

Chemistry Update

Newsletter 302, 25 October 2018

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Calendar of Events

Inorganic Seminar Speaker: Prof Andrew Weller, University of Oxford Date: Thursday 25 October Time: 12pm—1pm Location: C/A/122 Inorganic Seminar Speaker: Dr Mike Ingleson, University of Manchester Date: Wednesday 31 October Time: 1pm—2pm Location: C/B/101 Chemical InterActions Coffee Morning Date: Tuesday 6 November

Time: 11am—12pm Location: C/A/122

RSC Education Award Winner Lecture

Speaker: Dr Andrew Dicks, University of Toronto Date: Monday 12 November Time: 1pm—2pm Location: C/F/106

Physical Seminar Speaker: Dr Anouk Rijs, University of Nijmegen Date: Tuesday 13 November Time: 1pm—2pm Location: C/B/102

E&D Lunchtime forum: Being a BAME Chemist

Date: Wednesday 14 November Time: 1pm—2pm Location: C/A/140

Flow / Computational Chemistry Mini Symposium

Speakers: Dr Steve Christie, University of Loughborough; Dr Natalie Fey, University of Bristol and Dr Richard Bourne, University of Leeds Date: Wednesday 14 November Time: 2pm—4pm Location: C/A/101

Physical Seminar

Speaker: Dr Dave Townsend, Heriot-Watt University Date: Wednesday 21 November Time: 1pm—2pm Location: C/B/101

Physical Seminar

Speaker: Dr Aaron Jubb, US Geological Survey Date: Thursday 22 November Time: 1pm—2pm Location: C/A/122

Chemistry Postgraduate Open Day Date: Wednesday 28 November Time: 1pm—3.15pm

Date of Next Issue: 30 November 2018

The gold standard

The Department of Chemistry has been featured by The Royal Society of Chemistry in an article promoting initiatives to support diversity in the workplace.



Helen Coombs

The <u>Athena SWAN Gold Award</u>, held by the Department for 10 years, recognises our commitment to advancing the careers of women in science, technology, engineering, maths and medicine employment in higher education and research.

The <u>article</u> discusses specific initiatives including familyfriendly working, a flexible working guarantee, a part-time working assurance, pay gap analysis and unconscious bias awareness, and gives examples of how they have transformed the environment within the Department.

Importantly, the policies developed as part of the Athena SWAN initiative benefit all staff members. As <u>Dr Caroline</u> <u>Dessent</u>, Chair of the Departmental Equality and Diversity Committee, points out in the article: '*This has been really important in keeping the support of all of the Department's staff over the last decade and has led to inclusivity, which goes*

far beyond the original remit of Athena SWAN and aims to provide a welcoming environment, which actively supports all members of the Department, irrespective of gender, sexuality, disability, ethnicity or background.'

In particular, the article highlights the invaluable and tireless work of Dr Helen Coombs, Departmental Manager, who has introduced and implemented many of these initiatives. As Helen says in the article: 'There is a sense of satisfaction when a new set of guidelines or scheme we have introduced makes a difference to staff and students and when some of the good ideas we have in chemistry are adopted by other departments at York or at other universities.'

She goes on to say, 'I have been very fortunate to be surrounded by some excellent colleagues; it is very much a team effort with everyone playing their part'

The most important thing is that these policies genuinely make a real difference to people, as Helen enthusiastically notes: 'It is lovely when someone says they have taken advantage of the flexible working scheme to adjust their hours to suit family or health needs or when we have formally changed the working hours to give someone a better work-life balance'.

The article makes clear that although we have come a very long way over recent years, there remain unsolved challenges, and the Department is determined to continue improving. In particular, there is a wish to ensure greater inclusion and success of those from disadvantaged backgrounds as well as those from black and minority ethnic communities.

You can find the article on the <u>RSC website</u>.

Breakthrough in studying sustainable synthesis

Research carried out in the research groups of Professor Ian Fairlamb and Dr Jason Lynam has developed a new method to probe chemical catalysts.



