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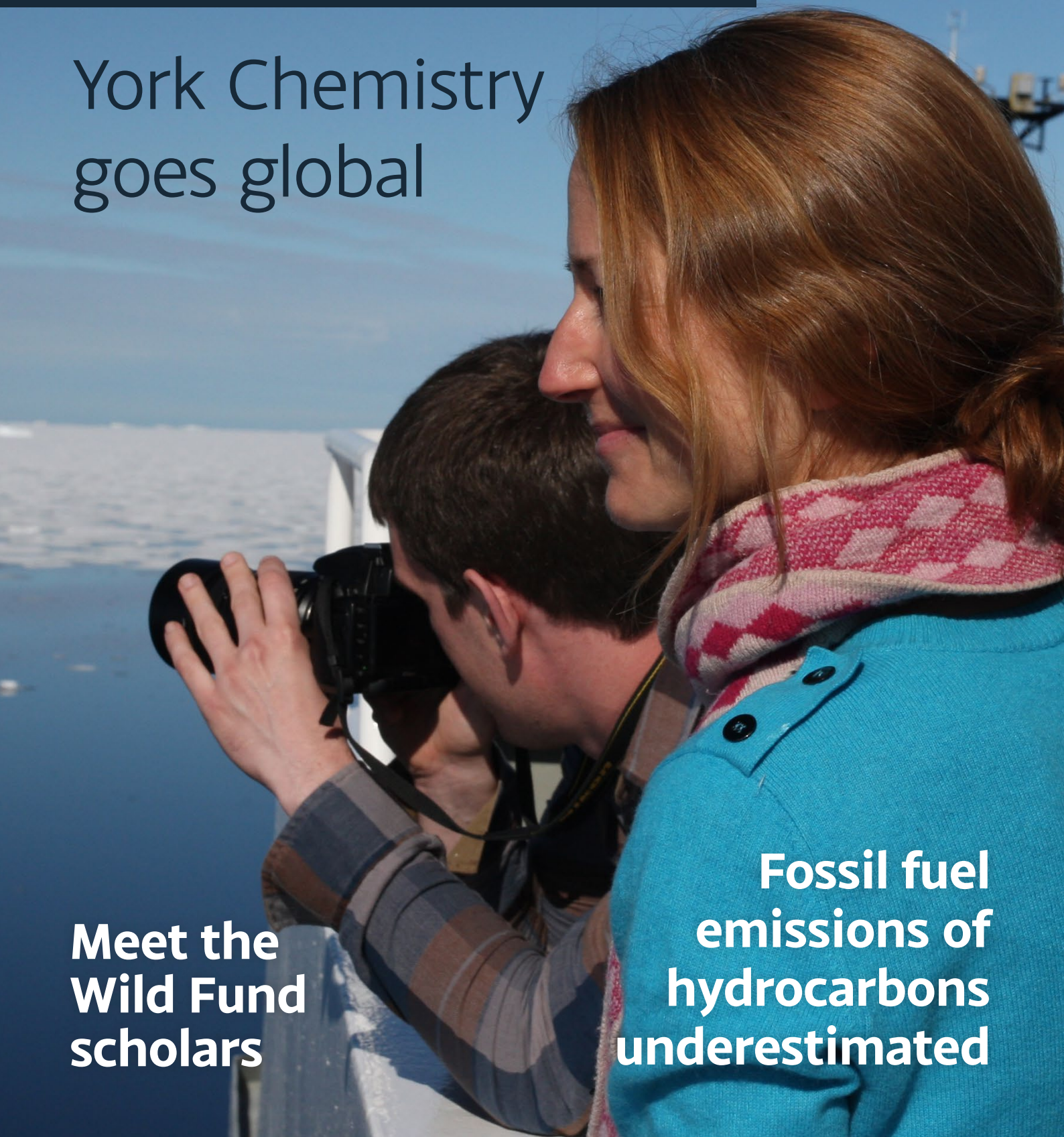
ChemYork

HIGHLIGHTS FROM A LEADING UK CHEMISTRY DEPARTMENT

York Chemistry goes global

Meet the Wild Fund scholars

Fossil fuel emissions of hydrocarbons underestimated



Welcome



WE ARE VERY FORTUNATE IN BEING A DEPARTMENT WITH EXCEPTIONAL STUDENTS – BOTH UNDERGRADUATE AND POSTGRADUATE – AND EXTREMELY TALENTED STAFF WHO CONDUCT RESEARCH, TEACH AND PROVIDE FANTASTIC SUPPORT TO RUNNING A LARGE AND BUSY DEPARTMENT.

Their dedication and team spirit is truly wonderful. If I slightly misquote Edison, then 'Success is a mix of inspiration and perspiration'. It is clear that we have the necessary perspiration, but what about the inspiration? Inspiration comes from our own people, but an organisation develops and prospers when it is fortunate to have input from those with different experiences and backgrounds. Who might these people be and where might they come from?

Some of them are members of academic staff and it is always exciting when the department is able to make new appointments, bringing in new skills and ways of thinking. As I write, we have just interviewed for two posts in Molecular Materials Chemistry and have advertised a

position in cryo-electron microscopy. In addition, we have recently made three other appointments, so this promises to be an exciting period of renewal across the department.

