



Chemistry Update

Newsletter 234, 22nd February 2013

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Calendar of Events

Scientific Update Symposium

Date: Wednesday 27 Feb

Time: 2pm—6pm

Location: A101

UCAS Interview Afternoons

Dates: 5 & 12 March

Time: 12—4pm

Location: Hub DS/008

Graduate Research Seminars—Spring

Date: Wednesday 6 March

Time: 1.15pm—4.15pm

Location: A101

UCAS Post Offer Visit Day

Date: Monday 11 March

Time: 12noon—4.30pm

Location: Chemistry Hub

Organic Seminar

Date: Wednesday 13 March

Time: 2pm—5.30pm

Location: A101

Organic Synthesis

Group Plenary Session

Date: Friday 15 March

Time: 3.15pm—5.15pm

Location: A101

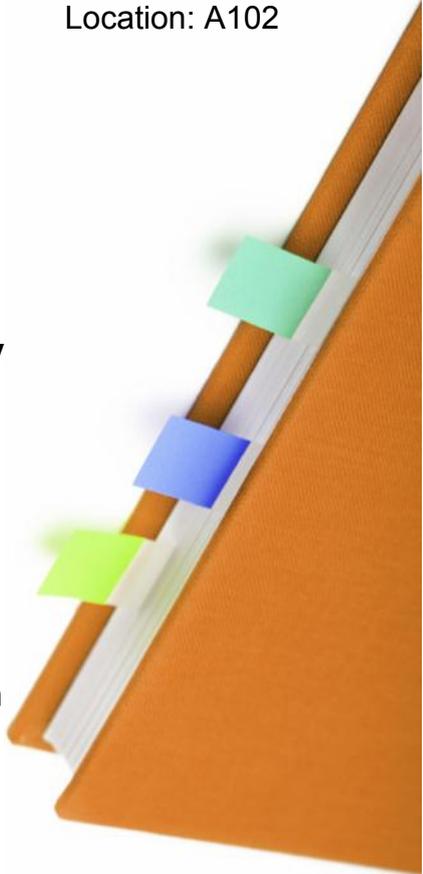
All Welcome

Bruker Poster

Competition and Seminar

Date: Tuesday 16 April

Location: A102



Date of Next Issue: 29th March 2013

Rushlight Award Success for Starbons



Professor James Clark's Starbon® Technology team have won a Rushlight award for the potential use of Starbons in water purification. Starbons are bio-based materials with a remarkable range of tuneable properties from polar, hydrophilic to polarisable hydrophobic and from starch-like to graphitic. They are made from starchy wastes and other low value polysaccharides including alginates from seaweed.

James and Maggie McGowan were there to accept the award at the Rushlight Awards Gala Dinner, which was held at The Royal College of Surgeons of England in London on 31 January. Greg Barker, Minister of State for Energy & Climate Change, was the Guest Speaker. The Rushlight Awards bring together each year the leading organisations which are developing new clean technologies and innovations and those that are supporting them. This is the second time the Green Chemistry Centre has won such an award; the first time was for innovation in recycling.

Starbons were discovered in York following EPSRC funded research on new applications for polysaccharides. They were first reported in the literature in 2006 (*Angew. Chem. Int. Ed.* 2006, 45, 3782 –3786) after they had been patented. This led to further EPSRC funding where Starbons were proven to be active directly on food waste fermentation broths, greatly simplifying

the route from waste to chemicals. The Starbons team also showed how these fascinating materials could be used in separations including chromatography, leading to a collaborative project with Jane Thomas-Oates' group, and in water purification. A further EPSRC "follow on" grant enabled the project to move to a new level by collaborating with the UK chemical company Contract Chemicals on scale-up leading to the manufacture of Starbons on the 100s of kg scale. By this time, Starbons were attracting a lot of interest with substantial sales by Sigma-Aldrich and publications on their use from outside of York. Starbons became the focus of a new spin-out company (www.starbon-technologies.com) in 2012, which is currently working with a number of other companies on a range of applications.

Professor James Clark said of the award: "The Rushlight award is Starbon's first but we intend to make sure it's not its last!".

EPSRC Funding of £1 Million for New Research Equipment

Our spectroscopy facilities will be upgraded and extended through EPSRC funding.