Chemical catalysis is a vitally important process in the preparation of plastics, materials, pharmaceuticals and agrochemicals. Catalysts make reactions proceed more rapidly and at lower temperatures, increasing the efficiency of the synthetic process. Professor Ian Fairlamb and Dr Jason Lynam, working in collaboration with scientists at the ULTRA laboratory at the Central Laser Facility, Rutherford Appleton Laboratory and Syngenta Crop Protection, have pioneered a new method to study how catalysts work.

The researchers focussed on manganese, a cheap and sustainable metal, and aimed to understand how it performs the crucial step of forming carbon-carbon bonds. Normally it is not possible to observe these steps in a catalytic reaction as the compounds that perform them are extremely short-lived and may only be present in very small amounts. However, the team developed an innovative method to circumvent these problems and directly observe the species responsible for the key reaction steps.

Central to the success of the approach was the application of laser facilities at the ULTRA laboratory. The ULTRA laser system is applied to a catalyst in order to activate it. This triggers the generation of substantial amounts of the catalyst intermediates so that their behaviour can be observed. This allows reactions to be studied over a wide range of timescales, from extremely short (picoseconds) to much longer (milliseconds) – equivalent to studying events occurring from one second to over three years in a single experiment!

As Dr Lynam points out: 'Being able to observe the key steps which are involved in the reactions of a sustainable metal like manganese for the first time is extremely exciting.'

As a result of this approach, the team has directly observed the short-lived intermediates responsible for carbon-carbon formation, gaining a detailed understanding of their structure and function. This knowledge will enable new, more active, catalysts to be developed, thus improving efficiency.

As Professor Ian Fairlamb explained: 'This work has uncovered some really surprising steps that underpin catalysis and will significantly aid with the development of new, highly active sustainable catalysts for chemical synthesis.'

This work was supported by a programme grant from the Central Laser Facility, funded by the Science and Technology Facility Council providing access to the world-leading laser facilities at ULTRA. It is also funded by Syngenta through an EPSRC iCASE award. The research is published in <u>Nature Catalysis</u>.

York research on Channel 4's Grand Designs

Research carried out by York atmospheric chemists was featured on Grand Designs, as a family in South-West London built a low-VOC emitting house.



Aiden Heeley-Hill with his graph which was used in the recent episode of Grand Designs

Scientists from the <u>Wolfson Atmospheric</u> <u>Chemistry Laboratories</u> (WACL) in the Department of Chemistry were called on to measure VOCs (Volatile Organic Compounds) in a 'hypo-allergenic home' on a recent edition of Grand Designs. The programme, which aired on Wednesday 3 October at 9pm, followed a couple building a home for their two sons who suffer from life-threatening allergies. A main aspect of the challenge was to complete the build with minimal use of materials which emit VOCs. Once the house was completed, the show called on scientists from WACL to test its effectiveness.

Aiden Heeley-Hill, a PhD student who carried out the analysis with the help of Dr Jim Hopkins, said:

"My supervisor, <u>Professor Ally Lewis</u>, asked if I wanted to get involved in the project."

"We sent air sampling canisters to the house, to quantify VOC levels, and samples were taken over a period of three days."

A wide range of VOCs were analysed, including isoprene, benzene and xylenes, and the results were compared to the average concentrations of the compounds in a typical new build property. The results suggested, in most instances, significantly lower concentrations of VOCs in the home, with benzene and isoprene displaying the greatest reductions at over 95%. At the end of this episode of Grand Designs, Presenter Kevin McCloud was shown using a graph produced by Aiden to discuss the results with the family.



Presenter Kevin McCloud discusses the results of the analysis on the programme

Aiden went on to explain:

"It was really interesting to see the programme and understand more about the family's motivations for building the home and although we already knew what the results were, it was nice to see them being presented as part of the show." Prof Ally Lewis said:

"As outdoor air quality continues to improve in the UK more attention is now being paid to air inside. Modern homes are very energy efficient and that can mean they trap pollution inside. Our analysis shows that by selecting low VOC building products you maintain low concentrations indoors, even in a brand new home."