In July, Professor Neil Hunt, currently at the University of Strathclyde, will join us as Professor of Physical Chemistry. Neil is renowned internationally for his innovative work on two-dimensional infrared spectroscopy – an extremely powerful technique that he deploys, *inter alia*, in the study of enzyme action. With current laser expertise in the department across a wide range of time and frequency domains, and broad interest in Photochemistry and Spectroscopy, this is an exciting development – we will feature more about Neil's work in a future edition. Previously, we have featured groundbreaking work from the Centre for Hyperpolarisation in Magnetic Resonance (CHyM) relating to enhanced methods for magnetic resonance imaging (Issue 2: 'Body molecules more visible in new detection system'). Since then, we have appointed Dr Aneurin Kennerley, who previously worked in the Medical School at the University of Sheffield, to a Lectureship in MRI – further strengthening this team's work at the medical interface. The study of the chemical biology of carbohydrates is a key theme of the world-leading York Structural Biology Laboratory (YSBL) and to develop this area further, we have appointed Dr Lianne Willems, currently working at Simon Fraser University in Canada, to a lectureship in glycoscience starting in June.

Other people who influence the way we work bring experience and knowledge from other countries and cultures. Academia is a truly international undertaking and many, if not all, of us work with colleagues from other countries and we are enriched by learning from them. In the department, we are also particularly fortunate in offering a unique international dimension for our students. Our undergraduates

can spend their final year in countries such as India, Japan, Australia, Canada, New Zealand and Singapore as well as a host of European countries. Furthermore, we welcome undergraduates and visiting students from continental Europe as well as Brazil, Brunei, China, India, Japan, Malaysia, Pakistan, Sudan, Ukraine, the USA...

For our postgraduates, we are extremely fortunate to have the backing of our alumnus Tony Wild, which for many years has enabled us to offer financial support to students from outside the UK. More on this can be found elsewhere in this edition of ChemYork. In addition and once more thanks to Tony's generosity, our postgraduates can now undertake short-to-medium-term research placements within leading research groups across the globe to conduct specific experiments and forge new research links. Finally, very many of our talented postdoctoral researchers originate from countries right across the world.

As such, we work hard on the global stage of Chemistry and take great pride in the careers of our international students and research fellows once they leave us. This is something that has been, and always will be, central to the department and reflects the inclusive way in which we always try to work. There has rarely been a more important time to look outwards and recognise the importance of working in an international community, for in that way excellence and understanding will prosper – that is crucial to all that we are and all that we seek to do.

Professor Duncan Bruce
Head of Department

Front cover image: Professor Lucy Carpenter pursuing global research in atmospheric chemistry

Compiled by David Smith
Designed by Cookie Graphic Design

Awards

IN RECENT MONTHS, MEMBERS OF THE DEPARTMENT HAVE BEEN RECOGNISED FOR THEIR UNIQUE CONTRIBUTIONS IN A WIDE RANGE OF DIFFERENT AREAS.

Social Media Superstar

Dr Glenn Hurst, one of the Teaching and Scholarship staff in the department, has been recognised as one of the top 10 UK 'superstars' in a competition celebrating the excellent social media work being done in Higher Education.

The judges in the competition, run by Jisc, were particularly impressed by Dr Hurst's use of Snapchat in which he sends students a blend of annotated pictures and videos to allow them to contextualise the chemistry concepts taught in lectures to the real world, providing students with a glimpse of how chemistry research is conducted.

He also empowers students to create their own YouTube videos of organic chemistry mechanisms. Students then tweet their videos to him to receive feedback. Dr Hurst said: "This approach has allowed me to provide students with even more feedback than other approaches such as tutorials/workshops and enables them to improve their communication skills."



New Year Honours for Professor Pratibha Gai

Professor Pratibha Gai was appointed a Dame for services to chemical sciences and technology. Professor Gai is the founding co-director of York's JEOL Nanocentre and Professor of Electron Microscopy in York's Departments of Chemistry and Physics. She is a pioneer in advanced electron microscopy to analyse dynamic gas-catalyst reactions on the atomic scale. Such processes are at the heart of industrial processes for producing chemicals, energy, as well as many industrial and healthcare products, and for pollution control. Her chemical process and electron microscopy inventions are used worldwide.

Professor Gai said: "I am truly humbled to receive this national honour and delighted that the research has received this wonderful recognition. This honour belongs to all the outstanding co-researchers and staff I have collaborated with. I am grateful to them and my main funders the Engineering and Physical Sciences Research Council."



