Chemistry Update

Newsletter 273, 27th May 2016

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Calendar of Events

Graduate Research Seminar
Date: Wednesday 1 June
Time: 4pm—5pm
Location: A101

Chemical *Inter*Actions Talk
Speaker: Prof Elena Rodriguez-Falcon
Date: Monday 6 June
Time: 11am—12pm
Location: A122

Inorganic Seminar
Speaker: Dr Arnald Grabulosa, Universitat de Barcelona
Date: Friday 10 June
Time: 1pm—2pm
Location: B101

Computational Chemistry Seminar
Speaker: Dr Tom Penfold, Newcastle University
Date: Monday 13 June
Time: 2pm—3pm
Location: A122

CODY Awards
Date: Thursday 16 June
Time: 4.30pm—6pm
Location: B101

Chemistry Research Forum
Date: Friday 17 June
Time: 12pm—2pm

Bio-Based Porous Carbons Symposium
Date: Friday 17 June
Time: 9.30am—4.30pm
Location: GCCE, F Block

Green Chemistry Seminar
Speaker: Dr Nick Gudde
Date: Wednesday 22 June
Time: 3pm—4pm
Location: F106

Computational Chemistry Seminar
Speaker: Dr David Tew, University of Bristol
Date: Thursday 23 June
Time: 2pm—3pm
Location: F106

Open Days
Dates: 24 & 25 June

Chemistry Graduation Drinks Reception
Date: Wednesday 13 July
Time: 1.30pm—3pm
Location: Chemistry Quad

Date of Next Issue:
24th June 2016

Prof Pratibha Gai Elected FRS

Professor Pratibha Gai, JEOL Professor of Electron Microscopy, Professor in the Departments of Chemistry and Physics, and founding co-director of the York JEOL Nanocentre, has been elected as a Fellow of the Royal Society (FRS) in recognition of her ground-breaking work on new materials, processes and electron microscopy. This highly prestigious fellowship is the top honour in UK science, and Pratibha becomes the fifth FRS in the Department of Chemistry, joining Professors Eleanor Dodson, John Goodby, Robin Perutz and Gideon Davies.

Pratibha studies dynamic chemical processes on the atomic scale. Her research focuses on the development of new nanomaterials and chemical processes for use in a range of high technology applications, including catalysis, energy, healthcare, chemicals and food coatings; and novel electron microscopies. Her process and microscopy inventions are being used worldwide.

Her great innovation was to create a **whole new type of electron microscope** which allowed researchers to visualise reactions as they actually happen at the atomic level, in the real conditions which they would normally occur. In order to achieve this, she needed to drill a hole in the imaging lens of the microscope - something she has described as being 'like drilling a hole through a person's heart or drilling a hole through a camera lens'. By taking this calculated risk with very specialised equipment, a whole new area of imaging was opened up, transforming the field.

On hearing the news of her FRS award, Pratibha said: "I am greatly honoured and thrilled to be elected Fellow of the Royal Society and pleased that my research has received this wonderful recognition. This prestigious fellowship belongs not just to me but to all the outstanding co-researchers I have collaborated with."

Pratibha's research has previously been recognised by the **L'Oreal Unesco Women in Science Award** for Europe in 2013 and the Fellowship of the Royal Academy of Engineering. Her career, research and personal pathway into science have also been highlighted by The Royal Society of Chemistry who named her as one of their 175 diverse **Faces of Chemistry**.

Prior to her current York assignments, Pratibha held positions in the USA and at the University of Oxford after receiving her PhD in physics from the University of Cambridge.

http://www.rsc.org/diversity/175-faces/all-faces/professor-pratibha-gai-frsc

York academics elected Fellows of Royal Society

As Hard as Snails?

An international study involving Dr Bea Demarchi and Dr Kirsty Penkman has shown how the hardness of calcite crystals can be tuned by incorporating different amino acids, providing new insights into the mechanical properties of inorganic / organic nanocomposites. Not only is this important for our understanding of biomineralisation, but it also opens up the possibility of using this strategy to tailor the mechanical properties of a wider range of materials.

