Chemistry Update

Newsletter 317, 31 January 2020

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Calendar of Events

UCAS Visit Days
6, 11, 17, 20 & 27 February
Time: 12pm—4pm

Physical Chemistry Seminar
Speaker: Prof David Klug, Imperial College London
Date: Tuesday 4 February
Time: 1pm—2pm
Location: C/B101

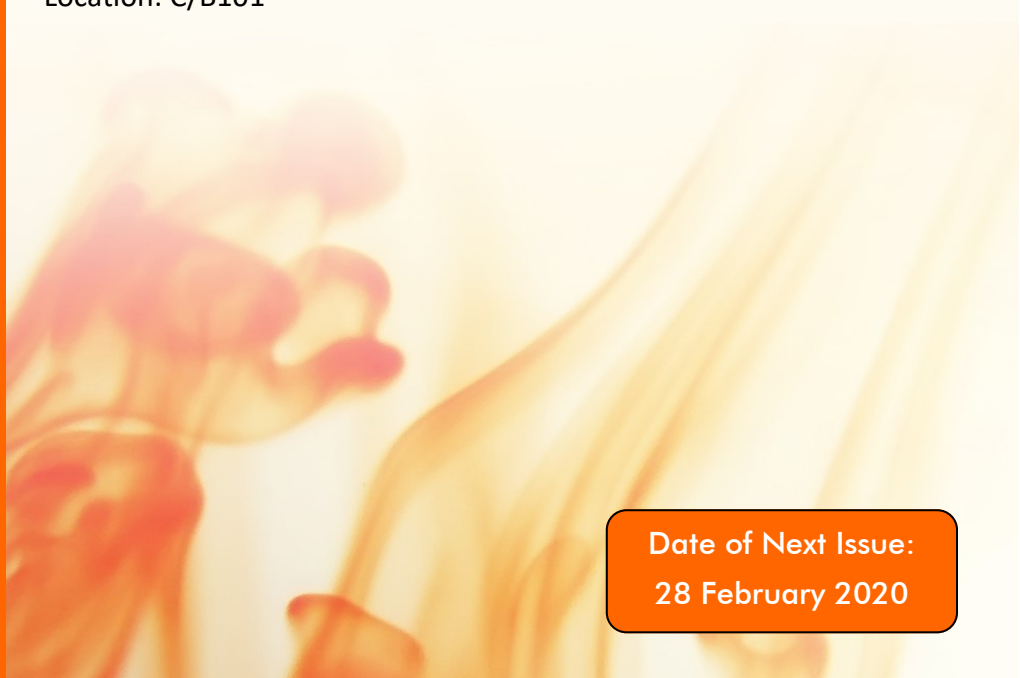
Green Chemistry Seminar
Speaker: Dr Mark A. Harmer
Date: Wednesday 12 February
Time: 10.30am—12pm
Location: C/F106

RSC Prize and Award Winner Lecture
Speakers: Prof Nicolai Cramer, EPFL & Dr Seb Pike, University of Warwick
Date: Wednesday 19 February
Time: 1pm—3pm
Location: C/B101

Chemistry@York
Date: Friday 21 February
Time: 10am—3pm

RSC Applied Inorganic Chemistry Award Lecture
Speaker: Prof Claire Carmalt, UCL
Date: Wednesday 26 February
Time: 1pm—2pm
Location: C/B101

