Chemistry Update

Newsletter 328, 18 December 2020

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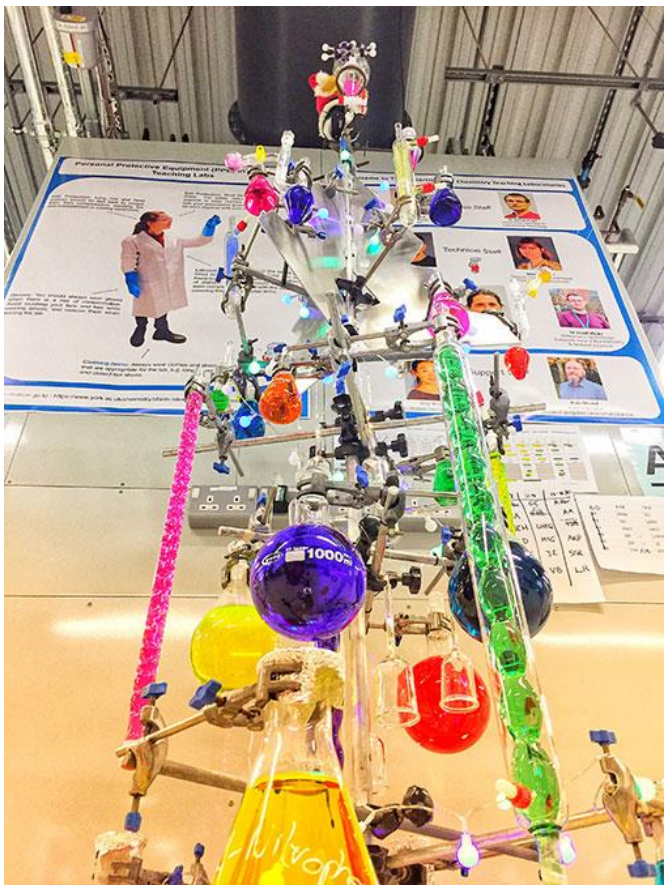
Calendar of Events

YorkTalks 2021: Session Three
Date: Wednesday 13 January
Time: 1.45pm—3.15pm
How can algae boost our crop yields? What's the role of house design in combating malaria? Are online games good for you? How can we ensure the protection of data in an age of quantum technology? Join us online for answers to these questions - and many more - in the third session of our YorkTalks 2021 research showcase. Explore the YorkTalks programme and book free tickets.

Date of Next Issue:
29 January 2021

Celebrating Ten Years of the Chemistree

The Department of Chemistry's Teaching Labs' Chemistree is twice its usual size for its tenth anniversary year, bringing even more colour and light - and a fantastic variety of glassware - to Christmas 2020.

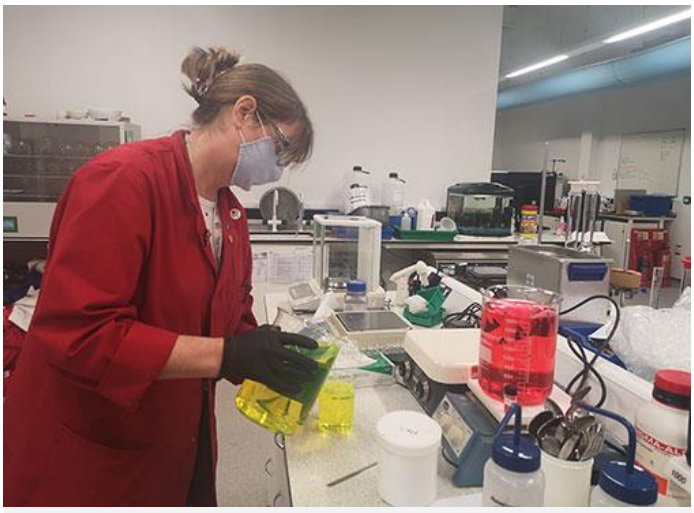


Standing on an 8ft retort stand, with 25 'branches' made from bosses and clamps, and 41 pieces of glassware filled with coloured dye solutions prepared in-house, the Chemistry Teaching Labs' Chemistree 2020 is an impressive sight at the labs' entrance.

"Our aim was to make something more impressive this year," said Helen Burrell, Deputy Teaching laboratory manager in Chemistry Teaching Labs, and the tree's creator. "Making the labs covid-secure for 2020 has made more space where the Chemistree usually stands, and this has turned out to be a great opportunity. We wanted to make something for the new students who haven't necessarily seen a Chemistree before, and to celebrate the tenth anniversary year by making a much bigger tree, showcasing some more unusual chemistry glassware."

