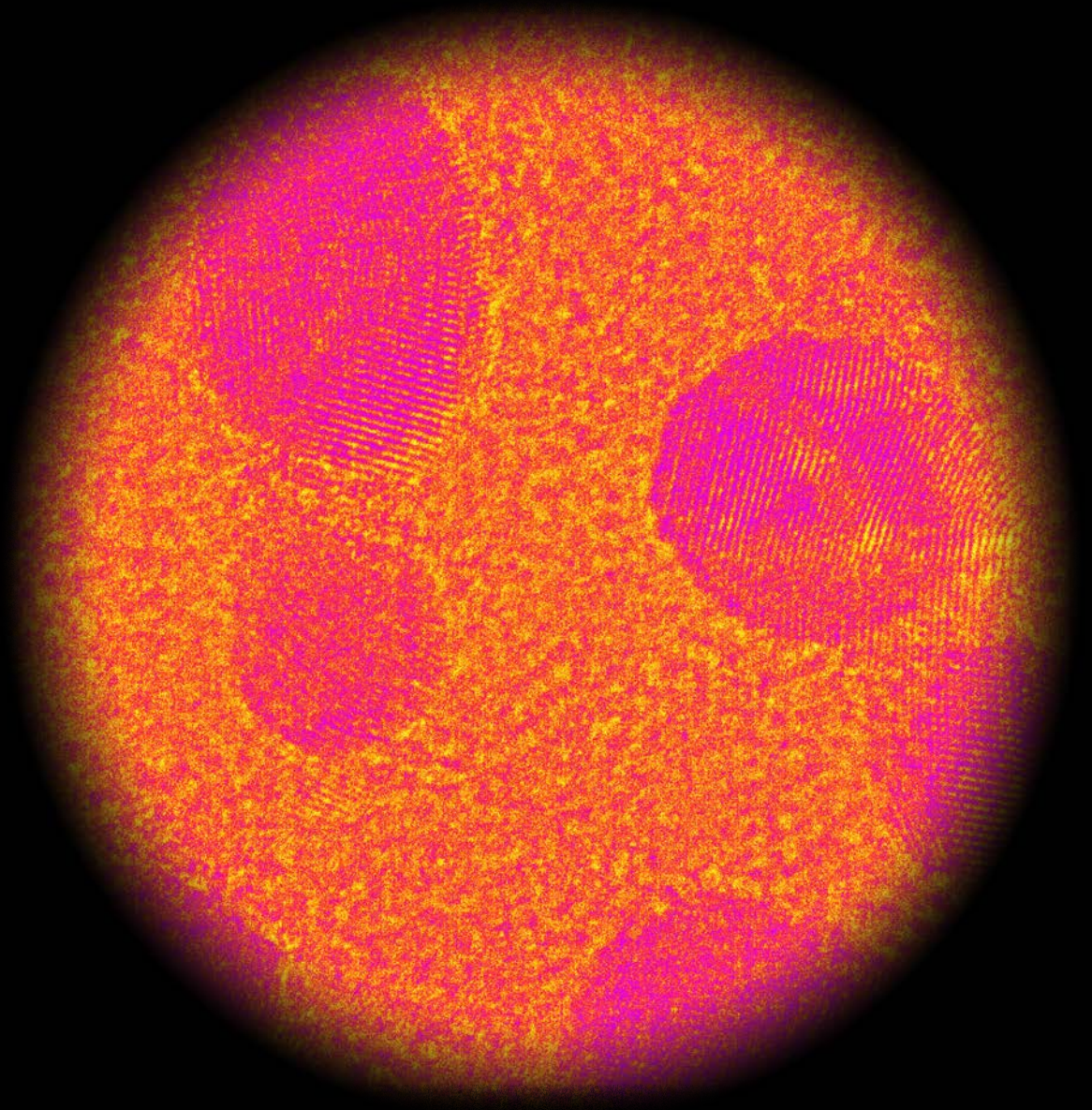
UCL

Chemistry **NEWSLETTER**



Technical Showcase

Special Feature

Celebrating the teams that keep our teaching labs and facilities running smoothly

Saying Goodbye
Farewell to Prof. Alwyn Davies

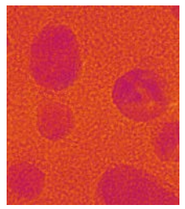
The World of Organic Semiconductors
Chemical Physical Society
Manufacturing Futures at UCL East

Contents

Cover Image

Gold nano particles on carbon, taken on the EJOL 2200 FS with the Gatan K2 IS detector

Image supplied by Dr Andy Stewart, TEM Facility Manager



Welcome

I'm writing the welcome to this year's newsletter having recently returned from a relaxing holiday in Kefalonia, which I greatly enjoyed since it was the first summer holiday abroad for 4 years! It's been good to see staff and students heading off to in person conferences again and we've enjoyed more in person teaching and events this past academic year. We tried out a new event this year, the UCL Chemistry Postgraduate Symposium which brought together our research school. The 3rd year PhD students all gave research talks and the 2nd year PhD students presented a poster on their research. There was a terrific buzz in the room and the students enjoyed the opportunity to interact with other year groups. I have already heard of collaborations which have developed from discussions between students from different research groups and this event will be developed further next year. It was also pleasing to see more research groups and laboratories in the department embracing UCL's LEAF (Laboratory Efficiency Assessment Framework) with 3 laboratories gaining Gold awards and 4 a Silver award.

This year we had an Internal Quality Review (IQR). It has been a challenging time over the past few years due to the effects of Covid and large student numbers. I was therefore delighted that the IQR panel had a positive impression of the department, commenting that it was a lovely department, with a great atmosphere, with colleagues speaking warmly about the department and that the professional services and technical staff were clearly valued. The panel were particularly struck by the chemical education team - the dedication, imagination, innovation, and weekly connected learning meetings. I am very grateful to Dr Stephen Potts, Professor Dewi Lewis, Professor Katherine Holt and Dr Anna Roffey for their efforts with preparing all the documentation.

We had a few retirements and leavers this year. Professor Jim Anderson, Professor Steve Caddick, Dr Steve Firth, and Martin Vickers took early retirement. Professor Dewi Lewis will also be retiring in September and Professor David Scanlon and Dr Gemma-Louise Davies moved to new positions at the University of Birmingham. Daniel Underwood (Senior Research Administrator), Frank Otto (Computational Support Officer), Lillian Anyadi (Education Administrator), Mike Kelly (Senior Education Administrator) and Yael Moscou (Deputy Departmental Manager) left the Department to take up new positions (many staying at UCL). Dr Rachel Crespo-Otero (Associate Professor), Dr Keith Butler (Associate Professor), Dr Guido Bolognesi (Associate Professor) and Dr Guanjie He (Lecturer) joined the academic staff along with Dr Adam Clancy (proleptic Lecturer and Royal Society URF) and Dr Fabrizia Foglia (proleptic Lecturer and EPSRC Research Fellow). Dr David Palomas Dona (Lecturer(teaching)) and Dr Michele Crotti (Lecturer) have been appointed as part of our expansion into UCL East with our new MSc in Chemical Sustainability starting September 2023 and Dr Sam Cassidy (Associate Lecturer (teaching)) has recently started in the inorganic section. Rafid Mahdi (Deputy Departmental Manager), Tulika Gupta (Computational Support Officer), Anastasia Vasoleiou (Research Administrator) and Richard Colquhoun (Senior Research Administrator) joined the professional services team along with Dr Xueming Xia as an Experimental Officer for SEM and Dr Jamie Gould as our new XRD Facility Manager. Matt Nolan moved to the new position of Senior Education Administrator and Rhianna Betts to Education Administrator. This academic year we were pleased that three new Experimental Officers - Dr Faiza Habib, Dr Aseel Al-Qutbi and Dr Jasper Fairchild started to provide support within the teaching laboratories.

Professor Tom Shepperd was awarded the 2023 SCI Process Chemistry Award and Finden Ltd, a British scientific consultancy led by Professor Andy Beale, received the RSC 2023 Analytical Science Horizon Prize: Sir George Stokes Prize. Dr Daniel Wilson will join us with a Royal Commission for the Exhibition of 1851 fellowship (our 2nd Fellowship announcment is still under embargo at the time of press). Professor Richard Catlow was elected a fellow of the International Science Council and Professor Peter Coveney was elected Fellow of the Royal Academy of Engineering. Congratulations also goes to those who were promoted in the Senior Promotions this year: Dr Matt Blunt to Associate Professor, Dr Yang Xu to Associate Professor, Dr Kerstin Sander to Associate Professor and Dr Vicky Hilborne to Associate Professor (Teaching).

We exceeded last years record intake of undergraduate students with 240 students joining us at the start of the 2022/21 academic year but this coming academic year we will return to our usual target.

I thank all the staff for their hard work through this past academic year and look forward to welcoming all the new students as we move into the new academic year. I wish you all the best for 2023/24 academic year.

Professor Claire Carmalt, Head of Department

Staff Update

New Staff

Dr Guanje He
Associate Professor in Materials Chemistry

Dr Guanjie He is an Associate Professor in Materials Chemistry, a Fellow of the Institute of Materials, Minerals and Mining, and a prestigious ERC Starting Grant Awardee at UCL. He has made significant contributions to the generation of new methodologies and knowledge in the field of functional materials synthesis and device innovation for aqueous electrochemical energy storage (EES) applications, including batteries, supercapacitors, and their hybrid devices, to generate best-in-class performance and promote the industrialisation for sustainable and safe EES. He has developed new cathode materials and electrolyte components for Zn-ion batteries, many of which have promising potential for industrialisation. He also has developed in-situ characterisation tools to understand electrochemical behaviours within batteries and electrocatalysts.

Notably, his work on Ni, Co-based sulfide nanostructures in aqueous electrolytes proposing a rechargeable alkaline battery mechanism has been recognized as one of the most accessed papers. Additionally, his research on new high-capacity Zn-ion battery cathodes and other studies on ZIB cathodes have been featured as frontispieces, front cover stories, and HOT papers in leading journals, garnering attention from media outlets and the research community. Dr He has pursued interdisciplinary approaches to tackle complex challenges in materials chemistry and energy storage. The impact of his work extends beyond academic recognition, contributing to advancements in energy storage technology with potential implications for a sustainable future.

Dr He has published over 120 research articles in internationally recognized journals such as Joule, Nat. Commun., Angew, and Energy Environ. Sci. Dr He has also organized workshops and international conferences, such as CSCST Annual Conference 2023 and EMRS 2023/2022. Dr. He is serving as an Associate Editor for Battery Energy (a Wiley journal), and a Guest Editor for journals including Batteries, Molecules, Frontiers in Materials, and Frontiers in Chemistry. Moreover, he received Young Leaders Committee of Energy & Environmental Materials and the Youth Editorial Board of Green Energy & Environment, Emerging Investigator Awards (Journal of Material Chemistry, Nanoscale), RINENG Young Investigator Award, Mitacs Globalink Research Award, DRA-ABTA Doctoral Research Award, and two STFC Futures Early Career Awards (2018, 2016).

Dr Guido Bolognesi
Associate Professor in Physical Chemistry

His research aims to discover and characterise mass transport processes and interfacial phenomena in soft matter and biological systems, and engineer them to develop new technologies for diagnostics, biosensing and drug delivery.

Guido graduated in Mechanical Engineering from La Sapienza University of Rome. He then carried out an international joint PhD in Theoretical and Applied Mechanics under the supervision of Prof R. Di Leonardo and Prof C. M. Casciola from La Sapienza and Prof L. Bocquet from University Claude Bernard Lyon 1 (UCBL). During his doctoral research, he investigated micron-scale flows by means of optical trapping and digital holography, and liquid flow slippage on superhydrophobic surfaces via particle image velocimetry.

Afterwards, Guido joined as a post-doctoral researcher the group of Prof. Oscar Ces in the Department of Chemistry of Imperial College London, working on the synthesis and optical manipulation of functional droplets and microparticles. At Imperial, he also worked on optofluidic technologies for the construction of 2D/3D droplet and vesicle networks as artificial tissue mimics.

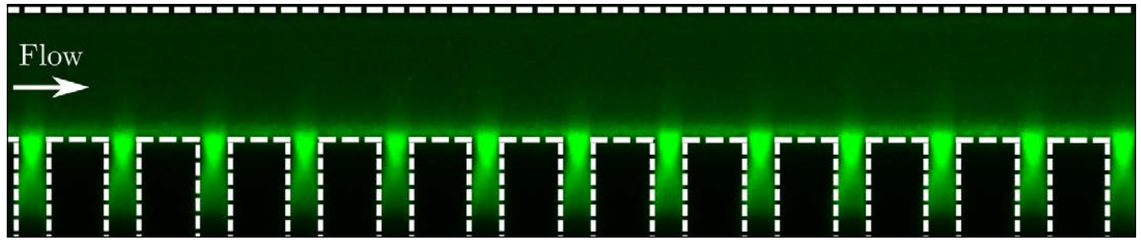
Guido established his own research group at Loughborough University as Lecturer and then Senior Lecturer in Bioengineering. His group's research activities focus on (i) the manipulation of colloids by interfacial mechanisms for bio-analysis, (ii) the optical manipulation of drop/vesicle assemblies for synthetic biology and (iii) the microfluidic synthesis of functional particles for drug delivery. In January 2023, Guido started his new position at UCL Chemistry.

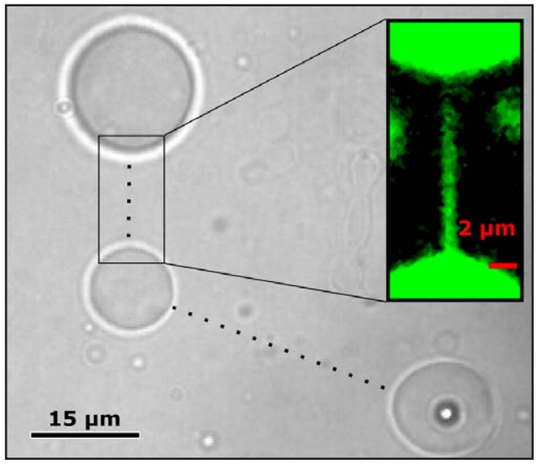
Inside Guido's Lab

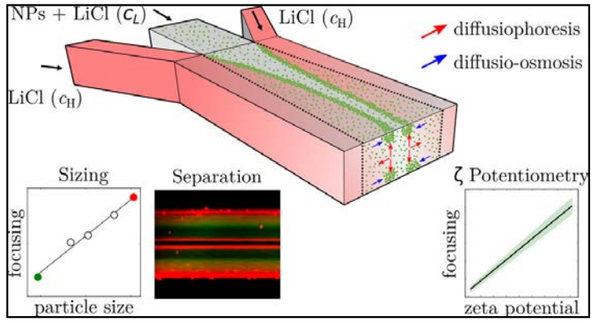
Top: Diffusiophoresis-driven accumulation of green-fluorescence colloids inside the dead-end grooves of a microfluidic device.

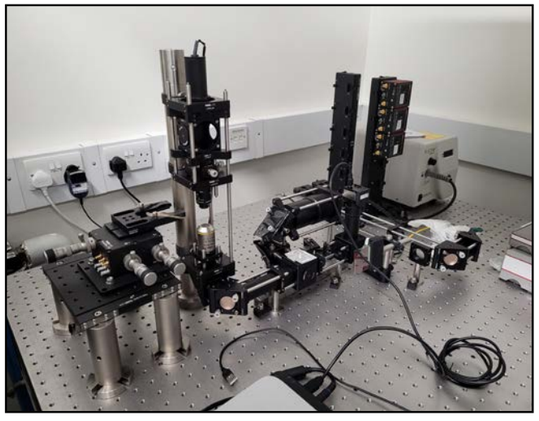
Middle: Optically-assembled droplet-nanotube network (left) and microfluidic device for solute-driven sizing, separation and -potentiometry of colloids (right).

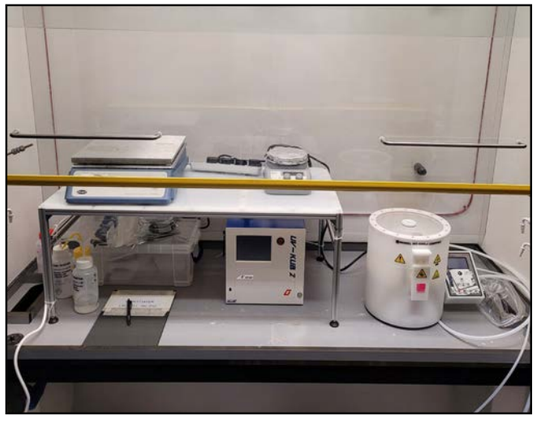
Bottom: Optical trapping and epi-fluorescence modular microscope (left) and photo-lithography station for microfluidic device fabrication (right) in Guido's lab at UCL Chemistry.











Dr Keith Butler

Associate Professor in Computational Materials Chemistry

Keith did an undergraduate degree in Chemistry at Trinity College Dublin, graduating in 2004. In 2006 he came to UCL and did a PhD in Computational Chemistry, under the supervision of Dewi Lewis, studying the nucleation and growth of zeolites. Keith then did post doctoral research in the University of Sheffield with John Harding and the University of Bath with Aron Walsh, during this time he was mostly working on simulations of interfaces in photovoltaics, with a particular interest in crystalling silicon solar and hybrid halide perovskites.