The department has been awarded a grant of just over £1 million from the EPSRC for new instrumentation to support our wide-ranging research activities. The grant covers the purchase of a number of state-of-the-art instruments, including a 400 MHz solid state NMR spectrometer, which will be housed in our [Centre for Magnetic Resonance](#). A small angle X-ray diffractometer will also be provided for our [materials research group](#), who specialise in molecular material based upon liquid crystals. In addition, the grant allows an upgrade to current [mass spectrometers](#) to keep them at the forefront of research.

Professor Richard Taylor commented "This EPSRC Core Capability funding was targeted at the UK's most research-active Chemistry Departments. It enables York Chemistry to upgrade and extend its spectroscopy facilities and will provide a major boost to on going and future research programmes".

Prof. Richard Taylor Meets Exchange Students in Singapore

In February, Richard Taylor visited Singapore to advise the organic chemists at the Institute of Chemical and Engineering Sciences (ICES, an A*Star Institute). While there, Richard met up with four York Chemistry exchange students who are spending their fourth year studying and carrying out a major research project at Nanyang Technological University (NTU) in Singapore.

Pictured are Phil Groves, Jack Law, Adam Flores and Chloe Westley with Richard having a seafood dinner at Lau Pa Sat, the historical Hawker centre in the downtown area of Singapore.



Suggestion Box



Reminder: there is a Suggestion Box located next to the pigeon holes in the foyer of A Block and one outside Room K167 for YSBL staff. Suggestions from staff are most welcome. All suggestions are discussed at the departmental communications meeting.

The Million Tonne Potash Mine

Not many people know that within 30 miles of York is one of the world's biggest potash (i.e. KCl) mines – Boulby Mine, north of Whitby on the North Yorks Moors.

I visited it at the end of January in the company of Wendy and, believe it or not, the Lord Lieutenant of Yorkshire, in the full kit you see here. The rich deposit of KCl (£100 tonne-1) lies on top of a deposit of NaCl (£30 tonne-1), through which wide roads have been driven to get access to the KCl, most of which goes for fertilizers. The NaCl is a by-product which provides most of the road salt for the UK.

1000 metres under the North Sea there's a network of roads like a large town and dozens of stripped down Land Rovers, Transit vans and huge diggers ripping out the KCl – 1 million tonnes of it a year. If you get a chance, visit Boulby – it's an amazing experience to feel the conditions (hot, dry, dusty) and see the chemistry that goes into finding the best potash.

Professor Sir John Holman



York Chemist in World Skydiving Contest

Edward Monteith studying for an MSc in Green Chemistry and Industrial Sustainable Technology took part in the World Skydiving Championships.



The World Championships, held in Dubai from 28 November to 9 December 2012, are the most prestigious competition for a skydiver. In 2012 the championship was a mondial, which meant every event/discipline within skydiving would compete along side each other.

Approximately 1200 competitors took part from 56 countries. Edward was representing Ireland and competing in Canopy Piloting event which had 132 competitors.

Canopy Piloting has three rounds of three events which all involve leaving the plane or helicopter at 5000 feet and opening the canopy within 5-15 seconds and then flying to a point above the ground and starting a diving turn to build speed. Once you have finished your turn and level off at ground level you can be reaching speeds of 70-90 mph. In the Speed event you fly through a carving course of 75 meters as fast as possible. For the Distance event you have to fly through and drag your foot through a set of gates 5 feet/1.5 meters high then go as far as possible. The final event is Accuracy, this has 4 water gates worth 50 points in total, you score points by dragging your foot through each gate then 6 landing zones ranging from 0-50 points. The aim is to score as many points as possible up to a maximum 100.

The facilities were by far the best in the world. Everyone was accommodated in a 5 star hotel and provided with 3 buffet meals each day, the pond built for swooping cost millions of pounds and was filled with and constantly topped up with millions of litres of fresh water!

Edward started competing 11 months before and had been placed 4th in the British nationals, 3rd in the Irish nationals and 21st in the German open. There was one freestyle round held in Dubai; it was unofficial as it has not been approved for competition, but Edward had a very good run and scored very highly. In the main competition he finished 120 out of 132.





