

Chemistry Update

Newsletter 276, 23rd August 2016

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A Fifth of Global Warming 'Hidden' From Climate Data, Scientists Find

Global warming has been underestimated by approximately 19 per cent, scientists at the University of York say.



The discrepancies are due to data inaccuracies that falsely suggest historical climate records and current climate models do not match.

The study, led by NASA in collaboration with the Universities of York and Reading, explains why projections of future climate, based solely on historical records, estimate lower rates of warming than predictions from climate models today.

After many years of acknowledging this discrepancy, scientists have now demonstrated that measured warming since the 19th century actually agrees with climate models despite earlier reports that the data favoured less warming in response to greenhouse gas emissions.

Calculations using measured climate change since the 19th century previously suggested that climate models show around a third too much warming in response to greenhouse gas increases. This, however, conflicted with satellite measurements of climate processes and evidence from the deep past, which pointed toward more warming.

Dr Kevin Cowtan, from the University of York's Department of Chemistry, said: "The problem was due to a mismatch between the way temperatures are calculated in models versus the real world. We can't go back and collect more data from the past, but we can measure the climate models in the same places where we had real weather stations."

The Arctic is warming faster than the rest of Earth, but there are fewer historic temperature readings from there than from lower latitudes because it is so inaccessible. A data set with fewer Arctic temperature measurements naturally shows less warming than a climate model that fully represents the Arctic.

The new study also accounted for two other issues. First, the historical data mix air and water temperatures, whereas model results often report air temperatures only. This quirk also skews the historical record toward the cool side, because water warms less than air.

The final issue is that there was considerably more Arctic sea ice when temperature records began in the 1860s. As sea ice declined, ships started measuring water temperatures where previously only air temperatures from coastal weather stations had been available.

Dr Cowtan added: "We have known about this problem for a while, but this is the first time we have been able to explain the puzzle. When you apply a like-with-like calculation to models and climate records, there is no significant disagreement between the models and observations.

This is important because it means that data used to inform vital environmental commitments, such as the Paris climate agreement, which aims to limit global warming to below 2 °C, is in fact supported by both the climate models and historical observations."

The research is published in *Nature Climate Change*.

6 For the Price of 1!



York team publish a new method for the formation of 6 medicinally important molecules from a single precursor.

To discover new pharmaceutical drugs and agrochemicals, industrial discovery laboratories rely on the design and preparation of new compounds for biological screening. Traditional procedures for the preparation of novel candidates involve a number of experimental

procedures carried out one after another, with different sequences being followed for each product type. In a new approach, York chemists have developed a process in which a given starting material can be controllably converted in one of six different product types by the judicious choice of catalyst and reaction conditions. Rhodium, palladium and copper catalysts were employed as well as processes catalysed by silica gel. The essence of work is illustrated in the art work; much as a single light source can be split into an array of colours with different visible properties, for example in a rainbow, the York team has been able to apply this concept chemically, to generate an array of products with diverse chemical properties from a single precursor.

The senior researchers, Dr Will Unsworth, Professor Richard Taylor and Professor Peter O'Brien commented: "We are delighted with this new approach. Some reported methods allow the selective formation of two distinct products, and there are rare reports of procedures to deliver three or more products. But to be able to prepare six distinct product types in good yields simply by changing the catalyst and reaction conditions is remarkable. The PhD student, Michael James, who is a former York undergraduate and carried out this study as part of his PhD programme, deserves enormous credit for his ideas and his tenacity in bringing them to fruition."

This research is published in Angewante Chemie International Edition:

York Chemist Creates Solution to Boost Biorefineries

University of York chemists have come up with a unique solution to ensure biorefineries are economically resilient to oil price fluctuations.



Biorefineries produce ethanol fuels from nonpetroleum sources, notably biomass. However, if oil prices are relatively cheap, there is less economic incentive for biorefineries to produce 'greener' ethanol fuel due to the production expense involved.

Biomass consists of three major components: lignin, hemicellulose and cellulose. Ethanol fuel is produced from the cellulose component, but in this process up to 25 percent of cellulosic sugars go to waste.

