

Chemistry Update

Newsletter 319, 27 March 2020

Inside this Issue

- University of York partners with industry in PhD pilot 2
- From programming to policy 3
- Towards equality in science: the Beacon Equality and Diversity Lecture 2020 4-5
- Social media campaign for International Women's Day 5
- Prestigious research prize awarded to University of York academic 6-7
- Research grant fosters York-Cape Town partnership 7
- Scientists search for new source of air pollutants by taking flight during Cape Verde dust season 8-9
- New starters 10
- Clarke Group news

Chemistry supporting hospitals and NHS workers



The University has donated medical supplies and food to the NHS as part of the national effort to contain coronavirus. Chemistry and other departments across the University rallied together to donate items including surgical masks, clinical waste disposal bags, disposable gloves and sterile needles to local NHS providers, including York Hospital. Food from University catering outlets was also collected and donated to the hospital. [Read more](#) about this fantastic community spirit.

Date of Next Issue:

24 April 2020

University of York partners with industry in PhD pilot

Employees from regional and national industries could study for PhDs under a new £1m pilot scheme to be introduced at the University of York in the area of circular, sustainable manufacturing.



Up to eight funded places will be available for employees from partner businesses working in chemical and biochemical industries to work with York academics in the Departments of Chemistry and Biology.

Equality and diversity

The new scheme allows staff to combine work and study, supports equality, diversity and inclusivity and career mobility by reducing barriers for people who have industry experience, but might not have traditional qualifications for PhD study.

The scheme, the first of its type at the University of York, was announced today by the Government as part of a £179m funding package to support the next generation of research and innovation leaders. It is funded by the Engineering and Physical Sciences Research Council (EPSRC) - part of UK Research and Innovation (UKRI).

York is one of only four UK pilot projects. The first group of students will begin their studies at York in autumn 2020.

Dr Avtar Matharu, from the University's Department of Chemistry will lead the project. He said: "This is a new model of academic-industry partnership that offers a pathway into doctoral study for employees who have industrial experience, but may not have traditional academic qualifications. Our approach is very personal and respects the needs of the employer, employee and academic supervisor.

"Doctoral training opens up options for further career advancement - but it also offers benefits for industry in terms of increased productivity and the introduction of new, more sustainable manufacturing processes to support a more sustainable, circular economy."

Industry partners

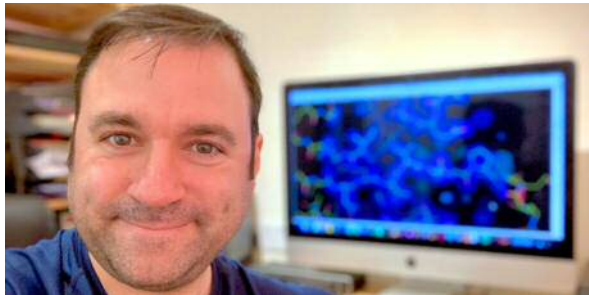
Partners in the York project include Nestle, Unilever, speciality chemicals company Croda and FujiFilm Diosynth Biotechnologies (FDBK). Other partners include University of York subsidiary the Biorenewables Development Centre (BDC); BioVale and the York, North Yorkshire and East Riding Local Enterprise Partnership.

University of York Vice-Chancellor Professor Charlie Jeffery said: "We are delighted to be part of the pilot project to open up our doctoral training to people working in industry. This project enables us to share our considerable research expertise in a way that benefits individuals - but also benefits the wider regional and national economy by opening up new insights into productivity and sustainability."

York has also been awarded £2.6m by EPSRC to fund a further 33 PhDs in engineering and the physical and mathematical sciences.

From programming to policy

Dr Jon Agirre takes part in the Royal Society Pairing Scheme 2020.



Dr Jon Agirre from the Department of Chemistry swapped programming for policymaking during his visit to the Houses of Parliament and Whitehall this month. Dr Agirre was at Westminster from 1-5 March as part of a unique pairing scheme run by the Royal Society – the UK’s national academy of science – with support from the Government Office of Science.

During his visit, Dr Agirre shadowed Catherine Harold, Defra Deputy Director for Future Animal and Plant Health, Endemics and Traceability and learn about her work. As well as attending seminars and panel discussions about how evidence is used in policymaking, Dr Agirre also attended a mock Select Committee.

The visit provided Dr Agirre with a behind the scenes insight into how policy is formed and how his research can be used to make evidence-based decisions. It also gave Catherine Harold the opportunity to investigate the science behind her decisions and improve their access to scientific evidence.