Despite being formed from brittle minerals and flexible polymers, biominerals (e.g. shells, corals, teeth) are inorganic / organic composites that exhibit remarkable strength and toughness. In order to better understand these properties, and in an attempt to control them, an international research project grew and analysed calcite crystals which had incorporated amino acids, organic molecules which have been implicated in biomineralisation.

The project was led by researchers in Leeds, who grew crystals of calcite within solutions of varying amounts of 2 amino acids, while analyses at York (Bea Demarchi & Kirsty Penkman) and Cambridge showed that the amino acids were incorporated within single crystals as individual molecules. Computer simulations at Sheffield determined how the amino acid molecules fitted into the crystal lattice, which showed remarkable concordance with the experimental data from York. Researchers at Technion and the Diamond Light Source characterised the distortions formed by this incorporation of the amino acids within the crystal lattice. The hardness of the crystals were the largest yet reported in man-made synthetic calcite, and similar to those measured in biomineral calcite. A team from Cornell determined how far apart the molecules were from each other, and then showed that the greater hardness in the modified crystals (compared to pure calcite) was determined by the force needed to break the covalent bonds within the amino acids.

This collaborative study therefore provides a window into how organic materials incorporated into minerals can provide such an increase in their toughness, an aspect that has been exploited by nature for the last 541 million years. The “tuning” of the mechanical properties made possible by this understanding could pave the way for using similar strategies to tailor-make other composite materials.

The research, "Tuning hardness in calcite by incorporation of amino acids" was published on 2nd May in *Nature Materials* (http://www.nature.com/nmat/journal/vaop/ncurrent/full/nmat4631.html).

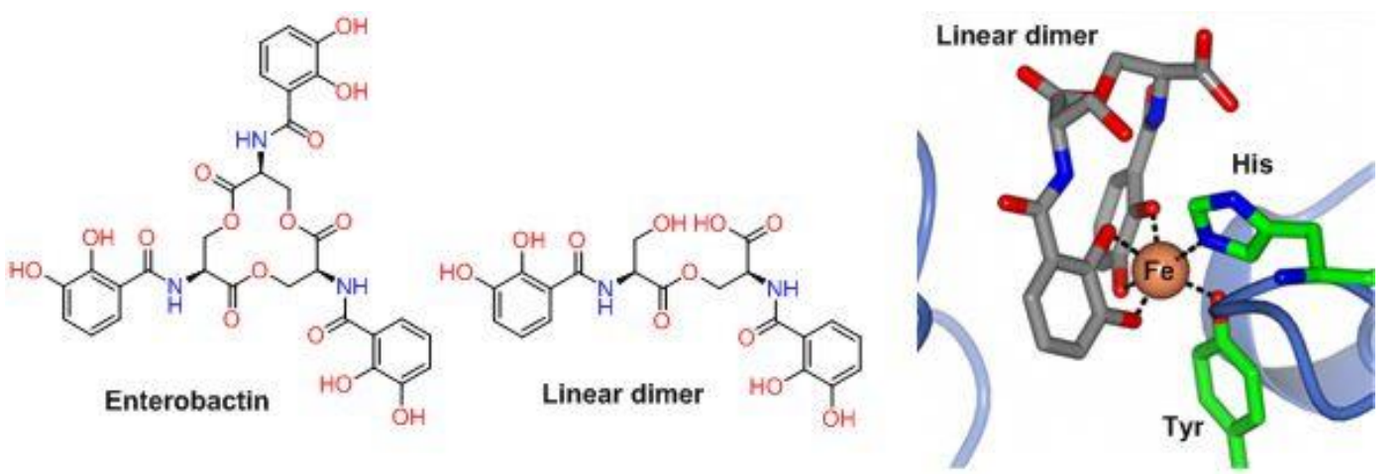
High-Affinity Iron Binding

High-affinity iron binding in *Campylobacter jejuni*, the most common cause of food poisoning in the UK

Researchers in York have found that a key protein within the iron uptake system of a pathogen can scavenge the fragments of siderophores made by other bacteria to gain an advantage in the competition for essential iron.