Dr Mario De bruyn, Postdoctoral Research Associate, and colleagues in York's Green Chemistry Centre of Excellence (GCCE) in the Department of Chemistry, have developed an innovative, simple and scalable method to produce an additional chemical product from these leftover sugars – levoglucosenone.

Levoglucosenone forms the basis of fuels, pharmaceuticals, a range of solvents and 1,6-hexandiol – an essential component in Nylon.

Dr De bruyn explains: "Before 2014 gasoline at the pump was prohibitively expensive. Under conditions where the oil price exceeds the broad \$70-100 mark, it is viable to make fuels from non-petroleum sources. With the current geo-political situation, oil prices are closer to \$40-50, so the profitability and thus the incentive to make ethanol fuel from biomass in biorefineries has been eroded."

"To alter the economics of biorefineries, we have been looking at getting more out of biomass than just ethanol. Many strategies have been explored to make better use of hemicellulose and lignin but these have proven challenging. Our invention deals with the inefficiencies in biorefineries where not all the cellulose is converted into ethanol."

"This could have huge industrial impact, as the sugar production requires no additional technology and is easily scalable."

Additionally, the Green Chemistry team has developed a one-step process to convert levoglucosenone to Cyrene, a benign and sustainable solvent that can replace current industrial toxic solvents such as NMP and DMF. Cyrene is currently being taken to pilot scale by Circa Group in Tasmania. The new invention can help turn this solvent into a worldwide product.

Top of the Russell Group in NSS 2016

York Chemistry has achieved outstanding results in the 2016 National Student Survey (NSS).



With an overall student satisfaction score of 97%, York was placed joint 1st out of the 21 Russell Group universities offering chemistry degrees. This continues a remarkable run of scores higher than 95% and ensures the department retains its leading position amongst the elite of UK universities.

Furthermore, York chemistry was in a clear 1st place among the Russell Group in terms of its scores for Teaching, Assessment & Feedback, Personal Development, and Organisation & Management. The department was also placed 2nd and 3rd out of 21, for academic support and learning resources, respectively.

The teaching on the course was praised by 95%

of students in the survey, with 97% finding the course intellectually stimulating and wellexplained. In terms of assessment and feedback, 87% students are happy - far-above the NSS average of 74%.

As a department, we put lots of effort into supporting each individual student and ensuring their degree runs smoothly. 92% of students are happy with the academic support they receive, and 93% feel the degree programme is well organised and managed. In addition, learning resources were praised by 95% of students reflecting the high quality of our new sector-leading teaching laboratories.

The emphasis we place on developing students as individuals, and enhancing their personal skills was noted by 93% of students - an improvement of 14% - reflecting the way in which skills provision has been fully integrated into our degree programme. A recent Education in Chemistry article explains how our innovative teaching methods have achieved this:

http://www.rsc.org/eic/2016/06/employability-skills-transferable-learning-curriculum

Averaged across all questions, York Chemistry's outstanding score of 92.4% was well ahead of our nearest Russell Group competitor, who scored 88.9%. This is testimony to the outstanding student experience at York in all aspects, and the dedication of our staff in providing a high quality research-led learning environment.

Sniffing Out 10,000-Year-Old Glue: Earliest Use of An Odoriferous Resin Within an Animal-Based Coating

An international study involving researchers at York has provided evidence of the earliest known combined use of animal and plant products to make a decorative 'glue'.

The way humans treat their dead reflects cultural, cognitive and technological innovations. Excavated in the 1980s, an intriguing set of skulls from Nahal Hemar cave in Israel had been covered 10,000 years ago with a thin layer of a brown-black substance, and subsequently adorned with a similar material applied in a net pattern (Fig. 1). Studies in the 1990s suggested that this could represent an early use of collagen 'glue' as a binder, remarkable when the earliest previous evidence of this in the area was much later, during the 3rd millennium BC in Egypt.