During his time at the University of Bath, Keith became interested in machine learning for the discovery and analysis of new materials. In 2018 he moved to the Rutherford Appleton Laboratory, where he was involved in setting up the scientific machine learning group (SciML). In 2022 Keith moved to Queen Mary University of London as a Senior Lecturer in Green Energy Materials. In 2023 Keith re-joined UCL Chemistry as Associate Professor.

Keith's research focuses on using a combination of data-driven methods (such as deep learning and Bayesian statistics) and quantum mechanics calculations to design new materials on computers and to help accelerate the experimental characterisation of materials. His group (https://mdi-group.github.io/) work with other academics, national facilities and companies. Keith is deputy editor of npj Computational Materials and sits on the editorial board of Machine Learning Science and Technology. Keith is a keen advocate of open science and open software and is involved in the development of several community packages. In his spare time Keith is (overly) obsessed with fermentation, he keeps a stable of several kombucha SOCBYs and will probably try to pickle your lunch if you're not careful!

Dr Fabrizia Foglia

Lecturer in Inorganic and Materials Chemistry

I graduated in Chemistry in Naples, and after one year as a research assistant working on the thermodynamic characterisation of biomolecules, I moved to London to start my PhD at King's College. After a couple of PDRA across London universities, I returned to UCL Chemistry as EPSRC fellow and, more recently, as Lecturer in Inorganic and Material Chemistry. My research focuses on understanding how membrane morphology and local dynamics control transport, to best tailor nanostructures with optimised performance, addressing industrial requirements and demands. This relates to energy conversion with a specific focus on fuel cells and electrolysers, while it can be also extended to separation science and soft matter applications. An essential part of our research is the use and development of advanced neutron techniques to progress a fundamental understanding and, therefore, resolve molecular-level assembly mechanisms and pathways from a structural and dynamical point of view either in situ or under operational conditions.

My research benefits from an extensive network of collaborations at both national and international levels extending from academia, industry, research centers, and to large-scale facilities.

Dr Sam Cassidy

Associate Lecturer (Teaching) in Inorganic Chemistry

Sam completed a BSc in Analytical Chemistry at The Technological University of the Shannon in Limerick, before returning to his home town of Dublin to complete an MSc in Nanotechnology from the Physics Department at University College Dublin. Upon completion of his MSc, Sam joined the Molecular Modelling and Materials Science CDT as part of the Carmalt Parkin Research Group. During his time at UCL Sam completed an MRes and EngD looking at research related to superhydrophobic and antimicrobial surfaces. During his time away from UCL, Sam spent a year teaching at King's College London, where he taught both inorganic and physical chemistry. A large part of his work at KCL was related to outreach and wider participation programmes. As such, he was actively involved in initiatives aimed at increasing the participation of students from traditionally underrepresented groups at both undergraduate and postgraduate levels.

Dr Rachel Crespo-Otero

Associate Professor in Computational Chemistry

Rachel was born and grew up in Havana, Cuba. She studied Chemistry at the University of Havana, where she worked for almost 8 years. She did the PhD within a collaborative program between the University of Havana and the Autonomous University of Madrid under the supervision of Prof. Luis Alberto Montero and Prof. José Manuel García de la Vega. From 2010 to 2013, she worked as a postdoctoral researcher in the group of Prof. Mario Barbatti at the Max Planck Institute for Coal Research (Mülheim an der Ruhr, Germany) on the topic of excited states and non-adiabatic dynamics. In October 2013, she joined the group of Prof. Aron Walsh at the University of Bath (UK) to work on metastable materials and water splitting. She joined the Chemistry department at Queen Mary University of London as a Lecturer in January 2015. In September 2019, she was promoted to Senior Lecturer and in May 2023 joined UCL Chemistry as Associate Lecturer in Computational Chemistry.

Getting to know Rachel in 600 words or less:

On Computational Chemistry, Cooking & Life in London

Describe your research in a few words.
My research involves modelling excited states in organic systems: mostly organic molecular crystals. We try to understand how these systems work, when they emit light and when they don't and why – this is useful to understand lasers, and highly emitting materials in general.

What are you looking to achieve the next 6 months to a year?
We are now trying to finish the implementation of excited state dynamics in the solid state – this has resulted more challenging that initially expected as these types of calculations take a lot of time. Also, we are trying to incorporate machine learning to our code to be able to simulate excited state dynamics for longer timescales. I hope that within a year, we will make further advances in these projects.

How did you get started as a computational chemist?
I got started in computational chemistry because I wasn't very good at experimental chemistry – really, not at all! I struggled with it quite a bit.
I always had a liking for chemistry, especially the theoretical aspects like understanding reactions and mechanisms. However, I was incredibly clumsy in the wet lab and broke lab equipment all the time. At one point, I even considered switching to physics. Computational chemistry turned out to be a great compromise. It's closely related to physics, and it allows me to explore the aspects of chemistry I enjoy, such as reactions and molecular structures, without having to work in a wet lab.

Although I'm not cut out for experimental work in a lab, I've actually been improving my cooking skills. Lately, I've been experimenting with cooking more frequently, especially during the COVID-19 pandemic. I've even started baking more, which is something I hadn't done much before. Surprisingly, I've found that I enjoy it. For the longest time, I couldn't cook at all.

So, I guess I'm making peace with the world of experimental chemistry.

Do you have any tricks/tips for younger chemist?
Stay curious – try and find what you like and try to understand things. Try to find those questions that motivate you and try to answer them. This works for both experimental and computational chemistry. Chemistry is everywhere, and you can find interesting questions anywhere. You must be passionate.

You are from Cuba, lived, worked and studied in Madrid, Mülheimm, Bath and London – all over.
I really like London – I never feel like a foreigner here. London is so open – also expensive! - but there are a lot of possibilities and a world of opportunities.

And your favourite places locally?
I really like the area around Tower Hill. I have lived in East London since 2014 and I really like it, you find everything and there are amazing places to visit.

If there is one aspect of your home that you would transport here, what would it be?
One of the reasons I like Tower Hill is its proximity to the Thames, which reminds me of the sea. In East London, I frequently take walks along the canals to stay close to the water. When I was at the University of Havana, I could see the sea every day. While it's not quite the same here, these walks make me very happy.

Dr Michele Crotti
Lecturer in Chemical Sustainability

Dr. Michele Crotti obtained his Ph.D. in Industrial Chemistry and Chemical Engineering at the Politecnico di Milano (Italy) in 2018, where he conducted research under the supervision of Prof. Francesco G. Gatti and Prof. Brenna. His work focused on the development of chemo- and multi-enzymatic cascade processes for the stereoselective synthesis of biologically active molecules. During his doctoral studies, he had the opportunity to join the research group of Prof. Rudi Fasan as a visiting Ph.D. student at the University of Rochester (NY, USA), where he worked on the engineering of P450 catalysts for the late-stage functionalization of micheliolide.

In April 2018, he moved to the University of Groningen (Netherlands) as a Postdoctoral Researcher in the research group led by Prof. Gerrit Poelarends. His postdoctoral work focused on the engineering of the enzyme 4-oxalcrotonate tautomerase to enhance its promiscuous enzymatic activities for sustainable pharmaceutical production.
Finally, in January 2022, he joined the research group of Dr. Castagnolo at the Department of Chemistry at UCL after being awarded a Marie Skłodowska-Curie Individual Fellowship to work on the directed evolution of methyltransferase enzymes.

Dr. Crotti will start his new position as a Lecturer in Chemical Sustainability at UCL in December, as part of the Department of Chemistry and the Manufacturing Futures Lab.

Dr Adam Clancy
Lecturer in Inorganic and Materials Chemistry

My work revolves around liquid phase solutions of nanomaterials. In contrast to more common, but intrinsically unstable, liquid phase dispersions, the solutions are infinitely stable and innately scalable. The chemistries required to making solutions vary with nanomaterial type, but often involve putting a very strong charge on the surface. These solutions find direct practical application from solar cell additives to high toughness composites, but they also open up a wealth of fundamental problems. We understand how a tiny molecular charged thing dissolves (like why table salt dissolves in water) and we understand how really big charged things are stable (it's how paint works), but neither the big-picture or small-picture approaches explain why charged not-quite-big-but-not-quite-tiny things dissolve. This blurry middle ground where nanomaterials sit is a fascinating area to probe, allowing us push the limits of supercapacitors, look at what happens to liquids when they are stuck by/in/between nanomaterials, and understanding how liquids behave intrinsically. By expanding the chemistries of our nanomaterials, we can control their properties, better tune them for real-world applications, and even occasionally discover brand new nanomaterials!

Dr David Palomas Dona
Lecturer (Teaching) Chemical Sustainability

David is an organic chemist with a background in catalysis and green/sustainable methodologies. He joined UCL as a Lecturer (Teaching) in Chemical Sustainability in April 2023. His Chemistry Education Research centres on Active Learning Inclusive Practices and Lab-based Chemical Education for Sustainability.

Before UCL, David worked as a researcher in Spain (University of Oviedo), Germany (Max Planck Institute for Coal Research, CAT-catalytic centre-Covestro), and the UK (Imperial College-Royal Dutch Shell). His career as an Educator began in 2015 at Queen Mary University of London as a Chemistry Teaching Labs Manager, progressing to Lecturer in Materials Science and Chemistry Education by 2020. Beyond work, David enjoys all things related to tennis and family time with his wife and energetic daughter.

Awards

RSC Awards

Finden Ltd, a British scientific consultancy, led by Prof. Andy Beale (right), received the RSC 2023 Analytical Science Horizon Prize: Sir George Stokes Prize for the development and application of X-ray diffraction computed tomography to image and identify structure-activity relationships within functional materials and devices. The team has achieved significant advancements in X-ray diffraction computed tomography (XRD-CT) and related chemical imaging methods like pair distribution function computed tomography (PDF-CT) or multimodal-CT through collaborations with academic and industrial partners. Most recently, Finden has driven the development of XRD-CT to the point where high-quality data can be generated for a variety of functional materials under operational conditions.

The team includes colleagues Professor Jawwad Darr, Dr Tom Ashton and PhD students Dustin Bauer and Hongyang Dong.

SCI UK Process Chemistry Award

Tom Sheppard received the 2023 SCI UK Process Chemistry Award. This award is sponsored by AstraZeneca, GSK and Syngenta and recognises "outstanding work carried out by a UK-based academic in the development of significant new synthetic methodology, process technology, or reaction understanding such that it has the potential to become useful for the manufacture of an active pharmaceutical ingredient or agrochemicals on scale." Tom received this year's award in recognition of his research groups work on "green and sustainable chemical synthesis". This has included the development of new borate ester catalysts for efficiently preparing amides (one of which is sold by Merck/ Sigma-Aldrich as "The Sheppard Amidation Reagent"), and the discovery of new methods to convert renewable feedstocks, such as sugars, into useful chemical building blocks. Tom gave an award lecture entitled "New Synthetic Methodology for Sustainable Synthesis", and was presented with the award at the 39th SCI Process Development Symposium in Cambridge in April.

He also attended the SCI Sustainability and Innovation Awards Dinner at the House of Lords in May where we was presented with a certificate to go with his award.

Tom's group are continuing to work on the development of novel chemistry in sustainable synthesis, as well as beginning some new projects in organofluorine chemistry.

Promotions

Dr Matt Blunt
to Associate Professor

Dr Kerstin Sander
to Associate Professor

Dr Vicky Hilborne
to Associate Professor (Teaching)

Dr Yang Xu
to Associate Professor

Farewell

This year we have wished happy retirement to several members of staff.

Professor Jim Anderson and Professor Steve Caddick retired after 14 and 20 years at UCL.

Jim had a tremendous impact on the running and teaching in the Department. He was head of Organic Chemistry for 8 years and then Graduate Tutor for 4 years. Jim's research involved a portfolio of projects which combined contemporary synthetic organic chemistry methodology with adventurous blue sky research.

Steve also made an enormous contribution to UCL over the years, serving in roles such as Head of Department of Chemistry, and Vice Provost (Enterprise and London). He led the development of the vision, academic and business cases for the creation of UCL East. His research focused on the chemical modification of proteins and antibodies for development of therapeutics and diagnostics, with nearly 200 research articles published, greater than £40million of external grant awards and supervising approximately 50 PhD students.

Professor Dewi Lewis retired in September after 25 years in the department. Dewi's been an exceptional colleague who had made huge contributions to the collegiate running of the Department. He was Admission Tutor for 10 years between 2004 – 2014 and through his efforts student numbers and entry qualifications increased. Since 2015 Dewi has been the Departmental Tutor and Deputy Head of Department (Teaching) and his leadership and expertise contributed towards the functioning of the Department through the COVID period and over recruitment of students. His contribution to leadership was recognised through a UCL Leadership Award for Outstanding Contribution in 2020. He has provided superb pastoral support to our students. He is also highly regarded for his research in porous solids and he was awarded the RSC Meldola Medal and prize in 1996.

Prof. David Scanlon and Dr Gemma Louise Davies left to take up new positions at the University of Birmingham. We thank them for their contributions to UCL Chemistry over the years and wish them every success for the future.

Top: Prof. Jim Anderson, Prof. Steve Caddick, Prof. Claire Carmalt & Prof. Tom Sheppard Middle: Prof. Claire Carmalt, Prof. Dewi Lewis, Dr David Rowley Bottom: Prof. Claire Carmalt, Dr David Scanlon & Dr Gemma Louise Davies

Graduation

Chemistry staff at this year's Graduation Ceremony, 4 September 2023 with the presentation of graduates by Prof. Ivan Parkin, Dean of MAPS Faculty at the Royal Festival Hall.

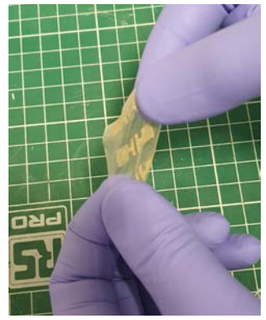
UK Chemistry Olympiad

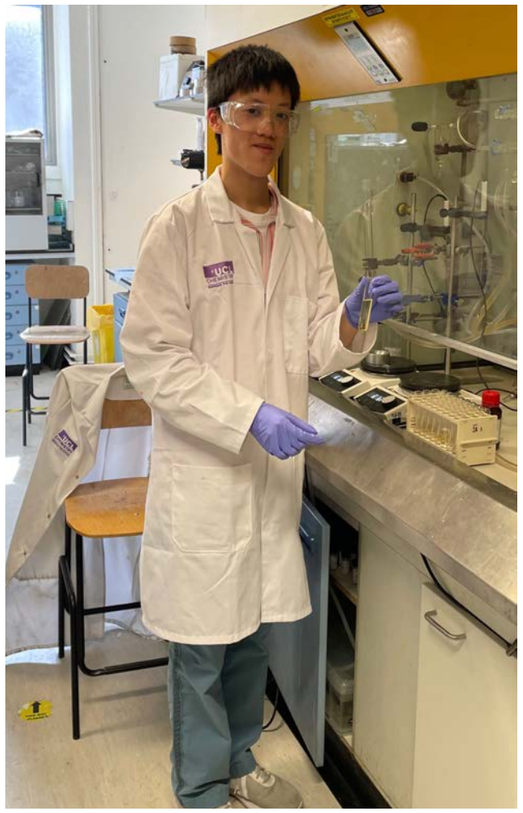
The UK Chemistry Olympiad returned to the Department this summer for their training week. The team of four A-level students, selected from across the country, studied advance topics in the Ramsay Lecture Theatre, did practical work in the Turner Lab, and stayed in UCL accommodation. After this intensive training, the team travelled to Zürich, Switzerland where they represented the UK at the 55th International Chemistry Olympiad, hosted by ETH Zürich. This year the event was attended by 350 students from 89 countries. All four members of the UK Team earned medals: Kiran Diamond from The Perse School (gold), Kiran Desai-Kinvig from Westminster School (silver), Pak Chuen Fung (known as Patrick) from Cardiff Sixth Form College (silver), and Kotchapun Saritsiri (known as Perth) from The National Mathematics and Science College (silver).

The team, Olympiad Working Group, and Royal Society of Chemistry would like to thank the Department for the opportunity to train here. The team appreciated the warm welcome each morning by Saeed Said. This was the first year for practical training since the pandemic, and it would not have been possible without the hard work by Claire Gacki and Luka Nunar. In the lab, the students accomplished such tasks as identifying ions, analysing water hardness, and synthesising lidocaine. The training was led by the Olympiad Working Group including Peter Bolgar Associate Lecturer (Teaching) and JL Kiappes, Lecturer (Teaching). JL also attended the International as part of the mentor team, where he was elected Chair of the International Steering Committee.

The World of Organic Semiconductors

By Michael Chan
BSc Chemistry (2020-3)
MSc Pharmaceutical Formulation and Entrepreneurship (2023-4)





Other page: Bob in the lab with PhD student Adibah Zamhuri. Above left: Bob reviewing a flexible senor with post-doc Pete Gilhooly-Finn and a flexible sensor up close.

Above right: Michael photographed in the lab last year during his summer placement.

I had the pleasure of sitting down for a chat with Dr Bob Schroeder, an Associate Professor within the department.

I would like to thank Dr Schroeder for his time. The initial interview transcript consisted of around 4000 words, a testament to Dr. Schroeder's immense passion for his work. Here is the condensed version of the interview.

What initially sparked your interest in the field of organic semiconductors and self-healing materials, and how do you feel your passion has evolved over time?
When I initially started on organic semiconductors, it was all for solar applications and semi-transparent photovoltaics, which is definitely something of interest. However, we started realising that there were huge problems with degradation, leading to quick loss of performance in solar cells.