Pathogenic bacteria have evolved to synthesise molecules that enable them to acquire essential iron from their host. These siderophores display a remarkably high affinity and selectivity for iron(III).

To be competitive, many bacteria rely on the production of large siderophores with six iron-binding sites, such as the siderophore enterobactin. However, a number of species, including the food-borne pathogen *Campylobacter jejuni*, steal siderophores from other micro-organisms and make use of their degradation products, for example by scavenging the enterobactin linear dimer.



Research led by Professors Keith S. Wilson and Anne-K. Duhme-Klair in the Department of Chemistry reveal that CeuE, the periplasmic siderophore-binding protein of *C. jejuni*, is adapted to bind the hydrolysis product of enterobactin via two key amino-acid side chains. This adaptation allows the pathogen to benefit from the enterobactin made by other bacteria and hence gain a competitive advantage by exploiting their resources.

This research was supported by the Engineering and Physical Sciences Research Council (EPSRC) and is published in *Proceedings of the National Academy of Sciences of the United States of America (PNAS)*, DOI: 10.1073/PNAS.1520829113:
http://www.pnas.org/content/early/2016/05/05/1520829113

MChem Project Leads to First-Author Publication

Tom Nicol (MChem, 2015) has had his MChem project work published in the journal *Physical Chemistry Chemical Physics* as first author. Tom's project was a theoretical study, supervised by Dr Seishi Shimizu, focusing on cyclodextrins.

Cyclodextrins are a class of compounds made up of sugar molecules bound together in a ring (cyclic oligosaccharides). These cone-shaped molecules are hydrophobic inside and hydrophilic outside, meaning that they can form complexes with hydrophobic compounds, encapsulating other molecules within a hydrophobic cavity and hence enhancing the solubility and bioavailability of the encapsulated compounds. These properties make cyclodextrins of great interest to the pharmaceutical and food industries, among others. For example, cyclodextrins are used in the preparation of cholesterol-free products: the bulky and hydrophobic cholesterol molecule is easily lodged inside cyclodextrin rings that are then removed.

Tom's MChem project, which focused on use of cyclodextrins in drug solubilisation, aimed to tackle the lack of fundamental molecular-level understanding of the overall solubilisation mechanism: traditional views are that the "encapsulation" is the only thing that leads to cyclodextrin's ability to improve solubility; however, some scientists have noticed that there is behaviour (non-linear solubility enhancement) that cannot be described using only the encapsulation / inclusion approach.

The original idea to study cyclodextrins was Tom's, and he worked with his project supervisor, Dr Seishi Shimizu, and Seishi's longstanding collaborator Professor Nobuyuki Matubayasi of Osaka University (both of whom provided input on the complex mathematical derivations required), to shed light on the variety of molecular-level interactions taking place.

Statistical thermodynamic theory shows that solubility is affected by changes in interaction between the cyclodextrin molecules, when the drug or other molecule is introduced, as well as by the interactions between cyclodextrin and the other molecule. Or put in more technical terms, the solubilisation behaviour's deviation from linearity is due to competition between cyclodextrin self-association changes induced by introduction of the drug molecule, and direct drug-cyclodextrin interactions. Understanding the nature of such a subtle and elusive mechanism will help scientists improve solubility and achieve more effective delivery of drug compounds.

Tom described the theoretical work as "both challenging and rewarding; also, it reveals molecular level interactions which are of great interest to me". He will return to the Department in September to start a PhD project on "Solubilisation of biomass polysaccharides by bio-derived solvent: optimisation and mechanistic studies", co-supervised by Seishi and Professor James Clark.

Origin of nonlinearity in phase solubility: Solubilisation by cyclodextrin beyond stoichiometric complexation
Tom W.J. Nicol, Nobuyuki Matubayasi, and Seishi Shimizu, *Physical Chemistry Chemical Physics*, 2016

Hat-trick of Awards for York Chemists

Three University of York chemists have received prestigious Royal Society of Chemistry (RSC) awards.

Professor Ian Fairlamb, Dr Kirsty Penkman and Professor Paul Walton have been awarded the RSC Corday-Morgan Prize, the Joseph Black Award and the Joseph Chatt Award respectively.

