oseberg B Drilling Platform – a period that afforded him the opportunity to ski regularly in winter and wind-surf in summer. By happy coincidence, whilst in Norway his lifelong rowing friend Jan Smulders (Mech Eng 45-50) was working as a senior manager, for a different company, on the parallel Oseberg A project, and based just a few miles away.

Whilst working at ICI Billingham in 1963, Tom met his future wife Judy. They married in October 1964 and enjoyed over 55 years of marriage.

Most of the content of this obituary has been provided by Tom's son Peter, who followed his father to Imperial in 1984 to study Mechanical Engineering and who is also a life member of CGCA.

Tom died on December 9, 2019 aged 90, and is mourned by Judy, their three children and six grandchildren.



L to R: Jan Smulders, Pete Swash and Tom Gilbert at Henley Regatta

# Always ready to explain even the most difficult concepts in terms of easily understood ideas

Prof NICOS CHRISTOFIDES (Elec Eng 60-66)

Nicos was born in 1942. He left his native Cyprus to take A-level courses in Folkestone and, in 1960, began his lifelong association with Imperial by winning a scholarship to study Electrical Engineering.

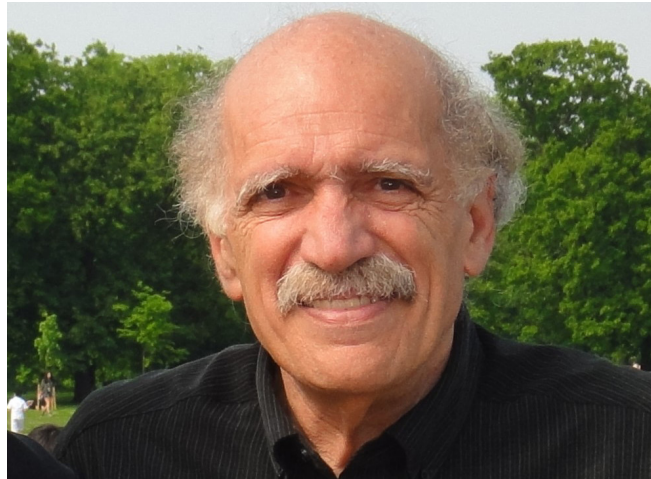
After graduating with First Class Honours in 1964, he stayed in Electrical Engineering to complete a PhD titled 'The origins of load losses in induction motors with cast aluminium rotors' under a joint supervision that involved the renowned scientist and Nobel Prize winner Dennis Gabor, for which he was awarded the Ferranti medal. Even though several of his later publications received more prestigious awards, he fondly recalled this particular ceremony as it was the first official event that he attended with his girlfriend and future wife, Ann.

In 1968, he changed focus towards a different problem area, by taking a lectureship in the Management Engineering Section of Mechanical Engineering (which evolved into the Department of Management Science, the Management School, and finally the Business School).

Here Nicos started his work in combinatorial optimisation and graph theory, an area where practical problems are often so complex that they cannot be easily solved optimally. Nicos, together with department head Sam Eilon, were pioneers in vehicle routing algorithms. In 1971, Nicos published his first book with Sam: 'Distribution Management: mathematical modelling and practical analysis'.

Nicos is perhaps best known for the Travelling Salesman Problem (TSP). A classic example of these computationally difficult problems, it is one of the most intensively studied problems in optimisation:

The salesman has to find the shortest route to visit a set of towns, visiting each town exactly once and coming back to the beginning. In a world where small computers were the size of a wardrobe, vehicle routing (a version of the TSP) was an early application of graph theory. Unfortunately, even though Nicos had devised innovative algorithms, the necessary coordinate data were not yet available. His sons still recall the months, if not years, where the family dining room table was covered with maps, coloured pens and tracing paper as Nicos and his wife spent many evenings digitising the UK road system, where junctions became nodes, roads became arcs. It was at this time that fundamental



new ideas on his famous work on bounds on Travelling Salesman were formed and fuelled.

In 1975, Nicos published his seminal and pioneering book, 'Graph Theory: An Algorithmic Approach'. Shortly afterwards, Nicos and his family took a sabbatical year in North America visiting several universities and developing research projects. He held visiting professor positions at a number of major US universities with visits to Carnegie-Mellon, University of Rochester, Berkeley and Stanford. It was during his time working on the TSP, among other combinatorial optimisation problems, that he made his lasting friendships with mathematicians George Dantzig, and Don Knuth.

Nicos worked on finding upper and lower bounds for an optimal solution for the TSP which was put together as a hastily prepared conference presentation following strong encouragement from his friends. A famous and longer version of the conference presentation was prepared during this sabbatical, 'Worst-case analysis of a new heuristic for the travelling salesman problem' and was first published as a research report in 1976 at Carnegie-Mellon, where he was visiting the Management Sciences Research Group.