A new suite of analyses (involving protein analysis using liquid chromatography with softionisation mass spectrometry and gas chromatography-mass spectrometry) were able to identify within the skull coatings and associated basketry material the unique combination of a fragrant styrax resin with animal collagen to form this decorative 'glue'. The complexity and originality of these coatings, in particular the addition of an odoriferous resin only on the skulls, is the earliest known evidence of the use of these animal and plant products in the Near East.

The research, "Identification of the earliest collagen- and plant-based coatings from Neolithic artefacts (Nahal Hemar cave, Israel)" was published on 9 August in Scientific Reports (<u>http://www.nature.com/articles/srep31053</u>). The amino acid analyses at York were funded with the support of the Leverhulme Trust. This collaborative study was led by Caroline Solazzo from the Smithsonian Institution and Mike Buckley at the University of Manchester, and included researchers from the University of Strasbourg, University of York, Weizmann Institute of Science and Harvard University.



Fig. 1: Neolithic human skull from Nahal Hemar, with a net pattern decoration from which the chemical analyses were undertaken. Photo: Clara Amit, courtesy of the Israel Antiquities Authority

New Starters

Hello!

Dene Bowdalo, Research Associate (working with ME) Room: G116; Extension: 4758; Email: <u>dene.bowdalo@york.ac.uk</u>

Clarke Group News

At the end of June, Dr Paul Clarke attended the Tetrahedron Conference in Sitges, Spain. Almost immediately Paul flew to Australia to attend the Heron 7 conference on Unusual Molecules and Reactive Intermediates 9-15 July at Heron Island on the Great Barrier Reef. Paul gave a lecture on the "Prebiotic Synthesis of Carbohydrates". After the conference Paul went on a lecture tour of Australia and Singapore, giving a lecture entitled "New Methods for the Stereoselective Synthesis of Functionalised Hetercyclic Structures" at the University of Queensland, the Australian National University, the University of Sydney and Nanyang Technological University. His month-long tour has resulted in some interesting discussions and a possible solution to the synthesis of a chiral 4-substituted cyclohexenone which has been challenging the group recently.

Sam Griggs gave a flash talk at the summer postgraduate conference at the University of Oxford, which was attended by over 300 delegates. Sam's presentation was on his PhD work "Synthesis of 3D-Spirocyclic Piperidine Fragments for Drug Discovery"



Photos 1, 3 and 4: Heron Island. Photo 2: Dinner with the Bates Group, Singapore

24th International Symposium on Gas Kinetics

The RSC's International Symposium on Gas Kinetics & Related Phenomena was held at the Ron Cooke Hub from 17-21 July. Delegates from all over the globe came to York for a programme of 160 presentations on themes as diverse as reaction dynamics, atmospheric chemistry, nanoparticles, aerosols and combustion. Highlights included our own Professor Lucy Carpenter speaking on reactions at the air-ocean interface, and Dr Pete



Edwards on modelling of complex atmospheric systems. The breadth of York science was well represented, with 20 excellent posters from the physchem group, WACL and York Plasma Institute. Poster sessions included the novel opportunity to do "Reaction Dynamics in Virtual Reality", courtesy of Dave Glowacki from Bristol.

As tradition dictates, the symposium was rounded off with the prestigious "Polanyi Medal" presentation, this year to James Anderson of Harvard. The final scientific talk from Prof. Anderson was a tour-de-force, featuring balloons in space, spy planes, pilotless aircraft, and a fair bit of reaction kinetics!

Alongside the science, we had a lot of fun on excursions to the Yorkshire countryside around Masham, an afternoon at Castle Howard or York Minster, and the Gala Banquet at the National Railway Museum.

In all, the symposium was a great success, and left delegates wanting more. This was made possible by hard work and cooperation from many people in chemistry, most especially our GK-2016 helper team – a big thank you to Katie Smith, Jacob Shaw, Fiona Whiting, Rosaria Cercola, Kaarunya Dhevi, Qiaochu Du, Daniel Ellis, Anjitha Geetha, Andrew Grantham, Jamie Minaeian, Ed Matthews, Pedro Nunes, Xiaobing Pang, Conor Rankine, Stefan Swift, Andy Goddard and Pete Edwards.