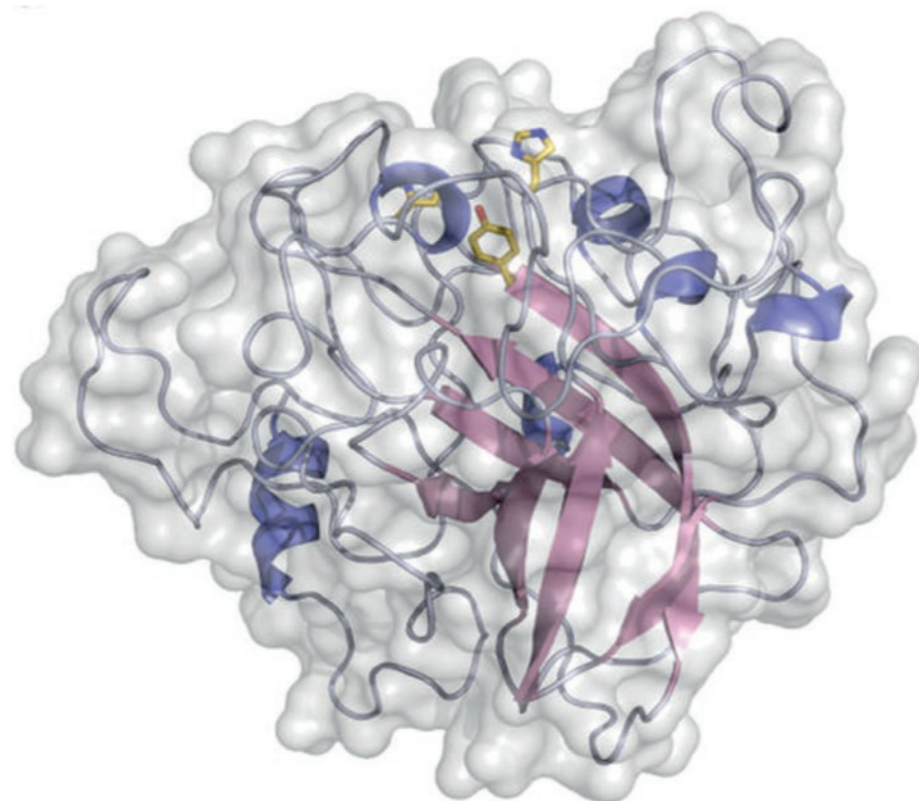
Gay Times Honour

Professor David Smith was nominated for a Gay Times Honour in recognition of his advocacy as an LGBT+ scientist. The event marked 50 years of the decriminalisation of homosexuality and recognised the organisations and individuals who have had a major impact on what it means to live openly and freely as LGBT+ people in Britain today. Dave was nominated for the Gay Times Honour for Excellence in STEM. He is a rare example of an 'out' gay scientist, who has led extensive public work to raise the profile of

this hidden area of diversity and support LGBT+ individuals working in STEM.

Professor Smith said: "It was very satisfying to see the contribution of those working in STEM recognised by the LGBT+ community. Science needs diverse individuals with varied approaches and ideas in order to solve challenging scientific problems. Hopefully, in the future, scientists will feel increasingly comfortable in bringing their whole selves to work, with science labs being diverse, safe spaces where all researchers can be happy and fulfilled."

Unlocking wood biomass



RESEARCHERS IN THE DEPARTMENT HAVE DISCOVERED A NEW SET OF ENZYMES THAT ARE CAPABLE OF BREAKING DOWN ONE OF THE MAIN COMPONENTS OF WOOD. TRADITIONALLY, WOOD IS DIFFICULT TO PROCESS IN BIOREFINERIES THAT CONVERT BIOMASS INTO USEFUL COMMODITIES SUCH AS ADVANCED BIOFUELS AND PLANT-DERIVED PRODUCTS.

The research, funded by BBSRC and published in *Nature Chemical Biology* 2018, 14, 306 by Professors Paul Walton and Gideon Davies and their collaborators Professors Jean-Guy Berrin and Bernard Henrissat from Marseille, reports new lytic

polysaccharide monooxygenases (LPMOs). Importantly, these new enzymes can break down xylans, the component of wood biomass that is resistant to the enzymes typically used in biorefineries. The new enzymes are isolated from

fungi, which themselves play a vital role in the terrestrial carbon cycle and dominate wood decomposition in forests. These new LPMOs may therefore underpin the development of improved enzyme cocktails for biorefinery applications.

Global fossil fuel emissions of hydrocarbons underestimated

New research from the Wolfson Atmospheric Chemistry Laboratory (WACL) has revealed that global levels of ethane and propane in the atmosphere have been underestimated by more than 50%. These hydrocarbons are particularly harmful in large cities where, through chemical reactions with emissions from cars, they form ozone – a greenhouse gas which is a key component of smog and directly linked to increases in mortality.

Professor Ally Lewis said: "The effects of higher ozone would be felt in the

rural environment where it damages crops and plants, and in cities on human health. It causes a variety of serious health complaints and is one of the three major causes of pollution-related deaths."

Ethane and propane escape into the air from leaks during natural gas extraction and distribution, including from fracking. The international study, published in *Nature Geoscience* 2018, 11, 178, involved researchers from York, Oslo and Colorado. In the light of their findings, the authors are now calling for further investigation into fossil

fuel emissions of methane, a potent greenhouse gas which is emitted along with ethane and propane from natural gas sources.

Co-author of the study, Professor Lucy Carpenter said: "If ethane and propane are being released at greater rates than we thought, then we also need to carefully re-evaluate how much of the recent growth of methane in the atmosphere may have come from oil and natural gas development. The current policy case for fracking is partly based on the belief that it is less polluting than coal."

Food flavour on a molecular scale

In order to gain a detailed understanding of food flavour and aroma, Dr Seishi Shimizu has developed a simple approach to measure how much vanilla, almond or lemon flavour is bound to macromolecules present in food.

Starting from the fundamental laws of statistical thermodynamics, and using pencil and paper, Dr Shimizu and his collaborator Professor Matubayasi from Osaka University wrote down a theory that can effectively capture such non-specific

