



# UCL Chemistry NEWSLETTER

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## Introduction

Many thanks go to Louise McSeveny, for organising this year's newsletter and to Tracy Hankey at UCL Digital Media Services for her help.

We hope this newsletter gives a flavour of the exciting chemistry and family atmosphere achieved in the department. It is not an exhaustive document but can provide a number of contact points to the wide variety of activity that occurs in the department.

## Introduction by Head of Department

As I sit here writing this welcome the UK basks in temperatures over 25 degrees, the government has published its long awaited Brexit White paper and Donald Trump is visiting the UK! Fortunately we keep our minds busy in the chemistry department with lots of exciting science and activities, which you can read about in this newsletter.

We have had a number of retirements this summer – Mr Jim Stevenson, Mr Phil Hayes and Professor Derek Tocher all of whom have been at UCL over 30 years (53 years for Phill!). We are grateful to Jim and Phil who both contributed greatly to the technical team in the department over the years in the workshop and teaching labs, respectively. Thanks also go to Professor Tocher who has taken on many key roles over the years including Pro-Provost for East and South-East Asia, Departmental Tutor, Admissions Tutor, Deputy Safety Officer, Affiliate Student Tutor and for the past 6 years Deputy Head of Department. We were delighted when Professor Tocher was awarded a special Lifetime Achievement Award, as part of the MAPS Faculty Education Awards. Indeed, chemistry did extremely well with awards going to Dr Katherine Holt (Teaching Staff category), Dr Anna Roffey and Dr Daren Caruana (Continuing Professional Development Category) and Emre Sener (Postgraduate Teaching Assistant Category).

This year Dr Hugo Bronstein moved to the University of Cambridge after 4 years here at UCL. We welcomed Dr Bob Schroeder from the University of Queen Mary as a Lecturer in Organic Chemistry and Dr Kerstin Sander as a Lecturer in Radiochemistry and PET Pharmacology (joint appointment with medicine). Dr Clare Blakewell and Dr Antoine Maruani will both start Ramsay Trust Fellowships in October 2018 and Dr Rachel Dickman has been awarded an EPSRC Doctoral Prize Fellowship. We also welcomed Louise McSeveny as acting EA and Dr Richard Fitzmaurice as acting Laboratory Manager for the organic section, while Nicola Phillips and Dr Helen Allan are on maternity leave.

There have been many new initiatives and grants awarded within the department. A few highlights include Professor Giuseppe Battaglia who was awarded an ERC Consolidator Grant for €2m entitled CheSSTaG (Chemotactic Super-Selective Targeting of Gliomas) and Dr David Scanlon an ERC starting grant for €1.5m for a project called DISCOVER (Design of Mixed Anion Inorganic Semiconductor for Energy Conversion). Professor Jawwad Darr is leading an EPSRC JUICED (Joint University-Industry consortium for energy materials and devices) Hub grant for £1.8m (with Professor Ivan Parkin, Professor Furio Cora and Dr Rob Palgrave). Well done also to Dr Rob Palgrave who co-led a bid between UCL and University of Cardiff for the National XPS facility to be located at Harwell. UCL's bid was worth £1.2m and UCL will own one instrument on completion.

Yet again the department had a record intake with over 100 students taking one year MSc and MRes degrees in the department. Undergraduate and PhD admissions were also very strong which presented challenges with respect to space and research project allocations.



However, we had two enjoyable away days this year – one for academic staff and one for Professional services/support staff from which many ideas have emerged. We are currently in the process of having new fumehoods fitted in the 3rd floor laboratories and apparently our toilets are going to be refurbished in the department!

I wish you all the best for the 2018-19 academic year.

Professor Claire Carmalt

## NEW APPOINTMENTS

## Academic Appointments

**Bob C. Schroeder****Lecturer in Organic Chemistry**

Before joining UCL in January 2017, Bob was an Academic Fellow at Queen Mary University of London (2014-2017) and a Postdoctoral Research Associate at Stanford University (2014-2016) and Imperial College London (2013-2014). He received his PhD in Chemistry in 2013 from Imperial College London, under the supervision of Professor Iain McCulloch.

Bob's research interests focus on the design and synthesis of new functional materials based on organic semiconductors for both energy and healthcare applications. His interdisciplinary research group currently consists of 2 postdocs and 3 PhD students. Current research within the group focusses on the synthesis of new conjugated polymers for wearable thermoelectric generators and flexible solar cells. Furthermore, the group has an increasing interest in exploiting the unique properties of organic semiconductors for biomedical applications, such as in-vivo imaging and targeted drug delivery.

Bob's research group takes an interest not only in developing new functional materials for organic electronic applications but also in gaining a deeper understanding of the underlying structure-property relationships. By doing so, they can control the solid-state morphology, modulate the optoelectronic properties (such as light absorption/emission) and the mechanical behaviour of the organic semiconductors.

**Kerstin Sander****Lecturer in Radiochemistry and PET Pharmacology**

Kerstin was appointed Lecturer Radiochemistry and PET Pharmacology in September 2017. Kerstin joined the UCL Radiochemistry group in 2010 to work as a post-doctoral research associate with Professor Erik Årstad (until 2017). Before this, she was a research associate in the group of Professor Holger Stark at Goethe University Frankfurt/Main (Germany), where she was awarded a PhD in Pharmaceutical/Medicinal Chemistry.

Kerstin's research focuses on the development and characterisation of radiotracers, in particular for imaging of brain diseases. The aim is to establish a platform for the development and non-clinical evaluation of imaging agents that will facilitate to assess the suitability of a tracer for a given purpose, e.g. early diagnosis,

differential diagnosis, patient stratification or treatment monitoring. This will accelerate clinical applications and translation of novel tracers into clinical studies.

## Research Fellows

**Clare Bakewell****Ramsay Fellow**

Clare conducted her PhD in the field of polymerisation catalysis at Imperial College, under the supervision of Professor Charlotte Williams and Professor Nick Long. She was awarded an EPSRC Doctoral Prize Fellowship for her research, after which she went on to spend a year working for the polymer start-up Eonic Technologies. She then returned to Imperial to work as a postdoctoral research associate in the group of Dr Mark Crimmin. Here her research focused on the activation of strong chemical bonds using highly reactive metal complexes. As a Ramsay Fellow she will be developing new methodologies for polymer formation, using highly active organometallic catalysts.

**Antoine Maruani****Ramsay Fellow**

Antoine Maruani obtained his Master's degree in Chemistry from École Normale Supérieure of Lyon (France). After working with Professors Vogel and Gerber at EPFL (Switzerland), Professor Davies at Oxford University and at Merck KGaA (Germany), he then joined Professor Stephen Caddick's group at University College London where he obtained his PhD in 2015 with his thesis focusing on the site-selective dual modification of proteins. He is currently working as a postdoctoral fellow under the supervision of Dr Vijay Chudasama on the development of novel methodologies for bioconjugation. In April 2018, Antoine obtained a Ramsay Memorial Fellowship which he will start at UCL in September 2018.

**Rachael Dickman****EPSRC Doctoral Prize Fellow**

Rachael obtained her MChem degree in Medicinal Chemistry from the University of Manchester in 2013. She then moved to London for her PhD studies, supervised by Professor Alethea Tabor at UCL, working on the synthesis and structural analysis of the lipid II binding region of nisin, a potent antimicrobial peptide. Following her PhD, she moved to Sweden for a postdoctoral project with Dr Máté Erdélyi at Uppsala University, where she

conducted detailed NMR studies on nisin using NAMFIS analysis. In 2018 she was awarded an EPSRC doctoral prize fellowship to work with Prof Stefan Howorka and Dr Stephen Cochrane at Queen's University Belfast, studying the structure of the nisin-lipid II pore complex using biophysical experiments. When not at the lab, Rachael enjoys baking and watching live music.

## Promotions

We are very proud to announce the following senior promotions of the department, effective from 1st October:

**Christopher Blackman****Promoted to Professor of Inorganic Chemistry****Katherine Holt****Promoted to Professor of Physical Chemistry****Christoph Salzmann****Promoted to Professor of Physical and Materials Chemistry****David Scanlon****Promoted to Professor of Computational Materials Design****Thomas Sheppard****Promoted to Professor of Organic Chemistry****Scott Woodley****Promoted to Professor of Computational Chemistry and Physics****Stephen Potts****Promoted to Senior Teaching Fellow**

## MAPS Faculty Education Awards 2018

Each year the Faculty of Mathematical & Physical Sciences recognises excellence in teaching from staff through the Faculty Education Awards.

We are delighted to announce the following winners of the 2018 MAPS Faculty Education Awards from the Chemistry Department:

**Professor Derek Tocher**  
(Winner of Lifetime Achievement Award):

"It is most heartening to have the work I have done at UCL over the last 34 years recognised by the Faculty. The most enjoyable aspect of my long career has undoubtedly been the fact that I have been able to combine my research interests in crystallography with a love of teaching our undergraduates and it was my privilege as Departmental Tutor for ten years to guide and support undergraduate students through to the completion of their degrees and take the first steps in their subsequent careers. In my time here I have worked closely with too many excellent colleagues to name but special mention needs to be made of Professor Sally Price who I have collaborated with for the last 20 years on a project trying to understand the organic solid state."





**Dr Katherine Holt**  
(Winner of Teaching Staff Category):

Katherine Holt is Reader in Physical Chemistry in the Chemistry Department at UCL and for the past 3 years has been Chair of the Departmental Teaching Committee. During that time she has overseen a complete redesign of the Year 3 labs, the recruitment of three Teaching Fellows, a stronger integration of a Careers Programme into the department and the introduction of free access to core e-textbooks to students. "I'm really grateful for the nomination from my department and really delighted to have won this award. It's a pleasure working with many enthusiastic and committed colleagues to improve the student experience in the Chemistry Department and I hope we continue to be successful in doing that."



**Dr Anna Roffey**  
(Joint Winner of CPD Category):

"I am very interested in the post graduate student experience and it has been such a pleasure helping to design and execute the new postgrad taught Master's in Applied Analytical Chemistry this year. We have a wonderful bunch of PGT students from a diverse range of backgrounds, and I have had the opportunity to learn what needs these students have, and how we can best meet these at UCL. This has involved being flexible, while still maintaining our academic standards, with the aim of imbuing our students with the professional skills they need to excel in the future."



**Dr Daren Caruana**  
(Joint Winner of CPD Category):

"To create a learning environment that is both challenging and able to connect with students requires us to ditch many of our traditions and assumptions on student capability. If students from 1978 were transported to the present day, they will probably be baffled by Portico, but probably have little problems engaging with the learning environment, as in many respects it remains unchanged. We need to move with the times and deliver a more contemporary learning experience. We should be more creative and take more risks with a firm aim of pushing students in directions that will stretch their abilities; rather than hold their hands. Given the chance to start a new MSc with a new learning approach has been very rewarding, this award highlights the enormously capable colleagues I have had the pleasure of working with and the supportive environment of the Chemistry Department, for which I am grateful."