Dr Agirre said: “As a scientist, it is part of my social contract to engage with society. Policy design is one area where a disconnection between the making of science and the prioritisation of science can hold society back. I want to know more about the bigger picture – policy design, discussion and approval, and to be able to identify areas where my input could make a difference in the future.”

During her visit to the Department of Chemistry, Catherine Harold looked at how computer programmes are created to help model and understand the atomic structures of sugars, helping unlock better medicines and more efficient biofuels.

Sir Venki Ramakrishnan, President of the Royal Society, said: “It is crucial that we invest in the relationship between scientists and politicians so that either profession can articulate and appreciate the pressures confronted by both.

“The Royal Society Pairing Scheme does just this, endowing scientists with a fascinating insight into parliament, and connecting policymakers with the best innovative thinking in the world, and in the process, enabling both to draw from and engage with the mutual expertise needed to address the challenges of our time.”

The [Royal Society’s Pairing Scheme](#), which started in 2001, aims to build bridges between parliamentarians, civil servants and some of the best scientists in the UK.

Online Department suggestion box



The online Equality and Diversity suggestion box has been extended to be a suggestion box for the whole Department. You can submit your thoughts/suggestions/ideas for general Departmental matters as well as matters relating to Equality and Diversity. You can find the Google form on the intranet homepage or at this [link](#).

Towards equality in science: the Beacon Equality and Diversity Lecture 2020

Dr Jess Wade gave the Department of Chemistry's annual Beacon Equality and Diversity Lecture, inspiring a packed audience towards equality in science.



This year's lecture coincided with International Women's Day on 9 March, which this year encouraged us to work towards creating a gender equal world (#EachforEqual).

[Jess is a physicist](#) at Imperial College London, where she researches polymer-based organic light-emitting diodes. She is widely known for the work she does on public engagement in science, and her campaigning work to promote women in science and engineering. She is particularly well known for her [work tackling gender bias in Wikipedia](#), and has written over 900 biographies about women scientists on Wikipedia. Her work has been acknowledged by a 2019 British Empire Medal, and by being one of *Nature's* 2018 top 10 people who matter in science.

Jess gave an inspiring and entertaining talk that included examples of how attitudes towards women's education as chemists have changed over time. She encouraged us to use scientifically tested approaches to inform our approach to Equality and Diversity, and suggested a number of practical areas to focus on, including provision of clear guidance for reporting sexual harassment, encouraging lecturers to use diverse examples of scientists to illustrate their teaching, and lobbying funding organisations and high-impact scientific journals to make their practices more gender neutral.

Dr Caroline Dessent, Chair of the Department's Equality & Diversity group said "This was an amazing talk. I think everyone came away thinking how important it is to celebrate the achievements of women scientists, as well as BME scientists. We should all reflect on ways to promote the scientific achievements and career stories of a diverse range of scientists." As part of the Equality & Diversity day, Jess also met with a group of early career researchers for a question and answer session.

Dr Leonie Jones, the Department's Employability and Diversity Officer, led the session and commented "We had lively discussions about everything from short-term contracts to gendered Lego. It was fantastic for our PhD students and postdocs to meet with Jess and discuss how we can all help to make science more accessible".



L-R: Dr Caroline Dessent, Chair of the Chemistry Department Equality and Diversity group, Dr Jess Wade and Dr Leonie Jones Employability and Diversity Officer

For those who were not able to attend the lecture, we plan to make a recording available very soon, please keep an eye on the staff and student Chemistry digests. More information about Equality in the Department of Chemistry, and our commitment to the Athena SWAN Charter can be found on our [Equality and Diversity webpages](#). Chemistry at York was the first academic department in the UK to receive the Athena SWAN Gold award, held continuously since 2007.

Social media campaign for International Women's Day 2020

To celebrate this year's International Women's Day (8 March), the Chemistry Equality and Diversity Group (EDG) ran a [social media](#) campaign to showcase the amazing work and accomplishments of some of our postgraduate researchers. Ten PhD and MSc(research) students from across the Department were featured in a series of tweets posted throughout the day. The campaign was coordinated by Leonie Jones and Christina Surdhar. A massive thanks to [Kelechi Uleanya](#), [Rachel Johnson](#), [Parul Johar](#), [Dominika Pasternak](#), [Saikiran Ravi](#), [Martina Conti](#), [Zoë Ingold](#), [Nat Wong](#), [Alice McEllin](#) and [Roxana Milescu](#) who all took part.



✓ [Rachel Johnson](#), [Zoe Ingold](#) and [Wendy Robinson](#) also took part in an [@HMGNorth](#) and [N8 Research](#) campaign by making short videos 'shining a light' on women who had inspired them (choosing Professors Jane Thomas-Oates, Eleanor Dodson and Frances Arnold respectively).