- Terry Dillon, Jenny Hudson-Bell and Andrew Rickard



Photo left: Pete Edwards experiences reaction dynamics in virtual reality.



GK York 2016 Group photo outside the Ron Cooke Hub.



Prof. James G. Anderson receives the Polanyi Medal from George Marston, Chair of the RSC Gas Kinetics Discussion Group

Green Chemists in China

In July, Professor James Clark gave a series of 10 lectures and 3 workshops on Green Chemistry to undergraduate students at Sichuan University in China (in the city of Chengdu - home of the Pandas!). The Chemistry Department at Sichuan, which includes the national Key Lab for Green Chemistry, has an agreement with our Chemistry Department that allows a small number of students to spend time in York doing research. The first of these students is due to arrive very soon. We have also sent 4 of our undergraduates to a Summer school at Sichuan.

Later on in July, Professor James Clark and Dr Avtar Matharu were joined by academic representatives from all over the world to discuss specific challenges and competencies of green chemistry in China at the G2C2's 4th Annual Workshop and Symposium. The Global Green Chemistry Centres, led by the Green Chemistry Centre of Excellence (GCCE) in York, meet annually at one of their member centres to share recent research advancements. The 2016 meeting was hosted by Sichuan University, which has had a green chemistry course since 1998 and doctoral program since 2003. This lengthy heritage set the stage for engaging discussions ranging from agricultural waste valorisation to process intensification and nanoscale photocatalysis.



Participants included delegates from all over China, as well as South Africa, Mexico, Belgium, Singapore, and Hong Kong; attendees attended a special tour of the Chengdu panda research station and a delicious conference dinner featuring local specialties and a theatre performance. Avtar gave a talk on latest global developments in sustainability and the circular economy - "Chemistry 4.0 - the age of application" and chaired a session on global initiatives in green chemistry". The G2C2 Young Researcher's Award was given to Dr Jean-Philip Lumb of McGill University for his accomplishments in cascade reactions for complex molecule synthesis, aerobic catalysis, and waste-free synthesis of metal-organic materials. Next year's G2C2 symposium is being planned for Melbourne, Australia.





James Clark and Dr Alice Fan also visited China's no. 1 University Tsinghua where James gave an invited lecture on "Towards a Circular Economy Using Green Chemistry". Tsinghua has a major research initiative on the circular economy and the GCCE has agreed to a collaboration with an initial focus on scarce minerals. Their first joint article is already in the pipeline!

Suggestion Box



Reminder: There is a online anonymous suggestion box for staff under the Equality and Diversity section of the intranet: <u>http://www.york.ac.uk/chemistry/internal/</u> 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.

York Chemists Measure Air Quality in West Africa



York team in Togo

A team from the Wolfson Atmospheric Chemistry Laboratories travelled to Togo to study air quality in West Africa. The team went as part of the wider EUfunded FP7 <u>DACCIWA</u> (Dynamics-Aerosol-Chemistry-Cloud Interactions in West Africa) project, a collaboration between sixteen partner organisations from both Europe and West Africa.

The campaign involved three research aircraft, from Britain, France and Germany. The instruments from York were used to measure pollutants such as

ozone, nitrogen oxides, carbon monoxide and hydrocarbons from the British Antarctic Survey Twin Otter aeroplane. Together with instruments from Manchester they provided an assessment of the air pollution in the region.

Research flights took place over key West African cities to look at pollution plumes, including Lomé in Togo which is where the aircraft were based, Cotonou in Benin and Accra in Ghana. As well as in situ measurements, air samples were also collected during the flights for later analysis.

West Africa is predicted to undergo dramatic changes in population growth and economic development in the near future. The data from this campaign will help to better predict the effect of these changes on atmospheric composition and the implications for climate and air quality.



York instruments inside the Twin Otter



BAS Twin Otter aeroplane used by the UK research institutes for the DACCIWA field campaign.