Professor Fairlamb is recognised for his work in understanding how organic, carbon-containing compounds co-operate with transition metals such as palladium. His research enables the development of sustainable and greener chemical reactions and syntheses, producing valuable pharmaceutical and agrochemical compounds that are of benefit to human-kind.

Dr Penkman's ground-breaking work focuses on the field of amino acid dating and its application to archaeological and geological questions. As Senior Lecturer in Analytical Chemistry, she uses proteins in fossils to date the last 3 million years – a time period (the Quaternary) critical for our understanding of climate change and human evolution.

Professor Walton is awarded for his work examining enzymes made by bacteria and fungi which are used to break down plant materials, with the ultimate aim of understanding how a new class of enzymes called lytic polysaccharide monooxygenases can be used to aid the commercial production of liquid fuels from biomass.

Professor Fairlamb said: “I am delighted to receive this prestigious award. I’m deeply indebted to the incredible efforts and talents of both past and present research group members, in addition to academic and industrial collaborators from the UK and overseas who make a real difference.”

Dr Penkman said: “I would like to express my sincere thanks to the Royal Society of Chemistry for this honour, and for the support, patience, understanding and precious samples that the Quaternary community has provided. Collaborations with earth scientists and archaeologists have been integral to this research, helping us to push the analytical science forward, whilst advancing our understanding of our earth's history.”

Professor Walton said: “Many colleagues and co-workers have contributed to the research recognised by the award, and I am very pleased that the award is a testament to their great skill and contribution.”

Dr Robert Parker, Chief Executive of the Royal Society of Chemistry said: “It is an honour to recognise the illustrious achievements of our prize and award winners in our 175th anniversary year.

We were founded in 1841 by a group of academics, industrialists and doctors who understood the power of the chemical sciences to change our world for the better. Our winners share that vision and are advancing excellence in their fields, whether through innovative research or inspirational teaching and outreach.

We are proud to celebrate and support the work of inspiring and influential individuals, whose work has the potential to improve so many lives.”

Each prize consists of a monetary award, a medal and a lectureship at up to four UK universities.

4th Place for York Chemistry in the Guardian

The Department of Chemistry at the University of York has been ranked 4th place in the latest Guardian League Table, with a score of 80.3 / 100 and 98% satisfied with the course.

We are one of just two Chemistry departments in the country to appear in the top 4 of both the Guardian and Complete University Guide 2017 league tables.

UK universities ranked

Subject area: Chemistry

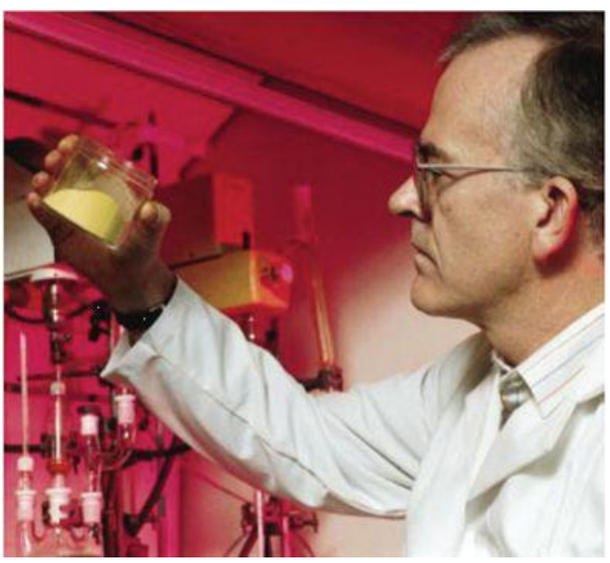
How to use these tables » Find out more about studying chemistry »

Rank 2017	Institution	Guardian score/100	Satisfied with course	Satisfied with teaching	Satisfied with feedback	Student to staff ratio	Spend per student/10
1	Sussex	100	97	95.5	86.1	9.2	10
2	Oxford	89.8	88.9	90.7	67.1	16.1	10
3	Loughborough	85.1	98	97.2	90.6	12.5	5
4	York	80.3	98.0	94.8	77.0	13.4	8

6reen Chemi5try Celebrates Prof James Clark

A tribute and reflection of Professor James Clark's contribution to green chemistry on his 65th birthday.