I was still fascinated by the materials and started thinking about the other fun things I could do with them. They are fun, in the sense that they are stretchable and flexible, and able to do many things silicon electronics could not. I then thought "What if you have an electrical signal that you can modulate?" and "Can you use it for sensors? Where better to use the sensor than directly on your skin?"

Going through the different runs of materials, we still keep finding out new things. It is quite exciting.

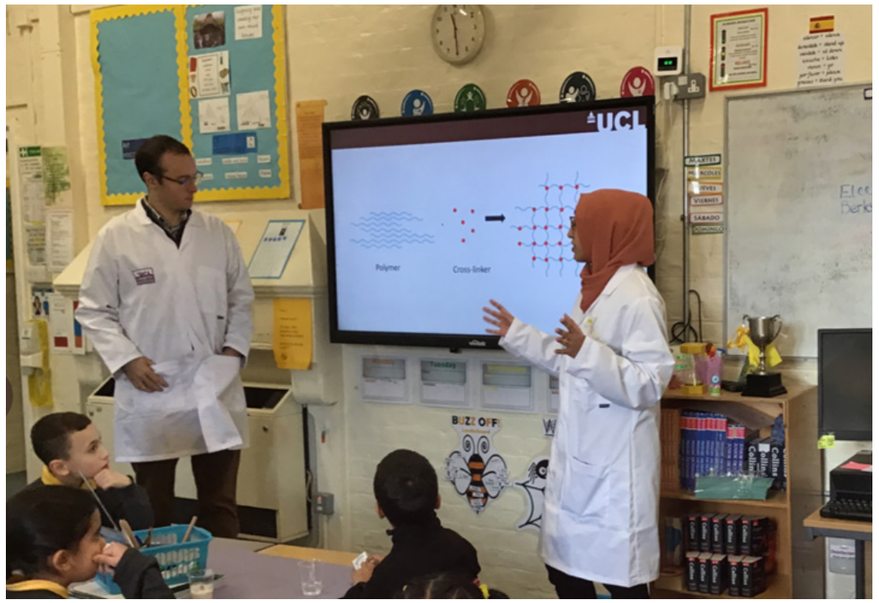
Can you tell me about some current research in your lab?
We started working on interfacing nerve cells directly with semiconductors to see how the cells react. Down the line, we are hoping to use our semiconductors to trigger the cells to perform a desired action. This would be directly influencing, for example, cell growth through electrical stimulation. In our research in the sensory direction, we attempt to understand how we can get biological analytes to interact with our materials.

You mentioned using semiconductors to promote cell growth. What are the other implications of this research?
The cell growth is the more fundamental work. The long-term target, for instance, would be use in the treatment of a severe nerve injury. Usually, surgery would be required to put a conduit/plastic tube over the nerves to allow for regrowth but now, with The School of Pharmacy, we are striving to provide a pathway for the cells to grow along and enhancing that growth through electrical stimulation of the nerves with our materials.

How do you approach selecting a research topic or an area of focus for your research?
I should probably say that I consider a lot of factors, but I am usually getting distracted. I just like fun ideas and a good challenge. The self-healing and stretchability one – that is something I have been working on for a couple of years now. That has gotten much more thought and I am quite lucky that I have lots of talented students; they come up with a lot of good ideas. And so, the projects evolve.

The cell project is something that was largely born out of students and now we are trying to take it further. A lot of it comes through discussions with students, collaborators, and colleagues; you never really know where an idea will come from.

What has been the most fascinating research project you have worked on?
I like surprises. It is not so much that I have a favourite project. It



Ryan, Pete, Aisha, Adibah, Megan & Barnabas delivered a day of slime making at St Gabriel's Church of England Primary School as part of the school's STEM week. 200 children made two different types of slime and compared the properties of the slime for observations.

SLIME TIME

With the Schroeder Group

Christmas dinner with the Schroeder Group

Right: Bob with PhD students Aisha Mumtaz and Jessie Liu

is more like the discovery of different things and then also seeing the students grow. You can often see when students start their first year being a PhD student or first month when it comes to Master's students – how they evolve over time with their research.

Would you give any advice to your former self and to prospective PhD students?
To my former self – I would go way back to undergrad and tell myself to study harder. I failed my first year of university but ultimately, the most important thing is having fun and passion. Especially for a PhD, you spend so much time on a topic. There are fun days, but this is outnumbered by many horrible days in the lab where frustratingly, nothing works.

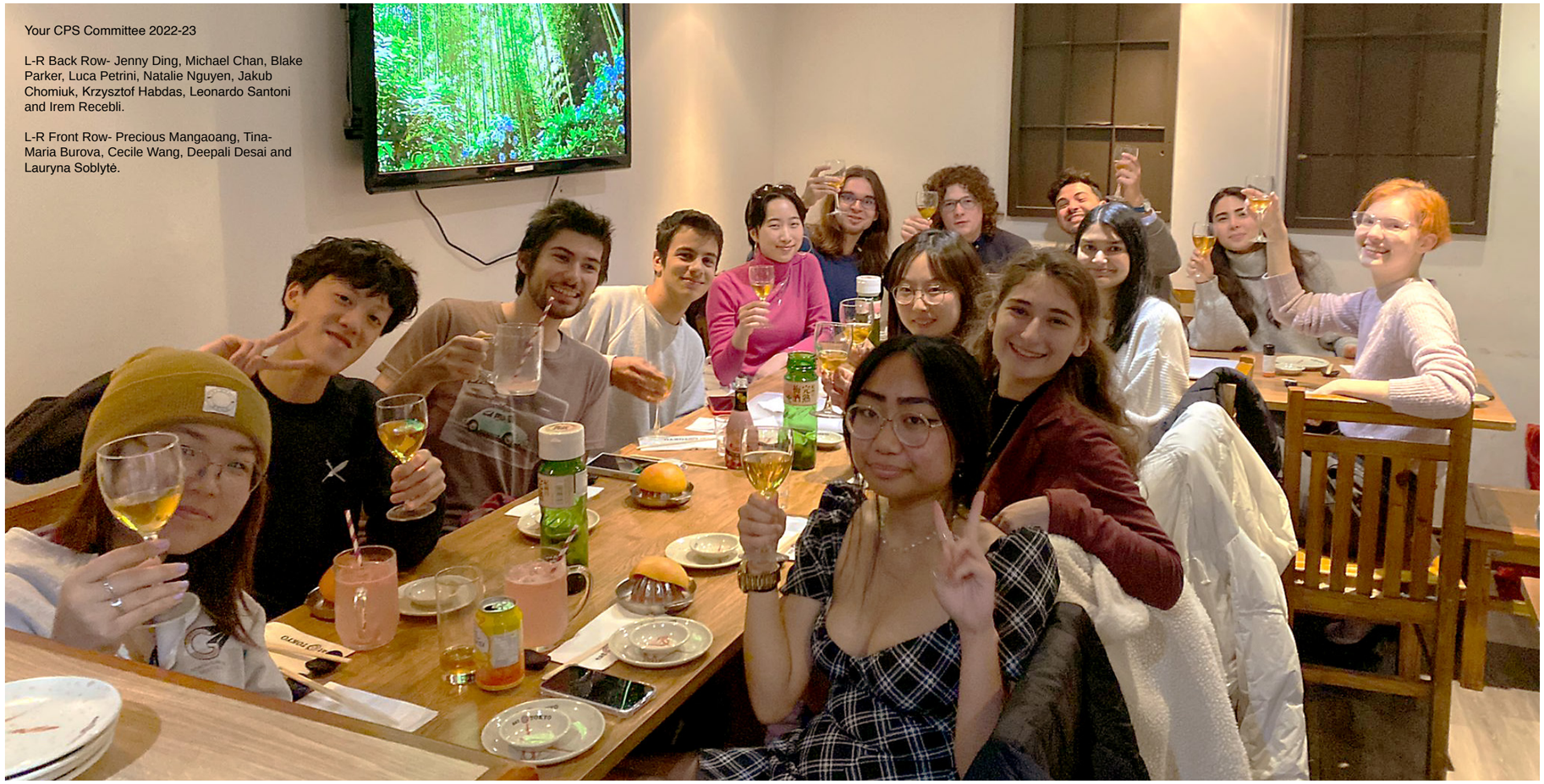
What is the most fulfilling aspect of working with kids on outreach projects and what do you think the importance of doing outreach is?
My students came up with a slime experiment where we can make a variety of different slimes: magnetic, colourful, and ones with varying viscosity. We talk the students through "What do you see?" and "Why do you think this is?". It is very easy to get children engaged in science and when you ask them afterwards, everyone wants to become a scientist. For me, I want to show them that for a scientist, you do not need to be like Sheldon Cooper-type person – you can just enjoy science, questions and coming up with a hypothesis. It is also a great opportunity for my students to talk about their research to non-experts and to get them to think differently about what they do and why it might be important.

You talked about enjoying watching PhD students grow. Is that also why you take on MAPS Summer internship students?
100%. Someone took a shot at me to have a summer opportunity which rolled into an internship which then ended up in a PhD. This summer, we have five visitors for the lab in two months. I love to give as many an opportunity as I possibly can.

When you look in the teaching labs for example, the experiments teach different techniques and methodologies, but it is a different experience to spending six weeks in a lab owning your project and developing your own synthetic route towards making something new.

Describe your research in ten words.
(Whilst counting on his fingers) We make plastics that conduct electricity and self-heal on skin.

What do you like to do in your free time?
Reading. I am actually reading a book on quantum physics at the moment but most of my reading is history, economics, philosophy – lots of stuff unrelated to chemistry.



Your CPS Committee 2022-23

L-R Back Row- Jenny Ding, Michael Chan, Blake Parker, Luca Petrini, Natalie Nguyen, Jakub Chomiuk, Krzysztof Habdas, Leonardo Santoni and Irem Recebli.

L-R Front Row- Precious Mangaoang, Tina-Maria Burova, Cecile Wang, Deepali Desai and Lauryna Soblytė.

Business as Usual

For those unfamiliar, CPS is the department's society, all things related to chemistry can be found here. Actually, probably not. That sounds hard. What we do however, is try and bring everyone (including postgraduate students and staff) together in a confined space, and eat.

Those well versed with the lab-ridden schedule of chemists (and sometimes non), and the lack of human interaction we receive daily, you'll appreciate just how vital the society is for morale. In fact, our schedule this year was filled to the brim with opportunities to get fed, including our notorious weekly Tuesday talks, and for term one, we averaged three talks per week. Of course, they were a great resource, but so much work on behalf of the committee. So please come. For us.

Chemical & Physical Society

In fact, to test how loyal you are, here's a lovely little quiz, tot up the points you get and email uccacps@ucl.ac.uk for the chance to win nothing:

What was the first talk of the year on?
a. Violins
b. Cellos
c. Drums

What did we have two consecutive talks on?
a. Wales
b. Whales
c. Wails

The title of the talk on 17th November was "a tale of two stained…"
a. Glasses
b. Glosses
c. Gases

According to one of our speakers, what does Oxford smell like?
a. Cigars
b. Rejection
c. Rain

What should you not eat before a drug test?
a. Nothing
b. Red velvet cupcake
c. Poppyseed muffin

Did you ever notice the misspelling of "Chemistry" on the CPS Moodle page?
a. Yes
b. Yes

Jokes aside, the committee really enjoyed organising the talks from researching and inviting the speakers, to taking care of the catering *wink wink*, and we as a committee would also like to thank the speakers for taking the time to come down to the Christopher Ingold Building to talk with us.

The first talk of the academic year was none other than our own Kreso Bucar's talk on violin making, and the inspiration his father had on his own craft as a luthier, but also as a chemist. Interestingly, we found out that the strings used to be made of sheep intestine.

Next up was Dirk Trauner with his fascinating talk on tetrodotoxin, a toxic chemical found in pufferfish. Though, in small quantities this can act safely as a powerful painkiller. His group managed to synthesise such a complex molecule from a glucose-derivative in a 22-step process!

Sean Sargent gave a talk, which was kindly sponsored by the SCI, where he delved into an exciting newly developed process of refining lithium salts for lithium-ion batteries, evolving from the traditional methods of pyrometallurgy and hydrometallurgy. He further talked about his company, Green Lithium's challenges in decarbonising the processes involved and utilising circular economies to minimise waste.

Yet again, another talk sponsored by the SCI from Thomas Davis! This time, we learnt about the industry of private fusion, and the issues industry often faces with funding. This is particularly true in the UK, where interest in the area is considerably less than in the states.

Dr Weiyin Chen spoke to us about the uses of superhydrophobic surfaces, particularly in electrode modification without the use of a solvent. Processes such as solvent-free brushing and lithiation were explained and their effectiveness studied.

An explanation of coastal erosion and prevention was given by Dr Aaron Berko, which is vital given that 3-4% of the world's GDP per annum is used on corrosion maintenance. In his research, local conditions at the Port of Dover were found to increase corrosion of steel structures.

Dr Hailiang Wang presented a potential means of water treatment using electrocatalysis. This was based on the conversion of carbon dioxide to methanol using molecule-nanocarbon hybridisation and second-coordination-sphere tailoring, techniques reliant of the reaction kinetics taught in the undergraduate course (a good revision opportunity for the third years on committee!). Subsequently, we had two back-to-back talks on marine mammals. It was particularly interesting to hear about the creative ways in which researchers must adapt to an outdoor lab environment from Dr Kelly Robinson. Dr Kimberley Bennett spoke of the importance of the work, and just how bad pollution is for seal populations, with contaminants impacting their young. Dr Jenny Zhang discussed the untapped potential of bioenergy, as the current market is full of inefficiencies. The redesign of these is facilitated by using artificial photosynthetic materials for converting energy.

Professor Dejian Zhou introduced the diagnostic methods employed on some of society's most prevalent diseases. His group utilised nanoparticles to determine the mechanistic interactions of viruses such as Ebola, and gold nanoclusters for anticancer/ antimicrobial uses.

Single molecular translations and rotations are studied by Laura Kaufman, particularly in supercooled environments, and how these relate to stained glass and glassy systems.

Of course, the very relevant topic of climate change had to be explored, which Michael Mainelli did using a corporate point of view. There are many ways that ESG can be translated from a buzzword to actual, meaningful implementation.

Microscopy was under the spotlight in Dr Alice Pyne's talk, which was particularly interesting given the group's development of their own open-source code for molecular identification. This allows the larger molecular structure and conformers to be identified. The computational chemist Professor William Jorgenson joined us from Yale about the applications of Monte Carlo simulations for drug development. The timeline from simple ethane to

methanol calculations almost 40 years ago, to those of the SARS-Cov-2 main protease inhibitors was remarkable, a display of the rate of scientific progress.

Bringing an interactive talk to CPS again (after her first a couple years ago), Ruth Mastenbroek immersed us in the world of perfumes – smelling different common components of perfumery from citrus scents to the rare and expensive ambergris, a substance painstakingly extracted from sperm-whales.
The use of magnetic fields on superparamagnetic particles, specifically out-of-equilibrium systems. Interestingly, some of their behaviour can be described using equilibrium phase properties.

Another sustainable chemistry talk was given by Tom Welton, including a discussion of using the SDGs of the UN in the scientific space.
Moving to our second term of talks, Simon Branch started us off with the eccentricities of the food industry, including the practice of food adulteration, quality control and the future of the health industry.

Brett McGuire spoke of molecular chirality, a concept most chemists are intimately familiar with, but particularly significant in the prebiotic molecules in star and planet forming regions of space. Notably, the critical biological molecules for life are right-handed, and the prospects of detecting chiral molecules in space.

The plant-based origins of pharmaceuticals were explored by Alan Boyd, leading to the statistic of 25% current medicines on prescription being plant derived. The future of these is bright given that there are around 250,000 species of plant, and most of these haven't been studied for their applications in medicines.
Magnesium plasmonics have a wide range of applications, such as in spectroscopy, cancer therapy and non-bleaching labels. Emilie Ringe explained their benefits, given that magnesium is abundant, biocompatible and better than aluminium as a plasmonic.

Auxins' influence on plant architecture is well known, but the angles that they grow at were investigated by Suruchi Roychoudhry and provide the basis for manipulating the angle of growth for better agricultural yield and reduce energetic and resource input.

Page 16: Murder Mystery: Hollywood Lies food spread.
Page 17: Final talk of the year with CPS Vice-President Dr JL Kiappes!
Page 18: Top: The First CPS Talk of the Year with CPS President Dr Krešo Bučar!
Page 19: Top: When you realise you have winter ball at night and an 8am the next day
Bottom left and right: Murder Mystery: Hollywood Lies
This page Top and middle: All aboard! End of Year Boat Party
Bottom: CPS at the 2022 Lab Dinner

Samuli Autti introduced the quizzical concept of time crystals, a building block for quantum devices. This is intriguing since this could be achieved at room temperature.

Wuge Briscoe modelled membrane systems to look at nanoparticle-membrane interactions. This allowed for better insight into nanoparticles and their effects on cellular entry.

The design process of stamps was explained by Ben Glazier, since some interesting chemistry is involved in special editions, in their inks, designs and even codes. He aided in the design of Stephen Hawking stamps, RAF100, 300 Years of Freemasonry, 2001: A Space Odyssey and Apollo: 50th Anniversary of the Moon Landings collections. The future of printing, including digital printing innovations were also discussed.