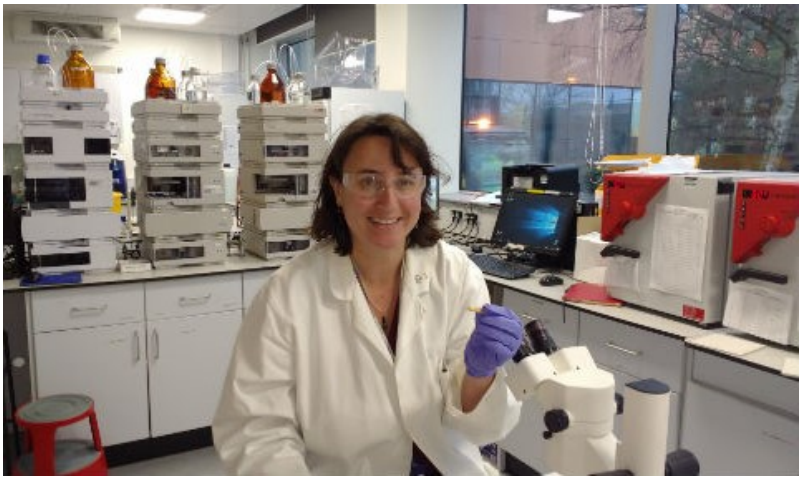
Equality & Diversity / Chemical Interactions Seminar
Speaker: Prof Kevin Cowtan
Date: Friday 28 February
Time: 1pm—2pm
Location: C/B102



Date of Next Issue:
28 February 2020

Dr Kirsty Penkman receives international recognition for pioneering work

Dr Kirsty Penkman, from the University of York's Department of Chemistry, has been recognised by the prestigious Blavatnik Family Foundation and New York Academy of Sciences for her pioneering work in fossil dating.



Dr Kirsty Penkman is the Foundation's Chemistry Laureate this year and will receive an award of £75,000. The Blavatnik Awards for Young Scientists recognise the pioneering work of academics under the age of 42.

Dr Penkman's work has led to improvements in the accuracy of dating fossils from the last three million years, leading to new insights into human evolution and climate change.

Innovative

In each of the three categories—Life Sciences, Physical Sciences & Engineering and Chemistry— the winners were selected by a jury of leading scientists from across the UK. Six other finalists have also been recognised for their innovative discoveries.

Dr Penkman said: "Having always loved chemistry, but also been fascinated by the past (both our human history and that of our Earth), I feel enormously lucky to be able to combine both in my work.

"My research focuses on the analysis of fossil biomolecules: their pathways of degradation, methods for their detection, and how these molecules can inform us of an organism's life and death history.

"I am tremendously honoured by the Blavatnik award, and it is thanks to my wonderful colleagues and collaborators who have been integral to this research. Working closely with earth scientists and archaeologists has helped push the analytical science forward, whilst advancing our understanding of our earth's history."

Prestigious

Professor Deborah Smith, Pro-Vice-Chancellor for Research, said: "Dr Kirsty Penkman is an excellent scientist whose ground-breaking work has brought new insight into our understanding of how ancient events impacts on the world today.

"The award of this prestigious prize is richly deserved and will inspire others who follow in her pioneering footsteps."

Professor Duncan Bruce, Head of the Department of Chemistry said: "I am absolutely delighted that Kirsty has been recognised in this way.

"Kirsty's work shows the diversity of fields in which chemistry can make a real difference and it is fitting that her hard work, dedication and imagination have been judged worthy of this prestigious award."

Global

Sir Leonard Blavatnik, founder and Chairman of Access Industries and the Blavatnik Family Foundation and member of the President's Council of the New York Academy of Sciences, said: "We are incredibly proud to elevate these select scientists to an international stage that will enable them to be recognised globally, prepare them to become world-class leaders in their scientific fields, and propel the wheel of innovation and societal progress."

Now in their third year, the 2020 Blavatnik Awards for Young Scientists in the UK received 80 nominations from 41 academic and research institutions across the UK. The UK awards sit alongside their global counterparts, the Blavatnik National Awards in the United States and the Blavatnik Awards in Israel, all of which honour and support exceptional early-career scientists at lecturer level and above.

Perspectives on the Circular Economy

In his recent Perspectives article in *Science*, 'Rethinking chemistry for a circular economy', Professor James Clark explores the use and re-use of chemical products in the modern age.