The Wolfson Atmospheric Chemistry Laboratories, established in 2013, enable experimental and theoretical studies relating to the science of local and global air pollution, stratospheric ozone depletion and climate change. WACL operates as a collaborative venture between the University of York and the <u>National Centre for Atmospheric Science</u> (NCAS), co-locating more than 50 researchers from seven academic groups and NCAS.

The programme, entitled "<u>Richmond 2018</u>" is available to view for a limited time on the Channel 4 website.

New starters

Dr Marius Horch, PDRA with Professor Neil Hunt Room: C/A057; Ext: 4524; Email: <u>marius.horch@york.ac.uk</u>

Emily Flack, PDRA with Dr Martin Fascione Room: C/B016; Ext: 2594; Email: <u>emily.flack@york.ac.uk</u>

Dr Petr Slavik, PDRA with Professor David Smith Room: C/D014; Ext: 4184; Email: <u>petr.slavik@york.ac.uk</u>

Darren Spillett, Undergraduate Assessment Administrator with Katrina Sayer Room: C/A119A; Ext: 2512; Email: <u>darren.spillett@york.ac.uk</u>

Madeline Crosswaite, Programme Evaluator with Dr Maria Turkenburg, CIEC Room: C/B013; Ext: 2562; Email: <u>madeline.crosswaite@york.ac.uk</u>

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 <u>link</u>.



Traces of opiates found in ancient vessel

Researchers at the University of York and the British Museum have discovered traces of opiates preserved inside a distinctive vessel dating back to the Late Bronze Age.

Vessels of this type, known as 'base-ring juglets', have long been thought to have links with opium use because when inverted they resemble the seed head of the opium poppy; they are known to have been widely traded in the eastern Mediterranean ca. 1650 – 1350BC.



The juglet (right) resembles the shape of an inverted opium poppy seed head (left)

Researchers used a range of analytical techniques to study a particular juglet housed in the British Museum, which is a sealed vessel, allowing the contents inside to be preserved. This meant that there was a rare opportunity for scientists to investigate what components might have survived.

Initial analysis by scientists at the British Museum showed that the juglet residue was mostly composed of a plant oil but hinted at the presence of opium alkaloids, a group of organic compounds derived from the opium poppy, known to have significant effects on the human body.

To conclusively detect the alkaloids and demonstrate the presence of opiates in the oilbased residue of the vessel, however, a new analytical technique was needed.

Using instruments in the <u>Centre of Excellence in Mass Spectrometry</u> at the University of York, Dr Rachel Smith developed the new analytical method as part of her PhD in the Chemistry Department.

Dr Smith said: "The opiate alkaloids we detected are ones we have shown to be the most resistant to degradation, which makes them better targets in ancient residues than more well-known opiates such as morphine.

"The alkaloids were in degraded plant oil, so the question as to how opium would have been used in this juglet still remains. Could it have been one ingredient amongst others in an oil-based mixture, or could the juglet have been re-used for oil after the opium or something else entirely?"

In the past, it has been argued that these juglets could have been used to hold poppy seed oil, containing traces of opium, used for anointing or in a perfume. In this theory, the opium effects may have held symbolic significance.

<u>Professor Jane Thomas-Oates</u>, Chair of Analytical Science in the Department of Chemistry, and supervisor of the study at the University of York, said: "*The juglet is significant in revealing important* details about trade and the culture of the period, so it was important to try and progress the debate about what it might have been used for. "We were able to establish a rigorous method for detecting opiates in this kind of residue, but the next analytical challenge is to see if we can also succeed with less

well-preserved residues."

This is the first time that reliable chemical evidence has been produced to link the opium poppy with a base-ring juglet, despite many previous attempts.

<u>Dr Rebecca Stacey</u>, Senior Scientist in the <u>Department of Conservation and Scientific Research</u> at the British Museum, said: "It is important to remember that this is just one vessel, so the result raises lots of questions about the contents of the juglet and its purpose. The presence of the alkaloids here is unequivocal and lends a new perspective to the debate about their significance."