Our final talk was that from Kyle Frohna, on the development of thin film solar cells, with an emphasis on perovskites, which promisingly are showing the fastest performance increase in history. Their innate disorder on a variety of scales raises questions about stability and their behaviour, so investigating where this arises from is a task for solar cell development.

Our socials this year saw amazing participation and turnout. We started the year with our annual pub crawl, of course had our Christmas quiz (in-person for the first time in a while). Of course, we love to stretch ourselves, so we also had some new events, such as the gin tasting, a return of the winter ball, and the intriguing murder mystery.

The boat party served as a great way to bring this year (and the workload) to an end. I will at this point, thank all of you for supporting us, because without all of you, none of this would have been worth it. For me personally, CPS was a big part of my undergraduate life, and I look forward to see the exciting things committee will do in the future. Hopefully you'll look back on this article, and see that we have well and truly, returned with a vengeance.

Signing off, Deepali Desai 2021-22 Vice Sec, 2022-23 Sec

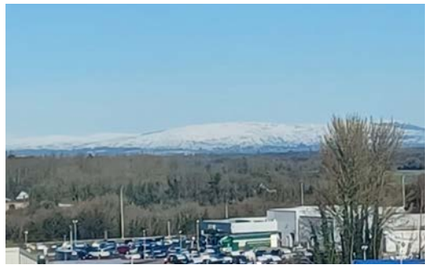
iCASE Study

By Matt Salinger
PhD Student

Amber alerts, Guinness and methyltransferase enzymes.

Matt, is a BBSRC London Interdisciplinary Biosciences Consortium PhD iCASE Candidate with Professor Helen Hailes and spent three months earlier this year at Almac Group in Craigavon, Northern Ireland.

Matt writes about his experience and time at Almac Group for Chemistry **NEWSLETTER**



Photos: Matt's views of Craigavon and Belfast. Below: Matt (centre) researching local life

From January to April 2023 of this year, I had the opportunity to undertake an industrial placement as part of my PhD. This was with the Almac Group, a pharmaceutical manufacturing company headquartered in Craigavon, Northern Ireland. The work I was conducting at Almac was a continuation of my research initiated at UCL, which broadly involves the use of methyltransferase enzymes to perform methylations and alkylations. Using these enzymes allows greater reaction regioselectivity and enantioselectivity, as well as being more environmentally friendly than traditional chemical methods, which utilise highly toxic alkylating agents that become problematic when used on an industrial scale. Given the ever-increasing push towards restriction and elimination of the use of such chemicals pursued by the UK, EU and further afield, the value of greener chemoenzymatic strategies such as methyltransferases will only become more apparent, especially in industry.

Being the first time I had ever have set foot in Northern Ireland, let alone live there for 3 months, I was unsure of what to expect, particularly given the somewhat turbulent history of the region. Nonetheless, I arrived in an overcast Belfast on the 14th of January, and made my way to a town nearby to Almac called Lurgan, where I met up with my very friendly host Dechlan, who was quick to give me a full tour of the surrounding area (particularly the pubs) and fill me in on what (and what not) to do in Northern Ireland, as well as explain why Guinness in Ireland tasted leagues better than in Great Britain. After settling into Lurgan over the weekend, I then embarked on my placement at Almac where I was struck by the differences between industrial and academic research. Examples of such differences included modus operandi, where a good deal of focus at Almac was on research efficiency to necessarily reduce costs by scaling down processes such as bacterial transformations to scales that I didn't think were previously feasible, as well as the stringent actions taken to avoid phage contaminations in bacterial cultures, which was something I often did not consider at UCL. Furthermore, whilst UCL is surrounded by the busy and sometimes chaotic aura of central London, Almac is essentially in the peaceful Northern Irish countryside, with my journey into work finding me cycling past fields of sheep and cows, in addition to providing some stunning landscape in the form of Lough Neagh and the surrounding mountains.

Whilst like all research there were high and low points in terms of experiments working, the lows were mitigated by fellow members of the Almac Biocatalysis team, who as well as providing helpful advice and teaching me various new techniques, also provided a good deal of humour and anecdotes about their own PhD experiences. The people I lived with in Lurgan similarly provided relief, with a personal highlight of mine being asked where in the Republic of Ireland I was from by an Irish couple despite having perhaps the most London sounding accent imaginable. The weather also provided an interesting challenge too, having been caught in not one, but two Amber alert snowstorms on my cycle to work, and somewhat resembling a snowman by the time I had arrived in the office to the amusement of my colleagues.

The weekends provided the perfect opportunity for some travelling around the island of Ireland. After exploring as far as my legs could take me on bicycle in and around Lurgan, the next place on my list was Belfast, which I visited with some PhD friends from London and learned a huge amount about the history of the city, from the construction of the Titanic there to the peace walls (having stayed in an AirBNB right next to one) and the Troubles. I was similarly impressed by Dublin with its universities and museums, as well as the elite-tier Guinnesses which may or may not have been the deciding factor to head over the border.

All in all, I'm very grateful for the placement, and I learned a number of research skills and techniques whilst I was there that I've applied back here at UCL, whilst also getting a good bit of exploring done – as they say in Ireland, it was good craic!

Exploring Advanced Materials

My Internship Odyssey

By Sofia Rogers Ruiz
MSc Chemistry with Mathematics

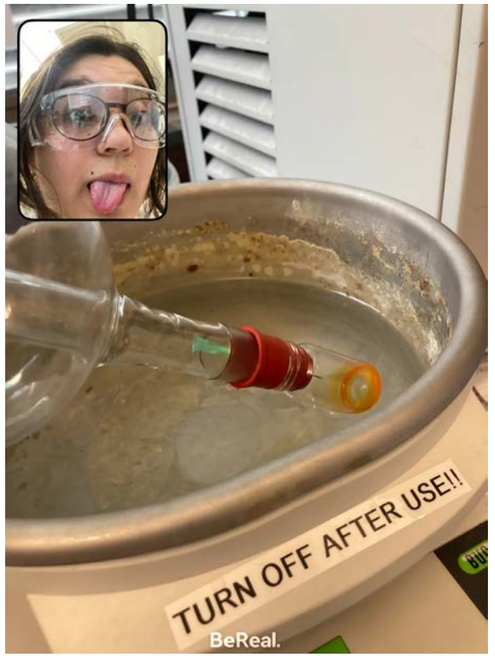
Securing my internship felt like the natural next step in my scientific journey, an extension of my master's project's quest to create hydrophobic surfaces using TiO_2 nanoparticles, a dye-sensitised hydrophobic agent made from a popular dye in the textile industry: acid orange six and stearic acid. This venture sprung from a desire to dive deeper into different material properties, especially those that make surfaces like cotton repel water and clean themselves, traits that have always intrigued me.

Before I embarked on this internship, I faced the classic cocktail of doubts and challenges. I harboured a fascination for dyes that could act as photo scavengers, hinting at their antibacterial potential; however, finding collaborators and dealing with the time constraints of my research internship were significant hurdles. Yet, undeterred, I seized the opportunity to enhance my skills in synthesising the target molecule—an aspect that, as an inorganic chemist, I hadn't given much thought to during my master's studies, which had primarily focused on instilling hydrophobic and self-cleaning properties.

My internship project was multifaceted. It sought to discover the antibacterial potential of coated cotton, refine the synthesis of dye-sensitised hydrophobic agents using new methods, and delve into purification techniques. This project carried immense weight in my academic journey, acting as a crucial stepping stone for my forthcoming PhD, which focuses on crafting materials for personal hygiene with an antibacterial mission.

Summer internships at UCL Chemistry are an excellent way for students to gain further experience working in a lab on a research project outside term time. Students are based within a research group of an academic supervisor for up to 8 weeks. This provides relevant research experience to interested undergraduates.

Sofia spent her summer with the Carmalt Group and writes about her internship for Chemistry NEWSLETTER.



The unique opportunity to exercise creative freedom under the guidance of Prof. Carmalt was invaluable and perfectly aligned with my aspiration to change the world of sustainable fashion and challenge the fast fashion industry.

In terms of supervision and collaboration, the camaraderie within our office and the ability to lend a helping hand to ongoing master's students were profoundly enriching experiences. Contributing to lab techniques post-masters felt particularly satisfying. Even in the face of numerous purification attempts that might generously be described as "learning experiences", collaborative brainstorming sessions in the front of unsuccessful purification attempts highlighted the power of collaboration and how a community can generate innovative solutions.

Throughout my internship, I encountered significant breakthroughs and realisations. It became evident that the synthesis of my target molecule was, to say the least, unexpected, full of surprises and more intricate than I'd initially anticipated. The purification process was a particularly demanding riddle. It taught me that the impurities coming from the starting materials during my master's project had serendipitously contributed to the success of coating cotton—an unexpected turn in my scientific journey.

Leveraging my prior scientific experiences, I may have yet to fully unlock the antibacterial properties of the fibres during this internship, but I gained invaluable insights into novel coating techniques and their application to materials like cotton. These insights carry vast real-world applications, from self-cleaning attire to more durable wearables and cutting-edge antibacterial medical clothing.

On a personal growth level, this internship hammered home the importance of passion and tenacity in research. It illuminated the value of collaboration and the power of embracing the unknown without fearing failure. While my target molecule may remain elusive in its purity, I honed techniques I might never have explored otherwise. It was an exhilarating journey, a stark reminder that there's always more to learn and that interdisciplinary collaboration is the lifeblood of innovation, even more so during the transition from the realm of inorganic chemistry to that of organic chemistry.

Above Left: Sofia and the rotary evaporator, finding alternative ways to not waste any of the product obtained.

Above Right: Separatory funnel showing 3 layers- aqueous layer at the bottom, emulsion layer in the middle and organic layer at top (desired layer).

Facing page: Sofia and supervisor Prof. Claire Carmalt on graduation day.

One of the most profound realisations was that I couldn't rely on established procedures as I might have in my undergraduate days. This journey was sprinkled with unforeseen turns, from salt forms forming during drying with magnesium sulfate to the unyielding need for an automatic column. These moments underscored the dynamic nature of scientific exploration, where the unexpected can lead to extraordinary discoveries.

Looking ahead, I anticipate a future brimming with fresh challenges and exciting developments in my research journey, even if the specifics remain tantalisingly uncertain.

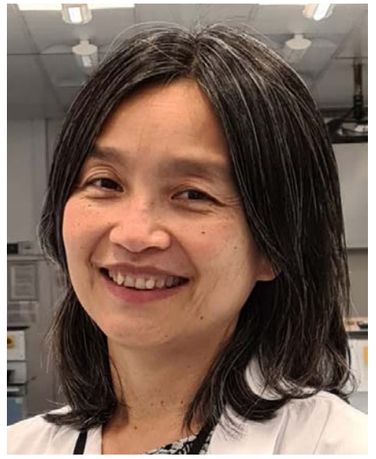
In conclusion, this internship experience has been a transformative chapter in my academic and professional growth, setting the stage for future scientific adventures. It has allowed me to navigate the labyrinthine world of materials science, celebrate the joys of collaboration, and revel in the thrill of innovation. As I embark on my PhD expedition, I carry with me the invaluable lessons, experiences, and memories gleaned during this internship. As the next chapter unfolds, I eagerly embrace the challenges and opportunities ahead, fueled by the pursuit of sustainable, innovative solutions and a dedicated commitment to improving the world—one scientific breakthrough at a time.

Technically Speaking...

Modern science is very much a team sport

In this issue of the Chemistry NEWSLETTER we meet some of the people in the teams who keep our teaching facilities and departmental instruments running smoothly. We also look at some of the science that is only possible at the big international facilities with huge teams of scientists, technicians and engineers working together.

Lab Technicians Make the World Go Around

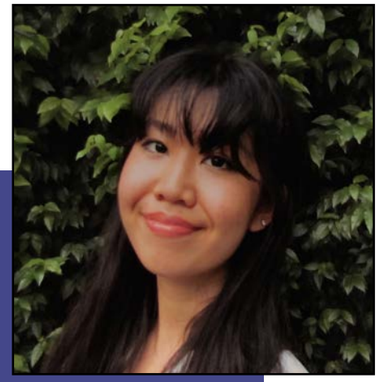


Helena Wong

Claire Gacki

By Winnie Sae-Seung

MSci Chemistry with Management Studies



While working this summer as a TA in the Turner Lab, Winnie found time to spend talking to two of our technical staff: Dr Helena Wong, Graham Laboratory Senior Technician and Claire Gacki, Chemistry Laboratory Technician, about their roles, challenges in the teaching lab and their dedicated support for both students and colleagues.

Quite literally for the 800 or so chemistry undergraduates in the Turner and Graham labs every year. As an undergraduate, every lab session was an extremely busy whirlwind of activity. But the one thing you can count on is that the equipment and chemicals would be perfectly set out, exactly where they're supposed to be, every single session.

Between the synthetic (Turner) and physical (Graham) labs, there are 10 technicians. These 10 people are responsible for approximately 240 first years, 220 second years, 210 third year *chemistry* undergraduates, not accounting for the natural science students. The scale of the operation seems baffling, how are so few people responsible for so many students? So, I sat down with Claire Gacki (Turner) and Helena Wong (Graham) this summer to understand more about what the UCL Chemistry teaching lab technicians do, and how they do it.

When asked to describe their role as technicians, both Claire and Helena unanimously agreed that it is a "hidden job." Organizing lab schedules, testing experiments, managing the inventory, setting up and resetting labs, and working on outreach; these are only some of the tasks that Claire, Helena, and the rest of the technician team juggle all year round. These tasks are often accomplished behind the scenes, but without it the labs simply wouldn't happen.

As a student, I wondered how the technicians manage to reset the Turner Lab on consecutive lab days when students leave the lab at 6pm the day before, but labs are again ready to go at 9am the day after. In the Graham lab, the turnaround is even tighter, as teaching groups often change twice a day, so the technicians only have an hour, or so, in the middle of the day to reset. To manage this, the technicians in both labs work in shifts, a morning shift that starts earlier than when students come in and an afternoon shift that finishes after students leave.

COVID and Lab Bootcamps

As a result of the 'COVID year' where undergraduates could not come into the labs, the chemistry teaching team organised lab 'bootcamps.' Bootcamp was an intensive 2-week lab course designed to teach undergraduates, from first to fourth year, the year-appropriate skills they lacked due to the pandemic. As a student, this was a very hectic period, as a year's worth of teaching was crammed into two weeks. So, I asked Claire what it took of the technician team to put this programme in motion. She told me it involved brand new organisation and planning compared to 'normal' years as the content and large number of students required different management. Due to the unique requirements, they even had to devise

Q&A

How did you become a technician?

CG: I wasn't really sure what to do after graduating from university with a biology degree. I knew I wanted a lab-based job and there was a technician position open at a local school. So, I applied there and ended up really enjoying working with the students and creating relationships that are different than a teacher-student relationship.

HW: I ended up being a technician out of circumstance. Initially after finishing my PhD in organic chemistry, I planned to work in pharmaceuticals research but ended up choosing to raise my family instead. As my kids got older, I started working as a technician in a local school as the academic year allowed me to take the summer vacations off and spend time with my family. I enjoyed working as a technician as it requires innovation and allows for more freedom. So after later working as a technician in the Pharmacy school at King's for 8 years, I moved to UCL in 2019.

Could you walk me through what a typical day looks like for a technician in UCL's Chemistry department?

HW: During term time, the day usually involves setting up and resetting the lab for students. During the summer holidays, the work is different and revolves around setting up for the next academic year. This involves managing the inventory, conducting audits, troubleshooting experiments, testing out any potential new experiments, and outreach activities.

CG: During the term, a group of technicians will be in the labs before the students to set up, and another shift will stay after the students leave for the day to reset the labs in preparation for the next day. When labs are in sessions, the technicians are also present in the stores for additional help and support. During the summer holidays, we work on setting up for the next school year and this involves a variety of things including managing inventory, outreach activities, and working with the teaching staff on any modifications or introductions of new experiments to the syllabus.

If there was one piece of advice you could give to an incoming first-year student what would that be?

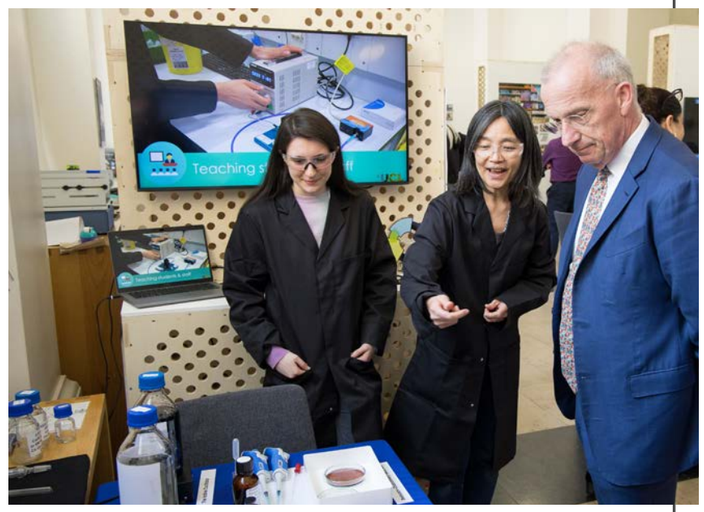
CG: Don't be scared. Have fun. Don't focus so much on marks and results. Focus on the learning and the skills. And don't be scared to make mistakes, that's how you learn.