Green Chemistry at the First Innovative Medicines Initiative (IMI) Chem21 Workshop

The end of January saw the first IMI Chem21 workshop take place, hosted in the impressive MIB (Manchester Institute of Biotechnology) building. Representatives from almost all of the 6 pharmaceutical companies, 10 universities and 5 Small & Medium Enterprises (SMEs) involved in Chem21 were in attendance for the two day event, including a large number of PhD students working on the project. The first day involved an number of presentations by European Federation of Pharmaceutical Industries and Associations (EFPIA) members educating the academics on the pharmaceutical industry and members from the GCCE educating everyone in green chemistry. The second day had a smaller number of attendees, but was boosted by the presence of a number of invited experts, with the consortium breaking out into syndicate sessions to discuss the various challenges facing the project. The entire event was intended to highlight challenges, hurdles, as well as providing an opportunity to educate and network. The next workshop will be held in Helsinki in mid March, by which time the specific goals of Chem21, indicators of success and dissemination of information both inside and out of the consortium will be set.

Research Shows How 'Mallard' Dye Fills Need for Speed

Researchers in the Department of Chemistry have developed a new medical tool which could help surgeons carrying out complex procedures in the operating theatre.

Researchers have developed a dye which provides a quick and accurate method of checking heparin levels in the blood. Heparin is an important anti-coagulant which has a significant role in major surgery. The scientists in the Department of Chemistry at York have used inspiration from biological systems to allow the dye to bind heparin even in highly competitive human serum.



In the laboratory, they have modified existing dyes which previously could not bind with heparin successfully under these challenging conditions. The modified dye, which has excellent sensing capacity for heparin pinpoints the anti-coagulant's level in human serum and has the potential to work more quickly than existing clinical methods for doing this.

The research, which was funded by the Biotechnology and Biological Sciences Research Council, is published in the Journal of the American Chemical Society.

Because the dye can rapidly detect heparin levels, the scientists have named it 'Mallard Blue'. It is the same shade as the livery of the A4 Pacific Mallard, which holds the world speed record for a steam locomotive, and is now preserved at the National Railway Museum in York.

Professor Dave Smith, who led the research said: "Our new dye allows the quantification of heparin in serum at clinically relevant levels and is the best in class for this application in terms of its ability to bind heparin strongly under really competitive biological conditions, and may improve on the currently used systems."

"We have named the dye 'Mallard Blue', after the record-breaking steam train, 'Mallard' which is housed in the railway museum here at York. Our dye is the same colour as the locomotive, and we believe it is similarly ground-breaking in its performance."

The York researchers worked with a team led by Sabrina Prici at the University of Trieste who used high-level computer modelling to understand precisely how Mallard Blue binds to heparin so strongly. The next stage in this research would involve the incorporation of this new dye into a device for simple bedside read-out of heparin levels in blood.

Smith Group News



In December, PhD students Will Edwards and Stephen Bromfield, from Professor David K Smith's research team both won prizes at the UK Macrocyclic and Supramolecular Chemistry Meeting at Queen Mary University, London. Will won a prize for 'best talk by a PhD student/postdoc', and Stephen won a poster prize.

In January, Professor David K Smith delivered his plenary Corday Morgan Award lectures at University of Oxford and University College Cork.

Clarke Group News

Dr Paul Clarke attended an EPSRC Grand challenge "Dial-a-molecule" discussion on "3D Fragments" in Huddersfield on 5th Feb.

He gave a RSC/ERDF Lecture at the University of Bangor on 19th February on the "Total synthesis of Tetrahydropyran-containing Natural Products"

Regional Meetings

The RSC NE Organic Division Regional Meeting will be held in Huddersfield on 4th March. The plenary speakers will be our own Prof. Taylor and Prof. David MacMillan (Princeton). A student poster session will be organised. People interested in going should contact Paul Clarke (paul.clarke@york.ac.uk).

Organic Synthesis Group Plenary Session

Friday 15 March at 15:15

A101

Will Edwards (DKS Group)

James Firth (PAOB Group)

Zhou Lu (VC Group)

Jonathan Ward (IJSF Group)

These final year PhD students will be giving talks about their research. Everyone is welcome to attend. Refreshments will be served.

Joelle Halliday Joins the CIEC Promoting Science Team

Joelle Halliday joined the **CIEC** team in January as a Primary Professional Development Leader. Joelle's career has included teaching in primary schools in the North West followed by several years as an LEA advisory teacher with a special interest in science.

Joelle will be delivering primary courses at the NSLC and developing new **CIEC** resources. She delivered her first course at the NSLC last week entitled *Enriching the Primary Curriculum using Space and Astronomy*. The CIEC resource *Is There Anyone Out There?* formed the basis for the activities.

Joelle said the course went well with the teachers particularly enjoying the practical sessions, which included making a chocolate volcano!



Chemistry Offers Two New Lectureships

The Department of Chemistry is offering two new lectureships.