Introducing the topic, Professor Clark of the Green Chemistry Centre of Excellence writes: "We are running out of some of the resources needed for the manufacturing of many of the products used in today's society, and those that are left are available only at increasing economic and environmental costs.

"As an important contribution to a sustainable future, chemistry and its products must be adapted to a circular economy - a system aimed at eliminating waste, and using and recycling products and resources.

"However, our products and the chemicals that make them work are becoming more complex. Plastics, for example, often consist of more than one polymer along with several additives, such as plasticisers, flame-retardants, colouring agents and antioxidants, which are often hazardous and difficult to separate in recycling."

In the new *Science* Perspectives article, James Clark and his colleagues Klaus Kümmerer and Vania Zuin argue that a new set of guidelines are needed to help integrate chemistry into the circular economy. Complexity is the enemy of circularity!

Symposium for Robin's 70th

On Friday 13 December, a symposium took place in the Department of Chemistry to mark Robin Perutz's 70th birthday, masterminded by Anne Duhme-Klair. It proved a great success in bringing people together who hadn't met for many, many years. There were even badges labelled with Rp in the style of a new element. The ten speakers, drawn from Robin's research students, postdocs and collaborators plus the sponsor, Liz Rowsell (Johnson Matthey) gave us a wide range of science plus plenty of anecdotes. Robin's diversity work was highlighted by the 50:50 gender split of the speakers. International diversity was secured with speakers from the USA, Spain, Ireland, Germany and France as well as the UK. About 25 further participants came from outside York, including Robin's former PhD supervisor Jim Turner and Oxford collaborators/mentors Malcolm and Jenny Green.

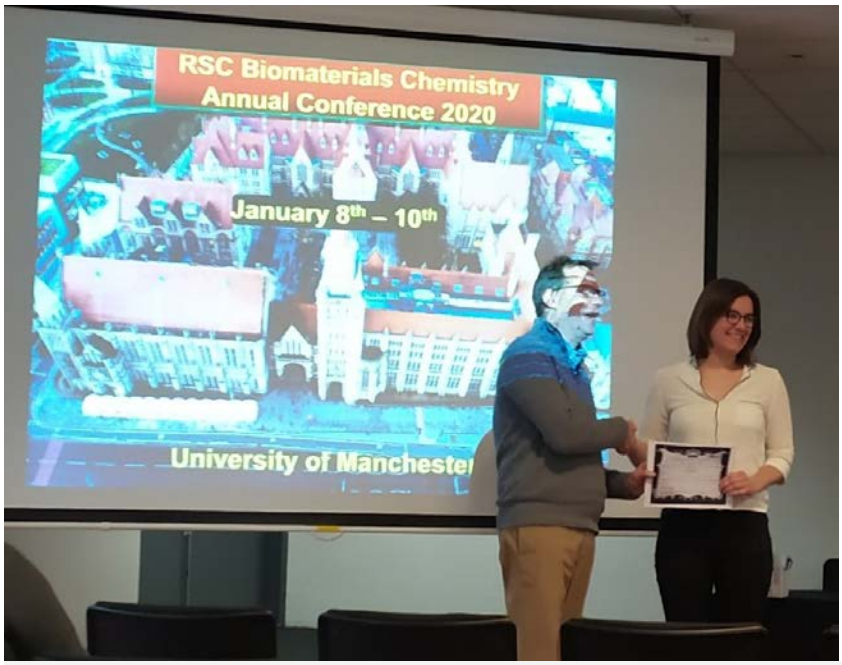
The cake, designed and produced by the Lynams, celebrated the sigma-CAM mechanism and required Robin to mutilate his own image. The birthday present shown in the photo is an infrared +gas cell with laser-engraved examples of molecules that represent Robin's research in spectroscopy and photochemistry. The cell was designed and produced by Richard Douthwaite, Abigail Mortimer and Tim Ayers. Finally, Paul Walton used his speech, better described as a one-man show, to remedy the deficiencies in Robin's wardrobe.