Dr Avtar Matharu and Dr Duncan Macquarrie celebrate James Clark's 65th birthday as a special Editorial in the RSC journal *Green Chemistry*:



"It is our immense pleasure to honour the 65th birthday of Professor James H Clark, founding Editorial Board Chair of Green Chemistry, global pioneer of green and sustainable chemistry, colleague and friend. James has carried out research on environmentally friendly chemistry for over 20 years, and has worked on education, networking and promotion of sustainable technologies for over 10 years. Through his intervention the world is now rapidly waking up to the importance of making chemicals and chemistry more green, environmentally compatible and within the framework of a sustainable 21st century circular economy."

The full editorial can be accessed at:
http://pubs.rsc.org/en/content/articlelanding/2016/gc/c6gc90053d DOI: 10.1039/C6GC90053D
DOI: 10.1039/C6GC90053D

New Starters

Dr Marie-Christine Labarthe-Last , PDRA in Biomedical Research
Room: CHM/114; Extension: 8893; Email: marie-christine.labarthe-last@york.ac.uk

Dr Katariina Nara-Zanotti, Maternity cover for Undergraduate Assessment Administrator
Room: A111; Extension: 2512; Email: katariina.nara-zanotti@york.ac.uk

Suggestion Box

Reminder: There is a online anonymous suggestion box for staff under the Equality and Diversity section of the intranet: http://www.york.ac.uk/chemistry/internal/ and a physical suggestion box located outside Room K167 for YSBL staff. Suggestions from staff are most welcome. All suggestions are discussed by the appropriate departmental committee.

Clarke Group News

Dr Paul Clarke attended the EU ORIGINS COST meeting on Astrobiology and Origins of Life in Vilnius, Lithuania from 24th - 29th April. At the meeting Paul delivered a lecture on the "Prebiotic Synthesis of Carbohydrates". The meeting and associated workshops were a great opportunity to meet and discuss Origins of Life with chemists, biologists and astronomers from all over the world. It was particularly interesting to hear more about the science and results obtained by the Philae lander on comet 67P/Churyumov–Gerasimenko and the latest results on prebiotic chemistry from others working in the area. Paul made some new contacts and new collaborations are in the offing.

After the meeting Paul took some time to explore Vilnius and its sights such as the Cathedral and Tower (where the Baltic Chain started); the Gates of Dawn and Trakai Castle.

BDC Joins Major Food Corporations in Signing Wrap's Ambitious Courtauld Commitment 2025

The Biorenewables Development Centre (BDC) has joined Wrap's Courtauld Commitment, an ambitious ten-year voluntary agreement that brings together organisations across the food system – from producer to consumer – to make food and drink production and consumption more sustainable.

"We are very pleased to have joined this exciting agreement, that has also been signed by the UK's major supermarkets, Coca-Cola, WWF and Unilever to name but a few," comments BDC Director, Dr Joe Ross. "Signing this commitment is a natural progression to our work. Our core focus is helping businesses develop products from biomass, so one of our strengths as an R&D centre is helping companies find innovative ways to make the best use of unavoidable food waste. For instance, we have a number of ongoing projects evaluating how side streams from the food manufacturing process can be converted into pharmaceuticals and personal care ingredients."

The collective ambition of Courtauld 2025 is to cut the amount of resource needed to provide our food & drink, reducing waste and GHG emissions by one-fifth in ten years from 2015. This could put the UK on course to achieve the UN Sustainable Development Goal 12.3 for reducing food waste by 2030, relative to when the Courtauld Commitment started in 2007.

Richard Swannell, Director of Sustainable Food Systems, said: "Courtauld 2025 is our most ambitious agreement yet and we are delighted that the Biorenewables Development Centre has pledged their support as a signatory. We are faced with some big challenges ahead with rising populations, climate change and dwindling resources. But tackling food waste offers a practical option to address these challenges and in doing so, will create new opportunities. Only by working together can we hope to realise the big changes that are essential to ensuring a more prosperous future for individuals, businesses and the planet."