As well as the more bauble-like round bottom flasks, this year's tree incorporates even more chemistry into its structure, with fractional distillation columns, coil condensers, conical flasks and even sinter funnels which are used for filtration. The giant retort stand which serves as the tree's base was specially made in the Chemistry Workshops, and the coloured solutions filling the various types of glassware were produced from water soluble dyes such as naphthol green and methylene blue, in the Teaching Labs' prep room. Filling all the different pieces of glassware, not all of which are frequently used in labs any more, was one of the challenges of creating this year's tree.

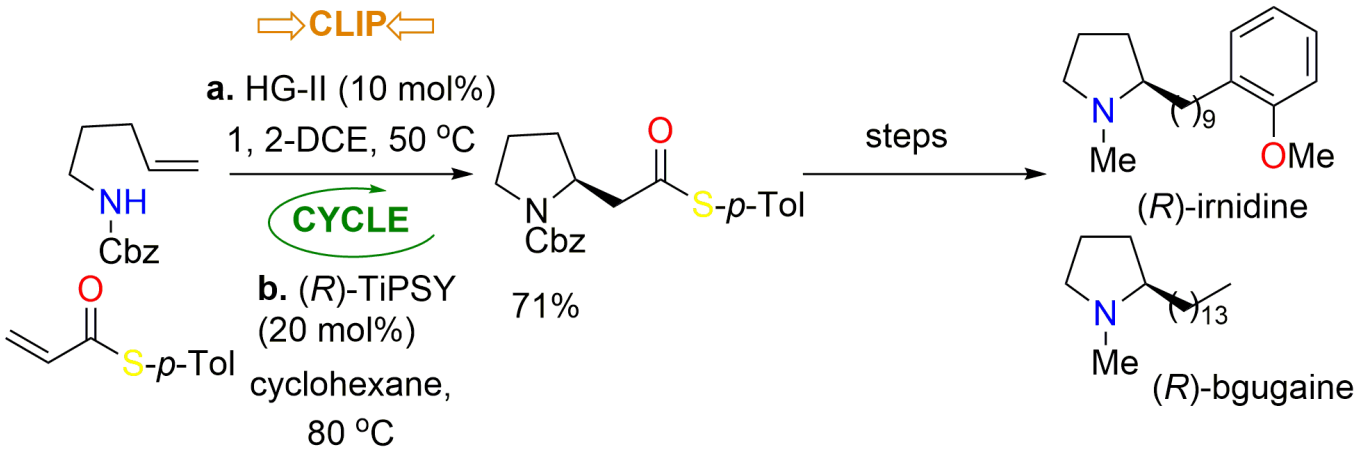
The first Chemistree was built in the Department in 2010 by Julia Walton, following her own chemistry teacher's tradition. The 2010 York Chemistree was featured in *Chemistry Review* magazine, and more recent trees have gained much of social media attention, with a photo of Chemistree 2019 being one of the Department's most popular Instagram posts ever. Helen Burrell has created all of the Department's recent chemistrees.



Helen Burrell prepares coloured dye solutions

Clarke group news

The Clarke group's latest paper on the catalytic asymmetric synthesis of (R)-bgugaine and (R)-irnidine is published in the Professor Richard Taylor honorary issue of *Tetrahedron*. The paper details the application of our new 'clip-cycle' method to the synthesis of biologically active alkaloid natural products.



In other news, Paul has been appointed to the Membership Committee and the Early Careers Committee of the SCI: where Science meets Business. For more information on membership of the SCI, its benefits and activities visit https://www.soci.org.

New starters

Pavol Bardy, Research Associate in Structural Virology (YSBL)
Room: YSBL labs/open office (L0); Ext: 8255; Email: pavol.bardy@york.ac.uk

Thomas Webb, Research Associate in Climate Data Analysis (Cowtan group)
Room: B/K264; Ext: 8253/8270 ; Email: tom.webb@york.ac.uk

Paul Bond, Research Associate in Computational Methods for Structural Biology (YSBL)
Room: B/K264; Ext: 8253/8270; Email: paul.bond@york.ac.uk

Lyndsay Muschamp, YSBL Research Group Administrator (new role)
Room: B/K157; Ext: 8259; Email: lyndsay.muschamp@york.ac.uk

Tw-Eat with Professor Dave

Our own Professor David Smith has recently published a cookbook!

In 2019, Dave's husband Sam sadly died, leaving him as a single parent to a hungry young boy. Cooking and a love of food have been helping them get through things together. As Dave cooks, he has shared some of the recipes on Twitter, and this led him to publish 'tw-eat'. This book presents around 100 of his favourite family recipes, in the simplest possible form: 280 characters or less. Alongside the recipes, 'tw-eat' tells the story of his family and explores the emotional resonance of what we eat.