RSC Biomaterials Chemistry Group Annual Meeting

Dr Carmen Piras (left) and Anna Patterson (right)

Dr Carmen Piras (PDRA) and Anna Patterson (3rd year PhD student) from Professor David Smith's group attended the RSC Biomaterials Chemistry Group Annual Meeting, held on 8-10 January at the University of Manchester. Annual meetings of the group are designed to promote biomaterials chemistry research and development, enhance existing links, foster new collaborations and spread expertise.

Carmen Piras gave a wonderful talk about growing stem cells in smart shaped and patterned gels for regenerative medicine applications. Congratulations to Anna Patterson, who won best poster prize for her poster showcasing her research on developing gels for drug formulation and delivery.



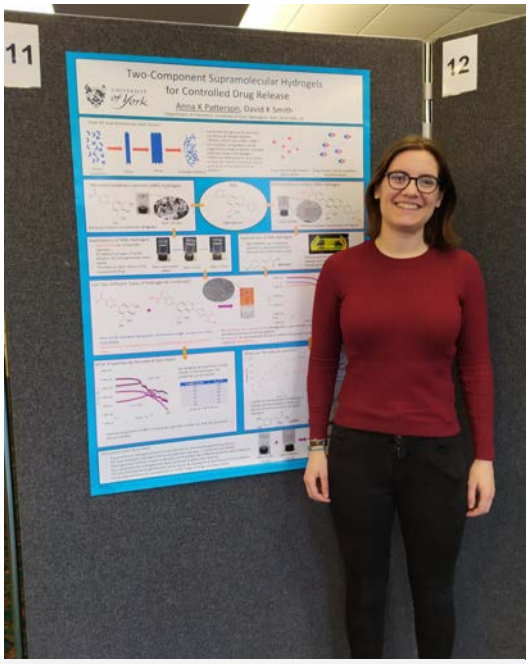


Photo left: Anna being awarded 'best poster' prize; photo right: Anna with her winning poster

Online Department suggestion box

The online Equality and Diversity suggestion box has been extended to be a suggestion box for the whole Department. You can submit your thoughts/suggestions/ideas for general Departmental matters as well as matters relating to Equality and Diversity. You can find the Google form on the intranet homepage or at this link.

CCP4 Study Weekend 2020: Model building and beyond

"Some *personal* thoughts on organising my fave meeting" by Dr Jon Agirre

How does an international meeting look behind the scenes? Should you ever try and put one together? Good news is, I might be able to answer almost 50% of that.

The last few months have seen my becoming a cog at the organisational level of the structural biology machine. A tiny little cog, considering the growing set of conferences and journals that checkpoint research history. Months after my appointment as co-editor of *Acta Crystallographica Section F: Structural Biology Communications* – or *Acta F* in crystallographic friendly terms – I got the huge responsibility to orchestrate a meeting for ~400 structural biologists. The CCP4 Study Weekend was knocking on my door.

Did I enjoy it? Yes. Would I do it again? Maybe. Why? Because in spite of how wonderful it was, I did not succeed in creating the sort of conference I had wanted it to be. In case you are curious about it, here I would like to offer you a look into the kitchen of this prestigious meeting. Hopefully, what I have learned from this experience will be useful to other people who, like us, want to bring the conference model into the 21st century.