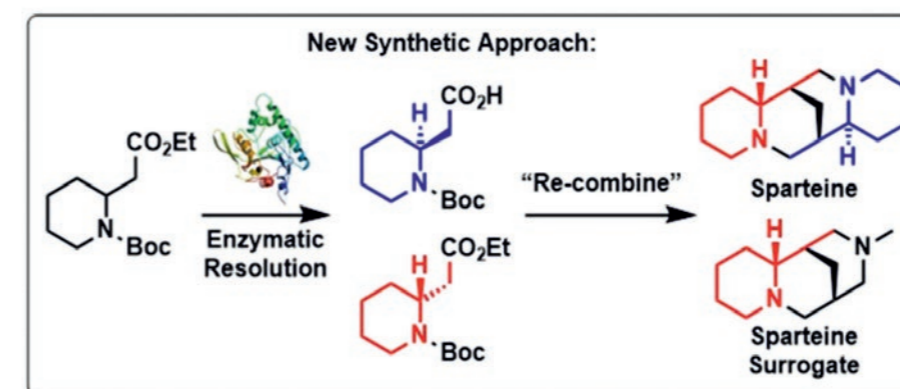
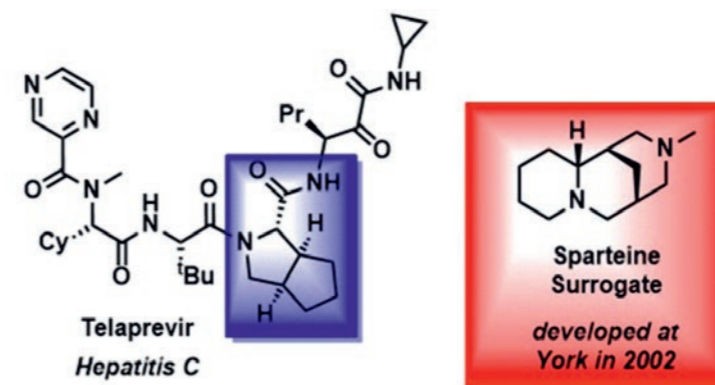
aroma-food interactions. Professor Steven Abbott of TCNF Ltd. turned their theory into a web-based app that food scientists can use to calculate food-aroma interactions simply in the lab on a smartphone.

The details of this approach were published in *Food and Function* 2017, 8, 2999 and featured on the Front Cover of the journal. Dr Shimizu said "It is gratifying to see how theory, developed only by pen and paper, is still so powerful in answering fundamental questions about food."



Supply issues of sparteine chiral ligands solved

RESEARCHERS IN PROFESSOR PETER O'BRIEN'S GROUP HAVE DEVELOPED A NEW SYNTHETIC ROUTE THAT DELIVERS TWO IMPORTANT SPARTEINE-BASED CHIRAL LIGANDS THAT COULD HELP IN DEVELOPMENT OF DRUG MOLECULES.



Sparteine and the sparteine surrogate, developed in York in 2002, are chiral ligands with the potential to synthesise mirror-image 'enantiomeric' compounds. For example, researchers at Vertex who developed the Hepatitis C drug Telaprevir, showed that the sparteine surrogate could be used to help synthesise the drug. However, there are issues with the long-term supply of both sparteine, which is extracted from scotch broom, and the sparteine surrogate, which derives from cytisine, extracted from the seeds of the Laburnum tree.

In their new research published in *Angew Chem Int Ed* 2018, 57, 223, Professor Peter O'Brien's group used common feedstock chemicals to make these ligands on an unprecedented scale, moving away from the precarious use of naturally occurring compounds, and hence allowing supply issues to be addressed. Dr James Firth, lead chemist on the project, said: "Our approach to the family of sparteine chiral ligands allows synthesis of either mirror-image form on a gram-scale for the first time. Hopefully this will help ease supply issues, assisting both fundamental research and drug production".

Atmospheric Chemist reaches the top

In 2000, Lucy Carpenter was the first atmospheric chemist appointed in the Department of Chemistry. Now she is Professor of Atmospheric Chemistry, winner of the RSC Tilden Prize, Royal Society Rosalind Franklin Award and Philip Leverhulme Award, and Mum to two children. Lucy plays a key leadership role in the Wolfson Atmospheric Chemistry Laboratories (WACL), which were established in 2013 - the first centre of its kind in the UK, co-locating over 50 researchers across seven academic groups, enabling experimental and theoretical studies relating to the science of local and global air pollution, and climate change. We caught up with Lucy, to learn the secrets behind her stratospheric success.



It is a great honour to receive the Tilden Award, a premier prize of the Royal Society of Chemistry. What research was being recognised?

In the atmospheric chemistry world, my group are best known for our work on halogens. We are one of probably 3-4 groups worldwide to establish that oceanic iodine and bromine mattered in the lower atmosphere (and in the case of oceanic bromine, the stratosphere), and also to discover the predominant source of iodine: chemistry occurring on the ocean surface. We work on other types of molecules too, but the places where halogens take us continue to surprise me.

Could you tell us a little more about some of your key research papers?

I started work on atmospheric halogens as a postdoc in the late 1990s. My first paper on the subject (*J. Geophys. Res.*, 1999, 104, 1679-1689) made the initial links between ocean sources and atmospheric halogen radicals, and really sparked the interest of the community, launching my independent career.

Our 2008 Nature paper (*Nature*, 2008, 453, 1232-1235), was the first to show that halogens had a profound impact on atmospheric chemistry, particularly ozone. This joint paper with Professor John Plane at Leeds marked the start of a great

collaboration and was also the first paper presenting results from the Cape Verde Atmospheric Observatory.

Our Nature Geoscience paper from 2013 (*Nature Geoscience.*, 2013, 6, 108-111) is one of those rare ones which make our jobs worthwhile; where you know you are on to something good and can barely think about anything else for weeks until you solve the problem. We had established in the lab that ozonolysis of seawater, containing iodide, produced iodine. The problem was trying to put that into a model to extrapolate it to the ocean-atmosphere system. When I finally managed it, and found the results matched the lab measurements - well, work doesn't get any better.

You mentioned your Atmospheric Observatory on Cape Verde off the African coast. What do you learn from it, and what are the challenges in running it?