HW: Make sure you are fully prepared and read the manuals. Ask for help if you need it and be assured you will be supported as much as possible.

I've noticed increased anxiety in the students and as technicians we can help with that. If you qualify for a SoRA, don't be afraid to let us know as we can help put things in place to help you manage more comfortably.

Helena and Chemistry Laboratory Technician Hannah Shalloe, with UCL President and Provost Dr Michael Spence at the UCL Technical Showcase, March 2023.

More photographs from the showcase can be found in our publications section page 54



new experiments for that year's fourth year cohort to ensure that they could graduate with MSci degrees without missing key skills. As a result of this tremendous amount of work and innovation, the teaching lab technicians (along with key teaching academics) received the Provost's Education Team Award for these bootcamps.

Mental Health and Accessible Labs

Not only is the bulk of the work done before and after lab sessions, but lab technicians are also a crucial touchstone for students during the lab sessions. They are a constant friendly face that helps answer a broad range of questions; from how to use certain equipment, troubleshooting small issues, to how to deal with accidents and injuries. But more than that, they also help make the labs an accessible learning space for all. Claire is a departmental mental health first-aider, one of the first in the UCL Chemistry department.

This position evolved from her being a friendly face that undergraduates, postgraduates, and staff alike would come and chat to, to someone who is designated to help with difficult situations. When we spoke, she told me about the different learning accommodations she has helped put in place for neurodivergent students or students with anxiety. These accommodations include organizing a quiet corner of the lab for students who are anxious or noise-sensitive to work in or showing students around the labs before their actual lab sessions to decrease anxiety. This compassion makes our teaching lab technicians, and the learning experience for our undergraduates even more exemplary. These little things can completely change the experience of a student and make the crucial learning from labs truly accessible to all.

Professional Development for Young Technicians

The technicians don't only take care of students, but the senior technicians also create an empowering work environment for the young people that join their team. Helena is passionate about increasing the visibility of technicians as a profession. She played a major role in organising the Chemistry department's exhibit at UCL's Technical Staff Showcase, stimulating conversation between students, staff, and technicians. Additionally, Helena also strongly encourages her colleagues to register as professional technicians, a certification that has to be renewed annually. She tells me she especially encourages junior technicians to keep this certification up to date as it aids in personal development by encouraging self-reflection and increases recognition and respect for each technician.

If you've spent any time in UCL Chemistry's teaching labs, it quickly becomes clear how crucial the teaching lab technicians are. Their ample experience and involvement in undergraduate teaching allows them to anticipate issues before they even occur. The relationships and the learning environment that technicians have fostered in the department over the years are invaluable. The technician profession may be "hidden" but their impact on the student experience truly isn't.

Fun Fact:

The technician team is highly awarded including the Provost's Education Team Award, MAPS Personal Excellence, MAPS award for the bootcamp, and RSC Technician team of the year.

Big Science: Working at X-ray facilities

Anna Regoutz

Rebecca Ingle

By Deepali Desai

BSc Chemistry with Mathematics

Deepali took some time out of her summer holidays to talk to Dr Anna Regoutz, Lecturer in Materials Chemistry & Dr Rebecca Ingle, Lecturer in Physical Chemistry about working at some of the big Xray faciltities around the World. A challenging task given the air miles these two chemists clock up…

I sat down with our Dr Rebecca Ingle and Dr Anna Regoutz to talk about their work in the field of X-ray science and some of the challenges and excitement of working at the big X-ray facilities.

In layman's terms, what is your research on? How has this changed from your initial interests in chemistry, if at all? What led you to explore this area of chemistry?

RI: We use different kinds of spectroscopy to determine the fundamentals of reaction mechanisms. Using ultrafast techniques we can see how bonds are made, broken, or rearranged and combining different experimental techniques can be really useful for understanding some of the more subtle changes in a reaction.

AR: We predominantly work on electronic materials which can be used in devices. The main group of compounds we look at are metal oxides and their application in transistors and sensors. We are interested in the fundamental electronic structure of materials, for example, their band gap, band alignment, and defects, and we use a lot of photoelectron spectroscopy to explore this. A main goal is to find materials for new devices and to improve future device generations. When I started my undergrad, I wanted to focus on biochemistry, but I couldn't stand the smell of the cultures, so I moved to solid state chemistry very quickly! During my undergraduate I worked for a semiconductor company as an intern, and this allowed me to get industry experience early on and further develop my interest in this area. My PhD at Oxford enabled me to learn more about the fundamental chemistry and physics of metaloxides.

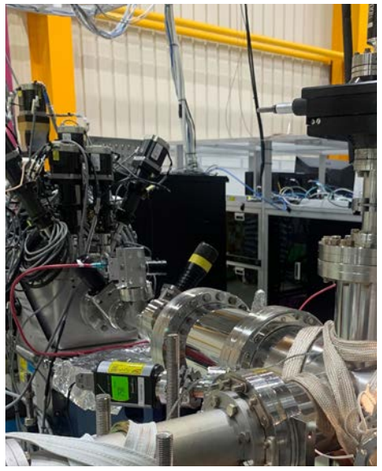
What brought you to UCL?

RI: I was also looking for a permanent academic position and London has a great research environment with the density of institutions here. There is always a lot of activity with seminars and events and opportunities for local collaborations. I've also got a lot of great colleagues here in chemistry - even if they do make fun of me for not really being a 'proper' chemist.

AR: I was looking for a permanent academic position and it was important for me to find an institution which is a good fit for my science and where I feel I could contribute. It's almost like matchmaking, where you need to make sure your research interests and philosophy overlap.

What is the most rewarding part of your research?

RI: Getting to perform the big experiments! We often use external facilities to make our measurements and work in Korea, Germany, Italy and France etc.



These experiment involve very large teams, many scientists, technical staff, and machine physicists. They are intense experiments which are technically challenging, but seeing it all come together, and the data rolling in is very special.

AR: For me, it's working with my group and students more generally. It is so rewarding to work with people who have energy, and are inspired, and to be able to support that. For example, with the PhD students in the group, when they share some exciting new results and you can see the spark they get from that work, is an unmatched joy and motivation for me.

Can you discuss any instances where unexpected results in your research led to new and exciting directions?

RI: A lot of the techniques we use have experimental observables that are very hard to calculate and are not always so widely used, so we don't always have a very strong idea of what the results will look like until we do the experiment. We've had quite a few molecules that most people would have described as 'solved problems' take us by surprise with these techniques which is always fun.

AR: We look a lot at interfaces. In devices, there is a very famous quote that says "the interface is the device". Instead of solely looking at the bulk materials, it is the interface that determines their behaviour and performance. Often, we go in blind at the start of a project, as it is very difficult to probe interfaces, and the chemistry is very difficult to ascertain. For example, you may have five different possible explanations, often from theory calculation, but measurements are crucial to identify the most probable and to decide the direction that you want to take the work in.

Which X-ray techniques do you utilize in your work?

RI: We are doing a lot of development of gas phase resonant Auger and RIXS and alongside that we do a lot of solution and gas phase Absorption, emission and photoelectron spectroscopy.

AR: Mainly photoelectron spectroscopy with a bit of X-ray absorption, diffraction and microscopy.

How important are X-ray facilities such as synchrotrons and free electron lasers to your experimental work? What's the difference between synchrotrons and free-electron lasers?

RI: They are essential. Currently there are no X-ray free-electron lasers (XFELs) in the UK and no dedicated gas phase synchrotron beamlines so I do all of my X-ray science abroad. The UK has had a strong history of molecular spectroscopy, and we still have some excellent accelerator physicists in Daresbury, it's clear that are really lacking in experimental capabilities. XFELs are the only technology capable of generating high brightness, ultrafast X-ray pulses which are essential for many chemical dynamics experiments as well as studies on more extreme states of matter.

AR: For us, Diamond Light Source is very important as it has one of the best photoelectron spectroscopy beamlines in the world. I am a visiting scientist there and this link helps us to make developments directly relevant for our research. Relationships are key to driving such innovation. We do also visit international synchrotrons, for example DESY's PETRA III in Germany, as there are some things we can't (yet) do in the UK. It's not a negative, but each synchrotron only has a limited number of slots for beamlines and experiments, and each one tends to specialise. Ultrafast experiments and XFELs are really Rebecca's domain. For solid electronic materials we are interested in, it is still very challenging to measure these and only a handful of experiments have been conducted so far.

What work would you carry out if you'd have access to such facilities?

RI: One of the big challenges we have in wanting to study chemical and biological systems is that many of the existing free-electron laser are really limited in repetition rate and brightness. This makes it hard to use 'photon hungry' techniques and it being very challenging to impossible to measure very low concentrations in time-resolved X-ray measurements. We've already seen how the higher repetition rate European XFEL has enabled us to take X-ray research into whole new areas of science.

AR: It would be truly transformative, if we could design and build an XFEL that can access femto- and atto- second timescales, which would mean we could study processes important for electronic devices at electronic timescales.

How sustainable are projects like these?

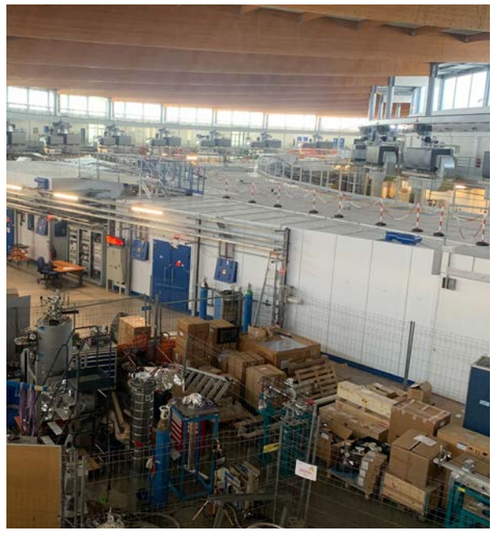
RI: Any large scientific infrastructure project always pushes a huge amount of scientific and technical development as well as providing jobs and training. Typically, science parks end up being built around such facilities and you see a large number of spin out companies being created, driving innovation. These brand-new machines come with hardware and technical developments in a number of areas including detectors, diagnostics, algorithms,analysis, computational, data handling ethics etc. Investment is very productive for the input, as, using the metric of cost per photon, XFELs are far more cost effective than any lab-based source.

Left: Interior of the Swiss Light Source Synchrotron
Bottom left: Endstation of the SSS (soft X-ray spectroscopy and scattering) beam-line at PAL X-FEL.
Above: Aerial view of the PAL X-ray free electron laser in South Korea.

The lifetimes of such facilities tend to be very long and even longer if you consider the impact of the expertise developed, jobs etc. You could ask, "is a new XFEL development for the sake of development"? But the thing is, we need to make new stuff, chemicals, therapeutics, materials and so on. This is something we simply can't do without also developing the methods to measure their properties, and strategy is vital as the chemical scope is broad.

AR: That's a very interesting question. I think the bottom line is that we need to push the development of synchrotrons and free electron lasers to enable truly ground-breaking science and satisfy our curiosity. We have questions we simply can't answer with existing tools. We want to understand things that are vital for future technologies and the level of complexity science has reached today means that we require highly specialised tools to allow true progress.

Middle: SOLEIL synchrotron in France
Right & bottom Interior of Swiss Light Source synchrotron



How important was the Town Hall meeting in 2019 at the Royal Society for garnering interest in the facility and what is the current status of the project?

RI: The UKXFEL project has now been granted £3 million for a conceptual design case, thanks in part to the work at the 2019 meeting. This means we need to look at the current user community, look at new user communities, and see what best meets their needs and fills a gap internationally. Overall, it's a case of finding capabilities not covered by current facilities, seeing what the future of the machine physics side is and how we can best enable new science.

AR: It was a good kick off to start the dialogue with people outside the initial science case team. Prof Jon Marangos from Imperial College who leads the efforts has assembled an already diverse team, but of course there is a limit on how many people could get involved in the first stage. But now is the perfect time to connect with the wider scientific community in the UK. XFELs could deliver crucial results for a wide range of scientists in industry and academia and we are now sharing our ideas on what the machine could look like and what science it could enable through several UK wide town hall meetings.

How does your research tie into real-world applications or industries (photoinduced processes in solution and gas phase)? Are there any potential practical applications on the horizon?

RI: We have a few projects on developing spectroscopic techniques for analytical applications and advanced automation of chemical synthesis at the moment. We're focusing a lot on not just new technologies there but the development of new

catalysts. One of my students is also seeing how we can use spectroscopy to improve the development of materials for water splitting.

AR: We work extensively with industry partners on electronic devices. Two key projects are power electronics, which can handle high power loads and are crucial for our move to renewable energy sourced, and biosensors, where inorganic sensing species enable high performance and better environmental stability.

How can we inspire a new generation of chemists?

AR: Making chemistry relevant is so important. If we want anyone to be interested, we need to try and get across why we care about chemistry. Science communication is key, if we can't explain to a 16-year-old why it's important, we probably shouldn't do it. Making these large facilities more accessible is essential to create an understanding of what they enable. Diamond Light Source has open days for example, and such opportunities are crucial to open up science to future generations.

What advice would you give those hoping to continue in academia/start their own research?

RI: Don't give up. There's an old saying of "If you know what you're doing, it isn't research". Always try and think about the problem before you go in the lab though – planning is critical. Things take time and effort; my PhD supervisor's advice was always to try harder. I've found that it works for most situations. Find problems you enjoy working on, don't be afraid to have a go, be persistent. Sometimes being stubborn is a good trait in research.

AR: Be persistent. For me it has been essential to figure out, what I really enjoyed and pursue it. Be proactive in finding placements, doing research, and narrowing down what you like. If you can find experiments or theory that won't bore you over years to come, you're probably found the right career for you.

How has your perspective on chemistry evolved throughout your career? Are there any pivotal moments that significantly shaped your outlook?

RI: It is an exciting time to be in science, there have been step changes in X-ray and laser tech. Experiments that were hard five years ago are easily done now. In my field, some of the focus has changed from struggling with the technology to really being able to focus on the scientific development and looking at exciting new molecules.

Method development starts with easier samples until we have enough confidence in the method to reach further out into the unknown. The first XFEL came online in 2009 and in the short scope of 25 years, the techniques and experiments have matured so much from being niche, proof of principle experiments to really working on complex applied problems.

AR: Right now, most people tell me I'm no longer a chemist, I'm a physicist. Starting off I definitely identified as a chemist. Solid state chemistry is almost interchangeable with condensed matter physics and overall science is interdisciplinary. I don't like labeling myself anymore in the historically established categories.

We work on solids and we love photoelectron spectroscopy that's at the core of what we do. No matter the label.

An instrument is only as good as its operator.

Chemistry NEWSETTER asked our Faciltiy Managers to tell us a little bit about themsevlves and the work they do.

Meet the faces behind the department's facilities who hold the secrets to an instrument's success.

Please meet:

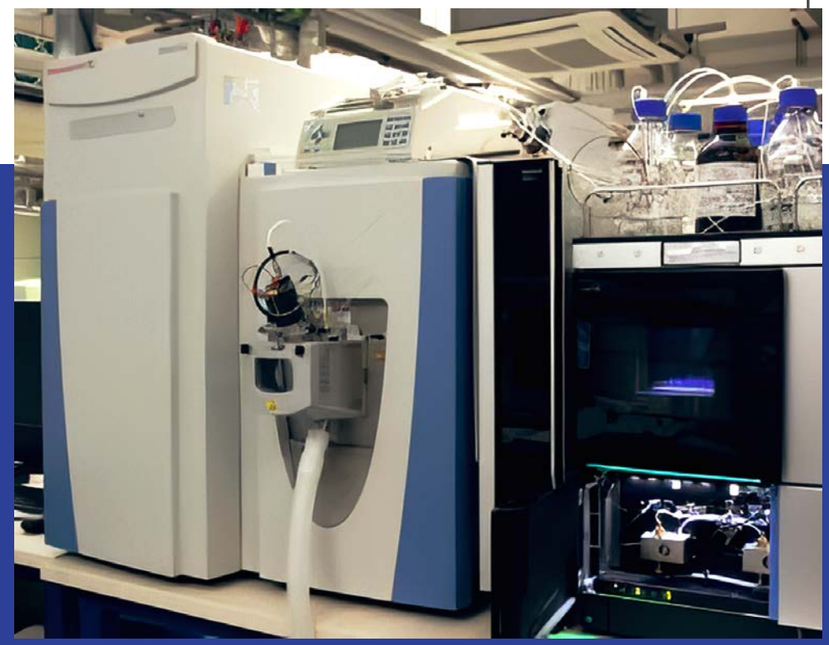
Dr Kersti Karu

I am Dr Kersti Karu, I gained my MSc in Analytical Chemistry degree from UCL Birkbeck College in 2001 and have started my research career at UCL School of Pharmacy in 2000, as a research mass spectrometrist. I was enrolled on a part-time PhD programme in 2005 gained my PhD in Liquid Chromatography Mass Spectrometry in 2009. I was classically trained as a mass spectrometrist, becoming well versed in mass spectrometry analyses of small molecules, proteins, peptides, DNA, RNA and their sample purification steps prior mass spectrometry analysis. During my PhD in UCL School of Pharmacy, I established a methodology for sterols measurements extracted from biological samples. After lipid extraction and tagged-derivatisation of sterols to enhance mass spectrometric response and intelligent use of multi-stage tandem mass spectrometry to obtain structural information this has led to a powerful method for the characterisation of sterols, steroids and bile acids from small quantities of brain tissues, amniotic fluids, plasma/serum. This methodology was used for a pre-natal diagnosis of Smith-Lemli-Opitz syndrome.