Caroline Dessent, Chair of the Chemistry Equality and Diversity Group was also interviewed for a University IWD2020 feature which highlights women from across campus and initiatives to support gender equality. You can find [Caroline's interview here](#).

If anyone has any ideas or suggestions for future initiatives you can contact leonie.jones@york.ac.uk or caroline.dessent@york.ac.uk.



Prestigious research prize awarded to University of York academic

A University of York academic is a joint recipient of this year's Gunther Laukien Prize – awarded annually to recognize cutting-edge nuclear magnetic resonance (NMR) research.



Prof Simon Duckett (left) pictured with co-recipient of the prize, Prof Warren Warren (right) and Prof Robert Griffin (MIT), Laukien Prize Committee Chair (centre)

Professor Simon Duckett has been recognised for his pioneering research on developing methods to dramatically improve the quality of pictures associated with medical imaging, helping to fight diseases like cancer.

Researchers hope that in the future, doctors will be able to accurately make diagnoses in minutes from advanced MRI scans. Currently this takes days, weeks and sometimes months to implement.

Developed

The underpinning technique, which is known as [Signal Amplification by Reversible Exchange \(SABRE\)](#), has been developed by scientists at York since 2013.

It works by magnetically labelling drugs or substances that occur naturally in the body, without changing their molecular structure, making the method very safe and versatile.

Professor Duckett, Director at the Centre for Hyperpolarisation in Magnetic Resonance (CHyM) at the University of York, is a joint winner of the prize along with Konstantin Ivanov (Novosibirsk State University) and Warren S. Warren (Duke University).

The prize carries a monetary award of \$20,000 which will be divided equally among the three awardees. The prize was officially presented to Professor Duckett at the [Experimental Nuclear Magnetic Resonance Conference](#) in Baltimore in March.

Honour

Professor Duckett said: "I am thrilled to receive this award, it is a huge honour. This area of science has developed substantially since it was first described in Science in 2009 by researchers in York and led to the York Centre for Hyperpolarisation in Magnetic resonance being established in 2013.

"The impact of SABRE is expected to grow over the coming years. One area of on-going research in CHyM seeks to harness SABRE to transform the ability of magnetic resonance imaging (MRI) to diagnose disease."

Professor Duncan Bruce, Head of the Department of Chemistry, said: "I am delighted to see Simon's transformative work recognised in this way. The methods developed by Simon and his co-workers have

opened up so many new avenues and possibilities from the chemistry laboratory right through to the clinic and, even though now we can see some of the impacts of his pioneering work, they will continue to emerge for many years to come.”

Find out more

The Laukien Prize was established in 1999 to honour the memory of Professor Gunther Laukien, a co-founder of Bruker. The prize is intended to recognize cutting-edge experimental NMR research with a high probability of enabling beneficial new applications.

Research grant fosters York-Cape Town partnership

A researcher at York is to partner with an academic at the University of Cape Town in a collaborative grant scheme designed to tackle global challenges.



Dr William Unsworth from the Department of Chemistry will work with Dr Wade Frank Petersen - a former University of York post-doctoral research associate - on a project titled ‘Rings around the globe: ‘growing’ macrocyclic drugs from York to Cape Town.’ It is hoped the project will lead to the discovery of new materials to treat infectious diseases like HIV, TB and malaria.

The research is supported by the Future Leaders – African Independent Research (FLAIR) collaboration grants programme. The programme pairs African researchers with UK scientists whose interests and fields of study align. The collaborations are designed to help develop the participants’ careers, bolster international networks and address global challenges.

The programme is run in partnership with the African Academy of Sciences (AAS) and the Royal Society, with support from the UK’s Global Challenges Research Fund.

Dr Unsworth said: “The University of Cape Town boasts world-leading facilities for the discovery of new ways to treat infectious disease - notably including HIV, TB and malaria.

“We are really excited to find out whether new materials relevant to the treatment of these critical diseases can be discovered by combining our technology for the synthesis of large ring molecules with Dr Petersen’s expertise in amino acid synthesis and medicinal chemistry.”

Dr Petersen said: “Infectious disease today is still of major concern, especially in Sub-Saharan Africa. Large ring molecules have been relatively under-explored in medicinal chemistry. One contributor to this is the challenge in making them. Dr Unsworth’s research has made this task much easier and so we are very optimistic that this research will make significant strides in finding new molecules in the fight to treat infectious disease.”

The grant will also fund two additional African students to spend six months in Dr Unsworth’s lab working on this project.

Scientists search for new source of air pollutants by taking flight during Cape Verde dust season



Scientists have been flying over the Atlantic Ocean to investigate how desert dust and man-made pollution are interacting in remote marine environments, which could have knock-on consequences for the air quality in our towns and cities.