The measurements have been very illuminating - the site is in a fantastic location to monitor the signal of changing "background" atmospheric composition over the ocean. For example, we have been involved in global efforts to monitor the rise in ethane and propane over the last 10 years in the northern hemisphere and link it to US fracking activity, establishing that fossil fuel emissions of these gases have been vastly underestimated. Key to this work



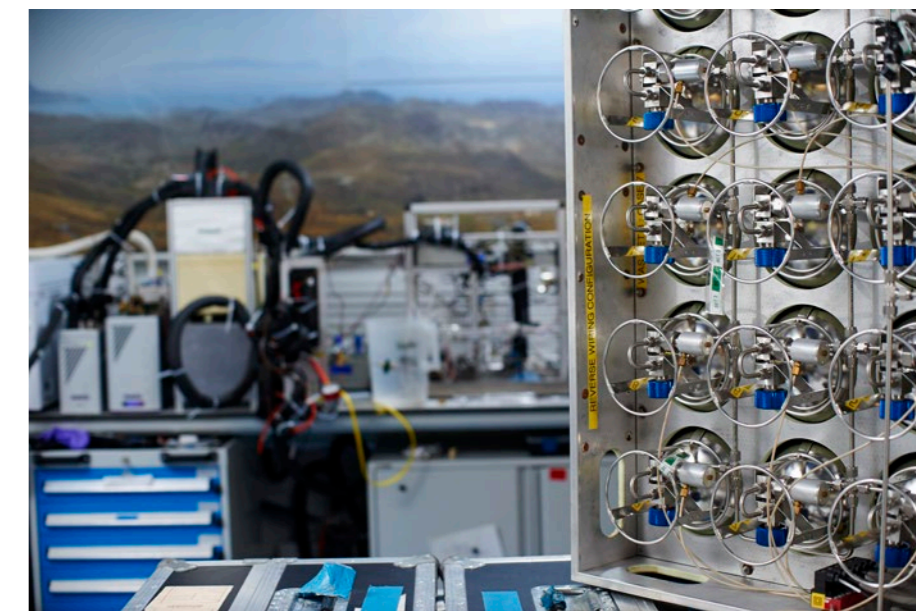
is a great team of very able people, including excellent collaborators at Cape Verde - vital given it is a remote site that takes over a day to travel to.

You were the very first atmospheric chemist appointed here in York. In the years since, the group has grown to become a leading UK centre. Could you share your thoughts on that?

It was transformative when my husband, Ally, was awarded a position here in 2003, meaning we could have a reasonable work-life balance and put an end to the non-stop York/Leeds commuting with a small baby in tow. Although we work mostly on separate projects, the pooling of resources in a similar field meant we could really start to build a group. The beginning of the National Centre for Atmospheric Science (NCAS), and the start of the Cape Verde Observatory, built momentum, and other academics and NCAS fellows joined the group. A key part of our success is that the group leaders work really constructively as a team, sharing equipment, people and knowledge, as well as coffee and beers!

As you noted, on a personal level, you and your husband have been bringing up a young family. How have you both balanced work and home life and also achieved such incredible success?

Goodness only knows. We share family responsibilities equally - crucial for a dual career. We are lucky to have "emergency" help from grandparents



when those inevitable diary clashes/illnesses/crises happen. There were times in the early days where it seemed impossible to do everything well. In the end, we just muddled through, relying on nurseries, some after-hours school provision, flexible working, and that nagging feeling you were only a small crisis away from it going badly wrong. Our oldest child is now old enough to leave in charge if we're out, so we are at the point where we can be less military about our diaries and who is going to be home at precisely which hour. That makes life easier, but it's amazing how quickly those early years went by.

In 2015 you received the Rosalind Franklin Award from The Royal Society. What have you done in the years since to promote careers in science for women?

The Award included funds for outreach. I organised a summer school on atmospheric sensors, targeting secondary school girls (though it also included boys), and getting parents involved in seeing their work on the final day. I'm extremely grateful to the talented and enthusiastic researchers in WACL who helped me design and run this project - particularly Sarah Moller, Pete Edwards, Marvin Shaw and Ruth Purvis. It was huge fun, and we had great feedback from students and parents.

I really enjoy giving talks to school-age children. I have spoken at the "Go Science Live" Chemistry events in

London and Birmingham to audiences of nearly 1000 A-level students. I hope to show a career in chemistry they may not have considered. I'm frequently in awe of the questions and discussion you get back - I learn a lot from them too.

In terms of my own research group, I'm proud to say we have been almost always around or over 50% female. I've been lucky enough to work with some very talented women. I think WACL as a whole is welcoming, friendly and egalitarian - as well as very successful - and I'm sure part of that is our healthy gender balance.

You mentioned, talking to school age students, what advice would you give to a young scientist interested in a career path in atmospheric chemistry?