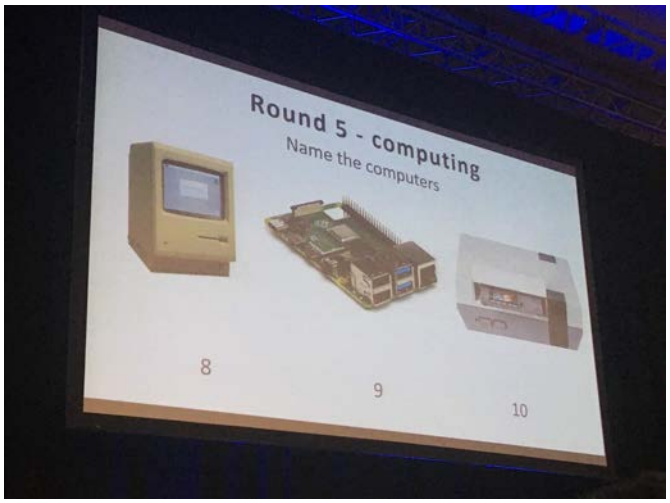
The Collaborative Computational Project 4 (CCP4, based at the Science and Technology Facilities Council at Harwell) is the sole sponsor of the event. For this reason, most of the heavy lifting is done by STFC personnel, commanded by Karen McIntyre. Without her support, we would have been clueless, and missed all the deadlines in the process.

We – that's me, together with Robbie Joosten (NKI, The Netherlands) and Alan Roseman (University of Manchester), my co-organisers – tried our best at achieving gender balance and having good international representation. Although the programme did have a bit more than 50% male speakers and chairs, women contributed more than half of the most memorable moments. Some involved science, some rode on personal charisma, but all were wrapped in boldness and made talks more engaging. Ignore gender balance at your own peril.

The meeting suffered two last minute cancellations: Victor Lamzin (EBI, Hamburg) and Maya Topf (Birkbeck College, London). We had organised an all-female tag team introduction with structural biology legends Helen Saibil and YSBL's own Eleanor Dodson. In retrospect, I believe it was foolishly ambitious of us to ask both speakers to cram decades of research into a single 45' slot; so, the additional time on their session due to not having Victor's talk straight afterwards fortuitously saved the day. Even more incredibly, we were able to cover Maya's absence with a former postdoc of hers, Agnel Joseph. He gave a fantastic talk with roughly a few hours notice, and discussed many of the ideas Maya had in mind for her slot – a huge credit to Maya and her group.

We tried to introduce the provision of childcare for the first time ever, but it would have required logistic

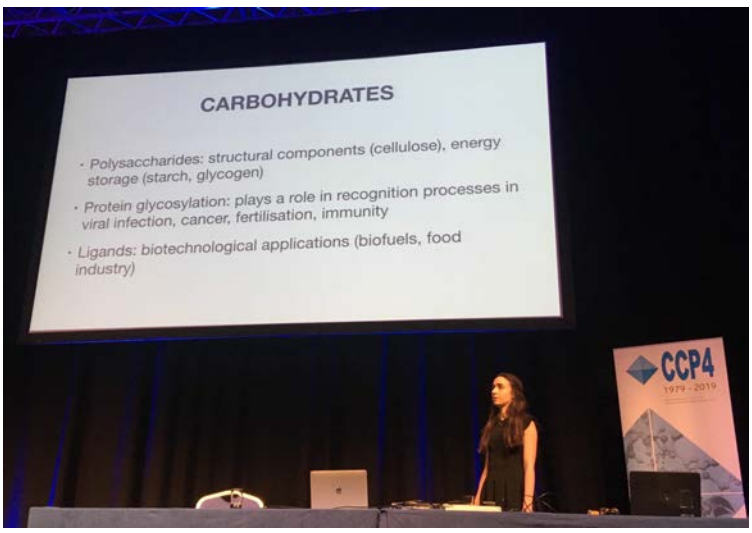
changes (closure of certain rooms and toilets) and, crucially, a bigger budget than we had. Having seen children at this year's meeting, I am ever more adamant that there is a strong demand for it, and will keep pushing the idea until it becomes standard practice.



I had the pleasure to welcome everyone and introduce the meeting and our initiatives to get people more involved in it. We had organised a quiz for the mixer event on the first night, plus stickers with different icons to show your keywords to other people and help in networking; we had analysed all feedback from the past few years forensically, so we knew there was an appetite for a more compelling social session. Also, we had introduced an illustration competition whose winner will help design the cover of the special issue of *Acta Crystallographica Section D: Structural Biology*, which will carry the proceedings of the meeting early in 2021. A slideshow with the competing images was shown on the screens at all times, and attendees could scan a QR code containing a description of the image and how it was created – see accompanying images for details on these innovations.