I joined Imperial College London as a Research Fellow in 2009, where I concentrated my efforts on gel-based and mass spectrometry based-proteomics for identifying pain related proteins in a central amygdala of brain. I led clinical studies and participated in research involving animals. Additional responsibilities were interacting directly with clinicians, surgeons, and pathologists to fulfil the aims of the research projects.

I joined the Department in 2013 as a Manager of UCL Chemistry Mass Spectrometry Facility. My main responsibility is the day to day running of the department's high-throughput mass spectrometry facility. I am working closely with academics and taking a role in developing grant proposal applications in areas of mass spectrometry measurements, and I am currently co-investigator and co-lead on several projects. My current position involves establishing and developing new mass spectrometry techniques for measurements of various molecules. I am combining several roles, conducting my research, and working with others and managing a high through-put mass spectrometry service. My research focus is the study of cholesterol biosynthesis and metabolism and how it varies in health and neurodegenerative disorders. To achieve this goal I am using mass spectrometry measurements of cholesterol metabolites and its precursors while I assist in the preparation and submission of instrument grant applications, research manuscripts and research grants. I am also lecturing a mass spectrometry course to master students and run one mass spectrometry practical each year for MSc in Applied Analytical Chemistry Course. Currently I have participated in publications of more than 40 manuscripts, and I am the author of more than 10 publications. I regularly present my research findings at UK and international conferences.

Thermo Vanquish LC connected to Q Exactive Plus Hybrid Quadrupole-Orbitrap mass spectrometer



The mass spectrometry facility boasts a range of industry-leading instruments, available to use for staff, students and external companies on request.

The laboratory is housed in LG11 in the Chemistry Building. It deals with more than 15,000 different types of samples every year. The staff of the laboratory develops new analytical techniques and methods and takes part in number of high impact research projects and international collaborations.

The laboratory is open weekdays from 9 am to 5 pm.

Dr Jamie Gould

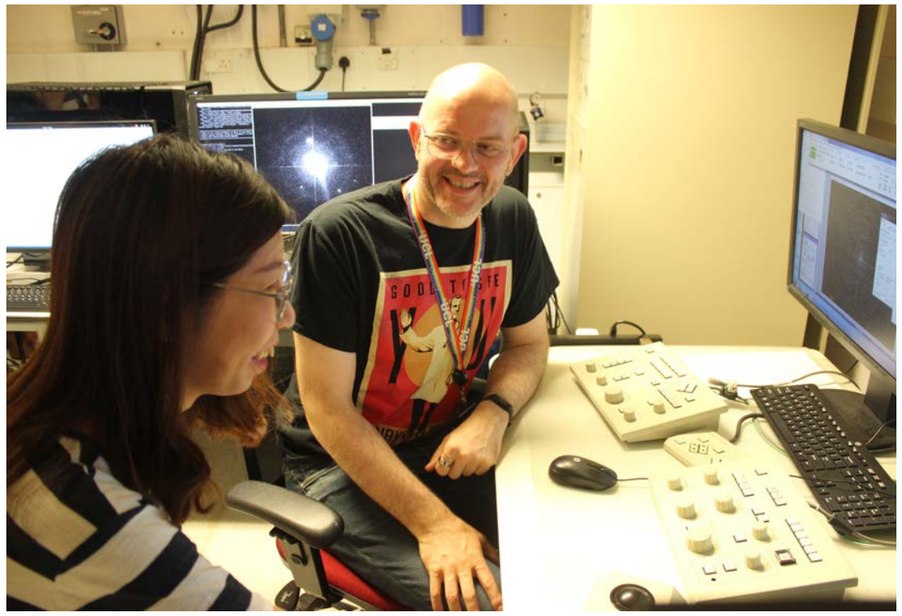
My name is Dr Jamie Gould and I'm the new X-ray diffraction facility manager, having started in July. In my role, I manage six different powder diffractometers and one single crystal instrument where we can determine the structures of molecular compounds and materials. Our powder instruments can determine the bulk purity of compounds and materials, and the composition of thin films. We also have the capability to measure samples in the temperature range of 90-1100 K and under in-operando battery conditions. It is a fantastic resource used by people across the department and the university.

I really enjoy my role as it gives me the opportunity to be a part of larger research projects, learn about different research and support others. I am always keen to learn more about what people do and I am open to new ways to perform experiments to suit people's needs.

Outside of work, I enjoy running, watching live music, food and travelling. Although I'm originally a southerner, this is the first time I've lived in the south for over 20 years.

Dr Andy Stewart & Dr Xueming Xia

I'm Dr Andrew (Andy) Stewart, I received my PhD from the university of Glasgow and have done postdocs in both X-ray and Electron diffraction methods development, at Cornell (USA), Stony Brook (USA), Oxford (UK), Mainz (Germany), and Patras (Greece), before taking up a faculty position in Limerick (Ireland). Subsequently I joined the Department in March 2022, and have been helping to assist the Liquid Transmission Electron Microscope (TEM) facility and the Microscopy facility more generally. Since May 2023 I've been assisted by Dr Xueming Xia. We run the Scanning Electron Microscope (SEM), TEM, X-ray Florescence (XRF) and Optical Light (Keyence) microscopes in LG26 and LG27 in the basement.



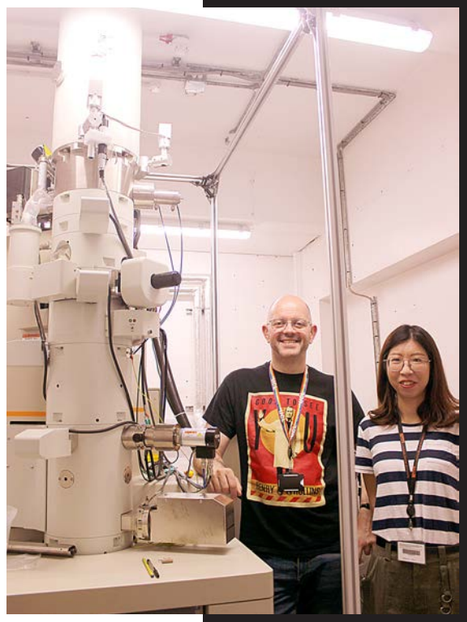
Xueming received her PhD from this department before starting a technical position in Chemical Engineering before returning to us with her experienced gained in the Microscopy facilities in Chem Eng.

I've been helping to update and modernise what can be achieved with our facilities by successfully applying for a Hybrid Pixel Direct electron detector, which is currently being installed and will enable 3D Electron Diffraction experiments, also known as MicroED, as well as 4D STEM within the coming months.

4D STEM bring a wide range of capabilities, from crystal orientation mapping, to finding crystals in an amorphous matrix, to doubling the image resolution via Ptychography and Differential Phase Contrast (DPC), as well as the ability to measure the electric and magnetic fields of a sample and its surrounding area.

The liquid supply system has also been upgraded and will enable electrochemical measurements on the instrument too, after the 3DED and 4D STEM implementations have been completed.

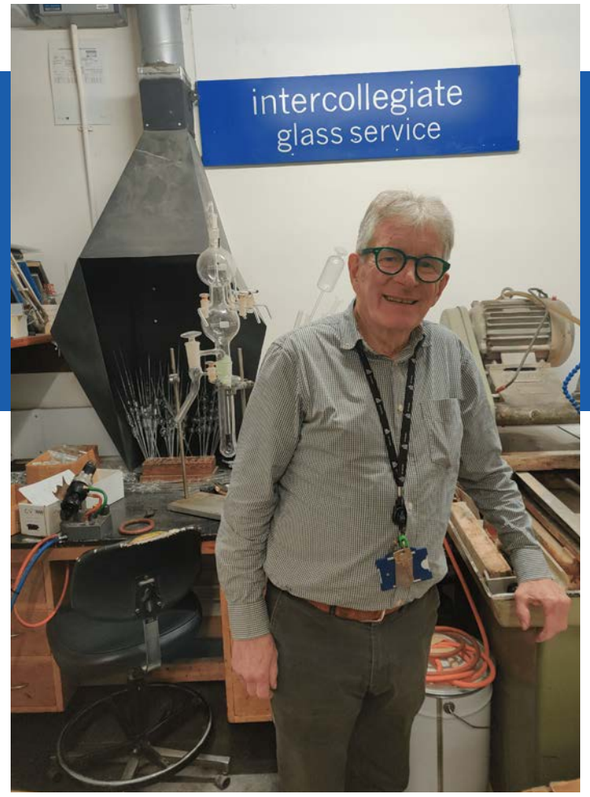
Further to this we'll be making videos and introducing students and postdocs to open-source software, LiberTEM, HyperSpy, pyXem to enable them to get the most out of the data they can obtain from the SEM and TEM and bring new powerful characterisation techniques to the department's capabilities.

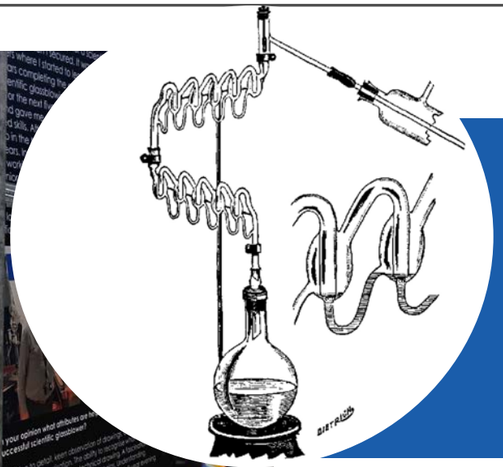


The pictures of us right (top) are taken in front of the JEOL 2200 FS microscope.

The device picture right (below) of is the DENS Solutions Liquid Supply System of in situ experiments, enabling imaging in liquids and the ability to bias the sample using a potentiostat, which is particularly good useful for battery research.

Additionally, we have recently installed the Quantum Detectors Merlin 4S Hybrid Pixel Detector which enables us to collect 3-dimensional electron diffraction data, essentially single crystal X-ray crystallography but on the nanoscale, which is currently being tested and commissioned, as well as 4D STEM, which is 2D scanning and 2D diffraction pattern collection, which enables a range of new imaging modes, including Differential Phase Contrast (DPC) and Ptychography for phase and intensity imaging, as well as the ability to image electric and magnetic fields in and around the specimen. All of which will be tested and commissioned over the coming year as new capabilities possible within the department.





Clearly Important

The Chemistry NEWSLETTER recently visited UCL's very own scientific glassblower, John Cowley, in his workshop on the first floor of The Christopher Ingold Building. The last intercollegiate scientific glassblower to service the universities of London, we found him in a bustling workshop standing amongst large plastic boxes of broken glassware that had recently arrived from Kings College.

John has over 50 years' of experience as a scientific glassblower, and is currently one of only 14 in the UK. After leaving school he completed a 5 year apprenticeship at Gallenkemp before joining Queen Mary in 1978. When the building that housed his workshop was demolished he was invited to join UCL by Mike Williams.

A man who understands the value of discretion, he would not say who was responsible for the majority of breakages within the department, but he admitted that repairs occupied a "fair bit" of his time although he laughed when he said that if things didn't get broken then he'd "be out of a job!" That said, precautions need to be taken when repairing broken glassware as residual chemicals can be explosive when heated. John will only accept cleaned glassware and will take the additional precaution of annealing the glass at 560°C - the annealing oven providing extra protection in the event of an incident. Any potentially harmful fumes can also be safely managed with good ventilation.

John also spends much of his time creating bespoke apparatus. Normally a PI and their student will decide that they need a piece of equipment and will approach John with a drawing and an explanation of the purpose of the apparatus. "The difficult bit is understanding what they want," said John, who completed a two year Technical Drawing and Engineering evening course to help his communication with the scientists. Often the pieces come back for refinement but these tweaks and changes are what make the job "very interesting".

Another interesting area is the recreation of historically significant pieces from contemporaneous diagrams and illustrations. One such piece is the Otto distillation apparatus pictured above, which was recreated from a simple drawing originally published in 1894.

We asked John about his creative process, he said that "there's a right way and wrong way to do things", and after over 50 years as a master craftsman, we are happy to accept his word for that. John cites the main attributes required for the job as an "attention to detail, keen observation of drawings, enquiring mind and good 3D visualisation", he casually adds: "a fascination and enthusiasm for manipulating glass helps".

With some small pride, John shows us a vacuum line he created in 2007, specifically to fit vertically within the tight confines of a fume cupboard. He points out a small cricket bat he created on the apparatus, a personal insignia for the requesting academic who was also the captain of the cricket team at that time. These personalized touches were a good way for researchers to tell which bit of kit belonged to whom, although John says that he tried to keep knowledge of these insignia quiet or "everyone will want a cricket bat or something." Sadly, those who weren't aware of these personal touches after the piece was put on show at the Technical Showcase in March 2023 have now been informed by this article.

And, even after over 50 years, John still doesn't find the job dull. Every day brings new opportunities to collaborate on new projects. So what does he enjoy the most? "Interacting with people and the challenges they set me to make interesting scientific glassware. Their appreciation for the work I do gives me a lot of joy."

In other news...

The department went shopping...

This year the department received around £600,000 in funds from RCIF (Research capital investment fund), MAPS Faculty and UCL Estates for equipment and lab refurbishment. The department has been able to upgrade our facilities with new equipment in the NMR, SEM/TEM and mass spec including a new Shimadzu 8030 MALDI-TOF mass spectrometer (pictured top right).

...then got the builders in

The department has substantially expanded its research activity in energy materials and electrochemical energy storage but has lacked a dedicated space for this research. Following a successful application to the BEAMS Small Works Projects, Chemistry was awarded funds to redevelop the layout of lab 301, in a way that meets the evolving demands of the Chemistry Department. The newly refurbished lab will house a range of departmental instruments such as the UV-Vis, fluorimeter, TGA and DSC and will be a fantastic new multi-user facility.

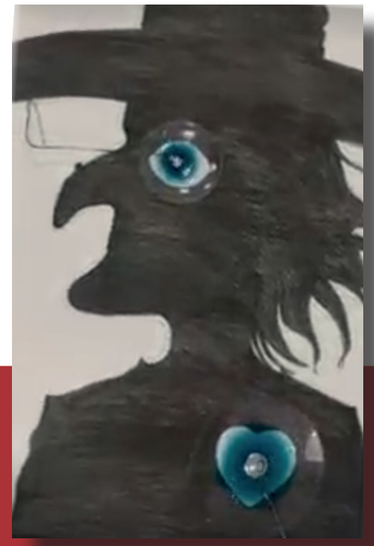
The former waste room has been converted back into lab space and we have installed a new laser lab in the lower ground floor.

The Lab Techs got SPOOKY...

Following a request from UCL student recruitment to make promotional videos for Halloween, the team got busy creating some spooktacular reactions and experiments.

Credits: Prof. Andrea Sella for his inspiration. Cesar Reyes for the thin films. Luka Nunar for the video equipment. Creative producers: Claire Gacki (also camera person), Hannah Shalloe (also video contributor) and Helena Wong.

Halloween clock:
Learn about the power of redox and halogen displacement to cast a spell on your friends. Chemical pumpkin.



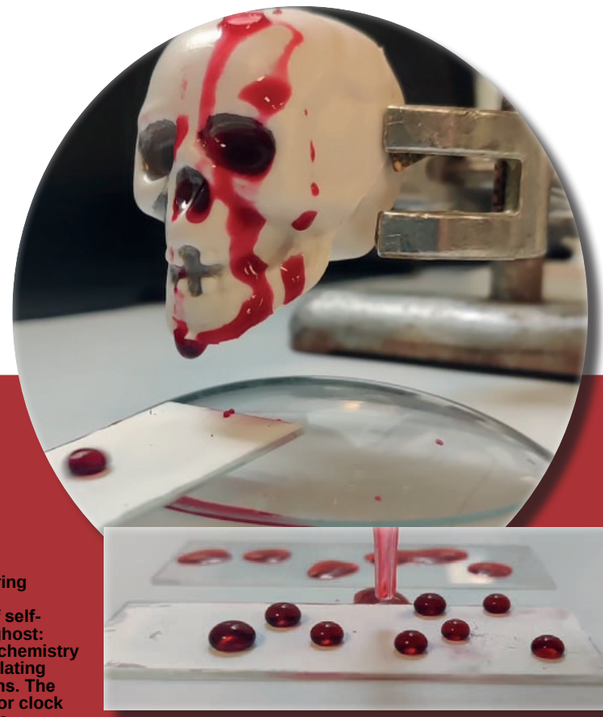
Mercury beating heart:
The dark arts of making inanimate Hg pulsate. Beating heart of a witch silhouette and twitching eye.

...and then won the Technical Showcase photography competition

Chemistry Technicians Martyn Towner & Claire Gacki, won the Technical Showcase Photography competition with their photo for the “Beauty through technical Lens” category. Martyn describes this as: “Super Cool” Undergrad experiment, demonstrating a superconductor ($YBa_2Cu_3O_7$) when cooled with liquid N_2 repels a magnetic field as demonstrated with levitating magnet (Meissner effect).

What happens if you dip copper foil into a mixture of ammonia, luminol, edta and hydrogen peroxide? On this occasion it was not a winner - but we think it is.

Disappearing Ghost:
Dark arts of self-oscillating ghost: Understand the chemistry behind oscillating clock reactions. The iodine oscillator clock reactions.