The need for a step change in how we produce and consume food and drink is widely recognised. Demand is rising, both in the UK and globally, and the UK food and drink supply chain will be subject to growing volatility as resource scarcity increases and the impacts of climate change take greater effect.

WACL Research Presented at the First NCAS Policy Forum

On 4th May, scientists from the Wolfson Atmospheric Chemistry Laboratories (WACL) joined other atmospheric scientists from across the UK to discuss policy relevant air pollution research with officials from the Department for Environment Food and Rural Affairs (Defra). The policy forum was proposed, organised and run by Dr Sarah Moller, a NERC Knowledge Exchange Fellow based here in the Department of Chemistry, in association with the National Centre for Atmospheric Science (NCAS).

The event, which took place in Westminster, was well attended with 21 academics, the NERC lead for the Environment and Health portfolio, the NCAS communications manager, and 13 Defra officials from across the Air Quality Data and Analysis team, Joint Defra/DfT Air Quality Unit, and European, National and Local Air Quality teams. Topics discussed included innovations in air pollution monitoring, sources of atmospheric particulate matter and emissions from road transport, as well as priority areas for future research. Dr Rachel Dunmore, Dr James Lee and Professor Ally Lewis presented recent research conducted at WACL on pollutant emissions, how we measure those emissions and the use of small sensors for air pollution measurements.

Some outcomes of the forum have already been realised, Defra officials and NERC have agreed to regular catch-ups about strategic priorities for air pollution research, and feedback from the event was extremely positive. Many respondents said that they would follow up discussions initiated during the event and all said they would attend if similar events were organised in the future. It is hoped that events of this type could become a regular fixture on the NCAS programme of research fora.

Chemical *Inter*Actions Seminar: Unconscious Bias Training for Undergraduates

Unconscious bias training has become an important part of equality and diversity initiatives in the Department of Chemistry. The training is widely considered some of the most engaging seminars attended by postgraduates, postdocs and staff. Recently, a session on unconscious bias was introduced into the iDTC as part of the Employability and Professionalism workshop run by Dr Leonie Jones. In addition, including equality awareness training in to our undergraduate course forms part of our Athena SWAN action plan.

Dr Calvin Smith and Dr Joy Singarayer have introduced unconscious training for undergraduates studying in the mathematics department in the University of Reading. Chemical *Inter*Actions invited them to speak about the training last month.

The visit provided an excellent opportunity to share ideas and good practice over lunch with members of the Equality and Diversity Group. It was interesting to hear Reading's experience and to compare notes on equality and diversity training with undergraduate and postgraduate students. We were able to share our experiences of preparing an Athena SWAN gold submission and also some early insights into York's recent innovation in using Unconscious Bias Observers as part of our recruitment process.

The Chemical *Inter*Actions talk drew a large audience and it was nice to see a great mix of staff and students from all areas of the department. Calvin and Joy discussed all aspects of what unconscious bias is and how it affects all of our lives. Beyond this they discussed how unconscious bias can be introduced to undergraduates and the observations made that led to the most effective training environment. They also discussed the merits and intended aims of the training; the main aim being informing and guiding future leaders so that STEM can be a more diverse and therefore effective working environment.

The seminar was very thought provoking and hopefully the messages and practices discussed can be put to good use in our own department's undergraduate programme very soon.

Chris Unsworth and Leonie Jones

Chemical *Inter*Actions Update and Future Events

A number of events have been arranged by the Chemical *Inter*Actions group for the first half of 2016. We had another successful smartphone quiz, plus our series of careers talks have continued with speakers including Dr Dominique Young from the University of California, Dr Jonathan Lawson from Cancer Research UK and a particularly well attended talk by Professor Sir John Holman. Continuing the careers theme there was a careers workshop in January as well as a networking event in March. On the theme of equality and diversity, we welcomed Calvin James Smith and Joy Singarayer from the University of Reading who delivered an interesting talk on their implementation of unconscious bias training, and in June, we will be joined by Professor Elena Rodriguez-Falcon from the University of Sheffield. Her talk "Yes #ILookLikeAnLGBTEngineer...but I am much more!" will be on Monday 6th June at 11am in C/A122.