I am very thankful that there was a great turnout for the "What's new in CCP4" session early on day one. It has not always been the case, and developers very much appreciate not talking to a half-empty room. During the main sessions, I loved the way the speakers referenced each other's talks, as I think it contributed to enhancing the natural flow in the programme. We kept the time the best we could, but there were moments of nervousness. Telling a speaker to wrap up after overrunning is painful; asking the next speaker to make their talk shorter to compensate is even more painful. I have learned a valuable lesson here.

One final note on the presentations: as the focus in structural biology keeps shifting to biology, formula-heavy talks seem to be less welcome than ever. So if you're thinking of filling your slides with integrals... just don't. At least not for this target audience.



The meeting saw a great presence from YSBL and the wider York fellowship: 17 attendees, Mihaela Atanasova (pictured right) presented her work on carbohydrate structure determination; K Cowtan, Stuart McNicholas and Haroldas Bagdonas demonstrated the

use of our software tools during lunchtime; K Cowtan talked about automated protein model building; Eleanor Dodson introduced standard practice in model building; and finally, myself at the helm.

As I have stated, I would have liked to boost inclusivity at the meeting a bit more than we managed to. I am happy that we seem to have started a conversation on a few fronts though, most saliently on childcare. Now, I am left wondering that perhaps a better way of disrupting the rigid conference model would be to create something new, accessible, inclusive at all levels and free from tradition. A conference that provides a testing ground for new ideas that other meetings can adopt.

Nobody's gonna travel second class. There'll be equality. And no suppression of minorities.

Well alright*.

* Lyrics shamefully stolen from Supersonic Rocket Ship by The Kinks.

Departmental Christmas Party

This year, the Department Christmas Party took place on 12 December at the York Marriott Hotel. The lovely drinks reception and delightful three-course meal was followed by a pub quiz (won by team “Not So Great Expectations”) and the annual competition of who can make the best PPE outfit out of Christmas decorations! It was a close call but, with Professor Duncan Bruce judging, teams Nick Rose and Nick Yates were ultimately declared the winners. Much dancing followed and a good time was had by all!

The organisers, Natalie Wong, Zoe Ingold and Katie Huxley, would like to thank all staff and student Christmas partygoers, as well as the staff at the York Marriott for making the party such a memorable evening.

Updated photocopying form

*** Using it will save money for the Department ***

Message from Chem-copy: We have made a further update for Spring Term to the Photocopying Form which can be found here. Please use the latest version as the **cost of printing has decreased** and orders with the new form should represent savings for the Department. Furthermore, the new form is easier to use than earlier versions (stapling top left / no hole punching set as default) and location is drop-down. Completed forms should continue to be emailed to chem-copy@york.ac.uk where it will be picked up by Nick or Lisa to forward on to Design & Print Solutions.

LGBTQ+ STEMinar 2020 - Birmingham

By Chris Furlan

This January, I went to the LGBTsteminar in Birmingham and it wasn't like other typical science conferences; there were 250 scientists from undergraduates to professors and we all were LGBT+ or allies. The day started with talks and presentations from many scientific areas, from neuroscience, astronomy, particle physics to fusion power. The talks were designed for a broad audience and therefore completely different from the very specialized conferences I am used to with the bonus of a very relaxed and cheerful atmosphere. Although I didn't know anyone at first, shortly after being there I met so many new people and I immediately felt at ease. That day I felt everyone, including me, was themselves without worrying about pronouns and judgments and it was a great opportunity to make links with other LGBT scientists that share my same challenges.