**Emre Sener**  
(Joint Winner of PGTA Category):

"I tried to provide a supportive safety net for students so that they could freely experiment without fear of failure. At the end, it was incredibly rewarding to see them take complete ownership of their projects."

**Other winners included:**

**Postgraduate Teaching Assistant Category:**  
**Pavlos Apostolidis** (Physics and Astronomy)

## Student Choice Teaching Awards 2018

The Student Choice Teaching awards (SCTAs) have been entirely developed by students – they developed the criteria, created the name and make up the entirety of the judging panel. They have been developed in partnership with UCL and are awarded with the provost teaching Awards.

We are thrilled that Dr David Scanlon is this year's winner for Outstanding Research Supervision. Dr David Scanlon is a Reader in Computational, Inorganic and Materials Chemistry. He was appointed to a Lectureship in 2013, Reader in 2016 and Professor in 2018. He leads the Materials Theory Group, which is focused on computationally driven materials design at UCL, especially within the remit of solid state materials for renewable energy applications. David's research is sponsored by the EPSRC, the ERC, the Faraday Institution and Industry.

David is extremely popular in his (and other) research groups, and has been exceptional in establishing collaborative partnerships with his students and building their careers. He has been commended for the detailed personal attention he pays to each individual student, his enthusiasm in encouraging his groups to work with cutting-edge technologies, and his dedication to helping his students find and make the most of academic opportunities.

## Kathleen Lonsdale Building Re-opened by Sir David Attenborough

UCL's Kathleen Lonsdale Building (KLB), home to UCL Earth Sciences and groups from Chemistry, Astrophysics, and Mathematics, was re-opened by Sir David Attenborough on Tuesday 17 April 2018 following a £27.5 million refurbishment. As part of the celebrations, scientists Professor Paul Bown and Dr Jeremy Young (Department of Earth Sciences) named a newly discovered ocean plankton species in honour of the BBC's Blue Planet series production team. The KLB was constructed in 1915 as the first purpose-built Chemistry building for UCL. Over the years, it has been adapted to suit different UCL departments, predominantly Earth Sciences, but has also housed groups from across UCL Mathematical & Physical Sciences.

Kathleen Lonsdale was a scientist, Quaker and pacifist, whose ground breaking research in crystallography was conducted at UCL under the shadow of World War II. She was the first woman to be elected a Fellow of the Royal Society when, in 1945, it was decided that the term 'Fellow' could encompass women. Furthermore, she was the first female President of the British Association.



*Sir David and Professor Claire Carmalt*



*Sir David and Professor Lars Stixrude and Professor Ivan Parkin*



*Sir David Attenborough*

Hosted by Professor Lars Stixrude (Head of UCL Earth Sciences) and Professor Ivan Parkin (Dean of UCL Mathematical & Physical Sciences), the re-opening ceremony: 'An audience with Sir David Attenborough' celebrated the outstanding completion of the renovation of the KLB by UCL Estates as part of Transforming UCL.

The day began with a morning reception in the Rock Room, followed by an arm-chair style discussion with Sir David Attenborough facilitated by Professor Lucie Green from UCL Space & Climate Physics.

The audience was extremely engaged with what Sir David had to say and asked thought provoking-questions on a range of topics from the sustainability of the meat industry, to the most fun moment of his illustrious documentary career. During the talk, Sir David was presented with a ceramic sculpture of the newly discovered species of ocean plankton named *Syracosphaera azureaplaneta* in honour of the BBC's Blue Planet series.

In the afternoon, Sir David met with the staff and students working in the different departments of the KLB. They showcased activities, discoveries, and research in their newly renovated surroundings. The day ended with the unveiling of a new plaque by Sir David, followed by refreshments with staff, alumni, and students.



## New Master's in Applied Analytical Chemistry - Arduinos and Awards

In September 2017 we welcomed our very first cohort of MSc students on the new PGT Master's in Applied Analytical Chemistry. 14 bright students took on this new and innovative programme, led by Programme Director Dr Daren Caruana, with a team including Dr Anna Roffey, Dr Vicky Hilborne, Professor Andrea Sella, Emre Sener, Dr Mike Parkes, Dr Kersti Karu, Martyn Towner, Professor Tim McHugh, Dr Emma Richardson and Dr Vicki Barwick (LGC).

Daren developed the teaching and learning ethos and philosophy behind the programme – immersion learning with peer-to-peer learning and assessment; free from traditional lecture-laboratory-examination. Daren is joined by Anna Roffey, a Teaching Fellow specifically working on curriculum design and delivery of content, assessment and feedback, as well as playing a key mentoring and pastoral role on the programme.

Other important members of the team include Vicky Hilborne, also a Teaching Fellow, with a strong background in analytical chemistry in academia and industry. Vicky developed and delivered the key theory module on the course, alongside Vicki Barwick from LGC, one of our industry partners. Emre Sener, a PhD student in Daren's group was also instrumental in delivering a module in analytical strategies, alongside Dr Mike Parkes – teaching and guiding the students in designing and building their own sensing devices using Arduinos. We also had several external speakers from other UCL departments (Tim McHugh, Clinical Microbiology; Emma Richardson, Art History) and outside UCL (Hilary Hamnett, Imperial).

The team worked hard to ensure the course offered a unique learning experience which led to the development of confidence in students' own abilities. The emphasis was on developing students' knowledge of analytical methodology approach and design. After extensive market research and discussion with key industry employers of postgraduate level training in analytical chemistry, it was clear that this course should not focus on techniques or instrumentation but rather analytical approach (i.e. 'How to be an Analytical Chemist'). The rationale behind many of the teaching methods is to place the students outside their comfort zone, to encourage them to work together as a cohort to find innovative solutions and become self-reliant.

After nearly a year of hard work, the students are now close to completion, and the efforts of the team have been rewarded with Faculty Education Awards: Anna Roffey and Daren Caruana (Continuing Professional Development), and Emre Sener (Post-Graduate Teaching Assistant). We are all extremely pleased with the progress the team has made, and excited to develop and grow the course further in the coming years.



*MSc Students in Applied Analytical Chemistry*

## RETIREMENTS



*photo courtesy of Luke Thomas*

### Mr Phil Hayes

Congratulations to Phil Hayes, who retired in June 2018 after 53 years at UCL! Phil worked at UCL Chemistry as the classroom manager, overseeing the running of the Turner Laboratory undergraduate teaching lab. Phil grew up and went to school locally, and joined UCL as a trainee when he was 16, doing part time training, and studying his A-levels on day release one day a week, eventually following with a chemistry degree.

UCL has been an important part of Phil's life outside of work and study as well, he met his wife here, when she was also working in the Chemistry department, and two of his four children also studied at UCL, one in Chemistry and one in Earth Sciences. As classroom manager Phil managed the UCL Turner Laboratory teaching lab, which is about the size of a football pitch, and in term time is used by about 100 students a day. "53 years, it's a bit scary really, when I tell people they often don't believe it, but the reason why is that I've loved to do Chemistry, and I've always been happy in a lab environment. One of the main things about studying here is it shows you how important education is, my wife was a science teacher, so for our family it's been an important part of our life" said Phil, on his time at UCL. We wish him all the best in his retirement and look forward to hearing about his skiing, boating and dancing!



### Mr Jim Stevenson

Congratulations also to Jim Stevenson who retired in May 2018. Jim worked in the Chemistry department as a Workshop Technician and he has been working at UCL for 30 years! He did retire back in 2012 but fortunately returned to work again so that the department could benefit from his expert skills in the workshop. He assures us that this time he really has retired! Jim was very popular with research students and staff who relied on his expert guidance and ideas, when looking to get pieces of kit built or developed. We wish him all the best in his retirement.



*photo courtesy of Martin Vickers*

### Professor Derek Tocher

Professor Derek Tocher retired on 31st July 2018 after 34 years at UCL Chemistry. Derek joined the department in 1984 as a lecturer and was promoted to Reader in 1993 and Professor in 2006. Throughout his 34 years at UCL Derek has been a hugely active member of the department and UCL in general. Derek took on many key roles throughout his time at UCL including Pro-Provost for East and South-East Asia, Departmental

Tutor, Admissions Tutor, Deputy Safety Officer, Affiliate Student Tutor and Deputy Head of Department. Derek has provided excellent support as Deputy Head of Department and was a truly dedicated Departmental Tutor for 10 years taking an extremely pro-active role with the undergraduates to ensure that they obtained the maximum benefit from their time at UCL. As UCL Pro-Provost for East and South-East Asia (2008-2011) he worked tirelessly to develop relations with government agencies and leading research institutions. As Admissions Tutor (2001-2003) he devised a strategy to improve the quality of the undergraduates accepted onto the department's programmes and over five years the average A-level grades of first year students improved by almost four points. Despite such a huge contribution to enabling roles, Derek achieved an excellent publication record with >300 research papers and an h-index of 43. His research has focused on problems related to structure determination of small (<200 atom) molecules. His collaborations covered inorganic, coordination, organometallic, organic chemistry and pharmaceuticals. He uses single crystal X-ray diffraction to solve problems in these areas and in particular has collaborated with Professor Sally Price in the area of crystal structure prediction for nearly 20 years. Derek has been a key member of the department; he always put aside the time to help colleagues and set a great example of the highest academic standards. We wish him all the best in his retirement and look forward to hearing about his long bike ride across Spain!



*Derek & Claire*



## SCIENCE AS A GLOBAL ENDEAVOUR

**Richard Catlow**

That science is inherently international is an obvious truism; but I have become vividly aware of the global nature of science and of the extent to which UK science is deeply embedded in the international community since taking up the role of Foreign Secretary of the Royal Society in 2016. I followed a distinguished predecessor, Sir Martyn Poliakoff (also a chemist) in a role which was established in 1720 – 60 years before the equivalent office was created by the British government – an indication that the Society early in its history appreciated the crucial role of international collaboration in science. The role of the Foreign Secretary is to lead on the wide ranging and growing international programmes of the Society.

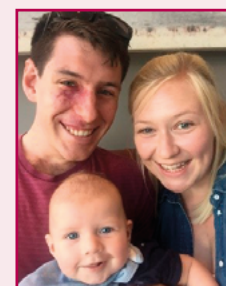
One of my first duties early in 2017 was to co-chair a meeting in Berlin between the Royal Society and two of the German academies to discuss the future of UK-German science collaboration. The preparation for this meeting by the Royal Society staff clearly revealed the depth of scientific partnership between our two countries – in terms of joint projects, publications and interchange of researchers. I was also heartened and encouraged by the clear and unambiguous support from our German colleagues for the continuation of such collaborations – a response I have received in subsequent visits, all over the continent, to academies, research institutes and funding agencies. UK science is respected throughout Europe and worldwide; and as I argued in a recent editorial in Chemistry World, we must remain partners in future European science programmes and equally (if not more) important we must ensure mobility for researchers.