View of Lomé, Togo from the air

"O'Brien Group on Tour" in July and August

11th International Symposium on Carbanion Chemistry Rouen, France, 17-21 July

During the hottest week of the year, Professor Peter O'Brien and the organolithium team from his research group headed off to Rouen for the international symposium on carbanion chemistry which is held every three years around the world. Masakazu Atobe, Will Duckworth, Alice Kwong and Adam Islip presented posters on their exciting recent results. In addition, Peter gave an invited talk on oxygen lithiation chemistry showing all of the results from Alice, Masakazu and Nico Seling, a visiting Erasmus student from Aachen. It was an excellent, wide-ranging scientific meeting but arguably the weather was too good!



RSC Physical Organic Chemistry Postgraduate Meeting 2016 Syngenta, 28 July

Adam Islip, co-supervised by Peter O'Brien and Peter Karadakov, was selected to present his PhD work at the prestigious RSC physical organic chemistry postgraduate meeting, which was held at Syngenta. Together with PhD students from across the UK and a plenary lecture from AnnMarie O'Donoghue (Durham), Adam presented his combined React IR, computational and kinetic analysis of some organolithium-mediated reactions.

Invited Lecture at Astex Pharmaceuticals, Cambridge, 10 August

Peter gave an invited lecture at Astex pharmaceuticals in August entitled "Exploring 3-D Pharmaceutical Space: New Routes to Nitrogen and Oxygen Heterocycles". Astex are a fragment -based drug discovery specialist company and the visit also allowed Peter to share the latest results from the 3-D fragments project that is being carried out in York.

Successful Inaugural JEOL Postdoc Poster Competition

On Wednesday 3rd August, the Department held the inaugural JEOL Postdoc Poster Competition, with three prizes of £250 generously sponsored by JEOL and the Department.

There were 24 posters entered with representation from across the department. Mark Dunham, General Sales Manager at JEOL very kindly came to represent our sponsor and help judge the competition along with members of academic staff. Prof. Simon Duckett, former chair of the

research committee, opened the proceedings, explaining that the competition was set up as a way for us to recognise the valuable contribution of our research staff.

The quality of the posters and presentations was extremely high and the judges had a tough time coming to a final decision. There were three cash prizes awarded to the three best posters, and two further posters were highly commended as runners up. The three winners will be invited to talk at a special symposium in the Department in the autumn.



The winners (in no particular order) were:

- Rachel Dunmore "Diesel-related hydrocarbons can dominate gas-phase reactive carbon in megacities"
- John Liddon "Catalyst-driven scaffold diversity: selective synthesis of spirocycles, carbazoles and quinolines from indonyl ynones"
- Peter Richardson "Low-field parahydrogen polarisation for reaction monitoring"

The runners up were:

- Soumya Roy "A sustainable nuclear hyperpolarization bank: applications in NMR and MRI"
- **Mahima Sharma** "Biocatalytic reductive amination enabled by NADPH-dependent imine reductases"

The event was really well attended and feedback shows that this was a very popular idea, and one that we will aim to run on an annual basis. It was a fantastic opportunity to celebrate the huge contribution made by research staff to the continued success of the Department.

Many thanks to everyone who presented at the JEOL Postdoc Poster Competition. We'd also like to extend thanks to those who helped to organise and judge the event, and to students and staff from across the Department who turned out to look at the posters. Thanks also to JEOL and the Department for generous sponsorship of the event.

- Derek Wann and Leonie Jones



Honorary Degree for Sir John Holman

Sir John Holman was awarded an honorary degree by the University of York on 13th July 2016. His oration is reproduced below.



I wonder how many of us, here in this hall today, had our future lives shaped by an inspirational teacher? Mine certainly was – and I am sure many of yours too. Sir John Holman is such a teacher – over almost 50 years he has inspired thousands in the classroom and lecture theatre – but his influence has extended much further - to curriculum design, to in-service teacher refresher courses, to University strategy, to government policy, to text-books and much beyond.