The research is published in the Royal Society of Chemistry's journal <u>Analyst</u> and was funded by the <u>National Environmental Research Council (NERC)</u>. It has been featured on Radio 4's 'Today' programme and in The Times newspaper.

Dr Glenn Hurst gives invited talk in Maastricht University



Glenn was invited to give a talk at the Aachen-Maastricht Institute for Biobased Materials (AMIBM) based on his work in green chemistry education at the end of September 2018. This was an excellent opportunity to establish a link between the GCCE and AMIBM, opening up new opportunities for research possibilities and other collaborative ventures.

While at Maastricht University, Glenn was able to sample their distinctive problem-based learning approach to teaching across the institution. Very participatory and effective! Glenn will share his experiences in a future Departmental Teaching Forum. Additionally, Maastricht have a rather unique 'Science Programme' where staff train the next generation of natural scientists. Learning about this programme has served as a good source of inspiration to further enhance Natural Sciences at York.

On the return journey, Glenn visited the famous Konigsallee in Dusseldorf where he arranged to meet up with local secondary school science teachers to discuss the curriculum in Germany together with how they teach green chemistry and sustainability.

York atmospheric chemists investigate air pollution in New Delhi

Researchers from the Wolfson Atmospheric Chemistry Laboratories (WACL) are currently in New Delhi, India taking ambient air measurements to assess air quality.

The work is part of a collaboration between the universities of Leeds, Manchester, Lancaster and Birmingham, along with researchers at the Centre for Ecology & Hydrology (CEH) and Indian partners. The site is located at Indira Gandhi Delhi Technical University for Women (IGDTUW) near Kashmiri Gate.



Some of the measurement team at the IGDTUW site, New Delhi. From left to right: Adam Vaughan, Pawel Misztal (CEH), Jim Hopkins, James Lee, Gareth Stewart, Beth Nelson, Will Drysdale, Stefan Swift and Naomi Farren.

Measurements started at the beginning of the month and will continue until early November. So far, high concentrations of NO_x , CO, ozone and volatile organic compounds (VOCs) have been observed. Instrumentation, shipped from York earlier in the year, includes NO and NO_2 2-channel chemiluminescence, a CO VUV fluorescence analyser, an SO_2 UV fluorescence analyser and an O_3 UV absorption analyser, along with both 1-dimensional and 2-dimensional GC instrumentation for VOC detection. The measurements will allow researchers to build a picture of the chemical composition of Delhi's atmosphere.



 NO_x 2-channel chemiluminescene, VUV CO fluorescence analyser, SO_2 fluorescence analyser and O_3 absorption analyser in situ at IGDTUW.



1-dimensional and 2-dimensional GC instruments at IGDTUW.

Along with concentration measurements, flux measurements are planned by sampling ambient air from a 30 m tower. These measurements will provide some information about the emission rate of chemical species from ground level. A secondary tower, situated at another location in Delhi, will also aid the analysis. Follow the WACL twitter feed <u>@AtmosChemYork</u> to keep updated with our progress, and to hear about other exciting news!

Fragment-based Lead Discovery Conference 2018



O'Brien group members James Firth and Hanna Klein presented posters at the Fragment-based Lead Discovery Conference 2018 (FBLD) in San Diego on 7-10 October. Both disclosed their work on the 3-D fragments project. They were accompanied by long-time collaborator and conference organiser Professor Rod Hubbard and co-workers Dr John Darby, Eleni Makraki and Bas Lamoree. Former POB group visiting researcher Masa Atobe (Asahi KASEI) was also present. There was also time for socialising and networking, including an evening meal aboard a boat on San Diego bay.

KMS Seminar and Year 2 Graduate Poster Competition

The KMS Prize Winners' seminar took place on 3 October and was very well attended by students and staff.