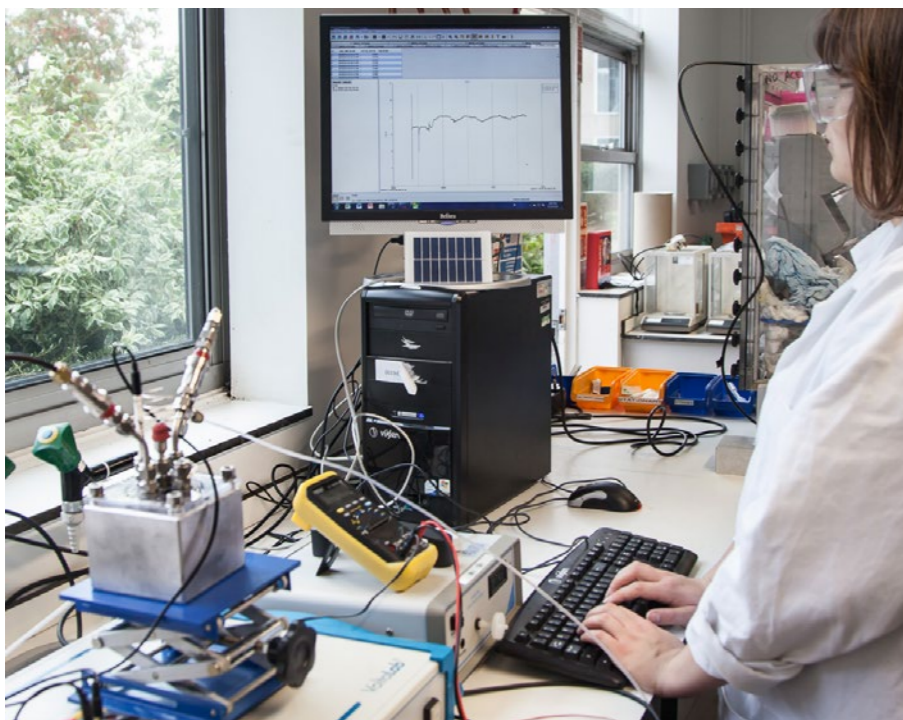
The degrees of atmospheric scientists are varied - physics, chemistry, maths, meteorology, environmental sciences - whatever you like best. You'll need to decide if you want to specialise in experimental work or computational modelling, but in the end, the best experimentalists usually run models too, so it helps to get to grips with that, and certainly learn how to handle data.

In the end, find something you are good at, and make sure you know it inside out so you can spot important new things when you see them. It's a big field - the atmosphere is complex enough there is still plenty of room for new discoveries. You never know, you might just help save the planet.



Sun, sea and electrochemistry

A RESEARCH TEAM INCLUDING PHD STUDENTS KATIE LAMB AND MARK DOWSETT HAS FOUND A NEW WAY OF SAFELY TRAPPING THE GREENHOUSE GAS, CARBON DIOXIDE, AS A SOLID MINERAL, DAWSONITE.



The process, developed by Professor Michael North and Dr Alison Parkin, uses scrap metal, sea water and electricity from solar panels, and is highly scalable. Some 850 million tonnes of carbon dioxide per year could be captured using nothing more than the dream summer holiday combination of sun and sea, along with some scrap metal and electricity.

Using graphite, the material used in pencils, to line an aluminium reactor, enabled low energy mineralisation of carbon dioxide. Filling the reactor with Whitby sea water and passing electricity through the graphite caused gaseous carbon dioxide to be transferred into the water. Normally high energy pressurisation and highly caustic agents would be required to drive this process. The reaction between the electricity and the aluminium (found in KitKat wrappers and pie trays) then turns the dissolved carbon dioxide into the mineral dawsonite, a natural component of the earth's crust. Unlike other carbon dioxide treatment systems that require hydrogen as an expensive input reagent, this approach completes its electrical circuit by actually producing hydrogen gas - a valuable fuel commodity.

Green Chemistry PhD graduate becomes University Vice Chancellor

Professor Egid Mubofu, who obtained his PhD in the Green Chemistry Group supervised by Professor James Clark and Dr Duncan Macquarrie, has become Vice Chancellor at the University of Dodoma in Tanzania.

After leaving York, Professor Mubofu joined the Chemistry Department at University of Dar es Salaam as a Lecturer in 2003, was promoted to Senior Lecturer in 2008 and served as Head of the Chemistry Department. He is now an Associate Professor and serves as the Director General of Tanzania Bureau of Standards

(TBS).

The University of Dodoma, where he is now Vice Chancellor, is a public university established in 2007, located in central Tanzania in the country's capital city, Dodoma. Under Professor Mubofu's leadership, The University of Dodoma will continue its major expansion, and when complete, the ambition is for the university to enrol 50,000 students, making it the largest university in Tanzania.



Johnson Matthey poster prize winners

The 2018 Johnson Matthey Poster Competition saw over thirty third-year PhD students presenting a poster about their research, which is scored by a panel of judges consisting of members of academic staff and postdoctoral researchers, who consider poster presentation, scientific content and student discussion.

Five winners were awarded £350 each to be spent on research-related activities and items: Robin Brabham (Dr Martin Fascione and Professor Rod Hubbard), Phillip Chivers (Professor David K. Smith), Paul Jones (Professors Peter O'Brien and Rod Hubbard), Conor Rankine (Dr Derek Wann) and Emma Stanbury (Professor Simon Duckett).



Major education conference held in York

THE VARIETY IN CHEMISTRY EDUCATION AND PHYSICS HIGHER EDUCATION CONFERENCE (VICEPHEC), THE LEADING UK CONFERENCE FOR CHEMISTRY AND PHYSICS EDUCATION AT TERTIARY LEVEL, WAS HELD IN THE DEPARTMENT OF CHEMISTRY. THE EVENT, ATTENDED BY OVER 175 DELEGATES, PROVIDED OPPORTUNITIES TO SHARE CUTTING EDGE EDUCATIONAL RESEARCH AND PRACTICE.

Professor Andy Parsons and Dr Glenn Hurst both gave presentations at the meeting. Professor Parsons talked about his online course 'Explaining Everyday Chemistry' and the way in which this demystifies organic chemistry to a wide range of different learners - this course was featured in Issue 2 of ChemYork. Dr Hurst presented the ways in which, working alongside Louise Summerton, Dr Avtar Matharu and Professor James Clark, he has been embedding Green Chemistry principles into a range of different learning environments - from schools in Brazil to undergraduate labs here in York.

New for VICEPHEC in 2017 was the 'Absolutely Fabulous' session, chaired by Dr David Pugh, which was an opportunity for conference delegates to present lecture demonstrations, experiments and outreach activities in our state-of-the-art teaching laboratories.