Researchers from the National Centre for Atmospheric Science and the University of York are interested in a new source of nitrogen oxides pollutants, also known as 'NO_x', which can cause lung disease and respiratory infection.

These chemicals are produced by a wide range of activities around the world, from traffic to agriculture. But scientists didn't expect to see nitrogen pollutants at offshore locations so far away from the continent.

Recent observations of nitrogen oxides over the Atlantic Ocean suggest there is a new source of these harmful chemicals in the marine atmosphere. The [ARNA project](#) is hoping to find out where they are coming from.

A Natural Laboratory

Over several years, the research team will spend around forty hours in the skies collecting evidence about the different chemical reactions taking place above the ocean. Their main focus is on the interaction between nitrogen pollutants and dust particles which can carry pollutants over the ocean.

The tropical Atlantic region is essentially a natural laboratory where scientists will explore the sources and evolution of different pollutants, including nitrogen oxides (NO_x), nitric acid (HNO₃), nitrous acid (HONO), and nitrate (NO₃⁻) on aerosol.



There is a relatively low concentration of human emissions over the tropical Atlantic, which enables scientists to hone in on the specific chemical reactions that take place when nitrogen pollutants come into contact with dust particles.

Dr Tomás Sherwen from the University of York says the team is hoping to make the most of the 'dust season' in Cape Verde.



"Cape Verde is a fantastic place to look at dust and nitrogen pollutants because there's lots of dust being transported near to the island at this time of year. It's essentially the 'dust season.' To guide where to fly once we arrive, we're using NASA model forecasts of the composition of the atmosphere (GEOS-CF)"

Scientists from the ARNA project believe that nitrogen pollutants may be released from dust particles over the Atlantic as the result of a chemical reaction when sunlight shines on aerosol particles, such as dust, which carry nitrate over the ocean.

Without direct observational evidence, it's impossible to know what causes this process to take place, and how it will impact global air quality.

Most of the research flights will take place around Cape Verde, which lies almost 600km off the coast of Northwest Africa, on board the [FAAM research aircraft](#).

The small island of São Vicente also provides a useful focal point for the science flights because it's home to one of the most advanced atmospheric observatories in the region, the Cape Verde Atmospheric Observatory.

The ARNA Project

The ARNA project, funded by the [Natural Environment Research Council](#), is using a wide range of data sources to solve the pollution mystery and these flights are just one part of their campaign.

In addition to the FAAM flight campaign, they are tapping into the information collected by the [NASA ATom project](#) - which has flown a research aircraft from pole to pole, past Cape Verde, four times over the last few years.

Then there are also satellite observations, which offer clues about how the air is moving over the ocean.

Back in the UK, scientists have set up special laboratory studies to test their theories about the chemical reactions taking place in our skies.

Ultimately their findings will be integrated into computer models that predict how pollution is created and transported across the world.

Written by Nathan Betts (NCAS, Leeds) and Tomás Sherwen (NCAS, York); photos by Tomás Sherwen

New starters

Hello!

Dr Adedayo Adedeji, PDRA in East Asian Air Pollution

Room: C/G116 (WACL); Ext: 4178; Email: adedayo.adedeji@york.ac.uk

Dr Alexandra Males, PDRA in Carbohydrate Enzymology (Change in role in Chemistry)

Room: B/K267 (YSBL); Ext: 8275; Email: alexandra.males@york.ac.uk

Dr Tabitha Petchey, Green Chemistry Research Technician

Room: C/F119 (GCCE); Ext: 2552; Email: tabitha.petchey@york.ac.uk

Dr Quentin Foucart, PDRA in Synthetic Carbohydrate Chemistry (YSBL)

Room: C/B016 & C/B031; Ext: 2594; Email: quentin.foucart@york.ac.uk

Dr Stuart Lacy, Research Software Engineer (Employed through IT Services but based in WACL)

Room: C/G116; Ext: 1214; Email: stuart.lacy@york.ac.uk

Clarke Group news

Professor Paul Clarke attended the alumni event of the UK-NL North Sea Neighbours Conference (formerly Apeldoorn Conference). The [NL-UK North Sea Neighbours Conference](#) is a bilateral conference series between the Netherlands and the UK. Previously called the Apeldoorn Conference, after the Dutch city where the first conference took place in 2000, the series has become a forum where the most influential commentators, policymakers, politicians, business leaders, academics and civil society representatives from both sides of the North Sea come together to pool ideas, expertise and best practices, and create lasting relationships, alliances and networks. This year the conference was held in the Rozaal, at the Binnenhof in The Hague - the heart of the Dutch Government.