The four winners of the KMS competition delivered excellent talks on their research and were presented with certificates by Dr Alison Parkin who chaired the KMS panel. Winners and their talk titles were:

Anna Zhenova (JHC): Developing green solvents for polymer applications
 Conor Rankine (DAW/J.Yuan): The femtosecond molecular movie starring 1,2-dithiane
 Alexandra Males (GJD/MAF): Structural studies of glycoside hydrolases to influence inhibitor design
 Stuart Grange (DC/ACL): Extracting additional information from routine air quality data

The event was combined with a poster session for PhD students entering their second year. This session provides an opportunity for students to share their research with the rest of the Department and 29 posters were on display. The poster session was really well attended, with lots of discussion taking place. People were asked to vote for their favourite poster and the winners were:



Kleopas Palate (WPU / PAOB)

Poster title: Expanding the scope of successive ring expansion

Kleo also handmade the pictured structure to illustrate the Unsworth lab's ring expansion method.

Natasha Hatton (MAF / C. Bauman / L. Wilson)

Poster title: Synthesis of bionic glycoproteins for the treatment of uropathogenic E. coli

Congratulations to all the winners and thanks to everyone involved including the KMS panel and all those who attended the seminar.



KMS Winners left to right:

Anna Zhenova, Stuart Grange, Conor Rankine, Alexandra Males, with Dr Alison Parkin, centre.

York atmospheric chemists give invited seminar in Japan

Following a Departmental Seminar from Dr Tatsuo Kaiho, a scientist who literally 'wrote the book' on iodine chemistry, Dr Liselotte Tinel and Dr Tomás Sherwen were invited to give a seminar on their atmospheric iodine research in Japan. Their host was Dr Kaiho, a technical advisor for (Godo Shigen Co., Ltd) and researcher at the newly established Chiba Iodine Resource Innovation Center (CIRIC) at Chiba University.



Plant tour of a iodine production site of Godo Shigen Co., Ltd. in Chiba, Japan

Both Tomás and Liselotte are currently funded to study iodine in the ocean via a NERC grant (PI: <u>Professor Lucy Carpenter</u>). Liselotte has taken new measurements of sea-surface iodide in the Indian Ocean and is currently studying the influence of organics on surface reactions between iodine and ozone. Tomas has been using Machine Learning techniques to build new global predictions of iodide sea-surface concentrations. Tomas also did his PhD on the atmospheric chemistry of iodine. This visit was therefore a good opportunity to talk to researchers from industry and academia about the role of iodine in both the atmosphere and the sea surface.

As part of visiting CIRIC there was also a chance to tour world's single largest iodine production plant, run by Godo Shigen Co., Ltd. in Chiba prefecture, close to Tokyo. The prefecture has a unique source of iodine which is found in underground brines. The photo (left) shows a blow-out tower where iodine is extracted from the underground brine through oxidation by Cl₂ and consequent absorption and reduction to HI. After

concentration, the high purity molecular iodine (>99%) is obtained through oxidation with Cl_2 and crystallization. The produced iodine is used in a wide range of applications, from polarizing films for digital screens to medical treatments and from additives in nutrition to research on iodine.

The seminar was well attended and followed by a interesting discussion. For many researchers at CIRIC the atmospheric role of iodine was quite new. There was a vivid interest in the role of iodine in climate change and for the different analytical techniques used to measure the speciations of iodine in the environment. Ideas for future collaborations were discussed and we look forward to seeing the first outcomes of this unique, new research facility in the near future.



Liselotte and Tomás experiencing local cuisine with generous hosts

Professor Dame Pratibha Gai chairs microscopy symposia

<u>Professor Dame Pratibha Gai, FRS, FREng</u> co-organised and chaired *in situ* microscopy symposia at the quadrennial International Microscopy Congress-19 (IMC19) held in September at the Darling Harbour, Sydney, Australia. The *in situ* symposia played a key role in the congress. She also presented a paper on the visualisation and analysis of single atom dynamics in chemical reactions. There were other participants from the UK in general, and York in particular. The congress was stimulating, with great talks, international participants and the wonderful venue. After the congress it was time to see some Sydney attractions!