Chris with another PhD student at the conference (left) and founder Dr Beth Montague-Hellen (right)

In a workshop that afternoon, we reflected on the lack of LGBT role models and representation in science and although expected it was still shocking to look at the low numbers. Talking to other international students we all reflected on how this impacts the career choices and how the lack of LGBT acceptance in my and other countries poses serious challenges to LGBT scientists or students. It was truly amazing just the fact that a conference like that was organized and that LGBT people are now often represented and recognized at university and this is something that we should not take for granted.

Next year's meeting will be in Oxford and I'd encourage anyone interested to attend.

The Department of Chemistry's Equality and Diversity Group (EDG) provided travel funding for two PhD students to attend this year's meeting. EDG is willing to consider funding travel for this and other E&D related conferences, please get in touch with leonie.jones@york.ac.uk for more details.

One Planet Week 2020 calendar/event launch

One Planet Week in Week 6 is fast approaching. Check out the range of events from open lectures to tree planting, upcycling, food events and more. See the One Planet Week website for event details and ticket links and @UoYsustain for new event announcements.

A great month for the GCCE and CO_2 Chemistry

January was a very successful month for the Green Chemistry Centre of Excellence (GCCE), especially for those researching CO_2 Chemistry.

A new two-volume collection of books on Carbon Dioxide Utilisation (CDU) was released by DeGruyter, with Professor Michael North as joint book editor and Dr Katie Lamb the sole-author of a chapter on "*Catalysts for the conversion of CO_2 to Cyclic and Polycarbonates*". Both volumes detail the "*fundamentals of CO_2 chemistry, its capture and separation as well transformative reactions*", to introduce researchers to the field of CDU. Both volumes are now available to purchase or download online.

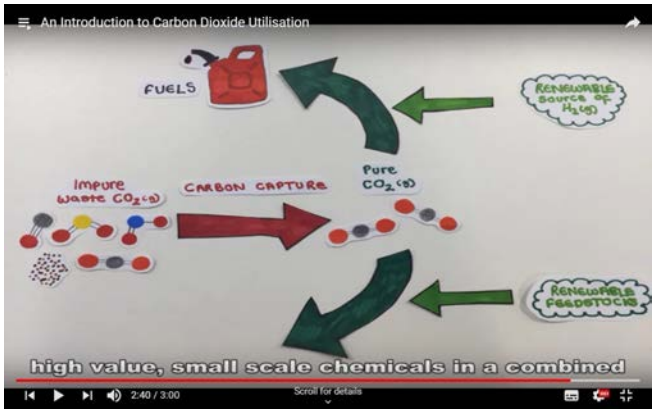
Front cover of one of the new books on CDU edited by Professor Michael North, as well a preview of the book chapter written by Dr Katie Lamb

January was also a busy month for CO_2Chem, the Carbon Dioxide Utilisation (CDU) Network, an international interdisciplinary network that supports CDU professionals across academia, industry and government. The CO_2Chem Winter School was held on 20-22 January at Bramall Lane, the home football ground of Sheffield United FC. This school provided a three-day intensive course on CO_2 chemistry and CDU, for global participants from industry and academia. Dr Katie Lamb and Professor Michael North presented lectures on "*CO_2 Insertion*" and "*CO_2 Mineralisation*", respectively.

Michael North delivering his lecture and Katie Lamb with copies of the DeGruyter CDU books at the CO_2Chem Winter School

Clare Hayes and Katie Stott, current BSc research project students with Dr Glenn Hurst, also entered the CO_2Chem Video Prize in December last year (co-supervised by Dr Katie Lamb). Applicants were invited to create and submit an original and creative "*short form video, showing how CDU can be used as part of an approach to remove fossil-based carbon from the economy*". All video entries were also restricted to three minutes! Clare and Katie won the independent institution video prize and their video was premiered at the CO_2Chem Status Conference on 23 January, an annual conference for global CO_2 researchers in academic and industry to discuss their research. They both won £1,000, copies of both DeGruyter's CDU books signed by the authors (including Michael North and Katie Lamb), and got the opportunity to meet Tony Currie, former Sheffield United and England football player.