Recipes and Reflections – Available on Amazon

"Such a beautiful book"

"Simple tweet length recipes"

"A story of love, loss and recovery"

"A love story to the two men in his life"

"A reminder of how food shapes memories"

"For those who cook and eat with love"

"Great recipes... simple but tasty"

"Heartfelt and simple recipes"

"Heartachingly beautiful"

Amazon Customers

The book contains lots of recipes for simple suppers - meat, fish and vegetarian - that can be made with a minimum fuss, without sacrificing flavour or style. The book has recipes for weekend comfort food and Sunday roasts that although taking a little longer, remain simple, and will nourish you in the darkest of times. There are also a number of no-fuss recipes for delicious puddings.

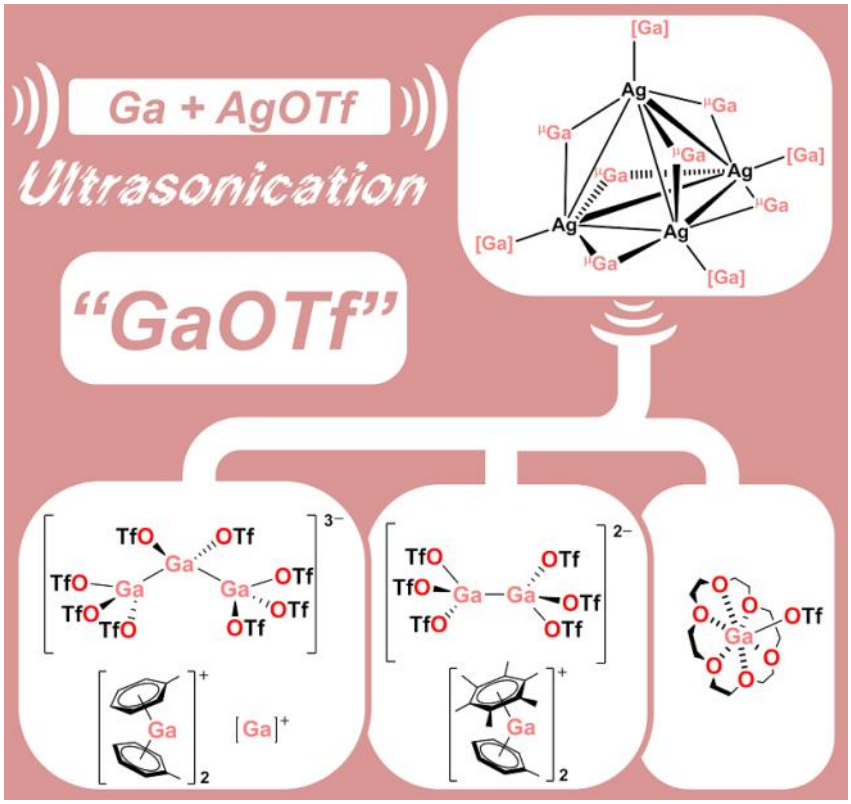
Every recipe is illustrated with a photograph of the completed dish. The book is also richly illustrated with scenes from Dave's life, that form a backdrop to his explanations of the emotional impact of the food he and his son eat.

"tw-eat: a little book with big feelings and short recipes for very busy lives" is available to buy now in both Kindle and paperback formats from Amazon.

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.

Mastering the structural chemistry of a new gallium catalyst



Research performed by Masters students in York has provided unique new insights into the unusual structures formed by an exciting new gallium-based catalyst. They demonstrated that gallium(I) triflate is actually a complex mixture of species, generating important information to help direct future catalyst design.

Gallium is a fascinating metallic element, with its chemistry being dominated by the +3 oxidation state. However, in recent years, there has been increasing interest in lower oxidation state forms of gallium for their use in catalysis.

One particularly interesting compound in this regard is gallium(I) triflate. This catalyst is simple to prepare and has been shown to promote carbon-carbon bond forming reactions, key steps in the formation of valuable molecules such as pharmaceuticals, agrochemicals and polymers.

However, almost nothing was known about the true composition of gallium(I) triflate, holding back the understanding of how it functions as a catalyst.

A team led by Dr John Slattery discovered that a wide range of gallium-containing compounds can, in fact, be isolated from catalytically-active solutions of 'gallium(I) triflate'. Careful structural analysis in collaboration with Dr Adrian Whitwood demonstrated that this seemingly simple catalyst is actually a complex mixture of compounds containing gallium in several different oxidation states. This work provides valuable insights that will aid the development of new gallium-based catalysis in the future.

The laboratory work for this study was performed by three Masters students. Joe Boronski and Matthew Stevens were final-year undergraduate MChem project students, while Bono van IJzendoorn was an MSc student. This clearly illustrates York's research-led teaching approach and demonstrates the important role that undergraduate students at York play in the supporting the Department's research activities during their Masters projects.