The Royal Society interacts with Academies and scientists around the world and it has been both exciting and stimulating to meet and work with colleagues from Korea, Japan, China, the US, Australia, Taiwan, Argentina amongst others. One of the most effective components of the Society's programme are the bilateral meetings which we organise, usually involving two or three symposia. Last November we held a particularly good meeting in Seoul with the Institute for Basic Sciences (IBS) and with two symposia – one on Advanced Materials, which I co-chaired and to which Gemma Davies made an excellent contribution and one on Neuroscience co-chaired by John Wood (also from UCL). The sheer quality of the science of our Korean colleagues was hugely impressive as were the opportunities for collaboration.

One of the high priorities for the Royal Society's international programme is the strengthening of science in the developing world, especially Africa. Many African nations are experiencing strong economic expansion coupled with very rapid population growth. If the continent is to achieve sustainable development (in particular the targets of the UN SDGs) it must develop a strong science and technology base and not just in the usual suspects of health and agriculture (although these remain of key importance) but in physical sciences and engineering. The Society was a pioneer in the field of "capacity strengthening" and now runs a range of effective programmes; and indeed both Rob Bell and I participated in an excellent meeting in Kumasi (Ghana) of a consortium funded by a Royal Society – DfID initiative and focussing on PhD student training with staff and students from Ghana, Namibia, Botswana and the UK. The Society now runs several programmes funded by the UK Global Challenges Research Fund (GCRF) including a new African Fellowship programme (FLAIR) modelled on our URF scheme. There are also several other programmes and I recommend members of the department who are interested in working with the developing world to consider applying.

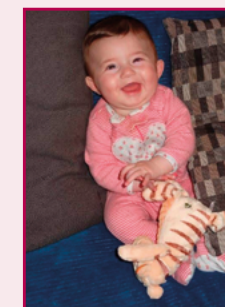
As one of the five officers of the Society, I get an overview of its very extensive work in policy, grants, publications, education outreach, industry and of course international. I believe that the Society has a crucial role to play in maintain the strength, integrity and culture of science in the UK and the Commonwealth and I hope that its international programmes will ensure that the UK and Commonwealth countries remain key players in the global scientific endeavour.

## CHEMISTRY BIRTHS

**Liam McCafferty**

Liam has worked in Jawwad Darr's group for four years, initially as a post doc and more recently as a project coordinator and technology transfer manager. His wife Jennifer gave birth to a 9lb 1oz baby boy on 30th January 2018, Jennifer and Liam named their son Owen William.

They are both extremely happy to have welcomed their first baby to the world and love watching Owen grow and develop every day.

**Laure Benhamou**

Laure is a Research Associate in chemistry working with Prof. Helen Hailes and Prof. John Ward.

Laure and her partner Ghyslaine are delighted by the arrival of their little daughter Chloé born on January 5th 2018. "She is growing really well and is a very smiley and lively little girl". They are

both very thankful to their friends and colleagues from UCL for their support during Laure's pregnancy and after Chloé's birth.

## Chemistry EDI (Equality, Diversity and Inclusion) Team



The success of our Department relies not only on the excellence of individual undergraduates, postgraduates, researchers, academics and professional services staff, but on how well everyone in the department works together. The challenge for the EDI team during the last few years has been to create a culture that encourages mutual support on a day-to-day basis. Such an approach benefits everyone, but it has been shown that it is of particular benefit to women and other under-represented groups.

There is evidence from the staff survey that we have been making good progress in our ambitions to make UCL Chemistry a better place to work. For example, in 2017, 81% of Chemistry staff said they were aware of UCL's range of benefits (up by 28% from 2015) and 68% of academic staff said the promotions criteria were clear (up by 20% from 2015).

It was pleasing to see that the workload document we developed for academic staff and teaching fellows, and has become part of our culture, matches very well with the 'best practice in the development and use of Work Allocation Models' published by the Royal Society earlier this year (<https://athenaforum.org.uk/media/1144/athena-forum-wam-reportjanuary2018.pdf>).

Dr Tracey Clarke and the EDI team's PDRAs (Dr Lorena Ruiz-Perez and Dr Loris Rizzello) have worked hard to establish an active PDRA network and have run highly successful workshops on topics ranging from developing an effective LinkedIn profile to writing a fellowship proposal. Our dynamic group of PhD students (Senio Campos de Souza, Eva Liatsi-Douvitsa, Carlos Noble Jesus, Naomi Omori, Maud Einhorn, Oscar Williams) have run their second successful Research Open Day, developed and run a new Chemistry PhD Student Survey and identified some very interesting ideas about how we can improve the PhD experience in the Department, from recruitment to networking and support.

We still have a lot of work to do but we hope that our efforts will be recognised by the award of an Athena SWAN Silver Award. We will then begin to work towards Gold!

I would like to thank the whole EDI Team for their huge efforts during the last year in collecting and presenting data (Dr Jadranka Butorac, Mike Kelly, Liz Read) and developing a challenging action plan for the Department and wish Dr Vijay Chudasama good luck as he takes over the role as Chair of the EDI Committee from October 2018!

## 2017 – 2018 PRIZE WINNERS

We would like to congratulate the following prize winners:

## Undergraduate Prize Winners

## YASSIN HJIEJ ANDALOSSI

## CK Ingold Prize

- For Excellence in Undergraduate Performance

## NEHAAL AHMED

## CK Ingold Prize

- For Excellence in Undergraduate Performance

## TERESA INSINNA

## CK Ingold Prize

- For Excellence in Undergraduate Performance

## ANDREA POUPARD

## CK Ingold Prize

- For Excellence in Undergraduate Performance

## YUNHAO (CONNIE) YANG

## CK Ingold Prize

- For Excellence in Undergraduate Performance

## SADIA BEGUM

## CK Ingold Prize

- For Excellence in Undergraduate Performance

## ELLA WAGLAND

## Neil Sharp Prize

- For Excellence in Theoretical (including Computational) Chemistry

## ANA-MIRUNA ANDRONICIUC

## Parke Davis Prize

- For Excellence in Medicinal Chemistry

## CARYS GREEN

## Harry Poole Prize

- For Excellence in Physical Chemistry

## MALAVIKA BHIDE

## Ronald Nyholm Prize

- For Excellence in Inorganic Chemistry

## JOE MCLOUGHLIN

## Charles Vernon Prize

- For Excellence in Biological Chemistry

## JOE HIGHAM

## Franz Sondheimer Prize

- For Excellence in Organic Chemistry

## PhD Prize Winners

## SAMUEL P DOUGLAS

## Supervisor: Caroline Knapp

## 2017 Tuffnell Prize (year 1)

- For the best student commencing a PhD in the Department of Chemistry, UCL

## 2017 Ronald Gillespie Prize

- For the best student in Inorganic/Materials Chemistry proceeding to a PhD at UCL

## ANDRE SHAMSABADI

## Supervisor: Vijay Chudasama

## 2017 Tuffnell Prize (year 2)

- For the best student commencing a PhD in the Department of Chemistry, UCL

## Supervisor: Jamie Baker

## 2017 Bader Prize

- For best student in Organic Chemistry proceeding to a PhD at UCL

## Chemistry Prizes

On 27th June 2018, Professor Claire Carmalt (Head of Department) congratulated the following final year PhD students who were awarded prizes for the best presentation in each of the major research areas of Organic/Medicinal, Inorganic/Materials, Computational and Physical Chemistry, as assessed by a committee.

## ALEX GANOSE

## Supervisor: David Scanlon

## Catlow Prize

Best PhD presentation in Computational Chemistry for his presentation entitled Beyond  $\text{CH}_3\text{NH}_3\text{PbI}_3$ : Prospects for Emergent Solar Absorbers

*Alex Ganose receives his Catlow Prize from Prof. Claire Carmalt*



## ELLIE DANN

## Supervisor: Richard Catlow

## Clark Prize

Best PhD presentation in inorganic chemistry for her presentation entitled: Developing Synchrotron Methods for Advanced Characterisation of Heterogeneous Catalysts

## XIANGYU ZHANG

## Supervisor: Jim Anderson

## Davies Prize

Best PhD presentation in Organic Chemistry for his presentation entitled: Applying Nitro-Mannich Reaction Towards The Total Synthesis of Schizozigine Type Alkaloids

## ROBERT MALINOWSKI

## Supervisor: Giorgio Volpe

## Ewing Prize

Best PhD presentation in Physical Chemistry for his presentation entitled Dynamic Control of Evaporating Droplets using a Local Vapour Source

*Robert Malinowski receives his Ewing Prize from Prof. Claire Carmalt*



## Second Year PhD Poster prizes

We are pleased prizes were awarded for the best 2nd Year PhD poster to the following students:

Physical Chemistry: **Mr Anand Patel**

Organic Chemistry: **Mr Andre Shamsabadi**

Inorganic Chemistry: **Ms Emma Campbell**

Computational Chemistry: **Ms Ceridwen Ash**

Rothwell Prize for best poster in synthetic inorganic chemistry: **Mr Juhun Shin**