Dame Pratibha Gai was conferred an Honorary Fellowship of the Royal Microscopical Society at an event held at the Royal Society on 27 September. She presented a lecture at the event.



Dame Pratibha Gai in sunny Sydney



After the Congress at the Sydney Opera House!

Lecture at the International Microscopy Congress-19 (IMC19) in Sydney

Set up an Out of Office in Gmail and Calendar

An 'Out of office' allows a user to set a standard automated reply email to be sent during specified dates. It is an important tool to let others know that you are absent or unavailable and is also important in the context of handling Freedom of Information requests. From the time a request arrives, the University has a set period of time to respond. However, where an out of office reply provides an alternate point of contact for such requests and asks applicants to re-submit requests to this, the request will not be counted as received during your absence.

Set up an Out of Office reply in Gmail

- 1. Click the gear icon in the upper right of the Google mail window and choose **Settings**
- 2. Under the General subheading, scroll down to **Out of Office Autoreply**
- 3. Select the radio button Out of Office AutoReply on
- 4. Set First day date and Last day date (optional)
- 5. Compose an email subject line e.g. "Out of Office"
- 6. Compose a message. This should include an expected date of return and /or alternative point of contact in your absence, e. g 'I am out of the office until xxxxx and will attend to your email as soon as possible on my return. If your email is urgent please contact xxxxx'
- 7. To send an Autoreply to all senders leave the following tick boxes unselected. Alternatively, if you would limit who will receive your receive your out of office reply, select the optional tick boxes for Only send a response to people in my contacts and / or Only send a response to people in University of York.
- 8. Click Save Changes.
- 9. A banner will appear at the top of your inbox to indicate that the Out of Office is enabled (n.b. The banner will only appear on your selected **First day** as per number 4.)

Set up an Out of Office reply in Calendar

Out of office is also available in Calendar and allows you to automatically decline events and meeting invitations during the dates and times that you are unavailable.

Helpful Hint

Enable working hours in Calendar Settings to let people know when you might be available for a meeting. This will warn people if they try to invite you to a meeting outside of your preferred times. See <u>How do I...use Google Calendar</u> for instructions on enabling the settings for working hours.

- 1. Select a white space in your Calendar
- 2. Select Out of office
- 3. Set your start and end dates and times
- 4. If preferred, you can edit the default message which is Declined because I am out of office
- 5. Select who can see this Out of Office booking in your calendar (Public, Private or Default Visibility)

Out of office 10:00 - 11:00		Out of office Event Out of office (Appointment stots)	×
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	â	Public *	
		New and existing meetings during this time will be automatically declined.	
		SAVE	

Created by the Chemistry Google Working Group: <u>chemgoogleworking-group@york.ac.uk</u> www.york.ac.uk/chemistry/chem-intranet/staff-intranet/working-chemistry/how-do-i/

Clarke Group news

The Clarke Group welcomes Suresh Shinde, who joined the group to study for a PhD. Suresh will be working towards the Total Synthesis of Anthracimycin. We also welcome Saikiran Ravi who started her MSc(Res) studies in the group. Saikiran's project is the Asymmetric 'Clip-Cyle' Synthesis of Piperidines. The group was also joined by final year MChem students Alex Brown and Zamin Khan.

Chris Maddocks delivered a lecture at the YoungChem 2018 meeting in Bydgoszcz, Poland. Chris presented his PhD work on the Asymmetric Synthesis of Pyrrolidones and Spiropyrrolidines.

Dr Paul Clarke hosted the SCI Welcome event for new graduate students in the Department and introduced them to the opportunities for travel bursaries and scholarships membership of SCI brings. For more information please chat to Paul or visit the <u>SCI website</u>.