Nicos never published this paper in an academic journal, apparently one journal accepted the paper with a few minor corrections, but he never got around to making the corrections! He called the algorithm related to this bound 'the three-halves bound' and it is now known as 'The Christofides Algorithm', which found a circuit for the salesman that was less than 1½ times longer than the optimal solution. In the general case, The Christofides Algorithm still remains the best 'worst-case' scenario.

Nicos' graph theory algorithms were applied to routing vehicles,

unloading oil tankers, packing containers, cutting fabric, network flows and warehouse logistics among other things. Nearly 50 years ago, Nicos developed, and fully commercialised, industrial quality vehicle routing software, that is still used today.

During the 1970s and 1980s, Nicos helped create SOGESTA, a research centre in Urbino, Italy, and supervised many research students who explored the developing field of heuristic algorithms for problems in areas such as vehicle routing and two-dimensional cutting. In 1979, Nicos released his third book 'Combinatorial Optimization'.

In 1982, he became Professor of Operational Research.

During the 1980s, Nicos started his work on the analysis of images, condensing an image to a combination of basic shapes. Over the following decades, he developed algorithms for image compression that allowed images to be stored using a fraction of the memory taken by the raw image. The crucial property of this compression was that the image could be restored with no, or a *priori* controllable, information loss. If images are created at vast expense and need to be transmitted as efficiently as possible without loss of quality, for example from a space probe, this no loss property is very attractive. As a result, Nicos did consultancy and had contracts with NASA and IBM relating to his Image Compression work.

In parallel with his academic career, Nicos was always very active in consulting for industry in a wide range of operational research projects.

Nicos had a unique ability of explaining elaborate and mathematically complex problems to the layman in a way that made extremely hard solutions sound easy. This skill naturally led him to

forge extensive relationships with business leaders and he consulted for a diverse set of industries, including the Oil and Gas sector (BP, ENI, PTT), Government Agencies (NASA, Centre for Disease Control), Telecoms (BT, C&W) and nearly every major multinational bank in the Financial Sector.

In 1990, Nicos and Gerry Salkin set up the Centre for Quantitative Finance (CQF) within the Management School, which he then directed for 17 years. The CQF was one of the largest and most highly respected research groups in finance in the world and was sponsored by a large number of distinguished American, European and Japanese financial institutions and corporates. Nicos's focus was on supervising PhD students in tackling 'real world' problems in financial mathematics and risk management. The centre was unique at the time, as it placed students within financial institutions, requiring the organisations to pay for the student's university fees along with a small salary. Scores of CQF PhD alumni are now spread throughout finance centres worldwide. In total, Nicos was involved in the supervision of over 200 PhD students.

Very popular as a teacher, Nicos was always ready to explain even the most difficult concepts in terms of easily understood ideas. It is said by his long-standing friend from Imperial College, Professor Tony Constantinides, that "the best way to learn from Nicos is to disagree with him".

Aside from work, Nicos was a renaissance man with an encyclopaedic general knowledge and was a prolific reader and writer. He enjoyed both the art and science of photography and collected fountain pens and leather-bound journals in which he wrote exquisite and detailed academic notes. He also had an extensive collection of marbles and wooden tops from his childhood, with which he would often try to impress his grandchildren.

Nicos was Professor Emeritus of Quantitative Finance at Imperial, having retired in 2009. During his academic career he had published over 150 papers in quality journals and four books on optimisation and quantitative finance.

In 2018, Nicos was devastated by the illness and death of his wife, Ann, but resolved to keep working hard until his death the following year.

His two sons, Alexander and Simon, and three grandchildren survive him.

# Always cheerful and uncomplaining; an example for us all



DAVID (DAI) THOMAS (Mining 55-58)

Dai Thomas was born into the Welsh mining industry in Tredegar and was awarded a National Coal Board scholarship to the Royal School of Mines.

He was a popular and enthusiastic participant of life at the RSM, socially and as a prop forward. He loved rugby.

Dai left the RSM in 1958 and joined the NCB on their graduate management training scheme. By 1965, he was an undermanager. But by 1967 the writing was on the wall for the coalmining industry in the UK. Dai left the Coal Board in 1967 and joined the Mineral Valuation Office of the Inland Revenue.

Then, in 1971, Dai moved to Amalgamated Roadstone Corporation Ltd., a subsidiary of Consolidated Goldfields, which was acquiring private quarry companies in the UK. The company became the largest quarrying company in the country.

Initially Deputy Group Lands Manager, Dai was promoted to

Group Lands Manager until 1999 when he was appointed Head of Natural Resources, based in the Head Office at Chipping Sodbury near Bristol.

Dai was responsible for providing professional services in lands and planning, land survey, geology and the environment across the Group. This involved the supervision of a considerable multidisciplinary team scattered across the country.

Dai survived the takeover of Consolidated Gold Fields by Hanson in 1989.

He spent much time representing the company on various professional bodies and trade associations, including 15 years on the CBI Minerals Committee.