## Graduating Students

## ZARRIN ANSARI

## PhD Chemistry

Supervisor: Gopinathan Sankar

## REECE BEEKMEYER

## PhD Chemistry

Supervisor: Helen Fielding

## SULTAN BEN JABER

## PhD Chemistry

Supervisor: Ivan Parkin

## AGASTYA BHATI

## PhD Chemistry

Supervisor: Peter Coveney

## ANDREW BREESEON

## PhD Chemistry

Supervisor: Robert Palgrave

## DOMINIC CHAOPRADITH

## PhD Chemistry

Supervisor: Richard Catlow

## DONG WOONG CHOI

## PhD Chemistry

Supervisor: Kwang Choy

**MOHIMA CHOWDHURY**

PhD Chemistry  
Supervisor: Jon Wilden

**ADAM COGGINS**

PhD Chemistry  
Supervisor: Matt Powner

**KLAUDIA CYBULSKA**

PhD Chemistry  
Supervisor: Erik Arstad

**RACHAEL DICKMAN**

PhD Chemistry  
Supervisor: Alethea Tabor

**OLIVER DICKS**

PhD Chemistry  
Supervisor: Alexander Shluger

**ALICE DUNBABIN**

PhD Chemistry  
Supervisor: Helen Hailes

**ANA ESTANDARTE**

PhD Chemistry  
Supervisor: Keith Robinson

**KEALAN FALLON**

PhD Chemistry  
Supervisor: Hugo Bronstein

**WEI FANG**

PhD Chemistry  
Supervisor: Angelos Michaelides

**DAVID FREEMAN**

PhD Chemistry  
Supervisor: Hugo Bronstein

**SAMANTHA GIBSON**

PhD Chemistry  
Supervisor: Thomas Sheppard

**EMILY GLOVER**

PhD Chemistry  
Supervisor: Robert Palgrave

**IAN GODFREY**

PhD Chemistry  
Supervisor: Gopinathan Sankar

**KALYANI GUPTA**

PhD Chemistry  
Supervisor: Jawwad Darr

**GEORGE HARRISON**

PhD Chemistry  
Supervisor: Geoff Thornton

**LILIAN HAYES**

PhD Chemistry  
Supervisor: Claire Carmalt

**CARLOS HERNANDEZ TAMARGO**

PhD Chemistry  
Supervisor: Richard Catlow

**SALLY HIGSON**

PhD Chemistry  
Supervisor: Helen Hailes

**DOUGAL HOWARD**

PhD Chemistry  
Supervisor: Jawwad Darr

**GI-BYOUNG HWANG**

PhD Chemistry  
Supervisor: Ivan Parkin

**REBECCA HYLTON**

PhD Chemistry  
Supervisor: Sally Price

**IAN JOHNSON**

PhD Chemistry  
Supervisor: Jawwad Darr

**HAZEL KITCHING**

PhD Chemistry  
Supervisor: Tony Kenyon

**MAXIMILLIAN LEE**

PhD Chemistry  
Supervisor: Steven Caddick

**MECHTHILD LÜBKE**

PhD Chemistry  
Supervisor: Jawwad Darr

**ESZTER MAKKOS**

PhD Chemistry  
Supervisor: Nikolas Kaltsoyannis

**GIULIA MANCARDI**

PhD Chemistry  
Supervisor: Richard Catlow

**SERENA MITCHELL**

PhD Chemistry  
Supervisor: Alethea Tabor

**ARIF NIKMAL**

PhD Chemistry  
Supervisor: Mathew Powner

**EMILIA OLSSON**

PhD Chemistry  
Supervisor: Nora De Leeuw

**EKREM OZKAN**

PhD Chemistry  
Supervisor: Ivan Parkin

**QAMREEN PARKER**

PhD Chemistry  
Supervisor: Robert Bell

**ANNA PLOSZAJSKI**

PhD Chemistry  
Supervisor: Thomas Skipper

**SAPNA PONJA**

PhD Chemistry  
Supervisor: Claire Carmalt

**DOMINIC POTTER**

PhD Chemistry  
Supervisor: Claire Carmalt

**BEN ROBINSON**

PhD Chemistry  
Supervisor: Jawwad Darr

**MARTIN ROSILLO-LOPEZ**

PhD Chemistry  
Supervisor: Christoph Salzmann

**MARCO SABATINI**

PhD Chemistry  
Supervisor: Thomas Sheppard

**THEO SUTER**

PhD Chemistry  
Supervisor: Paul McMillan

**FEYZA TUNALI**

PhD Chemistry  
Supervisor: Ivan Parkin

**ANTONIOS VAMVAKEROS**

PhD Chemistry  
Supervisor: Andrew Beale

**BENJAMIN WILLIAMSON**

PhD Chemistry  
Supervisor: David Scanlon

**RACHEL WILSON**

PhD Chemistry  
Supervisor: Claire Carmalt

**SITI ZAKARIA**

PhD Chemistry  
Supervisor: Katherine Holt

**Congratulations** to **Fazia Habib**, a PhD student in Professor Claire Carmalt's group, for receiving a fellowship for her PhD from the Schlumberger foundation in April 2018. The Schlumberger foundation offers Faculty for the Future fellowships for talented women from developing and emerging countries perusing advanced degrees in science, technology, engineering and mathematics (STEM) at leading universities worldwide.

**Congratulations** to **Jamie Riley**, a PhD student in Professor Helen Fielding's group, who won 2nd prize at the 2017 Southern Universities Spectroscopy and Dynamics Groups meeting held at Bristol for his talk, "Exploring solvation effects on the electronic structure of phenol". His talk described the first systematic UV photoelectron spectroscopy study of phenol in aqueous solution and showed evidence for formation of solvated electrons following photoexcitation of this ubiquitous chromophore. This work was carried out using the UK's first liquid jet photoelectron spectrometer, designed and built at UCL.



**Congratulations** to **Alex Ganose**, a 3rd year EngD student from Dr David Scanlon's group on the **Molecular Modelling and Materials Science (M3S) CDT** whose studentship is co-sponsored by **Diamond Light Source Ltd**, who has won a gold medal at the **Graduate Student Awards** at the 2018 MRS Spring Meeting. The **MRS Spring meeting** is the world's foremost international scientific gathering for materials research. The Graduate Student

Awards final is extremely hard to get in, with the top 30 students from around the globe competing for either a Gold or Silver Medal. Alex was one of only 2 UK students and 3 Europeans who reached the final. His presentation was entitled "Beyond CH<sub>3</sub>NH<sub>3</sub>PbI<sub>3</sub>: Prospects for Emergent Solar Absorbers". For his win, Alex received a certificate and a \$400 prize for his efforts.

## Chemical & Physical Society Annual Report 2017-18

By Oliver Vas, Co-Secretary

The Chemical & Physical Society (CPS) was founded in 1876 and is the oldest student-run Society in the World! Run by an enthusiastic team of undergraduates, with support from academic staff, who act as Presidents and Vice-Presidents in a mentoring and advisory capacity, the CPS hosts weekly talks during term time held every Tuesday evening.

To start the 142<sup>nd</sup> CPS year, we had a very interactive talk from Stuart Archer from the University of Sheffield "**Culinary Chemicals**" where we were given an insight into the innovative ways chemistry can be used to create new foods. With plenty of free samples to taste he had us all hooked from start until the finale where he made liquid nitrogen ice cream in front of our very eyes. In case you were wondering, it tasted much smoother than conventional ice cream!

Following that we welcomed the University of Bristol's Dr Wuge Briscoe who gave a talk on "**Nature's Secret Lubricants**", explaining the lubrication methods employed by the human body such as on the surfaces of our eyes and in our knees, and how recent research is trying to exploit such mechanisms for industrial use. In a very different talk "**Secret Science of Superheroes**" by Professor Mark Lorch of the University of Hull, we learnt about the chemistry, physics and biology needed for superpowers. He also explained how superheroes can synthesise elements on demand, what superhero suits could be made of and what sort of diets they would need to have to be able to fully function.

Jan Knight, CEO of Knight Scientific Limited, covered the applications of bioluminescent proteins in the detection of stress and anxiety in Professional athletes as well as a method for the early detection of STIs using urine samples in her talk "**Field Sports and Bedroom Sports**". Continuing a medical theme, Dr Nicholas Evans from the University of Southampton gave the talk "**Making Replacement Body Parts in the Lab**" in which he detailed the issues with organ donor lists and the research being carried out to synthesise human tissues and organs in the lab to meet this demand using stem cells and biomaterials.

This year for our annual outing we visited the **Petrie Museum of Egyptian Archaeology** where we were given an informative introduction by the curator, Anna Garnett, followed by time to walk around with a glass of wine staring artefacts and mummified remains!

We then welcomed back one of UCL's former Professors, Professor Richard Catlow, currently the Foreign Secretary of the Royal Society, to give the talk title "**Chemistry and Global Challenges**", which largely speaks for itself. He examined topics such as solar power and the shortage natural resources and what is being done to create a sustainable planet for the population.

To finish off the Autumn term we hosted the now famous annual **CPS Christmas Quiz** which was, as always, a huge success (despite Sainsbury's not delivering half of the order). Many thanks to all of those who help set up and organise the quiz, and of course to Dougal who single handedly wrote the entire quiz!

In the Spring term Dr John Emsley, a well-known science writer, started us off with "**The Shocking History of Phosphorus**" based on his book of the same name. This was an exceptionally interesting talk about the uses and impact phosphorus has had on society including its role in the feminist movement for fairer pay for female factory workers and some of its more violent uses such as in incendiary bombs in the second world war.

Following on from this we had two back to back drugs talks which were easily the most attended talks of the year (with some

rather interesting attendees who definitely weren't undergraduates). The first, "**Otherworlds: Psychedelics and Exceptional Experience**" by Dr David Luke from the University of Greenwich, which was a look at the changing attitudes to psychedelic drugs in recent years and some of the experiences people have claimed to have had while taking these substances (some more believable than others). The second talk was a detailed examination on the effects of ketamine when used to treat depression given by King's College London's Dr James Stone, entitled "**Ketamine, Glutamate and Brain Imaging**". He discussed the effects of ketamine on brain glutamate levels, functional connectivity, blood flow and neuroreceptor binding, and how these might be related to its antidepressant properties.

Next up was Professor Penny Gowland from the University of Nottingham with "**From Star Trek to Medical Imaging – the Physics of MRI**" in which she covered the history of MRI and how it is one of the most important medical advances of the 20th century. Also, some of the lesser known uses of MRI such as studying dynamic changes in physiology and metabolism making it very useful for experimental medicine studies. Unfortunately, Star Trek was only mentioned as an afterthought...

A rather different topic to our usual talks was "**Analytical Techniques to Determine Material Properties of a Tudor Collection**" by Dr Eleanor Schofield of the Mary Rose Trust. This talk explained how different artefacts are preserved and how their constituent components are determined so as to best look after them. Then the SCI's very own Dr Fred Parrett stepped in to give his famous talk "**The Black Stuff**" (aka the Bitumen talk). The ever-increasing demands to improve the material properties of this complex material has resulted in interesting developments. It's not just about roads and paving – as we discovered – bitumen itself is used in a whole range of materials.

Our presidential lecture by our own Dr Gemma-Louise Davies, "**Nano-bots: Movie Fiction or Scientific Innovation?**" definitely struck the right balance between entertaining and informative with a few pop culture references thrown in here and there. Dr Davies explained her own research into nanomaterials and the future of this field in treating diseases by putting nano sized machines into our bodies!

Dr Jonathon Brooks from the University of Leicester came next with "**A Dead Cert? – Can VOC Measurements of Decomposition be used to Enhance Victim Recovery Detection Dogs?**". Currently the use of police dogs lacks a fundamental scientific understanding of what it is the dogs are detecting. The University of Leicester has been working with the police to understand which volatile organic compounds released during human decomposition are being detected by these dogs. This talk did not however feature any live dogs.

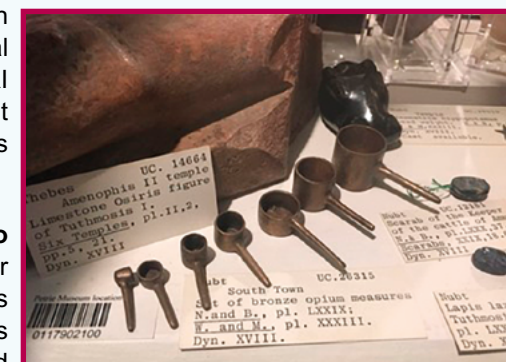
For a second year running UCL's Dr Stephen Potts delivered his event "**Wine is a Solution**" where we not only got a chance to taste an array of wines but also the major components of wine and there was a bit of chemistry in there as well!