As the summer approaches, we plan to hold some more social activities and would particularly like to encourage staff and students who come from outside of the UK to attend these. We are looking into arranging trips to some cultural attractions in Yorkshire so if there is somewhere you think would be popular, please get in touch! We will also be arranging an International Picnic and inviting people to bring along a traditional food dish from their country. This has been provisionally arranged for Wednesday 27th July at 4pm – further details to follow.

If anyone is interested in getting involved with Chemical *Inter*Actions to help with future events, or has any ideas for future speakers, please email chemical-interactions-group@york.ac.uk.

Green Chemistry Lab Features in TV Advert

The Green Chemistry Centre of Excellence (GCCE) lab in F Block has featured in a new TV advert for TransPennine Express. Watch it here: https://www.youtube.com/watch?v=VvTV61OKiHI

A Sad Day for CIEC – But a Good One for Valmai!

T S Elliot was right when he said that April is the cruellest month – it certainly summed up the feelings of all of us at CIEC as we had to say goodbye to Valmai – the longest serving member of CIEC. The event was marked by an intimate tea party in CIEC followed by a departmental party attended by all Valmai's friends from the Chemistry and Education departments – many of whom are also now retired.

According to David Waddington's lovely goodbye speech, Valmai was probably the first CIEC team member to take up residence in A block over 30 years ago – although Valmai had already been working in the department. Since then she has supported several managers – starting with Miranda Stephenson, John Holman, Allan Clements and now Joy and Gayle. They have all relied on Valmai (far too much!) to smooth their way through the job and support not only themselves but the ever changing CIEC team. As David and Joy mentioned, Valmai's ability to do anything and everything that was asked of her with no fuss and maximum result is truly legendary.

It was difficult to get a picture of Valmai at her party, although she was very happy to have a snap taken with Tim Peak!

Valmai with Tim!

Cutting the cake

The amazing cake

CIEC Welcomes Tom Frankland as Administrator

CIEC are delighted to welcome Tom Frankland as the new Administrator for CIEC and a new member of the Department of Chemistry. Tom replaces Valmai, taking on her duties as well as helping CIEC move forward with their technology, social media, design, etc.

Tom has been with us since 11th April and is already an established member of the team. Tom joins us from Oxford University's Department for Continuing Education. He is an archaeologist who brings his computer, web and fact-finding skills to enhance the work of CIEC.

If anyone is unsure where to find Tom (or CIEC!) he is in the CIEC office in the Undercroft (Under B-block) in room C/B016.

Tea and Cakes During Revision

The Department hosted 'tea and cakes during revision' sessions for the undergraduate students on Wednesday in Weeks 5 & 6.

Long Service Awards for Helen Coombs, Chris Mortimer and Tim Elsworth

In 1990-1991 a litre of petrol was under forty pence, the Bank of England interest rate was over 13%, the South African parliament repealed apartheid laws, the World Wide Web was launched to the public and, most momentously of all, Helen Coombs and Chris Mortimer started work at the University of York. They both started in lesser science departments as a postdoctoral researcher and apprentice but soon saw the light and migrated to work in Chemistry as Green Chemistry Administrator and Workshop Technician and I will let you work out who did what. They have been stalwarts of the Department since then and have witnessed and helped us navigate through enormous changes over that time and the Department would not be what it is today without their commitment and hard work and for that we are truly grateful and massively appreciative. We did trawl the archives for photos from that time but felt it may be construed as bullying so have not included those (although they are available for a fee) and similarly the list of crimes for which 25 years is the recommended sentence is not something we wished to write down! The Department is hugely grateful to both Helen and Chris who have given, and continue to give, so much and make the Department a much better place to work than it would be without them: thank you both so very much.

To mark this occasion Helen and Chris were recently presented with a certificate, and a gift, for surviving, sorry, thriving for quarter of a century at the University by the Deputy Vice-Chancellor and Provost, Professor Saul Tendler. At the same ceremony the recently retired Tim Elsworth received the forty year service award and we humbly acknowledge his commitment to the Department since 1975 when a litre of petrol was 15 pence, Margaret Thatcher became leader of the Conservative Party, 67% of voters supported continued membership of the EEC in a referendum: and the National Railway Museum opened in York: how some things change but equally how some stay the same!