In 1991, he became a Member of the Royal Town Planning Institute to enable him to give evidence at public inquiries into planning appeals following refusal of planning permission for quarrying.

Dai married Maureen in 1963. They had two daughters: Elizabeth, now a Senior Radiographer; and Anne, now Professor of Oncology at Leicester University; and four grandchildren. Sadly, Maureen died in December, 2016.

Dai retired in 2002 and took up golf and bowls and managed to enjoy both these pastimes in spite of kidney failure and enduring many years of self-dialysis.

Late last year, complications developed and led to a series of mini strokes; Dai was admitted to hospital and died peacefully on February 17, aged 82.

Throughout his years of ill health Dai remained cheerful and uncomplaining; an example for us all.

Dai will be sadly missed by family and friends, and by his fellow RSM mining graduates of 1958.



ALFRED (ALF) PERRY (Civil Eng 71-74)

Alf has been described by a colleague as:

'A thoroughly reliable structural engineer of vast experience, particularly in relation to bridges of all types. He made quick and wise decisions if he had sufficient information, and if not he would ask the right questions, judging the validity of answers carefully. He was a gentleman at all times, and had a great sense of humour.'

Alf was born in December, 1951, the son of railwayman, Douglas Perry, and his wife, Joan (nee Marwood). He was raised in Totnes, Devon, before a British Rail scholarship took him to Imperial College, to study Civil Engineering.

On graduation, Alf worked at British Rail for two years, before joining OveArup, where he remained until his retirement in 2009.

Throughout a varied career, Alf was involved in many projects, including: the design of the Hopewell Centre, Hong Kong (which, at

the time, was the tallest building in south-east Asia); the Cribbs Causeway shopping centre, in Bristol; Opel car factories in Poland and Thailand; and the redesign of Potsdamer Platz, in Berlin.

Alongside his commercial work, Alf pursued a keen interest in 19th-century engineering. He served as a trustee of the Clifton Suspension Bridge, and was involved in efforts to restore the Brunel Swivel Bridge (known as BOB, Brunel's other bridge).

It was while working in Hong Kong that Alf met Nancy Copplestone, his future wife, and discovered sailing, a shared enthusiasm of theirs. On their return to the UK, Alf and Nancy eventually settled in Bristol.

Alf's intellect was matched by a predisposition to understand the situation of those around him. He was a loving and supportive father, dependably calm, and gentle.

Alf died peacefully, on November 2, 2016, at the age of 64. His family were all with him.

## NOTICES IN BRIEF

BILL BRANDUM (Mining 48-51)

Bill was captain of RSM Boxing in 1950. In the 1960's, he worked in the mines near the Ottawa valley in Canada. From there, he was transferred by Pickands Mather to Cleveland, Ohio, where he eventually retired. He passed away, in Lewiston, New York, on February 19, 2020 at the age of 94.

PETER CLARK (Oil Tech 50-53)

Peter was the captain of the RSM RFC 1952-53. He passed away in early February, 2020.

Dr BILL FRANKLAND MBE

Born in Battle on 19 March 1912, Bill was Imperial's oldest alumnus. He studied Medicine at Oxford, then worked at St Mary's Hospital Medical School. In a 70-year career his work on immunology led to him becoming regarded as the 'grandfather of allergy'. He died on April 2<sup>nd</sup>, only days after his 108<sup>th</sup> birthday.

MICHAEL MEREDITH EVANS (Chem Eng 60-65)

CGCA has only recently been notified of the death of Michael Meredith Evans, who died on April 5, 2009, at the age of 67. Michael was born on August 18, 1941, studied Chemical Engineering at Imperial and was a Life Member of CGCA. He was for some years a Vice-President of Montrusco Associates (now Montrusco Bolton Investments), based in Montreal, Canada. Michael is survived by his wife, Claudette Sergerie.

TREVOR JOHN YATES (Elec Eng 71-74)

Trevor was born on December 1, 1952. He worked as an audit manager for the Save and Prosper Group, and was a member of CGCA. He died on December 28, 2017, at the age of 65 and is mourned by his wife Denise, and sons, David and Paul.

## 'A life well lived'

CHRISTOPHER TERREL WYATT (Civil Eng 56-57) DIC FEng, BSc(Eng), FICE, FIStructE

Christopher was born on July 17, 1927, in Ewell, Surrey, the son of Lionel H. Wyatt and Audrey Vere Wyatt.

Educated at Kingston Grammar School and Battersea Polytechnic, Christopher studied for a DIC in Civil Engineering at Imperial.

A member of CGCA, Christopher spent much of his professional life with the Costain group, serving

as Deputy Chairman and Chief Executive, and from 1987 to 1992 was a Chairman and Chief Executive of WVS Atkins.

Christopher married Geertruida Wilier in 1970.

He died peacefully on November 21, 2019 aged 92, a much loved husband, father, grandfather and great grandfather.

Christopher will be hugely missed by his family and many friends, a life well lived.