Also, in its second year, was the **CPS Boat Party**, a fantastic note to finish the year on. Despite a few last-minute problems such as a lack of a DJ, we managed to pull off quite an event that was well received by all who attended. Many thanks to the organisers and everyone who came along.

For more information about the talks scheduled for the upcoming Academic year, please visit [www.cpsucl.com](http://www.cpsucl.com), where you can also find information about joining the Society and becoming a lifetime member!



A talk at the Petrie Museum



Some artefacts at the Petrie Museum



Professor Penny Gowland



Dr Jonathon Brooks



## 2018 CHEMISTRY LAB DINNER

We are pleased to announce that this year's Chemistry Lab Dinner will be taking place on

**Friday 23rd November 2018**

**at the Ambassadors Bloomsbury Hotel**

For further details please visit our website:

<http://www.ucl.ac.uk/chemistry/about-us/chemistry-lab-dinner>



This year we are thrilled to announce the Thomas Graham Lecture will be given by **Professor Helen Fielding**. Helen received a BA from the University of Cambridge before carrying out research in the field of Rydberg state spectroscopy under the supervision of Professor Tim Softley (University of Oxford DPhil, 1992). She then carried out postdoctoral research as an 1851 Research Fellow in the Department of Physics at the University of Amsterdam before becoming a Lecturer in Physical Chemistry at King's College London in 1994. She moved as a Professor to University College London in 2003, where she is currently Head of Physical Chemistry. Her current research is focused on employing photoelectron spectroscopy to probe the electronic structure and ultrafast relaxation dynamics of photoexcited systems ranging in complexity from small organic molecules to protein chromophores. During the last 15 years she has designed and built instruments to study neutral molecules in molecular beams, molecular anions generated by electrospray ionisation and, most recently, molecules, ions and proteins in liquid microjets. Her research has been recognised by RSC Harrison (1996), Marlow (2001) and Corday-Morgan (2005) medals and the IOP Moseley medal (2008). Alongside her research, she has made major contributions to the Royal Society of Chemistry, which were recognised by an Award for Service in 2017.



Our after-dinner speech will be given by **Dr Rob Jackson**. Rob graduated from UCL in 1978 with a BSc in Chemistry and Physics, and in 1984 with a PhD in Theoretical Chemistry (supervised by Dr Stuart Walmsley). After postdoctoral positions at UCL, Birkbeck and Keele, he was appointed as Lecturer at Keele in 1988, and was subsequently promoted to Senior Lecturer in 1996, and to Reader in 2000, recently serving a term as Acting Head of School. His research interests are in computer modelling of inorganic materials, particularly with optical and energetic applications. Outside research, he helped run the Chemistry Section of the British Science Association for 20 years, organising the Chemistry contribution to the annual British Science Festival, and he is active in the RSC's Solid State Chemistry and Applied Materials Chemistry Special Interest Groups.



We have also invited the President of the Chemical & Physical Society, **Dr Stephen Potts**, to give a short speech on the current status of the CPS and how you can get involved. Stephen joined us in 2016 as a Teaching Fellow from Queen Mary University of London, and he was promoted to Senior Teaching Fellow this year.

### How to secure your place

**We operate on a first come, first served basis and have 80 places available.**

The full cost of the evening is £45. For current postgraduate students, a limited number of tickets will be charged at £25. To book your place at this year's event, please complete a booking form (found on the link above for payment information). All cheques should be made payable to **"University College London"**.

**Tickets are non-refundable.**

## Leonard Lovelock (UCL Chemistry, 1940)

### 100 year old celebrates his UCL graduation

In 1940, Leonard Lovelock was awarded his BSc in Chemistry from UCL. Leonard, who celebrated his 100th birthday in April, was one of the cohort evacuated during the war and was subsequently never able to attend a graduation ceremony. 78 years later we were delighted to invite Leonard back at UCL for the first time to celebrate his milestone birthday and give him the graduation celebration he never had.

Leonard and his family were pleased to meet with members of the UCL Alumni Relations team along with UCL Chemistry Professor Alwyn Davies, where they shared memories and learnt of developments at the university.

The party went on a tour of the "new" (built in 1970) Chemistry department lead by UCL Chemistry Deputy Head of Department, Dr Dewi Lewis and UCL Chemistry Professor Andrea Sella.



Read the full interview with Leonard at

<https://www.ucl.ac.uk/campaign/news/2018/aug/leonard-lovelock-1940s-chemistry-alumnus>



*Picture caption:  
Professor Alwyn Davies finds  
Mr Lovelock in a 'class photo'*



## Obituary

### Brenda Mary Prestt (Irlam) 1926 – 2018

Brenda Irlam came to College in 1944 just as the Department was returning from wartime evacuation in Aberystwyth, and I was in the same group of students. As facilities were limited we had to do our practical physics in pairs, and we were asked to find a partner. Brenda and I presented ourselves to the demonstrator as an appropriate pair, but got a horrified reception. The Physics Department could not accept a man and a woman working together, and we were sent off to find more appropriate partners.

She went on to get a First Class B.Sc. in two years, then a Ph.D. in a further two years, working with C.K. Ingold on neighbouring group effects on SN1 reactions. She rowed for the College women's eight and was Vice-President of the Mountaineering Club. In 1948 she was appointed to a lectureship at the University of Exeter, and in 1949 she was married to Henry Prestt.. She taught at Leicester until 1954 then took ten years off and brought up a family of three daughters.

She then started teaching part time in Yorkshire, then moved to Cheshire and lectured at Didsbury College of Education (later part of Manchester Metropolitan University). She worked on a voluntary basis as the Director of CISTEL (Centre for industry, Science, Technology and Education) and was active on many committees including the Council for national Academic Awards, and the Joint Matriculation Board., and was the general editor of a series of science books for Primary School children. In 1986 she was awarded a M.Sc. for her work on the role of women in the fields of science and engineering.

When they retired, she and Henry bought a large house with a 7 acre garden in Sussex, and spent part of the winter months trekking in the mountains of Nepal, and the summer months in restoring the garden and entertaining their large family which included 11 grandchildren and one great grandchild.

She was a talented and inspirational woman, far ahead of her time. She was dedicated to her family, to her work in education, and to working for the benefit of others.

*Alwyn Davies*

## Donations

Those UCL Alumni and friends who support the department directly, help us to build on our international reputation for teaching and research and make a range of exciting activity possible. Your kind contributions have a direct impact upon our students and staff and we are very grateful for it.

**We would like to thank the following UCL Alumni Donors for their help over the last year:-**

Dr John Henry Aupers  
Dr David Baxendale  
Dr Adrian Bradley  
Mr Gordon Hugh Brown  
Mr Gary Belchem  
Squadron Leader Peter Claridge  
Mr Calvin Chu  
Dr Jack David Forrester  
Professor Peter J Garratt  
Miss Vanessa Gstettenbauer  
Mr Frank Willam Haslam  
Dr J Michael Hollas  
Mrs Karen Susan Kershaw  
Dr Alan John William Lobo  
Dr Susan Christine Mangles  
Dr Dominic Peter Mann  
Mr Benjamin John Merrifield  
Professor Richard V Parish  
Professor Edward Arthur Robinson  
Dr Adam Ian Sotowicz  
Dr Graham Walker

Plus all the others who wish to remain anonymous – thank you all.

## Our History

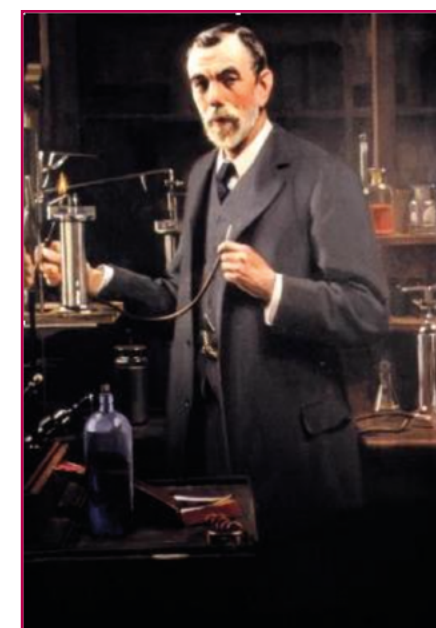
The fourth edition of the pictorial history of the college has been published: ***The World of UCL***, by **Negley Hart, John North and Georgina Brewis**. UCL Press. It costs £30, but is available through the College Shop for £20, but, what is more, is Open Access and can be downloaded for free from [ucl.ac.uk/ucl-press](http://ucl.ac.uk/ucl-press).

A few copies of the history of the Chemistry Department are still available: ***UCL Chemistry Department 1828-1937***, by **Alwyn Davies and Peter Garratt**. It is available through the college shop, free of postage, for £12 or through the authors ([a.g.davies@ucl.ac.uk](mailto:a.g.davies@ucl.ac.uk); [p.g.garratt@ucl.ac.uk](mailto:p.g.garratt@ucl.ac.uk)).

## Sir William Ramsay and the fatal addiction

**By Alwyn Davies**

In the four years from 1894 to 1898, in a spectacular burst of research, William Ramsay discovered five new gases, helium, neon, argon, krypton, and xenon, and added a whole new group, Group VIII, to the seven in Mendeleev's Periodic Table. This provided a keystone to our understanding of atomic structure, and for this work, in 1904, he was awarded the first Nobel Prize in chemistry to come to a British subject.



**Figure 1 William Ramsay**

The key to his success is apparent in his portrait painted in 1905, which we have in the Department (Figure 1).

Most academics in that period would be painted sitting at a desk writing or reading. Ramsay had himself painted in his favourite place, in the laboratory, at the bench, doing glass-blowing repairs to a glass vacuum line. He was never happier than when doing experimental work. He had learned glass-blowing from his assistant, Sydney Young, when he was in Bristol, and he worked on the equilibria between gases and liquids. He became expert in designing and constructing apparatus, largely in glass, and in manipulating small amounts of gases.

He carried through this love of experimental work into his lectures. We have the note book of one of his students, and in the front he has written: "Practically every laboratory preparation described was carried out on the lecture bench, and a sample of every substance mentioned was to be seen. Any unusual properties were demonstrated". Figure 2 shows him lecturing, with the bench covered with apparatus. He isolated argon in August 1884, and already in the November, when the academic year had started, he demonstrated the isolation in an undergraduate lecture.

He tried to go round the teaching labs every day, and carried on his watch chain a platinum spatula for poking the students' precipitates. He smoked, and rolled his own cigarettes, scorning the machine-made ones as being unworthy of an experimentalist. He modestly ascribed his own success in isolating the noble gases, to having a large flat thumb for closing the ends of tubes of gases when he removed them from the mercury troughs.