L-R: Prof Peter Styring of CO_2Chem and football legend Tony Currie awarding Clare and Katie their CO_2Chem Video Prize



Dr Katie Lamb and Dr Glenn Hurst said "We are extremely proud of Clare and Katie for deservedly winning the CO_2Chem Video Prize. Not only did they make the video using stop motion and their own artwork, but they also created a short video which brilliantly summaries CDU for a worldwide public audience. Well done Clare and Katie".

Clare and Katie's awarding winning video is now available to watch on YouTube.

New starters

Dr Samantha Furfari, Postdoctoral Research Associate (line managed by Prof Andrew Weller)
Room: C/E110 & C/E102; Ext: 2536 & 2538; Email: samantha.furfari@york.ac.uk

Dr Laurence Doyle, Postdoctoral Research Associate (line managed by Prof Andrew Weller)
Room: C/E110 & C/E102; Ext: 2536 & 2538; Email: laurence.doyle@york.ac.uk

Prof Andrew Weller, Professor in Inorganic Chemistry (line managed by Prof Duncan Bruce)
Room: C/E104 & C/E114; Ext: 6571; Email: andrew.weller@york.ac.uk

Claire Brodie, Postdoctoral Research Associate (line managed by Prof Andrew Weller)
Room: C/E110 & C/E102; Ext: 2536 & 2538; Email: claire.brodie@york.ac.uk

Benjamin Large, Postdoctoral Research Associate (line managed by Prof Anne Duhme-Klair)
Room: C/E001; Ext: 4587; Email: benjamin.large@york.ac.uk

Continuing bio-based collaborations at the GCCE – the ReSolute and CHAMPION projects

As we come towards the end of our first BBI JU funded project, ReSolve, we are delighted to have been awarded funding for two new BBI JU projects in the recent call for proposals. Providing total funding to the GCCE of over €1.47 million, the projects are due to start in mid-2020.

ReSolute, builds on directly from the ReSolve project and our strong long-term collaboration with the Circa Group and its bio-based solvent Cyrene™. Developed in partnership with the GCCE, Cyrene is currently produced at demonstration scale and is distributed by Merck and Will&Co. Having successfully obtained REACH Annex VIII registration in 2019, the solvent is being evaluated by over 400 organisations as a suitable replacement for NMP and other harmful dipolar aprotic solvents. The ReSolute project aims to develop the first commercial plant to produce Cyrene within the EU. The GCCE are pleased to continue to work with our ReSolve partners Circa and Norske Skog. Over the next four years we will provide scientific support to this Flagship project, ensuring the quality and safety of the Cyrene produced.

Within the CHAMPION project, the GCCE will continue our strong collaboration with a number of other ReSolve partners and key industry end-users. The GCCE will build on our successful coordination of the ReSolve project to lead this three-year project worth > €5.7M in total. Due to start on 1 June 2020, the collaboration of 14 organisations brings together large industry partners Unilever, Stahl and Scott Bader Company, alongside SMEs and research organisations providing expertise throughout the value chain from chemical production, through to use and disposal. The high-performance and safety of the polymers generated in the project will be assured through toxicity testing and pilot-scale up to allow application testing by the end-users. The project also includes techno-economic evaluation, Life-Cycle Assessment and market research.

Despite the uncertainty in EU research funding caused by Brexit, particularly during the application process, the success of these proposals provides some reassurance of our continuing relevance to the aims of the BBI JU. This public private partnership, comprising the European Union and the Bio-based Industries Consortium, operates during the timeframe of the EU's Horizon2020 research and innovation programme. The BBI JU's aims to develop sustainable and competitive bio-based industries to help achieve a bioeconomy in Europe, link directly with the BioYork approach. We look forward to delivering our contribution towards a circular bio-based economy within the UK and Europe, through the strength of the collaborations with our EU colleagues.