Spheres of blood:
Manipulate the shape of blood through surface morphology with thin films.
The power of the bleeding skull.

Student Update

Prizes

PhD Prizes

Clarke Prizes

Cesar III De Leon Reyes
Supervisor: Claire Carmalt
Best student presentation in Inorganic Chemistry for his presentation:
Investigating scalable coating methods for self-healing superhydrophobic surfaces.

Ayrton Joseph Burgess
Supervisor: Sankar Gopinathan
Best student presentation in Inorganic Chemistry for his presentation:
Development and applications of diffraction anomalous fine structure in the context of complex oxides

Catlow Prize

Adair Timothy Jules Nicolson
Supervisor: Rob Palgrave
Best student presentation in Computational Chemistry for his presentation titled:
Understanding and controlling disorder in emerging photovoltaics

Davies Prize

Ioanna Aikaterini Thanasi
Supervisor: Vijay Chudasama
Best student presentation in Organic Chemistry for his presentation titled: Enabling site-selective lysine modification on antibodies: forming next-generation Antibody-Drug Conjugates (ADCs)

Runner up:
Andrew William Mackie Cummins
Supervisor: Matt Powner

Ewing Prize

Max David Robert Trouton
Supervisor: Geoff Thornton
Best student presentation in Physical Chemistry for her presentation titled: Surface studies of model energy materials

Second year PhD Poster Prizes

Rothwell prize for best synthetic work

Leonardo Santoni
Supervisor: Caroline Knapp

Organic Chemistry

Victoria Kukunim Chris
Supervisor: Alethea Tabor

Inorganic Chemistry

Xuan Gao
Supervisor: Claire Carmalt

Physical Chemistry

Olivia Poppy Lund Dalby
Supervisor: Sabrina Simoncelli

Computational Chemistry

James David Green
Supervisor: Tim Hele

Undergraduate Prizes

The CK Ingold Prizes for excellence in undergraduate performance were awarded to: Jed Hutchings, James Norgate, Emila Duka, Kevin Ma, Oscar Hills, Yukun Wu, Nina Onatskaia, Xinjie Gu, Zibo Zhou

Nial Turner
Neil Sharp prize for excellence in Theoretical (including Computational) Chemistry

Kristina Kostadinova
Parke Davis prize for excellence in Medicinal Chemistry

Edoardo Simonetti
Harry Poole prize for excellence in Physical Chemistry

Tereza Kacerova
Charles Vernon Prize Charles Vernon prize for excellence in Biological Chemistry

Jirí Doležel
Franz Sondheimer prize for excellence in Organic Chemistry

Luca Petrini
Ronald Nyholm prize for excellence in Inorganic Chemistry

MAPS Faculty Awards

Education Awards

Highly Commended for Individual Excellence – Outstanding Support in Undergraduate Labs was awarded to:

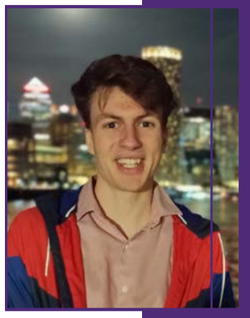
Zahra Khan (PhD Student with Prof. Ivan Parkin) who engaged well with the students and encouraged them to become active learners by promoting scientific curiosity and confidence in their knowledge.

Vytenis Rimkevicius (PhD student with Dr Gemma Louise Davies & Dr Anna Regoutz) knows the importance of guided enquiry for inspiring students and building sustained confidence in their own learning.

Other MAPS Faculty Awards

Curran Kalha PhD student with Dr Anna Regoutz won an award for Research Excellence at the MAPS Faculty Early Career Research Forum Awards.

Romain Lotthe MSci with Dr Michael Booth won an undergraduate MAPS Innovation & Enterprise prize competition.



Ramsay Medalist

Seán Kavanagh

I grew up in the countryside in Ireland near Dublin, where I studied Nanoscience, Physics and Chemistry of Advanced Materials in Trinity College Dublin (TCD). Funnily enough, this is where both my supervisors (Profs David Scanlon (UCL Chemistry) and Aron Walsh (Imperial Materials)) did their PhDs, and I also had *their* PhD supervisor (Prof Graeme Watson) for solid-state chemistry lectures. David likes to call us the "Irish mafia of computational chemistry" because of this! It was from talking to their former supervisor, Prof Watson, and with Prof Seán Corish (an old friend of Sir Prof Catlow in the early days of solid-state modelling), that I decided to pursue a PhD with David and Aron here in London. It was fantastic advice and I've enjoyed every moment of my PhD here so far.

In our research, we use quantum-chemistry computational methods to understand and predict the properties of energy materials, primarily geared towards application as solar cells, and often collaborate with experimental groups synthesising these compounds. During my PhD we've developed some novel techniques for identifying defect structures in solids, so in the future (during a postdoc), I want to extend this research using methods recently developed in the machine learning community (such as machine-learned forcefields). Beyond the Ramsay Medal, the biggest achievements of my PhD so far have been receiving MRS & eMRS Graduate Student Awards, eMRS Young Researcher Award, Materials Today Chemistry Rising Star Award, RSC Roy Prize and a UCL MAPS Faculty Education Award. Outside the 'lab', I enjoy being active, whether it's going for a run, to the gym or kicking a ball around with friends – it's my way to clear my head after a long day thinking about chemistry. Looking forward, I want to pursue a career in academia, and hopefully start my own research group someday!

Graduating Students

PhD

Ahmed Nehaal
Supervisor: Vijay Chudasama

Ceridwen Ash
Supervisor: Graham Worth

Eve Carter
Supervisor: Helen Hailes

Bharvi Chikani
Supervisor: Christoph Salzmann

Peixi Cong
Supervisor: Andrew Beale

Matt Cross
Supervisor: Thomas Sheppard

Nathalie Fernando
Supervisor: Anna Regoutz

Mandy Fong
Supervisor: Ivan Parkin

Madeleine Georgopoulou
Supervisor: Andrew Wills

Junjun Guo
Supervisor: Tracey Clarke

Faiza Habib
Supervisor: Claire Carmalt

Muhammed Haque
Supervisor: James Baker

Luisa Herring Rodriguez
Supervisor: David Scanlon

Mohamed Ibrahim
Supervisor: Michael Porter

Woong Jee
Supervisor: Scott Woodley

Yiding Jiao
Supervisor: Ivan Parkin

Zahra Khan
Supervisor: Ivan Parkin

Aaron King
Supervisor: Gemma Louise Davies

Stefan Kucharski
Supervisor: Chris Blackman

Hugues Lambert
Supervisor: Tung Chun Lee

Shreya Mrig
Supervisor: Caroline Knapp

Monik Panchal
Supervisor: Richard Catlow

Premrudee Promdet
Supervisor: Ivan Parkin

Alexis Ralli
Supervisor: Peter Coveney

Alexia Rottensteiner
Supervisor: Stefan Howorka

Ethan Rubinstein
Supervisor: David Scanlon

Juhun Shin
Supervisor: Chris Blackman

James Strachan
Supervisor: Michael Porter

Yeshu Tan
Supervisor: Ivan Parkin

Benjamin Thair
Supervisor: Helen Hailes

Manish Trivedi
Supervisor: Giorgio Volpe

Jone-Him Tsang
Supervisor: Matthew Blunt

Thibaut Wohrer
Supervisor: Tracey Clarke

Yuting Yao
Supervisor: Xiao Guo

Meltem Yilmaz
Supervisor: Gopinathan Sankar

Donglei Zhao
Supervisor: Claire Carmalt

Pinyi Zhao
Supervisor: Bing Li

EngD

Sam Cassidy
Supervisor: Claire Carmalt

Chiara Cursi
Supervisor: Francesco Gervasio

Georgia Fleet
Supervisor: Ivan Parkin

Mehzabin Patel
Supervisor: Stefan Guldin

Kevin To
Supervisor: Ivan Parkin

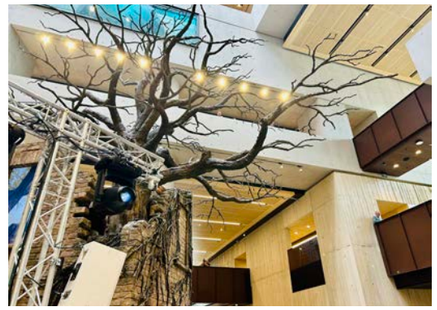
Jone-Him Tsang
Supervisor: Chris Blackman

MPhil

Yiming Ding
Supervisor: Sarah Price

Manufacturing Futures

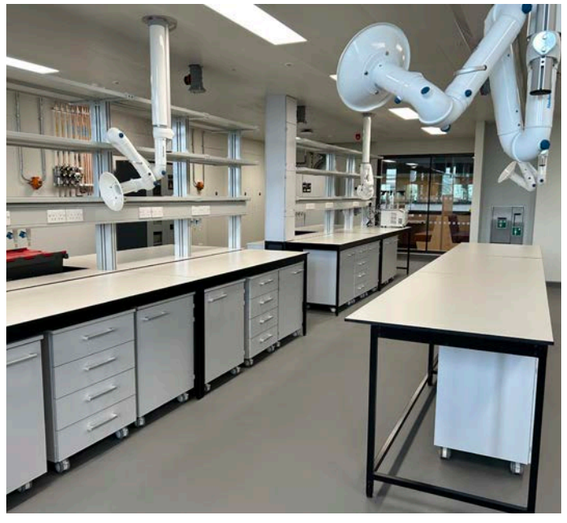
This year UCL Chemistry welcomed it first students to our new MSc in Chemical Sustainability. The programme is based at the Manufacturing Futures Lab (MFL), in our new UCL East Campus located in the middle of the Queen Elizabeth Olympic Park.



In the biggest development in the university's nearly 200-year history, the UCL East campus officially opened on 18 September. The campus is a direct response to the biggest challenges facing people and the planet. It is designed to accelerate breakthroughs in areas including robotics and AI, ecology, sustainable cities, green manufacturing, decarbonised transport, assistive technology, fair finance, and global health.

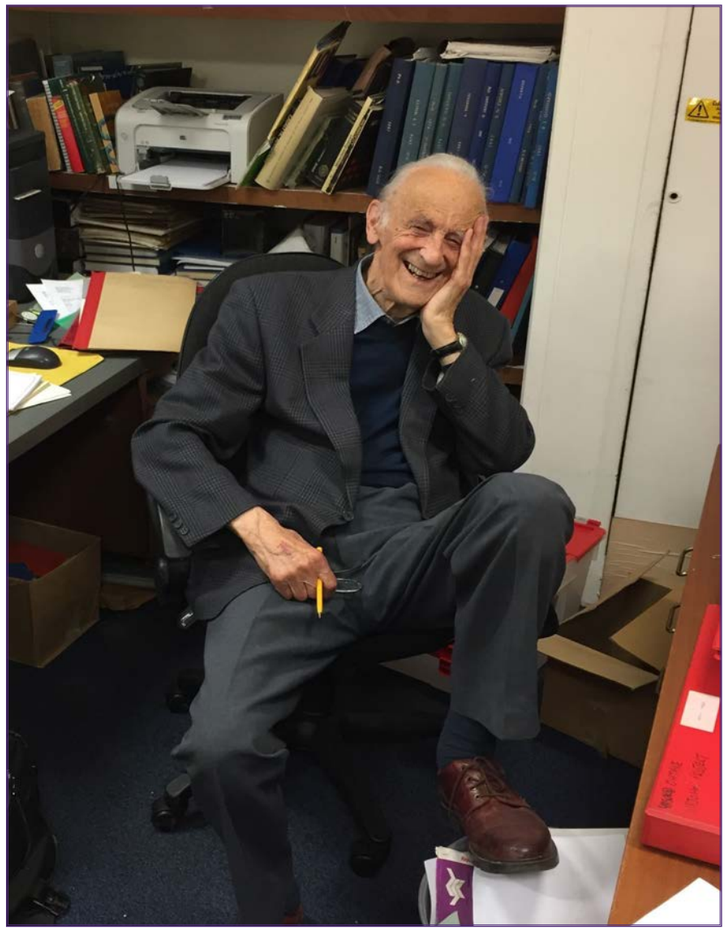
MFL is an innovative and multi-departmental facility that will support the development of new strategic research, focused on knowledge-based manufacturing to deliver the sustainable products and processes of the future, using technologies such as 3D printing, synthetic biology and biocatalysis, and intensified processing to make both existing and future products cheaper, more effective and more sustainable.

The one-year full-time MSc in Chemical Sustainability is unique and specifically developed in response to the need of pharmaceutical and chemical industries for highly qualified students and scientists with interdisciplinary knowledge of the core concepts and aspects of chemical sustainability and green chemistry, to tackle the major global challenges of today and tomorrow, such as energy and climate changes, pollution in chemicals and drugs manufacturing, clean water and plastic recycling.



Alwyn Davies (1926-2023)

Alwyn Davies, who died on September 2nd, was one of the last surviving members of Christopher Ingold's research group, a set of chemists who together transformed our understanding of mechanistic organic chemistry and laid the foundation for much of what we teach our students today.



Born in Ormsby in Norfolk in 1926, Alwyn's first choice for university was University College which had migrated to the safety of Aberystwyth during the Blitz. Ten days before start of term he received a letter instructing him that classes would take place in London. Alwyn duly arrived amid the ruins of UCL, to the rather grand Ramsay and Foster Laboratories in Gower Place where Ingold was head of department. It was a place that Alwyn found deeply congenial and in later years he would reminisce about the inspiration he drew from his lecturers, but also their eccentricities: Gilbert, who wore a bowler hat and played the clarinet in a West End band; Wassermann whose dog lived under his desk; Ted Hughes, the Welshman from Criccieth, Ingold's right hand man who had been instrumental in protecting the Department in the war. In the class photos from around 1945/46 Alwyn is visible first in the back row, then, more confidently sitting at the front, with his angular jaw, a warm smile, and an intense look.

When Alwyn graduated with a first class degree, Ingold invited him to do a PhD, an honour reserved for the very few. Alwyn's thesis "The steric course of halogen substitution in unsaturated chloro compounds" was submitted in 1949. Somewhat to Alwyn's chagrin the work was never published – the rumour was that Ingold was reluctant to encroach on the territory of his American competitor/friend Saul Winstein whose parallel work focused on stereoelectronic effects. Nonetheless, certainly with Ingold's backing, Alwyn was appointed to a lectureship at Battersea Polytechnic (today Surrey University). A new lecturer with no publications? It is unthinkable today. At Battersea, he came under the wing of the outgoing head of Department Joseph Kenyon FRS. Kenyon was, in Alwyn's words "a wonderful experimentalist" who made a profound impression; for the next few years they would collaborate on a series of projects to resolve the enantiomers of various alcohols and to understand tautomeric structures. Some of Kenyon's consultancy work led to samples of organic peroxides arriving in the lab and this would be the starting point for new direction in Alwyn's chemistry.

In 1953, with rather more of a track record, Alwyn received a phone call from Ted Hughes, Ingold's successor, asking whether he wanted a job back at UCL. Things were done differently in those days! Perhaps to avoid overlapping with Ingold and Hughes, he proposed to continue his work on peroxides, with a focus on neutral radical reactions. There was some scepticism in the Department that this was a viable research direction. As his colleague Peter de la Mare pointed out "I should tell you that, in this Department, homolysis, even between consenting adults, is grounds for dismissal." Undeterred, Alwyn, with some of his first students Mike Abraham (who would much later become a member of staff here) and Erwin Buncel made some of the first boron and silicon peroxides and this led to extensive mechanistic work to understand the behaviour of both organic and inorganic hydroperoxides, work that would be continued by Brian Roberts who also became a staff member here.

Alwyn was a popular lecturer with students: never flashy, very enthusiastic, meticulously prepared, and always accessible. A fixture at the Staff-Student cricket match, he would turn up in an ancient purple College blazer, and play with great enthusiasm. Stories of his kindness to students are legion. Kris Page, an undergraduate at Kings when the department closed down in 2003 (and now a lab manager here) was taken to the pub by Alwyn who wanted to know how they were coping with the sudden switch to a new Department. His lack of pretension and quiet approach are also exemplified by a comment from a member of Derek Barton's group after a seminar: "He doesn't *look* like a professor". In 1956 he married Margaret, an undergraduate in the Department whom he had met while demonstrating in the teaching lab. It was an enduring love match and they would have two children, Stephen and Sarah. Alwyn and Margaret would delight in helping to organize and attending the Lab Dinner to see their many old friends.

In the 1960s Alwyn was in charge of the organic chemistry practicals at a time when several young technicians were hired. Phil Hayes, who would remain in the Department for almost 53 years, remembers how Alwyn was prepared to stop and listen even to someone as junior as he was, in contrast to most other academics who were very hierarchical. Phil pointed out that none of the undergraduate glassware was equipped with ground glass joints; freshers accustomed from school to Quickfit joints were having to go back to corks and rubber bungs. Alwyn began a complete overhaul of the equipment in the lab to bring it up to date.

In the 1960s Alwyn began a long association with the International Tin Research Institute, with carte blanche to pursue any interesting chemistry he might dream up. A series of outstanding students joined the group to work on different aspects of organotin compounds as catalysts. These included John Bloodworth (later lecturer here), and Dennis Hall (later King's College). His students came to be known as Alwyn's Tin Men. Another, Dick Puddephatt (later Professor at University of Western Ontario in Canada and eventually FRS) would later extend this work to lead (Pb). A hands-on supervisor, Alwyn would come through the lab every day to catch up on the latest news and advise but especially to listen; he gave his students wide latitude to develop their own ideas. But he also had delicate antennae, able to pick up frustration with a research project before anything was even expressed in words; unhappy researchers might find themselves suddenly shifted onto something more fruitful.