This love of experimental work is also shown in the song overleaf, which he wrote and sang at the Lab Dinner in 1898:



**The Atmospheric Gases, O! (Air - Green grow the rushes, O!)**

*There' nought but air on every han',  
In every breeze that passes O;  
What guides the windmill or a fan,  
An' 'twere na for the gases O.*

**Chorus:** *Here's tae their masses O,  
Their atomic masses O,  
The happiest hours that ere I spend  
Are spent among the gases O.*

*The wardly race may riches chase  
And riches still may fly them O  
And tho' at last they catch them fast  
Their hearts can ne'er enjoy them O.*

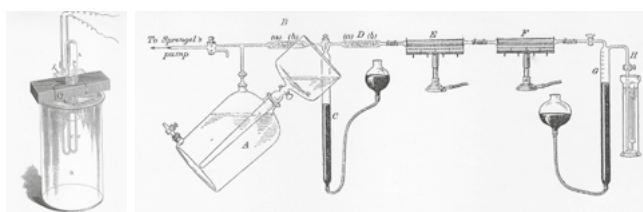
*Gie me a cannie hour at e'en,  
A pint o' liquid airie O,  
A tube or twa 'o impure Neon,  
I'll never ha'e a carie O.*

*In liquid sate, I'll fractionate  
Wi' Travers and wi' Baly O,  
And we are sure we'll make it pure  
And weigh it on the scalie O.*

*And Xenon tae, we'll catch and weigh  
And find its refractivity,  
And now it's done, we' ripe for fun  
To join you in festivity.*

*Sae lads o' mine, pour out the wine,  
Fill bumpers in your glasses O.  
Wi' three times three, come join wi' me,  
"The atmospheric gases O".*

When the opportunity arose, his superb experimental skill gave him the edge over other possible competitors, and enabled him to isolate the noble gases. In the long run his dedication was to be the cause of his untimely death. On April 19th 1894, Lord Rayleigh lectured at the Royal Society on his work on measuring the atomic weights of gases by determining their densities, and Ramsay was in the audience. Rayleigh said that he found that the density of nitrogen, which he had obtained from the air, was greater than that of nitrogen, which he had prepared in the laboratory. The difference was small, about half of one percent, but the result was reproducible: atmospheric nitrogen was denser than what he called laboratory nitrogen. After the lecture Ramsay and Rayleigh discussed the problem. They agreed that it implied that nitrogen from the atmosphere contained an unrecognised, heavy, unreactive, gas. They set out, independently, but in communication, in an attempt to isolate this supposed gas, and their different methods are shown in Figure 2, the physicist, Rayleigh's, on the left and the chemist, Ramsay's, on the right.



**Figure 2 Rayleigh's and Ramsay's apparatus for isolating argon**

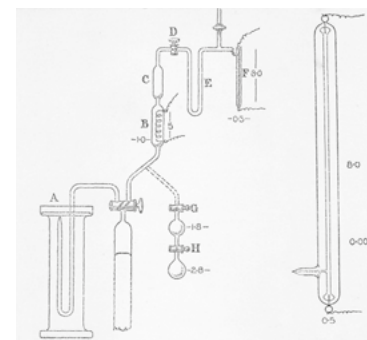
Rayleigh generated a spark in air, which caused the nitrogen to be removed as oxides of nitrogen. With his experience in constructing apparatus, Ramsay could be more ambitious and he constructed the gas train in which atmospheric nitrogen was passed over red hot magnesium where it reacted to form solid magnesium nitride. Ramsay's advantage is obvious: From 50 cm<sup>3</sup> of air, Rayleigh obtained 0.3 cm<sup>3</sup> of gas – a small bubble with which he could do nothing further. From 10 or 11 L of nitrogen, Ramsay obtained 104 cm<sup>3</sup> of a new gas on which he was able to determine the density, atomicity, discharge spectrum, and chemical properties, and together they were able to announce the discovery of the first of the noble gases, argon, with an atomic weight of about 40.

In 1895 he obtained helium, with an atomic weight of 4, from the gas occluded in a uranium mineral.

These two gases could find no place in Mendeleev's original Periodic Table, but they could fill the first and third places of a new Group VIII if it were added to the original seven. Ramsay thus set out to find the missing gas with an atomic weight of about 20 to fill the second place in Group VIII. In 1898 he decided that this new element was hiding in his argon, but to fractionally evaporate the liquefied argon using liquid air which had become available, he would need a large volume of argon. He obtained 18 litres by converting the batch-wise process shown in Figure 3 into an ingenious semi-continuous one in which a Sprengel pump was used to circulate the nitrogen over the magnesium until absorption was complete. From this impure argon he isolated neon, with A.W. 20, and from the liquid air residues he isolated krypton, A.W. 84 and xenon, A.W. 130.

From 1900 onwards, Ramsay's research was mainly on radioactivity, and again it is characterised by ingenious design of apparatus and its meticulous manipulation. Here are two examples.

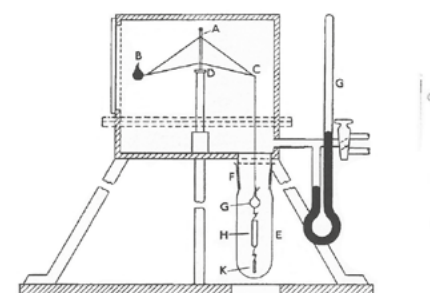
In 1902 with Soddy, he showed that helium, was the product of radioactive decay of radon.



**Figure 3 Apparatus used to show that helium was a decay product of radon**

Their apparatus is shown in Figure 3. Radon was contained in a thin-walled capillary which was enclosed in a wider evacuated tube. Radon has a half-life of 3.8 days and alpha particles from its decay passed through the capillary walls and the outer tube developed the characteristic yellow discharge spectrum of helium.

And in 1910, Ramsay and Whitlaw-Gray, built the balance shown in Figure 5 and showed that 6.58 x 10<sup>-5</sup> ml of radon weighed 6.55 x 10<sup>-7</sup>g, giving it the atomic weight of 222 and confirming its position as the sixth noble gas.



**Figure 4 Apparatus for determining the density of radon**

The dangers associated with radioactivity were not appreciated and throughout this work, Ramsay was handling the radioactive compounds with no precautions: His notebook from that period is still radioactive. He developed cancer of the jaw and after two operations he died on July 23 1916 at the age of 64. His love of experimentation, which had marked his whole career, ultimately proved fatal.

## UCL Chemistry Outreach

### Robert Palgrave, Chair of Publicity and Recruitment Committee



The 2017-18 academic year was another busy one for UCL Chemistry outreach which has seen us welcome almost 1,000 students and teachers to our department for outreach days, as well as seeing our members of staff and students visit many schools around the country.

Our regular programme of Spectroscopy Days and Adventures in Molecular Science lets sixth formers get a taste of university teaching, with lectures, workshops and practical sessions. As well as this we have continued our collaboration with the Tutorfair Foundation, a charity that helps provide 1-on-1 tuition for those school students who can't afford it. Tutorfair brought 100 of their students for a chemistry taster day, where they got some hands on experience with our spectrometers which helped them work out molecular structure of a compound they had synthesised themselves. We also continued our work with the Salters Institute, with which we ran two festivals of chemistry for 11-13 year olds over Easter. This year we also teamed up with the charity Generating Genius to give Chemistry taster days to their cohort of high performing students in state schools.

We have also been working hard with the charity Institute for Research in Schools, and UCL now leads a nationwide project on Ionic Liquid synthesis, carried out in school labs by enthusiastic sixth formers. This project gives the students a taste of real life chemistry research with equipment they can find in a typical school classroom. Several schools have visited UCL Chemistry to carry out NMR and MS on their ionic liquid samples – one school has even synthesised carbon nanoparticles in their ionic liquid that we characterised by TEM.

Prof Andrea Sella has led the pioneering air pollution project in primary schools, in which our first year Chemistry undergraduate students help local schools monitor the air pollution in their neighbourhoods. This is a great way to show the importance of outreach to our undergraduates.

I'd like to thank all staff and students involved in outreach and look forward to another exciting year.



## UCL Medicine-Chemistry collaboration breaks new ground for Diagnostic Imaging

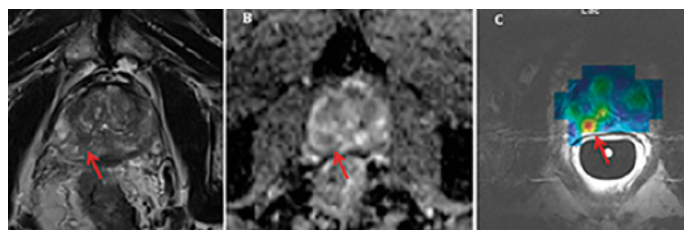
A University College Hospital patient has been diagnosed with prostate cancer using a hyperpolarised MRI scan in August 2017, as part of a UCL trial looking to develop more accurate and personalised treatment for cancer. The scan was the first time this experimental imaging method was used in Europe to scan a patient with prostate cancer and was able to help doctors confirm the location and state of the patient's tumour. The trial, led by Dr Shonit Punwani, is a novel programme hoping to revolutionise diagnosis, risk stratification and therapy for people with cancer, based on innovations in MRI technology.

Hyperpolarised MRI is an emerging medical imaging technique that uses carbon-13 enriched metabolites as tracers, in particular  $^{13}\text{C}$ -pyruvate. Hyperpolarisation with dynamic nuclear polarization give a signal increase 10,000 times above conventional NMR. This allows the metabolic activity of tumours, such as transformation of pyruvate to lactate, to be measured in patients. The goal of the study is to determine if metabolic information, along with anatomical imaging, can allow more accurate diagnosis and stratify patients for treatment. However, the technology is still at an early stage and depends on extensive collaboration between medical sciences and Chemistry.



The GMP team; Frazer Twyman, Matthias Glaser, Ramla Awais, Thibault Gendron, Erik Arstad and Kerstin Sander.

The **Good Manufacturing Practice** (GMP) facility, led by Professor Erik Arstad, played a central role in this study by developing a process for filling of kits with  $^{13}\text{C}$ -pyruvate under sterile conditions. Advances made at UCL allowed for the first time to fill such kits in a laminar air flow isolator, an important step towards formal trials with hyperpolarised MRI in patients. Following filling, the kits are pressured with helium to allow for the extreme conditions needed to hyperpolarise the tracer, and the whole assemble is finally laser-welded in a clean room.



These three images show an axial T2 weighted MRI (Image A) and Apparent Diffusion Coefficient map (Image B) acquired as part of a routine multi-parametric MRI study of the prostate.  $^{13}\text{C}$  spectroscopic lactate image (Image C) demonstrates high levels of lactate at the position of the biopsy positive Gleason 3+4 tumour site (red arrow).

**Dr Shonit Punwani**, Reader in Magnetic Resonance and Cancer Imaging and UCLH honorary consultant radiologist, said: "The multi-disciplinary research team have spent the past two years installing and testing the equipment, creating standard operating procedures and planning the study in great detail. We are really pleased to have scanned our first patient and we will continue to work closely with other sites, in the UK and internationally, to develop this technology further." Dr Punwani is the principal investigator of the Hyperpolarised MRI study which is developing the technology so that a full clinical evaluation can take place.