After graduating from Cambridge, John became a chemistry teacher, quickly rising through the ranks until, in 1994, he was appointed Head Teacher at Watford Boys Grammar School - one of

England's most successful state schools. During his earlier years at Watford, John became involved in curriculum development, with projects involving Nuffield and Salters', which were influential in shaping a new approach to science teaching which emphasised the key principles behind everyday scientific discoveries. As part of this approach, John co-authored *Chemistry in Context,* an A-level coursework book first published in 1978 and now in its 6th edition, that has sold over <u>500,000</u> copies worldwide.

Then, in 2000, John was appointed as the first Salters' Professor of Chemical Education here at York, to teach undergraduate chemistry and to lead the Science Education Group. John's lectures are in chemical thermodynamics, <u>a notoriously difficult subject to teach</u>, and they are renowned, particularly for his scientific demonstrations. I will leave it to your imagination to work out which chemical principle the 'screaming jelly baby' experiment illustrates – or the 'diet coke and mentos eruption'. But when you see 200 or so of our first years gathered round John in the quad as a huge plume of gas and coca cola jets into the sky – you believe in the Socratic method of teaching (and run for cover!).

At the same time, John led the team that produced the influential 'Twenty First Century Science' GCSE curriculum as well as developing A-level programmes in Physics and Biology. He also coauthored an undergraduate chemistry text, *Chemistry-cubed*, the current UK market leader, which has been translated and adapted in several overseas countries. John also popularised science with a range of general lectures, including *The Chemistry of Beer and The Mystery of the Champagne Bubble*, which have entertained and edified a range of non-specialist audiences. His lecture, *Chemistry at Christmas*, is one of the highlights of the year for our students who are enthralled by the topics and demonstrations - which include making ice cream using liquid nitrogen (à la Heston Blumenthal), which the audience then gets to taste.

Over the years, John's contacts with The Salters' Company grew stronger and he became Master in 2012 and more recently Chair of the Salters Institute Board. Under his guidance, the Salters' Institute is exploring many new directions, for example by piloting Chemistry Camps in India and by developing schemes to support technicians and apprentices in chemistry.

That is enough for one career I can hear you all thinking. But no – John was plotting even more ambitious plans. His vision was to establish a National Science Learning Centre in York, with extensive regional links, to provide a programme for the professional development and reinvigoration of UK science teachers. In 2003, a £25M Wellcome Trust bid to establish the NSLC was successful and John was appointed as the Centre's founding director, responsible for designing and building the centre, appointing its 60-odd staff and setting up a network of Regional Science Learning Centres. And in 2008, John secured major funding from the Gatsby Foundation to create the National STEM Centre at York, extending the remit of the NSLC to Mathematics and Technology. The contributions of the National Science Learning Centre to the rejuvenation of UK science teaching cannot be over-estimated.

John's contributions were widely recognised – in 2006, the Department for Education appointed him as its first National STEM Director to advise Ministers on policy in science and mathematics education. This obviously went well! John was knighted in the 2010 New Year's Honours List, for services to education. This goes with John's many other awards, most recently the Kavli Education Medal of the Royal Society awarded earlier this year.

In September 2010, John retired from his NSLC and government posts and was appointed Emeritus Professor at York, where he continues to teach undergraduate chemistry to this day. He also has a number of national advisory roles, with the Wellcome Trust, the Natural History Museum, the Royal Society and the Salters' Company. John continues his evangelical mission to make science engaging to all, to further the professional development of science teachers and influence policy-makers.

Also after retiring, John was invited to convene a University working party to plan a new Natural Sciences degree here in York – this was very successful and the first intake has just completed their first year. And in 2015 he was elected President of the Royal Society of Chemistry, for a two -year term, which began this month. Some retirement!

Vice-Chancellor, it is a great privilege to present to you Sir John Holman, educator, founder of the National Science Learning Centre, government adviser, but first and foremost an inspirational chemistry teacher, for the degree of Doctor of the University, *honoris* causa.

MACMILLAN COFFEE MORNING 2016 FRIDAY 23RD OF SEPTEMBER

The annual YSBL/Chemistry coffee morning in aid of Macmillan cancer care charity will be held on Friday 23th September. As usual, the event will take place in the Biology atrium; with a sister event in Chemistry.