SWB

Wednesday 1st June 2016

4pm A101

Conor Rankine

Challenging the Non-Ergodicity of Internal Conversion in 1,2-Dithiane using Surface-Hopping Molecular Dynamics

Edward Matthews

UV Spectroscopy as a Probe for Gaseous Structures: The Case of Protonated Nicotinamide

Ellis Wilde

Bacterial Iron Uptake: What can Periplasmic Binding Proteins Accommodate?

George Platt

Characterisation of Catalytic Intermediates Involved in Direct C-H Arylation Reaction of Fluoroarenes

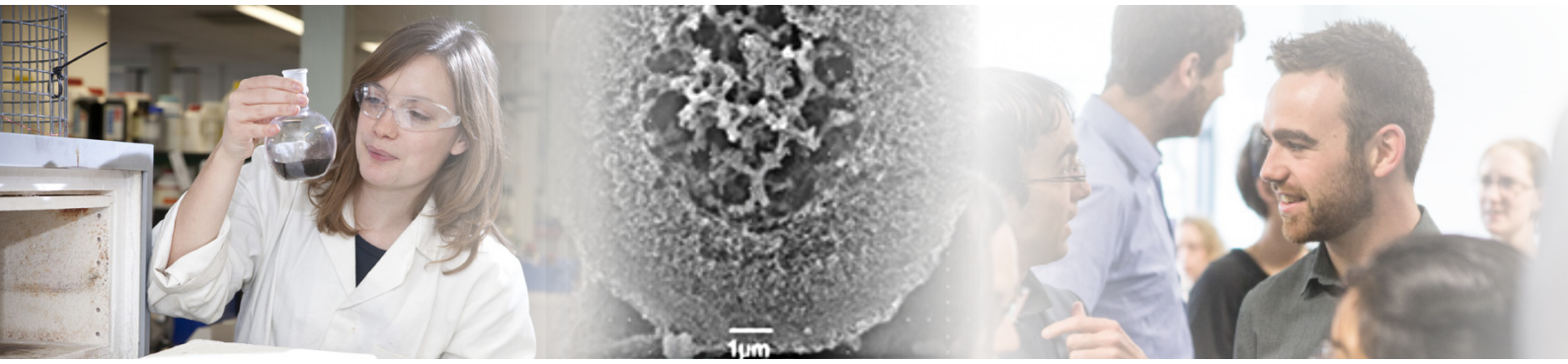
All welcome

Green Chemistry
Centre of Excellence

UNIVERSITY of York

Bio-Based Porous Carbons Symposium

Starbons, Starenes & More



Friday 17th June 2016, 9.30am - 5pm

Green Chemistry Centre of Excellence (GCCE), Department of Chemistry, University of York

The drive towards the bio-economy is making bio-based materials more important in many applications.

Starbons® are a novel family of mesoporous polysaccharide based carbonaceous materials developed at the Green Chemistry Centre of Excellence (GCCE), University of York, with surface functionalities tunable from hydrophilic to hydrophobic. This novel technology produces a Starbon® continuum of mesoporous materials from polysaccharides to activated carbon. Starbons® are now moving towards the early stages of commercialisation. Starenes are a new class of materials combining Starbon® and Graphene characteristics.

Why Attend

- Listen to talks from experts in research and technology across various fields of bio-based carbons, such as Dr Robin White, Fraunhofer ISE
- Learn about the current research and development surrounding Starbons® and Starenes
- Discover how we have taken Starbons® from the lab and developed it into a commercially available product which is now being manufactured
- Opportunities for knowledge transfer, discussion and networking.

Who should Attend?

This conference would be of interest to those working in the areas of:

- Bio-based materials
- Heterogeneous/supported catalysis
- Water purification
- Activated carbon and other porous materials
- Separation science

Register your place for free by Friday 10th June at
https://biobased-porous-carbons.eventbrite.co.uk