Professor Erik Arstad, Director of the GMP facility, said: "This is a major achievement following extensive work to allow filling of kits for hyperpolarised MRI under sterile conditions, and to ensure efficient and safe hyperpolarisation prior to patient scanning. With the first patient scan on Campus, the work has open up for a number of diagnostic studies that can help advance hyperpolarised NMR to become a routine clinical tool".

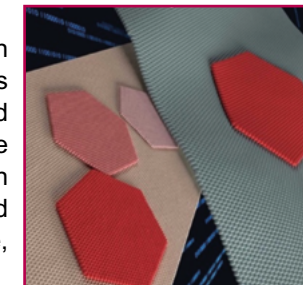
The equipment underpinning this work is a new Spinlab Hyperpolariser from GE situated at the **University College Hospital Macmillan Cancer Centre**, and designed to work in conjunction with existing MRI equipment to provide non-invasive metabolic assessment of tumours. The study is supported by funding from the **Medical Research Council**, the **Wellcome Trust**, the **National Institute of Health Research UCLH Biomedical Research Centre** (where Dr Punwani is Director of Clinical Imaging), **Cancer Research UK**, as well as philanthropic funding from the Mitchell Charitable Trust.

## The Centre for Computational Science – Advancing Science through Computers

**Professor Peter Coveney**

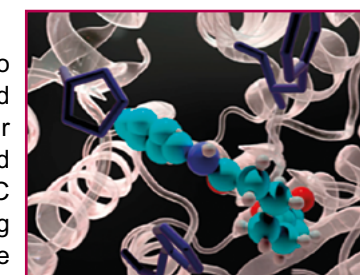
### Graphene

Our new forcefield for describing graphene-graphene interactions, GraFFm, was published in *Advanced Materials* early this year. Built using quantum calculations and experimental results it allows us to simulate for the first time graphene's unusual superlubric behaviour. We found that when graphene nano-flakes were given a small push it caused them to slip very large distances along a graphite surface. The flakes gradually slow down, losing energy when they fleetingly align with the substrate lattice. These alignments cause the flake to rotate and deflect causing chaotic motion. The distance travelled by these flakes depended on their size, which may in future prove to be a method of separating different flakes



### SCALE 2018 Award

The efficacy of drug treatments depends on how tightly small molecules bind to their target proteins. Quantifying the strength of these interactions (the so called 'binding affinity') is a grand challenge of computational chemistry. The Centre for Computational Science (CCS) and Rutgers University, USA, won the SCALE award (11th IEEE International Scalable Computing Challenge), for their work with HTBAC (High-Throughput Binding Affinity Calculator) managing calculations of the binding affinity of a range of drugs targeting a specific protein. Their runs demonstrated the ability to use thousands of nodes to run coordinated batches of simulations.



### CompBioMed Virtual Humans film

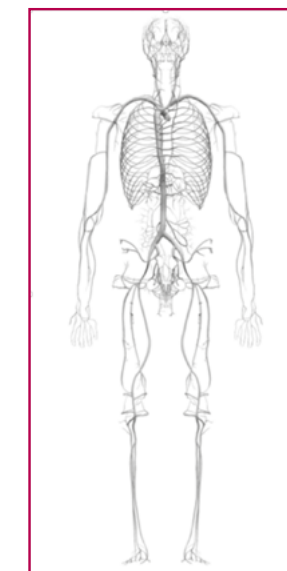
The European Centre of Excellence, led by the CCS, on computational biomedicine (CompBioMed, [www.compbiomed.eu](http://www.compbiomed.eu)) and their partners, have produced a stunning 6 minute film explaining computational modelling of humans and exploring the possibility of producing a digital twin of ourselves in the future. This was premiered at the London Science Museum on 27th September 2017, and has won awards and nominations at a number of science/film festivals since. It was released on YouTube at the beginning of March and has had over 6000 views (<https://www.youtube.com/watch?v=1FvRSJ9W734&t=8s>). Why not see it for yourself?



### Computational Model of the Full Arterial Tree

We have made important progress in preparing the full human arterial tree for simulation in 3D using the lattice-Boltzmann method. Obtained from CT scans of a male individual, the tree has been voxelized to O(10) microns. This has been made possible by our newly developed pre-processing workflow and memory-optimised implementation of HemeLB (our lattice-Boltzmann code for the simulation of blood flows in sparse geometry), allowing for the simulation of gargantuan problems consisting of billions of lattice sites (at which calculations are performed) on hundreds of thousands of processors. Furthermore, with HemeLB fully coupled to Alya Red, an advanced code for simulating the human heart with incredible accuracy, we will provide new insight into the operation of the full circulatory system; as in reality, the computational heart will drive the blood through the arterial tree. This is a milestone in blood flow simulation, and moves us a step closer to the virtual human.

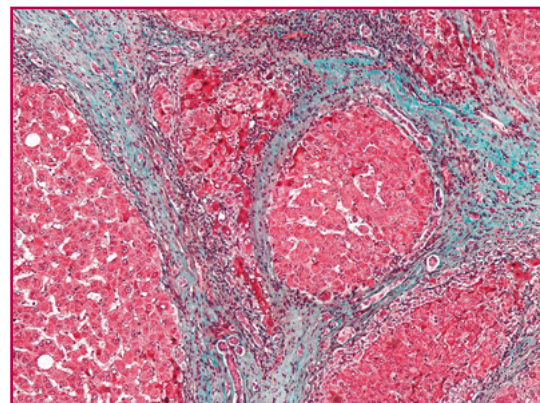
Finally, the VECMA project (**V**erified **E**xascale **C**omputing for **M**ultiscale **A**pplications, [www.vecma.eu](http://www.vecma.eu)), led by CCS, started on June 15th 2018. It will enable a diverse set of multiscale, Multiphysics applications to run on current multi-petascale computers and emerging exascale environments with high fidelity.





## New blood test to detect liver damage in under an hour

A quick and robust blood test that can detect liver damage before symptoms appear has been designed and verified using clinical samples by a team from UCL and University of Massachusetts. The test could address a huge need for early detection of liver disease as it distinguishes between samples taken from healthy individuals and those with varying degrees of liver damage.



A sensor that uses large molecules called polymers, coated with fluorescent dyes that bind to blood proteins based on their chemical properties was designed. The fluorescent dyes change in brightness and colour, yielding a different pattern of fluorescence depending on the protein composition of the blood sample.

The sensor was tested by comparing results from small blood samples (equivalent to finger-prick checks) from 65 people, in three balanced groups of healthy patients and those with early-stage and late-stage fibrosis. The groups were determined using the Enhanced Liver Fibrosis (ELF) test which is the existing benchmark for liver fibrosis detection that requires samples to be sent away to a lab for analysis. It was found that the sensor could identify different patterns of protein levels in the blood serum of people in the three groups.



"By comparing the different samples, the sensor array identified a 'fingerprint' of liver damage. This method is known as a chemical nose, as it can recognise the difference between healthy and unhealthy blood samples without relying on known disease markers," said co-lead author Dr William Peveler, who completed the research while on a EPSRC doctoral fellowship at UCL Chemistry department, with Professor Claire Carmalt before moving to the University of Glasgow.

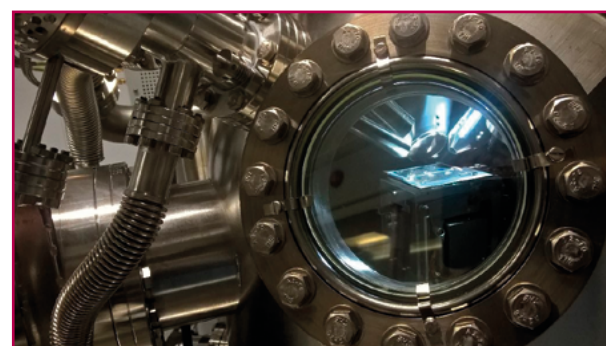
William J. Peveler, Ryan F. Landis, Mahdiah Yazdani, James W. Day, Raakesh Modi, Claire J. Carmalt, William M. Rosenberg, Vincent M. Rotello. **A Rapid and Robust Diagnostic for Liver Fibrosis Using a Multichannel Polymer Sensor Array.** *Advanced Materials*, 2018; 1800634 DOI: 10.1002/adma.201800634

## UCL Chemistry to run new National X-ray Photoelectron Spectroscopy Service



harwellxps

EPSRC has awarded £3.2m jointly to UCL Chemistry and University of Cardiff to run a key National Research Facility for 5 years. The new service, named HarwellXPS, is based at the Rutherford Appleton Laboratory in Oxfordshire, next to the UK's synchrotron and neutron source. Dr Robert G. Palgrave (UCL Chemistry) is Co-Director of the new facility, which allows any UK academic or industrial user access to state of the art photoelectron spectrometers, and expert advice on data analysis and interpretation. Photoelectron spectroscopy (PES) is a technique based on the photoelectric effect – electrons are ejected from a surface by incoming photons; measuring these electrons gives information about the elemental composition, chemistry and electronic structure of the surface. This information is useful for any kind of study where the surface of a material plays a leading role – for example, heterogeneous catalysis, corrosion, coatings and thin film technology etc. We encourage users to visit the facility and interact with the instrument scientists as the analysis is taking place – this helps users understand the measurements and get the most from their data.

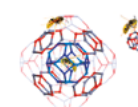


We also run three training events per year at the facility, and in July 2018 we hosted the UK Surface Analysis Forum summer meeting.

Further details can be found at [www.harwellxps.uk](http://www.harwellxps.uk)

## WASP@N: Web Assisted Structure Prediction "at" the Nanoscale

Scott M Woodley



Nanoparticles are used everywhere; in smart windows, in sun cream and as catalysts in car exhaust pipes. Their size provides an additional variable that can be changed in order to tune its properties. But, have you ever wondered whether the atomic structure of the smallest grain of salt resembles a piece cut from the familiar rock-salt phase of alternating sodium and chloride ions on a cubic lattice or perhaps a different structure as more atoms are associated with the surface (thus under coordinated) as opposed to the bulk?

Now you can easily find out using our interactive website, where ball and stick models of published atomic structures of these nanoclusters can be generated then rotated with a click of your mouse. One of the main threads of my research is that of developing and applying global optimisation approaches to predicting these atomic structures, which are then used as the starting point of further computational investigations into their chemical and physical properties using electronic structure techniques.