YoungChem 2018 - Group Photo



Chris Maddocks sampling the local beer after giving his lecture



A view of Bydgoszcz, Poland

Green Chemistry news



The Green Chemistry Centre of Excellence (GCCE) and Centre for Novel Agricultural Products (CNAP) in the Department of Biology joined forces to inform a workshop with Unilever and

Croda. The workshop included a presentation from Dr Tom Famer of the GCCE, which highlighted the recently announced top 10 UK Bio-based Platform molecules and the chemistries that can turn these into a vast array of useful compounds. The Unilever CEO has set the modest challenge to make all of their products from renewable bio-resources... given the enormous volume and range of products of the second largest HPC company in the world, that's quite a challenge and will probably need all of Tom's molecules!



In other news, Professor James Clark gave an invited lecture at Vertex Pharmaceuticals in Oxfordshire in September. Although Vertex has been in existence for

some 20 years, it is only now getting products on the market and has stayed well below the radar especially compared to the mega pharmaceutical companies like GSK and Pfizer. However, it is a very innovative company and in that context it is starting an in-house green chemistry programme to help ensure their future products are made using the latest green chemical technologies - we hope to help them move in a greener direction!

Unconscious bias observer training



As part of the Department of Chemistry's commitment to

equality and diversity, EDG (Equality and Diversity Group) would like to train more chemistry staff to act as observers in the Department's leading Unconscious Bias Observer Scheme. The training will be in the form of a two hour workshop covering unconscious bias awareness in recruitment, details of the scheme and role of UB Observer, Q&A.

Chemistry staff who undergo training will be added to the Department's pool of observers who will be invited to observe future recruitment panels. You will not be under any obligation to commit to any particular panel. Please discuss this with your line manager and confirm they are happy for you to join the pool of Departmental observers.

The session will be held on **Thursday 13 December**, **10am—12pm**.

Please express an interest / sign up using the <u>Google form</u>.

There will be 30 places, open to all University staff.

Observing has previously been performed by trained members of EDG. We hope to increase our capacity by creating a diverse pool of observers drawn from all staff groups (academic and support), all levels of seniority, and all genders (we are particularly keen to recruit more male staff who have been underrepresented as UB observers in the past).

This is a fantastic opportunity to take part in a highly innovative scheme and we have many other departments both in York and beyond interested in emulating our scheme. It may be particularly valuable for PDRAs and support staff who wish to gain experience of recruitment.

Please contact <u>leonie.jones@york.ac.uk</u> for more information.

Helium recovery system in the NMR Centre

Over the summer, after years of data collection, system assessment, visits to other Universities, meetings, and requests for funds, the helium gas recovery system was finally given the go ahead and installed in the NMR Centre. Heather Fish talks us through the process behind the installation of the new recovery system.

"A mysterious green shed (now named the BRGS), that caused much tearoom speculation as to what it was for, appeared besides the large liquid nitrogen storage tank.



"Copper pipework was installed from the BRGS, to run alongside the N2 pipes in the path alongside the DH building, around the top of A-block and into the NMR Centre.

"More copper pipework, and heat exchangers containing flow meters and ping pong balls were fastened to the wall next to each of the six magnets in the NMR Centre. This was done by James and Paul, who at times nearly gave me a heart attack by having a cherry picker less than a metre away from a magnet.



"Two yellow 18m² gas bags were then installed; one in the NMR Centre and the other in the BRGS, which also contains an aptly-named Typhoon helium compressor. "The system was successfully pressure tested and then the helium boil-off from the Bruker AV500 magnet at the front of the NMR Centre was connected to its heat exchanger.



"With much trepidation, fear and excitement, Alex Heyam, Richard John from CHyM, and I, under the watchful eye of the Motivair engineer, Paul, and various interested persons, began the helium fill. This was a new experience for us, as instead of the usual plume and noises from the helium vent that tell us how the fill is going, we all stared at the now bouncing ping pong ball. Paul encouraged us to speed up the fill by saying "give it some welly", a plea that sadly I had to ignore. After some time we could also see the helium bag filling out.



"When this bag was full, the pump noisily kicked in and pumped the gas down to the other bag in the BRGS. When this second bag is full, the gas is compressed into one of the two orange 15 cylinder storage packs in front of the BRGS.