Alwyn was promoted steadily, becoming Professor in 1968. On the sudden death in a car crash of the Head of Department, Ron Nyholm, in 1971, Alwyn, seen as a senior and competent pair of hands, was asked to act as interim head. With no particular interest in College politics, Alwyn looked after business watching his research group wither while the grandees of the College attempted, without success, to recruit a Nobel Prize winner or other big hitter. This continued for three long years until the distinguished thermodynamicist Max McGlashan was appointed as Nyholm's successor.

Free from the burden of headship, he now rebuilt his research activities. By the 1980s Alwyn and his students were also

exploring the chemistry of organic radical cations, where the use of EPR made possible a detailed understanding of their electron distributions as well as their potential for synthesis.

Over the years, Alwyn sat on a variety of committees and councils, feeling it his duty to contribute to the Royal Society of Chemistry, or to the College. For many years he was Departmental Safety Officer, at a time when the job was given given to a member of academic staff. It was a job he took very seriously. As he would remark in an interview around 2017 "At the start of my time at UCL, we were working with litres of a reagent. Today even one cubic centimetre is enough. This makes life a lot safer. We used to have frequent accidents, some very serious. Two blokes lost an eye, one lost parts of two fingers, and this would be unheard of nowadays." Several people remember Alwyn's calm in emergencies – his student John Bloodworth remembers Alwyn dropping into the teaching lab one afternoon just as a student's reaction caught fire. Alwyn had put the fire out before any of the demonstrators in the lab could react. On another occasion, a ferocious fire broke out among the oxygen cylinders outside the glassblowing workshop in the old building. Fire extinguisher in hand, Alwyn helped to put out the flames getting soaked and filthy in the process. Bill Davis, the storesman, rather broader than the svelte Alwyn, offered him a spare pair of trousers which Alwyn wore, tied at the waist with string, for a meeting with Provost. Incidents like these led wags to remark that where Alwyn went fire would follow.

But the reality was that Alwyn was almost fearless – Tony Legon remembers a very loud explosion when a student scraped an organic perchlorate he had made with a spatula. The severely injured, near-hysterical victim had to be rugby tackled before being taken to the nearby University College Hospital. There it transpired that there was a large amount of the same material drying in a dessicator back in the lab. Without hesitating, Alwyn took it on himself to go back to the lab and destroy the material before it could do further harm. From these experiences came deep wisdom. He was consulted by the Royal Commission after the huge Flixborough explosion in 1974, a disaster that killed 18 workers. But his advice was always gently put. I remember Alwyn admonishingly me gently for doing a particularly silly (but spectacular) trick with liquid nitrogen. "It looks unwise", he said quietly.

It was only at the very end of his career that Alwyn was elected a Fellow of the Royal Society, joining the ranks of the heroes of his youth: Lonsdale, Ingold, Hughes, Nyholm, and of course William Ramsay. Alwyn retired in 1993 but stayed on, cheerfully sharing with other emeriti a windowless office on the first floor from which he continued to edit the Journal of Organometallic Chemistry, referee papers, and give advice to colleagues who would send them their manuscripts or proposal for comment. Alwyn continued to come into the Department to work once or twice a week when well into his 90s, heading across to the Housman Room to hang out and gossip with old friends over lunch.

In seminars he might seem to be distractedly scribbling radical mechanisms on a scrap of paper, but he always had a sharp question for the speaker. Until the arrival of electronic journals, he would often be found combing the stacks in the science library, always wanting to keep up with both the old and the new chemistry. At the age of 77 he rewrote his monograph on the chemistry of tin and later edited a large textbook on organotin chemistry. He was still writing and drawing chemical structures at age 95, writing from home to Charles Willoughby (of the Department's IT support) that "I have downloaded and installed ChemDraw. It is pretty different from the old version, and all that I have got to do now is to learn how to use it."

Above all, he acted as the Department's institutional memory and archivist, a role he inherited from the inorganic chemist Bert Allen (remembered as the discoverer of the first transition metal dinitrogen complex) who left for Canada in the 1950s. Many undergraduates got to know Alwyn through his annual lecture on the history of the Department where, armed with a buzzing Tesla coil, he would recount the tale of how Ramsay had isolated the noble gases, bringing each one alive in the darkness. With UCL's collection manager, Nick Booth, he methodically indexed our holdings of relicts and memorabilia. With Peter Garratt he wrote a detailed history of the Chemistry Department from its inception to 1828 to 1974 which included a section dedicated to the technical support staff who meant so much to him. Alwyn, of course, had known more than two-thirds of the people mentioned in the book personally.

Alwyn also helped maintain strong links with Japan, helping to organize the unveiling of a memorial to the Choshu Five. These were the first group of students to leave the then-closed country to spend time with Alexander Williamson in the 1860s, and who went back to modernize Japan. Alwyn regularly hosted visits by groups of students and academic visitors wanting to learn more about the role of UCL in developing modern Japan, showing them the relicts from our archives; he was delighted when Prime Minister of Japan, Abe Shinzo, sent the Department a scroll to acknowledge Japan's debt to UCL and to Williamson – the scroll is on display in our foyer to this day.

Alwyn Davies was an exceptional scientist who opened new windows on chemistry. Although he started his work in the era before spectroscopy and routine crystallography he was a quick adopter of new tools as they came available: infrared, NMR, EPR spectroscopies and crystallography and made important contributions to organic chemistry. But he remained modest to the end, a true gentleman scholar, with no interest in riding political hobby horses and acquiring the trappings of academic "power"; Alwyn remained grounded in chemistry and in the Department right to the end. And his enthusiasm and curiosity never faded. A few days before his death a colleague and I received a short email that was typical Alwyn: "*I hove (sic) been worrying about a simple problem for which I can't find an answer. Why is a mirror image inverted horizontally but not vertically? If either of you know a simple answer, I would like to hear it.*
Alwyn

We miss him enormously and his legendary purple blazer is being framed for display in his memory.

Acknowledgments: I am grateful to Edgar Anderson, John Bloodworth, Phil Hayes, Dave Knapp, Tony Legon, Dewi Lewis, Brian Roberts, and Charles Willoughby for thoughts, reminiscences and, especially, corrections.

Remembering Alwyn

I completed my PhD in Poland under the communist regime. I had met Alwyn at a conference in Poland and we found common chemical interests. At that time leaving for the West as a postdoc was a process that was almost unheard of and typically available only to very few supported by a politically corrupt system that I was not part of. Alwyn was very quick to understand these nuances and used his understated diplomacy to wiggle me out of Poland for a postdoctoral position at UCL.

When in London, outside of our work together, I (and later we, with my wife who joined me after half a year) was treated as a member of Alwyn's family, living in their house for half a year, feeling the warmth and support of a family home. That support became critical when we abruptly decided not to go back to Poland at the end of my postdoctoral term in 1981 because of the introduction of marshal law. The trauma of that decision was immense. We did not have a job, we did not know if we will ever be able to go back to Poland. Alwyn, within a couple of weeks, arranged a meeting with Keith Ingold that secured a position for me at the National Research Council of Canada in Ottawa. I spent the rest of my working life there as a scientist and research manager. Canada became our new and happy home. We collaborated with Alwyn for many years and were fortunate to have Alwyn and Margaret to visit and stay with us in Ottawa a number of times.

My story is not unique. Alwyn helped many people like myself to start their carriers, to get them out of difficult circumstances, to take proper decisions with his wise advice. For many of us he introduced us to this wonderful world of the triumvirate of free radical wise men: Davis, Ingold and Beckwith.

I feel privileged to have known Alwyn and to be able to count myself as his friend. I owe him tremendous gratitude. He was a great chemist and a wonderful person who has guided me and many others to find their way and place.

Janusz Lusztyk

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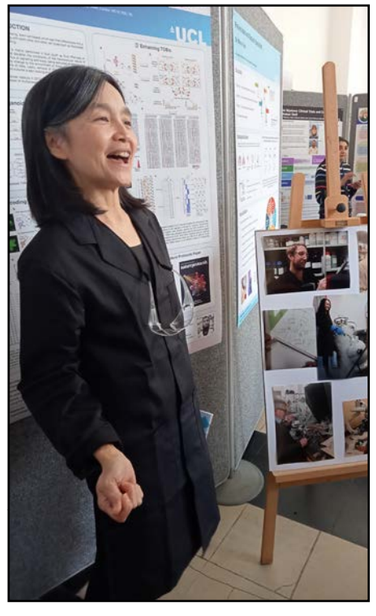

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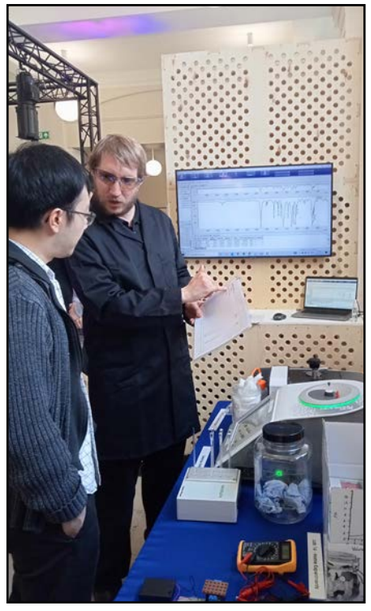

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Grants

Investigator: Dr Michael Booth
Title: Next-generation nucleic acids: combined self-delivery and remote control through chemical modification
Sponsor: Royal Society
Value: £752,243.75
Period: 28/10/2026 - 28/10/2026

Investigator: Professor Slater Ben
Title: CP2K for emerging architectures and machine learning
Sponsor: EPSRC
Value: £41,768.50
Period: 01/04/2022 - 31/03/2025

Investigator: Dr Michael Booth
Title: SIGSYNCELL: Engineering biological signaling pathways using synthetic cells
Sponsor: Horizon Europe
Value: £244,274.29
Period: 01/03/2024 - 29/02/2028
Investigator: Dr Kerstin Sander
Title: Monitoring Glucocerebrosidase Engagement in Parkinson's Disease
Sponsor: Michael J Fox Foundation for Parkinsons Research
Value: £196,314.80
Period: 01/04/2023 - 30/06/2024

Investigator: Dr Guanjie He
Title: Breakthrough Anode-less Rechargeable Aqueous Zinc-ion Batteries
Sponsor: UKRI - EU Underwrite UK Research and Innovation
Value: £1,270,408
Period: 01/08/2023 - 31/07/2028

Investigator: Professor Helen Hailes
Title: The comfort loop: A systems approach for sustainable absorbent hygiene products
Sponsor: EPSRC
Value: £1,829,410.05
Period: 01/10/2023 - 30/09/2026

Investigator: Professor Jamie Baker
Title: Investigations into aryl nitriles for protein modification via an untapped mode of reactivity
Sponsor: EPSRC
Value: £661,997.87
Period: 01/10/2023 - 30/09/2026

Investigator: Dr Mark Isaacs
Title: Addressing the gender imbalance in surface science
Sponsor: Royal Society of Chemistry
Value: £5,000.00
Period: 01/08/2023 - 31/10/2023

Investigator: Professor Peter Coveney
Title: CompBioMedEE: Computational Biomedicine Exascale Engagement
Sponsor: EPSRC
Value: £262,951.15
Period: 01/06/2023 - 30/11/2024

Investigator: Dr Michael Booth
Title: 21ENGBIO A Universal and Controllable Interface between Synthetic Cells and Living Cells
Sponsor: BBSRC
Value: £125,938.95
Period: 15/02/2023 - 14/02/2024

Investigator: Professor Alethea Tabor
Title: Nanoscale visualisation of bacteriocins in action on bacterial membranes
Sponsor: Oxford Nanoimaging Ltd
Value: £18,038.00
Period: 01/10/2023 - 30/09/2027

Investigator: Professor David Scanlon
Title: Post Transition Metal Oxides for Optoelectronic Applications
Sponsor: Horizon Europe
Value: £1,538,461.22
Period: 01/08/2023 - 31/07/2028

Investigator: Dr Daniele Castagnolo
Title: Development of P450 And BVMO Biocatalysts for the Stereocontrolled Production of the Garlic Sulphoxide Components
Sponsor: Almac Sciences Limited
Value: £3,053.91
Period: 21/03/2022 - 23/02/2023

Investigator: Dr Rebecca Ingle
Title: Intermolecular Electronic Interactions: Alternative Paths for Photochemistry
Sponsor: EPSRC Engineering and Physical Sciences Research Council
Value: £548,452.05
Period: 01/10/2023 - 30/09/2026

Investigator: Professor Helen Hailes
Title: Stereocontrolled biocatalytic routes to fluorinated molecules
Sponsor: Leverhulme Trust
Value: £227,573.00
Period: 01/10/2023 - 30/09/2026

Investigator: Professor Andrew Beale
Title: Catalytic Non-Oxidative conversion of methane to hydrogen, chemicals and high-purity carbons
Sponsor: Finden LTD
Value: £50,000.00
Period: 01/05/2023 - 30/04/2026

Investigator: Professor Graham Worth
Title: A Universal Approach to Using Quantum Dynamics for Real World Problems: Applying Coherent States for Molecular Dynamics Simulations (COSMOS)
Sponsor: EPSRC
Value: £1,874,092.46
Period: 01/06/2023 - 31/05/2029

Investigator: Professor David Scanlon
Title: Quantum computing for materials modelling applications in photovoltaics
Sponsor: Innovate UK
Value: £149,788.75
Period: 01/11/2022 - 31/05/2024

Investigator: Professor Robert Palgrave
Title: Investigating application viability for tellurium halide PV materials (Royce)
Sponsor: EPSRC
Value: £49,809.43
Period: 15/11/2022 - 30/06/2023

Investigator: Dr Guanjie He
Title: Construction of robust electrode-electrolyte interface for solid-state Zn-ion batteries
Sponsor: Royal Society
Value: £12,000.00
Period: 31/03/2022 - 30/03/2024

Investigator: Dr Guanjie He
Title: Cost-effective oxygen evolution electrocatalysts and devices for waste water splitting
Sponsor: Royal Society
Value: £12,000.00
Period: 01/11/2021 - 31/10/2023

Investigator: Professor Woodley Scott
Title: Materials Chemistry HEC Consortium
Sponsor: EPSRC
Value: £791,768.54
Period: 01/01/2023 - 31/12/2026

Investigator: Dr Adam Clancy
Title: Understanding Charged Interfaces at the Nanoscale with Designer Nanomaterials
Sponsor: Royal Society
Value: £631,706.76
Period: 01/10/2022 - 30/09/2027

Investigator: Professor Stefan Howorka
Title: Molecular rulers to measure membrane thickness in live cells
Sponsor: BBSRC
Value: £420,187.25
Period: 01/05/2023 - 30/04/2026

Investigator: Professor Darr Jawwad
Title: New materials and new battery architectures for next generation batteries
Sponsor: Addionics Limited
Value: £60,000.00
Period: 01/10/2023 - 30/09/2026

Investigator: Dr Yang Xu
Title: Investigating dynamic cathode electrolyte interphase in sodium metal batteries
Sponsor: Royal Society
Value: £12,000.00
Period: 18/04/2023 - 17/04/2025

Investigator: Dr Andrew Stewart
Title: 2022 EPSRC Core Equipment Award
Sponsor: EPSRC
Value: £161,400.00
Period: 03/01/2023 - 02/07/2024
Investigator: Professor Robert Palgrave
Title: Harwell XPS Development 2022
Sponsor: EPSRC
Value: £128,446.40
Period: 03/01/2023 - 02/07/2024

Investigator: Professor Giorgio Volpe
Title: Multi-color single molecule tracking with lifetime imaging
Sponsor: Chan Zuckerberg Initiative
Value: £248,842.02
Period: 01/03/2023 - 29/02/2024

Investigator: Dr Kerstin Sander
Title: Targeted Nitroxoline Delivery for Treatment of Multidrug-resistant Pathogens
Sponsor: MRC Medical Research Council
Value: £315,452.72
Period: 13/02/2023 - 12/02/2026

Investigator: Professor Helen Hailes
Title: Bug-Busting Spandex: Biodegrading Textile Blends for Molecular Recycling
Sponsor: BBSRC
Value: £375,519.79
Period: 13/02/2023 - 12/02/2025

Investigator: Professor Jawwad Darr
Title: Gen. 4b Solid State Li-ion battery by additive manufacturing
Sponsor: Innovate UK - EU Underwrite
Value: £511,045.56
Period: 01/07/2022 - 30/06/2026

Investigator: Professor Matthew Powner
Title: Nitriles from prebiotic peptides to synthetic applications.
Sponsor: EPSRC
Value: £1,107,962.14
Period: 01/04/2023 - 31/03/2026

Investigator: Professor Peter Coveney
Title: CompBioMedX: Computational Biomedicine at the Exascale
Sponsor: EPSRC
Value: £508,035.20
Period: 01/12/2022 - 30/11/2024

Investigator: Professor Ben Slater
Title: Ion exchange mechanisms in zeolites
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Investigator: Dr Michael Booth
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Period: 01/09/2022 - 31/08/2026

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Period: 02/05/2023 - 02/11/2023

Investigator: Professor Jawwad Darr
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