COME AND BRING ALONG A SMILE

Donations of cakes and treats will be greatly appreciated.

For more information, please contact Tamara Mielke (tfm504@york.ac.uk) in YSBL, or Helen Burrell (helen.burrell@york.ac.uk) in Chemistry.

Chemical InterActions International Picnic



The Chemical *Inter*Actions group decided it was time for another international picnic to celebrate the diversity of nationalities in the Department - as well as a good excuse for some nice food. So one afternoon in July, a number of students and staff assembled in A122, bringing along a variety of sweet and savoury snacks from around the world. We had Spanish tortilla, Maltese sandwiches, devilled eggs and sushi to name but a few, along with a range of cakes from countries including Syria, France and England.

The event was well attended and we would like to thank everyone

that came along, and everyone that provided food. It was a great opportunity to meet different people in the Department, and share a part of those different cultures.

Feedback was very positive so we hope to hold a similar event again in the future.

The Chemical *Inter*Actions group was set up to enhance the sharing of experiences and cultures of everyone in the department, staff and students. If anyone has any ideas for future events, or would like to be involved with the group, please get in touch:

chemical-interactions-group@york.ac.uk



A Chile Anglo-Spanish Collaboration

July saw a long planned three way Chile-York-Spain collaboration start to come to fruition. Earlier in 2016, the North group had secured funding to establish exchanges with the University of Castila-La-Mancha at Ciudad Real in Spain. Hence in July, Dr Xiao Wu spent four weeks in the Department of Chemistry at Ciudad Real working with Dr Jose Castro-Osma and learning the skills involved in polymer synthesis.

Immediately after Xiao's visit, Professor North travelled to Spain. Starting in Barcelona, he first visited the ICIQ in Tarragona and gave a seminar before travelling to Ciudad Real where he spent a very enjoyable week as a Visiting Professor and again delivered a seminar. Whilst in Ciudad Real, Professor North met Danay Osorio Melendez, a final year PhD student from the Catholic University of Santiago in Chile. Danay was carrying out a three month research visit in Ciudad Real as part of her PhD and it was planned for her to come to York for four months immediately after her stay in Spain. After spending a week in Ciudad Real, Professor North travelled on to Alicante where, after a relaxing weekend which included swimming in the Mediterranean, he delivered a seminar and was external assessor for a PhD defence before returning to the UK. During his time in Alicante, Professor North was hosted by Professors Carmen Najera and Miguel Yus.

Shortly after his return, Dr Jose Castro-Osma and Danay Osorio Melendez arrived in York. Jose will be a familiar face to many in Chemistry at York as he moved from Newcastle to York as a postdoc with Professor North and spent two years in the Green Chemistry Centre before returning to a fellowship in Spain. He is in York working on ring-opening polymerisation until 24^{th} August. Danay however will be here until the end of November and is already getting good results on the use of aluminium complexes she prepared in Chile as part of her PhD studies as catalysts for CO_2 utilization. Hopefully this will be the start of a successful multinational collaboration on green chemistry and catalysis.



Photo left: The four chemists involved in the exchanges. From left to right: Michael North, Jose Castro-Osma, Xiao Wu and Danay Osorio Melendez



Professor North in Alicante along with the candidate, supervisors and other members of the thesis panel at the end of a successful PhD defence.

Help Reduce Chemistry's Carbon Footprint



The Green Impact Programme at the University helps embed positive sustainable habits in the Departments. The teams follow easy-to implement actions that results in cuts in carbon emissions and cost, as well as increasing efficiency savings.

All members of staff and post-docs are welcome to join. Undergraduates can also participate and get York Award accredited training and experience

Email GreenImpact@york.ac.uk to either:

- Join one of the three existing Chemistry teams
- Create a new Chemistry Impact team
- Get more information about the programme

And get a Green Impact Award with a free lunch next June !

Green Impact

City Car Club



No need to bring a car, just use ours

City Car Club is York's innovative hourly car rental service, giving you all the convenience of owning a car without the cost and hassle.