"When the magnet was full, the ping pong ball went mad and made a lot of noise. Relief was felt all round.

"We now have all six magnets in the NMR Centre connected to the system and the bag is taking about a week to fill. We have not yet filled the first cylinder pack, but when we do, the compressed gas will be sold back to BOC. I won't be retiring on the proceeds.

"Thanks must go to Matt Thompson of the Estates Department without whom it would have been a much more long winded and painful installation. Thanks should also go to the Department for agreeing to fund this as we have now been able to put an agreement in place with BOC to guarantee surety of a supply of helium which is a finite resource; in turn this means we will be able to keep the NMR spectrometers running. We will also be helping to ensure that children's parties and graduations can have floaty balloons, so a win-win all round."

- Heather Fish



Further information and registration at https://foodwaste-closingtheloop.eventbrite.co.uk











Chemical InterActions is a social group open to all in the Department of Chemistry.

Come along to our coffee morning to meet new people and enjoy some cake!



All staff and students, both undergrads and postgrads, welcome!

Please bring your own mugs

Tuesday 6th November 11am in C/A122

chem-interactions@york.ac.uk www.facebook.com/ChemInteractions

Nobel Prize winning women

The 2018 Nobel Prizes have recently been announced, with women being prize winners in both Chemistry and Physics. **Frances H. Arnold** was awarded the Nobel Prize in Chemistry for work first reported in 1993, when she conducted the first directed evolution of enzymes. Since then, she has refined these methods that are now routinely used to develop new catalysts. The uses of Frances Arnold's enzymes include green synthesis of chemical substances, such as pharmaceuticals, and renewable fuels.



Nobel Prize Winners Frances H. Arnold (left) and Donna Strickland (right) (Credits: Caltech and Laurence L. Levin)

Donna Strickland was awarded her share of the Nobel Prize in Physics with **Gérard Mourou**, for work they conducted towards making ultrashort high intensity laser pulses without destroying the amplifying material. This work was first published in 1985 and was the foundation of Strickland's doctoral thesis. First they stretched the laser pulses in time to reduce their peak power, then amplified them, and finally compressed them, so that the pulse intensity increases dramatically. Strickland and Mourou's technique, called chirped pulse amplification, CPA, soon became standard for subsequent high-intensity lasers, and it's uses include corrective eye surgery. Donna Strickland answered questions during a <u>press conference</u> <u>at the University of Waterloo</u>.

This is the first time that women have been Nobel Prize winners in both Chemistry and Physics in the same year, although interestingly, Mayer and Hodgkin came close to achieving this record with their prizes in 1963 and 1964, respectively.

New insight into the electron capture mechanisms of flavins



Lumichrome (LC) is the chromophore of the flavin family of photoactive biomolecules, where key biochemical activity involves interplay between redox and photophysical events. Significant questions remain about the relationship between the redox status of the ground and excited states of flavins. In a study just published in the Journal of Physical Chemistry Letters (DOI: 10.1021/acs.jpclett.8b02529), Dr Caroline Dessent and PhD student Edward Matthews have used anion laser photodissociation spectroscopy to measure the intrinsic electronic spectroscopy and photochemistry of the lumichrome anion. Experiments were also performed on alloxazine, which is equivalent to lumichrome minus two methyl groups. Their results revealed a new mechanism for light-driven electron capture by flavins, and indicates that the presence of the lumichrome methyl groups is crucial in providing a structural barrier to valence electron capture that can initiate molecular dissociation.





Equality and Diversity Lunchtime Forum

Being a BAME chemist:

What could the Department do better to support BAME students and staff?

All staff and students welcome

Come along to chat and share your experiences. Meet others in the Department who are interested in equality and diversity.

Wednesday 14 November 1-2 pm, C/A140



Bring your lunch and a mug - tea and coffee provided

Please contact leonie.jones@york.ac.uk or avtar.matharu@york.ac.uk for more information