Professor Sir John Holman gave a thought-provoking plenary lecture

in which he explored the transition made by students (and himself) between school and university chemistry education.

A number of York alumni also returned to the Department and contributed to the meeting. Dr Dan Cornwell (ex-Smith group, now Kings' College London) described a new introductory 'sweet' experiment to spectrophotometry. Dr Russ Kitson (ex-Taylor Group, now University of Warwick) presented the use of 'game-based' learning to motivate students with monopoly money, with students working in teams to spend their money wisely on 'analysis' in order to determine molecular structures as efficiently as possible.

Dr Glenn Hurst, Chair of the conference organising committee said: "The many great discussions throughout the meeting attest to the healthy state of education in the physical sciences at university level and the strong sense of community that exists."

Intern of the Year

Tanya Bayley, a final year Chemistry student won Intern of the Year for her innovative work with North Yorkshire Police. Tanya won the accolade following a 12-week internship working with police to look at ways the force could better utilise their current equipment; such as laptops, computers and mobile phones. Tanya's report produced 20 recommendations, nearly half of which have been assessed and agreed for implementation, with the rest currently being considered.

Tanya said: "It is rewarding to know that my recommendations will have far-reaching effects, improving processes to benefit North Yorkshire Police and ultimately the public of North Yorkshire. I have thoroughly enjoyed this placement and it has allowed me to identify roles I would be suited to upon graduation."

LGBT+ STEMinar - a formula for inclusive science

IN JANUARY 2018, THE UNIVERSITY OF YORK HOSTED THE UK'S LARGEST EVER MEETING OF LGBT+ (LESBIAN, GAY, BISEXUAL AND TRANSGENDER) INDIVIDUALS WORKING IN STEM (SCIENCE, TECHNOLOGY, ENGINEERING AND MATHS). THE 'LGBT+ STEMINAR' 2018 WAS ORGANISED BY DR DEREK WANN AND DR LEONIE JONES FROM THE DEPARTMENT OF CHEMISTRY. THE GOAL OF THE MEETING IS TO CELEBRATE THE WORK OF LGBT+ SCIENTISTS, ENGINEERS AND THEIR ALLIES, AS WELL AS PROVIDING A UNIQUE, SUPPORTIVE NETWORKING OPPORTUNITY.

STEM subjects have historically, and wrongly, been thought of as heterosexual, masculine fields. However, the future of science relies on innovation, and it is vital that people from all backgrounds feel they can participate. LGBT+ individuals are an important part of this diversity.

The opening keynote speaker was Dr Beth Montague-Hellen, organiser of the first LGBT+ STEMinar held in Sheffield in 2016. She talked about the personal importance of community and reflected on how the STEMinars have enabled a diverse array of scientists and engineers to find unique and comfortable communities of their own.

The 15 minute scientific talks reflected the remarkable contributions of LGBT+ scientists across the UK to a range of areas from the speciation of bats to pulsar astrophysics. Dr Paul Clarke, from the Department of Chemistry at



LGBT+ STEMinar Organiser Dr Derek Wann and Plenary Speaker Prof Tom Welton (Imperial College London).

York, explained his ground-breaking research on the chemistry of the origins of life. Kiri Thornalley, a student in Professor David Smith's research group, explained her MSc project exploring self-assembled systems with potential medicinal applications.

For much of the day, extensive Twitter discussions involving both STEMinar attendees and participants from further afield, led to #LGBTSTEMinar18 trending in the top five UK hashtags. A key aspect of the STEMinar events is to act as a beacon; demonstrating to LGBT+ people in STEM that there is a large community of people happy to talk about science and support those facing difficulties.

In his optimistic closing plenary lecture, Professor Tom Welton, Dean of Faculty at Imperial College London, reflected on his own career rising to the top of academic life as an 'out' gay man working in Chemistry. He explained the support he had experienced along the way and told the audience that in our everyday lives, we are all role models, whether we like it or not.

After the STEMinar, we caught up with Dr Derek Wann to find out more about the event:

Why do you think events like the LGBT+ STEMinar matter?

'Events like the LGBT+ STEMinar matter hugely. For people working



in the STEM subjects, whether in academia, teaching, industry or elsewhere, to feel truly that they belong, there need to be visible role models. I think this is particularly true for our undergraduate, postgraduate and early-career colleagues. A few days before the STEMinar I was chatting to a senior professor from a London university who was telling me how one of her PhD students was thinking of leaving science because he felt he was different and couldn't fit in. He attended the STEMinar and I hope he was able to see that there are many people just like him working in similar fields.'

What were you happiest with about the LGBT+ STEMinar?

'I was delighted with the overall diversity of the event - in terms of gender, sexuality, ethnicity, career stage, and STEM discipline. For me it was so important that we didn't present a line-up of white gay thirty-something male lecturers - basically people who are a lot like me. And I think we achieved that despite the restrictions on how many people we could fit into the packed programme. I was also pleased that over 120 people attended the event - up from 80 the previous year in Sheffield and 60 the year before that. I think we can look forward to a bumper attendance in London in January 2019!'



Have you had any feedback from participants that you would like to share?

'The positive feedback that we received was lovely to read. It makes all the hard work so worthwhile - many attendees commented on the relaxed and open nature of the meeting, with free-flowing conversations, shared experiences and a genuine sense of community.

Almost certainly, however, the constructive feedback on how the event could be improved matters more. It was notable that, although we held the event in one of the most modern, accessible buildings on the University of York campus, there were not nearly enough all-genders-welcome toilets to cater for the attendees. There was also a very valid suggestion that the speakers themselves should be offered some guidance on the use of LGBT+ (too many participants inadvertently excluded parts of the audience) and in presenting their pronouns at the start of their talk.'