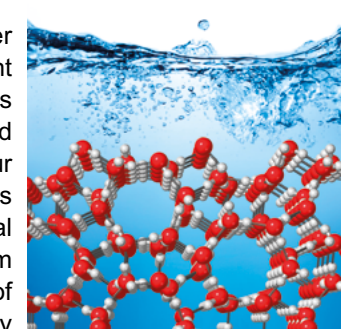
My group, and in particular the main software developer Thomas Lazauskas who at the end of this project has secured a permanent position at the Alan Turing Institute, have just completed the development of this database of nanoclusters, our Hive of knowledge, which is part of a five year EPSRC funded project. To allow access and interaction with the Hive, we have built a Web interface, which we refer to as the Wasp toolkit. The mapping between the structures and various properties is an essential element, or feature, of the Hive database, which is generated by algorithms that form part of a separate piece of code, aka the Bee software. The Bee software runs on dedicated computing facilities, whereas, the Wasp interface links the user, the Hive and the Bee software. With open access to the Hive, a number of security measures have been employed in order to protect the integrity of the data and the computing facilities from malicious attacks (to complete the analogy, we refer to unwanted visitors to the Hive as hornets). More details of this project has just been published in *Faraday Discussions* (DOI: 10.1039/C8FD00060C) and we encourage you to take a look at <http://hive.chem.ucl.ac.uk> – it is free to register and is designed for both the curious public as well as scientists working in the field of nanoclusters.



## Vanished without a trace: The impurity-triggered disappearance of ice II reveals a fundamental anomaly in water's phase diagram

Christoph Salzmann

The importance of water in a wide range of different settings and environments cannot be overstated, and it is deeply rooted in our conscience that there is something very special about this material. From the scientific point of view, water and its many



solid forms display a multitude of unusual properties and anomalies that are still very poorly understood. Famous examples include the highly unusual properties of supercooled water, the ordering of water molecules in thin ice films as well as the well-known fact that icebergs float on water. Recent collaborative work between the Salzmann, Bramwell and Slater groups published in *Nature Physics* reveals a fundamental anomaly in water's phase diagram that might be at the very heart of its general tendency to anomalous behaviour.

The starting point of their discovery is the intriguing experimental observation that one of the high-pressure phases of ice, namely ice II, disappears in a highly selective fashion from the phase diagram upon addition of small amounts of ammonium fluoride. The other phases of ice are perfectly happy to incorporate the impurity. This finding shows that ice II is a highly topologically constrained material which means that the water molecules in ice II interact with each other over very long distances. In a sense, whatever happens to one water molecule in a crystal of ice II – the effect is "felt" by all the other molecules. The small disturbance by the ammonium fluoride therefore has a catastrophic impact on all of the ice II and makes it disappear. Building on knowledge from related magnetic materials, the researchers then argue that the special character of ice II provides a new deeply-rooted explanation for the existence of a host of anomalies in water's phase diagram. In this sense, the special nature of ice II is the key for unlocking the door to finally understanding water and the many phases of ice.

**Article information:** Doping-induced disappearance of ice II from water's phase diagram

Jacob J. Shephard, Ben Slater, Peter Harvey, Martin Hart, Craig L. Bull, Steven T. Bramwell, Christoph G. Salzmann\*

*Nat. Phys.* 14 (2018) 569-572

highlighted by phys.org, Austrian Press Agency, derStandard daily newspaper, myScience, and the ISIS neutron and muon source.



## Grants and Awards

**Summer Studentship: Development of XPS as a method for quantitative phase analysis**

£1,520.00  
Analytical Chemistry Trust Fund  
**PI: Dr Rob Palgrave**  
31 July 2017

**X-ray crystallography on sub milligram samples using the crystalline sponge method**

£40,000.00  
Syngenta Ltd  
**PI: Professor Claire Carmalt**  
25 September 2017

**Precision cancer targeting by combinatorial low-affinity binding**

£32,000.00  
Medimmune LLC  
**PI: Professor Giuseppe Battaglia**  
1 October 2017

**Materials research hub for energy conversion, capture, and storage**

£132,837.64  
EPSRC  
**PI: Professor Paul McMillan**  
1 October 2017

**Computational study of DeNOx catalysts**

£32,000.00  
Johnson Matthey PLC  
**PI: Professor Furio Cora**  
1 October 2017

**Computational Discovery of Earth Abundant Solar Absorbers**

£35,000.00  
Bio Nano Consulting  
**PI: Professor David Scanlon**  
1 October 2017

**Operando X-ray Absorption Spectroscopy and Near Atmospheric Pressure X-ray Photoelectron Spectroscopic studies of industrial catalytic materials**

£27,800.00  
Johnson Matthey PLC  
**PI: Professor Gopinathan Sankar**  
1 October 2017

**Homogenous Catalysis Under Electrochemical Control**

£8,588  
EPSRC IAA  
**PI: Dr Jon Wilden**  
1 October 2017

**ISCF Wave 1: (The JUICED Hub [Joint University Industry Consortium for Energy (Materials) and Devices Hub])**

£2,248,579.51  
EPSRC  
**PI: Professor Jawwad Darr**  
8 November 2017

**Deposition of titanium-doped chromium oxide onto microsensor platforms**

£2,000.00  
McGowan Sensor Labs Ltd  
**PI: Professor Christopher Blackman**  
13 November 2017

**Ice - a highly complex material: New mechanistic insights into its phase transitions and mixing with hydrophobic species**

£99,308.71  
Royal Society  
**PI: Professor Christoph Salzmann**  
1 December 2017

**Development of 3D printed microstructured reactors for fine chemical production**

£104,881.50  
VITO Flemish Institute for Technological Research  
**PI: Professor Andy Beale**  
15 December 2017

**Integrating and managing services for the European Open Science Cloud**

£57,739.79  
European Commission Horizon 2020  
**PI: Professor Peter Coveney**  
1 January 2018

**Interface design for high efficiency solution processed solar cells**

£114,850.79  
British Council  
**PI: Dr Bob Schroeder**  
8 January 2018

**Conducting polymer fibres for thermoelectric fabrics**

£35,476.18  
Leverhulme Trust  
**PI: Dr Bob Schroeder**  
8 January 2018

**Design of Mixed Anion Inorganic Semiconductors for Energy Conversion**

£1,098,469.20  
European Commission Horizon 2020  
**PI: Professor David Scanlon**  
1 February 2018

**A New Antibacterial Route to Selectively Rupture Bacterial Membranes**

£30,000.00  
The Academy of Medical Sciences  
**PI: Professor Stefan Howorka**  
1 February 2018

**Borate Esters: Simple Catalysts for the Sustainable Synthesis of Complex Amides**

£29,279  
EPSRC IAA  
**PI: Professor Tom Sheppard**  
1 February 2018

**Expanding the biochemical toolbox for protein modification at cysteine**

£375,298.47  
EPSRC  
**PI: Dr Derek Macmillan**  
1 March 2018

**Faraday Challenge Multi-Scale Modelling**

£2,298,966.10  
EPSRC  
**PI: Professor David Scanlon**  
1 March 2018

**Computational identification of metal-organic-frameworks for high-value fine chemicals**

£94,992.00  
Royal Society  
**PI: Professor Ben Slater**  
31 March 2018

**Methyl Transferases for the Functional Diversification of Bioactives**

£268,487.01  
BBSRC/European Commission  
**PI: Professor Helen Hailes**  
1 April 2018

**CRUK Major Centre London**

£59,888.00  
CRUK Cancer Research UK  
**PI: Professor Jim Anderson**  
1 April 2018

**Developing inkjet printable electronics inks and coatings**

£100,000  
EPSRC D2U  
**PI: Professor Jawwad Darr**  
1 April 2018

**To Embed New Capabilities In Omniphobic Powder Technology To Develop Innovative 'easy-to clean' Slip Resistant Flooring And Hygienic Wall Cladding In Altro Product Lines Thereby Leading To Business Growth**

£191,790.00  
Altro Limited/Innovate UK  
**PI: Professor Claire Carmalt**  
1 May 2018

**Development and Testing of a Reference Computational Platform for Understanding Bio-molecular Recognition**

£156,363.84  
European Commission Horizon 2020  
**PI: Professor Francesco Gervasio**  
1 June 2018

**Depollution of air using polymer-based coatings**

£213,033.00  
Innovate UK  
**PI: Professor Andy Beale**  
1 June 2018

**Development of a Spectroscopic Technique and Instrument for In Vivo Cartilage Assessment**

£62,175  
EPSRC D2U  
**PI: Professor Paul McMillan**  
1 June 2018

**Vapour deposited nanomaterials for biosensing**

£10,632  
EPSRC KEIF  
**PI: Professor Christopher Blackman**  
5 June 2018

**Verified Exascale Computing for Multiscale Applications**

£792,619.00  
European Commission Horizon 2020  
**PI: Professor Peter Coveney**  
15 June 2018

**Site-selective antibody modification by cysteine-to-lysine transfer (CLT)**

£411,776.62  
EPSRC  
**PI: Dr Jamie Baker**  
16 July 2018

**Understanding How The Microenvironment Of A Protein Can Dictate The Course Of Bioconjugation**

£154,274  
Leverhulme Trust  
**PI: Dr Vijay Chudasama**  
1 August 2018

**Neuro-oncological precision nanomedicines**

£780,882.44  
EPSRC Engineering and Physical Sciences Research Council  
**PI: Professor Giuseppe Battaglia**  
2 September 2018

**A Combined Activation/tethering Strategy To Lariat Peptides**

£185,286  
Leverhulme Trust  
**PI: Dr Derek Macmillan**  
3 September 2018

**Probing novel doping mechanisms for high mobility transparent conducting oxides**

£44,214.00  
Diamond Light Source Ltd  
**PI: Professor David Scanlon**  
1 October 2018

**UK Consortium on Mesoscale Engineering Sciences (UKCOMES)**

£96,153.41  
EPSRC Engineering and Physical Sciences Research Council  
**PI: Professor Peter Coveney**  
1 October 2018



**Understanding structure evolution in supported metal nanoparticles used in emission control; translating observations made on model catalysts to real world applications**

£36,000.00

Diamond Light Source Ltd and Johnson Matthey PLC

**PI: Professor Andy Beale**

1 October 2018

**Coordinated Swarm Behavior With Minimal Communication In Complex Topographies**

£155,118.78

US Office of Naval Research

**PI: Dr Giorgio Volpe**

1 October 2018

**Multiphoton UV photoelectron spectroscopy in liquid microjets**

£52,650.42

Royal Society

**PI: Professor Helen Fielding**

1 October 2018

**HIGH END COMPUTING MATERIALS CHEMISTRY CONSORTIUM**

£489,315.64

EPSRC

**PI: Professor Scott Woodley**

1 November 2018

**Synthetic Peptidic Nanovesicles for Targeting Paediatric Brain tumours**

£146,763.84

European Commission Horizon 2020

**PI: Professor Giuseppe Battaglia**

1 April 2019

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*Chemistry Department staff at this year's graduation ceremony, Royal Festival Hall, 4 September 2018: from left to right: Dr Rob Palgrave, Dr Jeremy Cockcroft, Dr Caroline Knapp, Prof. Katherine Holt, Prof. Claire Carmalt, Dr Stephen Potts, Dr David Rowley, Prof. Ivan Parkin, Prof. Tom Sheppard & Dr Dewi Lewis.*

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