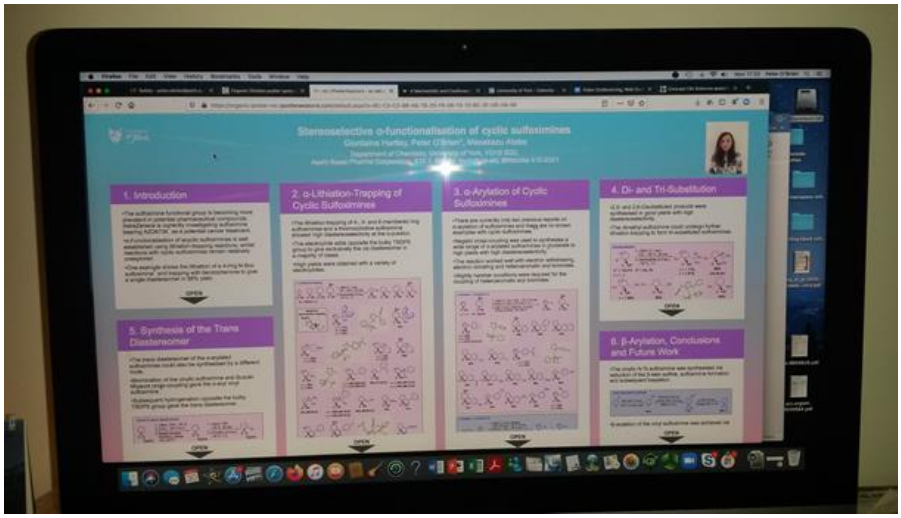
The research is published in *Angewandte Chemie*.

O'Brien Group News – The Coronavirus Months…

There has been lots going on in the group over the last few months but I realised that I had not written up the "O'Brien group news" since March… and I wanted to rectify that…

PhD successes: Since March, we have had three people in the group, Nico Seling, Sophie Berrell and Hanna Klein, successfully defend their PhD theses in a virtual world – we had to learn how to celebrate via group Zoom get-togethers. Here's four of us after Sophie's viva…

New vistas: We also had several people moving on from the group but, encouragingly, despite the economic downturn, everyone has found a great opportunity for the next stage in their careers (Apex Molecular, Concept Life Sciences and post-docs in St Andrews and Sweden). We were sorry to see Nico Seling, Sophie Berrell, Hanna Klein and Kevin Kasten leave York over the last few months – and we wish them well for the future. We also had to learn new ways for holding leaving parties – here's Hanna opening her "box of delights" leaving gift… (from which you can hopefully work out that she was heading off to Sweden!)



Posters and lectures: Unfortunately, my talks at a couple of conferences in March and July were obviously cancelled – but they have been rearranged as virtual events in 2021 – watch this space... I gave an update on our Covid-19 related fragment hits at a University Technologies Webinar in August and last week, I gave a lecture to 100 chemists at Pfizer in the US and the UK. Finally, there are increasingly opportunities for PhD students to attend and present at virtual conferences. Very recently, Giordaina Hartley, represented the group at the RSC Organic Division Poster Competition with a very colourful poster (see left) showcasing her extensive sulfoximine results.

From a personal point of view, I just wanted to say a huge thank you to Simon, Graeme and the technical team (and everyone else) for all their efforts getting our research labs up and running over so quickly in the summer. It was a huge morale boost to the research group who, by their own admission, were beginning to flag a little with "virtual stuff" and writing in general – it really helped and is so much appreciated (and I am sure I echo the thoughts of my colleagues with this comment).

- Peter O'Brien

Professor Jacqui Hamilton elected as Vice President of the UK and Ireland Aerosol Society

Professor Jacqui Hamilton has been elected as the Vice President of the UK and Ireland Aerosol Society. The Aerosol Society is a non-profit organisation with the aim of extending and supporting the study of airborne particles. Membership is now over 800 drawn from academia, government bodies and industry. Members' interests are numerous and include climate and atmospheric modelling, nanotechnology, development of inhaled therapies and air pollution.

The committee of volunteers promotes all scientific branches of aerosol research through its website, monthly member's newsletter and regular aerosol science related events. One of the Society's primary aims is the encouragement and support of early career scientists and the society annually invests thousands of pounds in studentships, travel and research awards. The Society also organizes numerous events for both members and non-members, including The Society's Annual Aerosol Science Conference and our recent series on aerosol transmission of SARS-CoV2.

Two PhD students in WACL, Alfie Mayhew and Dan Bryant were both recently awarded Aerosol Society Doctoral Student Awards with a prize of £1000. They both submitted interesting and thoughtful essays introducing their area of aerosol research and describing the direction of their doctoral studies.