The two lectureships available are:

Lecturer in Chemical Biology

Lecturer in Physical Chemistry

The closing date for both positions is 19 March 2013.

All departmental Vacancies can be found at: <http://www.york.ac.uk/chemistry/opportunities/>

Please Recycle Unwanted CDs!

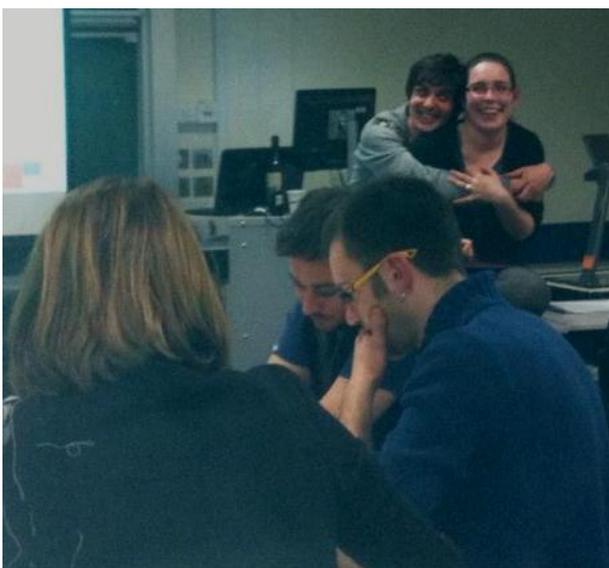


A Reminder from the Green Impact Team

All departments can send unwanted CDs for recycling by placing in CD/DVD confidential waste bags, available from the mail room at adm203@york.ac.uk.

Chemical *InterActions* Departmental Quiz

Around 50 staff and students from the Department of Chemistry took part in Chemical *InterAction's* first event of 2013 — a 'pub' style quiz on Wednesday, 30 January. Rachel Holmes did an excellent job as the Quiz Master, with her helpful assistant Jamie Minaeian by her side. Rounds included Sports, Science, Current Affairs and a Staff Babies Quiz, in which teams had to guess the identity of members of the Chemistry Department staff from their baby photos. 'Quizee Rascal' from Ian Fairlamb's research group were the champions, getting an astonishing number of questions right and taking home a box of chocolates.



The Admin 'A Team' were joined by their mascot, the Hub dog, and a feast of delicious snacks.

Interested in helping out with Chemical *InterActions* or have any idea for an event?

Email: chem-interactions@york.ac.uk

www.facebook.com/ChemInteractions

twitter.com/ChemInteract



Interview with Dr Beatrice Demarchi

Postdoctoral research associate and Kirsty Penkman's doppio whilst she is away

I have been in the Department since December 2009, carrying out research as a PDRA in the amino acid racemization (AAR) geochronology group with Kirsty Penkman. As a postdoc I accrued quite a lot of experience in managing projects and supervising (many) students, and therefore when Kirsty went on maternity leave I was chosen to hold the fort until her return – so I am currently running her lab and research group. This is a fantastic experience and I am very lucky to be working with an exceptional bunch of individuals, who are being incredibly supportive and helpful – thanks guys!

My main line of research is investigating post-mortem processes of protein diagenesis, particularly with regards to their dependency on time and burial temperature. I then use this as a geochronological tool for dating biominerals (mollusc shells, ostrich eggshell and such – hence the picture...!) that are found in the archaeological record because they are what is left of prehistoric dinners! My main projects are based in South Africa, around the Mediterranean rim, and in the UK. As you might have guessed this requires quite a bit of mental gymnastics, jumping from developing new methods for the analysis of amino acids and proteins (I wanted to learn mass spec to understand patterns of protein diagenesis – ask Jane Thomas-Oates about that one!) to pondering about the emergence of symbolic behaviour in early humans, to talking to geologists, physicists and environmental scientists about climate change in the last 2 Ma and the interface between biomolecules and mineral crystals. I like to view myself as the “glue” that keeps together different bits and bobs from different disciplines and Departments within and outside the University...truth is, I am just curious about stuff! And people are happy to share their knowledge with me, which I think is wonderful.