As a member of City Car Club you have 24/7/365 access to on-street vehicles across York plus hundreds more in 16 other cities across the UK including nearby Leeds and Huddersfield. City Car Club vehicles can be reserved at minutes notice and used for as little as 30 minutes or as long as you need.

You only pay for the time you use and the cost of tax, servicing, MOTs, parking and fuel is included in the price of membership (which is only £6 a month on Under 22 plan for younger drivers). Both staff and students can join the scheme today and start using the pay-as-you-drive cars across York, including the on-campus car at <u>University Road</u>.

How does it work?

City Car Club is ideal for those journeys where travel by car is the only option – the big weekly shop, a weekend excursion or a trip to see friends and family in other cities.

Using City Car Club to make these trips couldn't be simpler - once you've completed the application process and have been issued your membership card there are four simple steps to get on the open road.

How do I join?

City Car Club membership is open to everyone, they simply ask that you are at least 19 years old and have held a full driving licence for at least a year.

International students are also welcome just as long as your licence is a valid within the UK. City Car Club will require a scan or photocopy of your driving licence and passport for their records. As a student or member of staff at The University of York you can also take advantage of exclusive introductory offers courtesy of City Car Club. Enter one of the two following codes whilst filling out the online application form found <u>here</u>.

Students – quote YSU270 in your application to receive £30 free drive time. Staff – quote YST301 in your application to receive your first year's membership half price.

For more information go to www.citycarclub.co.uk

Cycletowork Extra

'Make big savings on the cost of a new bike for cycling to work!

* This scheme enables you to get a bicycle through a salary sacrifice scheme, saving up to 42% of the total cost (depending on your tax band).



* Pay for the total cost in 12 monthly instalments.'

You are able to make big savings on the cost of new bikes and related safety and security equipment under a Government initiative (Green Transport Plan) aimed at getting more people to travel to work on their bikes. The University of York has linked with a partner company, 'Cyclescheme', who provide cycle purchase vouchers that are accepted by a wide range of bike retailers. The University offers a scheme, Cycletowork Extra, whereby you can order a Cyclescheme voucher to purchase a bike and additional safety equipment, worth up to £1,000 in total, through a salary exchange agreement with the University over a 12 month period.

See the following webpage for more information:

http://www.york.ac.uk/admin/hr/employees/reward/extra/cycletowork-extra.htm

Car Sharing—Why?

There are numerous benefits to car sharing for journeys in general and in particular to the University:



- Save money (typically around £1000 per year!) by sharing your travel costs
- Find a space with ease...priority parking is available in designated car share spaces (currently at Vanbrugh College)
- Congestion and pollution levels in and around York are reduced
- Meet new people
- Save wear and tear on your car as you only use it half the time
- Sit back, relax, and let your 'chauffeur' take the wheel and bring you to campus. Return the favour the following day!
- Cheaper University of York <u>car parking permit</u>

For more information please see www.york.ac.uk/admin/estates/transport/carshare/index.html

Admin Team Continue with (NY)³ Pledges

Hopefully everyone can remember the (NY)³ fundraising that Chemistry staff and students took part in at the start of the year. We raised nearly £1500 for three charities (British Heart Foundation, Cystic Fibrosis Trust and Cancer Research UK:

https://www.justgiving.com/teams/YorkChemistryNY3

Two members of the admin team made pledges for the events in the summer which they have completed in August.

Angela Longman took part in the York 10K run on Sunday 7th August and raised over £100 for Cystic Fibrosis, which pushed us over the target of £500. Angela was pleased with her time of 1 hr 2mins.

https://www.justgiving.com/fundraising/YORKCHEMISTRY-NY3

Janet Milner completed a 1.5k Open Water Swim in "Lake 62" in Ashton Keynes, Wiltshire on 14 August. Despite her fears of wearing a wetsuit, hat and goggles, and swimming breaststroke, the lake was warm enough (20.5°) for wetsuits not to be compulsory, and she completed the course in a time of 41m 11s.

Congratulations to Angela and Janet and if anyone would like to contribute to one or all of these great causes, the pages are still open for donations!