"Thank you so much for this event...it is so wonderful to spend a day feeling valid and celebrating my identity"

"This is a fantastic event and has made my scientific career a lot more enjoyable!"

"Fantastic atmosphere, most relaxed and good-natured conference I've been to"

"Really inspiring. My first LGBT+ event of any kind...feeling very welcome and reassured that I have a community to belong to"



"The most warm, supportive, fun, and engaging seminar I've been to. Quite inspiring...a breath of fresh air".

The free event was sponsored by a range of professional societies including the Royal Society of Chemistry, Institute of Physics and Royal Astronomical Society, all of whom also provided travel grants to facilitate attendance, particularly for students and early stage researchers. The Department of Chemistry also generously supported the event using funding from its Equality and Diversity budget.

Following on from the LGBT+ STEMinar, the Department of Chemistry has continued to move forwards with its support for LGBT+ individuals here in York. Notably, there is a dedicated webpage with information and support links for LGBT+ staff and students, and a

number of staff have volunteered to be specific points of contact for those who wish to discuss LGBT+ issues. The department has also converted all possible toilets into all-genders-welcome spaces, with clear inclusive signage and is providing training to all staff in the use of personal gender pronouns, which will include providing students with a clear opportunity to express any preferences they have when they meet their personal supervisors at the start of the year. Based on this sector-leading LGBT+ inclusive approach, members of staff from the department regularly go out and talk at other universities and in industrial settings around the world about how to make STEM more inclusive. Hopefully, as with Athena SWAN, the things we are doing in York will help set the agenda and help improve the working environment and climate more widely within STEM.



Taking a global view - the Wild Fund scholars



Since it was established in 2006, the Wild Scholarship Fund, endowed to the Department by Dr Tony Wild, has enabled 70 students to accept postgraduate research positions, over 50 of whom have now graduated, with ca. 50% of all these students being female. The University of York has been the proud home of Wild Scholars from across with globe, with students coming from China, France, Nigeria, New Zealand, United States of America, Guatemala and Pakistan to name just a few. These incoming scholars have transformed and enlivened the department both with their passion for chemistry and their international outlook.

Previous graduates supported by The Wild Fund have moved on to a wide range of jobs across the globe including post-doctoral research, academic positions, research and development in industry, medical research and banking. For example, Dr Jianhui Huang (2006, China) is Full Professor at Tianjin University, Dr Marcus Fischer (2009, Germany) is a Faculty Member at St Jude Children's Research Hospital in Memphis, USA) and Dr Ruqia Nazir (2009, Pakistan) is at Kohat University of Science and Technology in Pakistan, where she is an Assistant Professor.

The Wild Fund currently supports scholars working in the department in research fields ranging across the whole of chemistry and in with impacts in energy technology, renewable resources, atmospheric analysis and medicinal chemistry. We got together with some of the scholars to find out about their experiences here in York, and what the financial support means to them.

What do you enjoy about studying here in York?

'I truly enjoy the learning environment and atmosphere in the University of

York, which are both very positive and relaxed. Studying here, students enjoy and easily focus on their study and research without any extra pressure.'

Mengyu Ge, China

'The Green Chemistry Centre is an excellent and supportive environment for students from all over the world. We have students, postdocs and visitors from Thailand, Nigeria, China, Brazil, Malta, and more. I have met so many people with diverse viewpoints, yet all of them share my passion for making chemistry more sustainable.'

Anna Zhenova, USA

'The opportunities and freedom that the University of York provides, go hand in hand with the requirements and support, making it a very strong education programme. In addition, I have spent time outside of my project supporting a disabled undergraduate student with their laboratory work and also taken part in outreach with school students.'

Olga Semenova, Russia

'My time at York has been amazing. Not only have I enjoyed getting to know the rest of the Department, but I have also joined the Women's Rugby Union team and become a regular starting forward for the seconds.'

Maddi Hartley, USA

'My time so far has been richly rewarding as I have been exposed to so much training and research. York as a city is also made up of very friendly and accommodating people, which has helped me to adjust to the lifestyle here, which has in turn helped my academic activity and progress, too.'

Kelechi Uleanya, Nigeria

What are you planning to do next?

'I would like to devote myself to solving the energy crisis, either by working for a company or in a university. Whether

I am working at a company or as a lecturer I want to share my ideas and knowledge.'

Ruifei Xuan, China

'I will be returning to Nigeria to take up an academic post. This will give me an opportunity to pass on the knowledge and experience that I gained here so that many other people can benefit from it. I hope that I will one day have an opportunity to also contribute towards funding other students to study at the University of York.'

Suleiman Ahmed, Nigeria

What difference has support from the Wild Fund made to you?

'With the help of the Wild Scholarship, I can focus on my research and rewarding extracurricular activities without worrying about taking a part-time job.'

Anna Zhenova, USA

'I am a New Zealander and therefore a long way from home. The help of The Wild Fund while I am on this side of the world has been greatly appreciated. I hope that many other people can also benefit from everything that the University of York offers for both professional and personal growth.'

Stuart Grange, New Zealand

'The Wild Fund scholarship gave me the confidence to continue my studies because it showed me there was someone else who believed in my abilities as a chemist and who was willing to help me reach my potential.'

Maddi Hartley, USA

'In the face of towering inflation that hit my country, drastically diminishing my sponsorship and closing up all foreign transfers, I will always remain a million times thankful to providence for the Wild fund that gave me invaluable support. Thank you, Thank you, Thank you!'

Kelechi Uleanya, Nigeria