I was born at the foot of the Italian Alps (near Turin, where Fiat, Juventus FC & Giandujotti are from!). I stayed in Turin for my BSc and MSc in Conservation Science (i.e. material science applied to paintings and statues etc.) but after that things got complicated (I think it's called cross-disciplinary)... as I was finishing my MSc in 2006 the situation in Italy was already bad (thanks to Silvio) and so I started looking for possibilities abroad. That means that one afternoon I randomly typed in google “PhD archaeology science York” for the simple reason I had been on holiday here the year before...and I hit upon BioArCh, the joint venture between Biology, Archaeology & Chemistry which was going to be my home for the following 7 years: I obtained my PhD in Archaeology in 2010 and I spent the following years as a postdoc in Chemistry and now as a Research Group Leader until next September. So my CV is one of those that make people scratch their heads and go: “what?!”. I

absolutely adore Yorkshire (when I was little I had read all of James Herriot's books) and its people (I have even developed a Yorkshire-Italian accent which makes my friends cringe). I do not know where life (i.e. the job market) will take me after my contract here ends, but I have been truly lucky to “land” here.

Interview with Dr Pedro Aguiar



Experimental Officer in NMR

In my capacity as Experimental Officer I am focussed on the implementation/development of experiments for the two higher-field NMR spectrometers (14.1 and 16.4 T) within the Department of Chemistry's Centre for Magnetic Resonance. My role encompasses numerous aspects with regards to the upkeep and maintenance of these spectrometers as well as liaising with researchers within the university to determine suitable approaches to solving their chemical problems.

I was born in Winnipeg, Canada and obtained a Bachelor of Science in Chemistry from the University of Manitoba. It was during my undergraduate studies where I first encountered and became interested in the power of spectroscopy to probe chemical structure. I began graduate studies with a new faculty member (Prof. Scott Kroeker) mounting a group focussing on solid-state NMR technique development and application to the structural characterization of inorganic solids. My PhD focussed on studying structural (dis)order in inorganic materials (primarily metal cyanide framework structures and oxide minerals/glasses) by solid-state by NMR. Upon completion of my PhD I began a post-doctoral fellowship under the mentorship of Dr. Dimitrios Sakellariou at the Commissariat à l'Énergie Atomique à Saclay (France) working on the development and application of NMR/MRI methods for nanolitre-sized samples. After leaving Paris I spent some time in Lisbon collaborating on a project with Prof. Isabel Coutinho (Universidade Nova de Lisboa) detecting/exploiting photo-excited states for magnetic resonance. In late 2012 I moved to York to take up my current position.

Chemistry Graduate Research Seminars - Wednesday 6 March in A101

All staff and students are invited to attend the spring term graduate research seminars where the following PhD students will talk about their research:

- 14:15 Introduction - Dr Anne Routledge, Deputy Chair of Chemistry Graduate School
- 14:20 Katrina Bakker - Pollen microcapsules: small and perfectly formed
- 14:40 Stephen Bromfield - Heparin rescue: controlling Blood Coagulation Through Thick and Thin
- 15:00 Kirsty High - Understanding accelerated organic decay at wetland archaeological sites
- 15:20 Daniel Wright - Structural perspectives of the inhibition of a bacterial fucosidase

Chemistry Cake for Comic Relief

Three fourth year MChem students, Ellis Wilde, Zoe Taylor and Sally Warrington, spent a weekend baking cakes depicting the periodic table with an individual cake representing each element. The money raised from selling the cake has been donated to this year's Comic Relief appeal. The cakes used 30 eggs and 1.7 kilos each of flour, sugar and butter. The enterprise was not without failure as the p-block elements were initially iced with a red natural food colour which gave an unpleasant beetroot taste, and the whole block had to be discarded and re-baked with a different food colour. As might have been anticipated there was keen rivalry between buyers to get a favourite element, at least one element was 'reserved' by an academic and several researchers were disappointed at not getting their choice element.



New Starters

Dr James Tunstall, Process Development Unit Technologist in the Bionewables Development Centre (BDC)

Extension number: 565361; Room: Biocentre 2.52d; Email: james.tunstall@york.ac.uk

Dr Fabien Deswarte, Business Development Manager in the BDC

Extension number: 435122; Room: Biocentre 2.90; Email: fabien.deswarte@york.ac.uk

Gemma Moy to Leave YSBL, Farewell on Friday 1 March

Gemma Moy (Administrative Assistant in YSBL) is taking up a new post in the University as Administrator in the Bio-Renewables Development Centre on 4 March. Gemma's last day in the Department will be Friday 1 March and you are invited to say goodbye to her either at 10.45 in the morning in DH Coffee room or at 16.00 in the afternoon for drinks in the Biology Atrium.