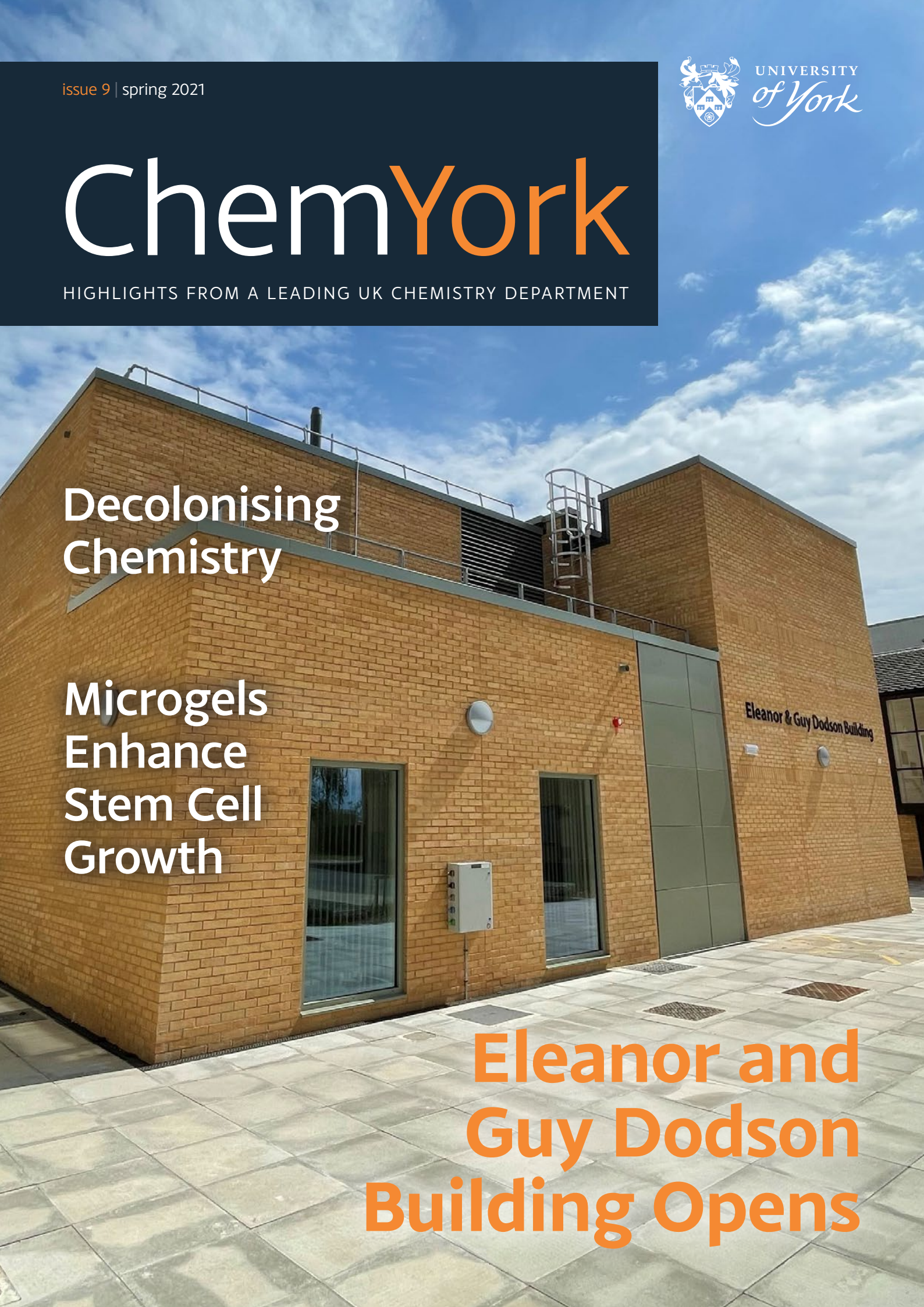
issue 9 | spring 2021

UNIVERSITY of York

ChemYork

HIGHLIGHTS FROM A LEADING UK CHEMISTRY DEPARTMENT



Decolonising Chemistry

Microgels Enhance Stem Cell Growth

Eleanor and Guy Dodson Building Opens

Team Chemistry

PROFESSOR DUNCAN BRUCE, HEAD OF DEPARTMENT, INTRODUCES THE SPRING EDITION OF CHEMYORK.

As I write this on the day that constraints on our lives have been relaxed further, it is sobering to reflect on the fact that this is the third issue of ChemYork that has been published while we have been under restrictions of one sort or another. It has been a period that has tested us all in so many ways and I know that many of you reading this, in common with many colleagues and students, will have found the last fourteen months or so very challenging indeed. However, out of adversity often comes the best of us and the way that everyone in the Department has pulled together in this period has been truly inspiring. Our labs have been kept in a safe state by technical staff and have been open for research (with variable occupancy) all of the time, with the exception of the first lockdown. Although the use of our labs for teaching was once again restricted in early 2021 with the resurgence of Covid, we were able to get our final-year project students back in mid-March with undergraduates returning to Teaching Labs after Easter. Support staff were creative in finding ways to keep all of their crucial work going, while our academic staff became on-line teaching experts at no notice and our students have engaged with us positively throughout the year. To be a part of that is something incredibly special.

> "It has been a period that has tested us all in so many ways... However, out of adversity often comes the best of us and the way that everyone in the Department has pulled together in this period has been truly inspiring."

In addition to looking back, so I must also look to the future and this is the last of the Forewords that I will write, for in September I will stand down as Head of Department, handing over to Professor Caroline Dessent. This then gives an opportunity for reflection and in that regard, I wish to concentrate on two things. First is the construction and completion of the Eleanor and Guy Dodson Building and the installation of its equipment. There is a separate feature elsewhere in this edition, but what this building does is provide those interested in protein structure with state-of-the-art facilities, including high-field NMR spectroscopy, a new X-ray diffractometer and a 200 kV electron cryomicroscope, which is already turning out fantastic data and will transform structural biochemistry and more. It has taken a great deal of time and effort to get to this point, but importantly it has been a real partnership of organisations and people who have come together to make it work. Not least among them are those who provided the funding and this is an opportunity to acknowledge BBSRC, the Wellcome Trust, Tony Wild, the Wolfson Foundation and of course the University. Thank you!

Second, and most important, is people. My time as Head of Department has seen some significant retirements from the Department of colleagues who have made immense contributions over many years, but as one door closes, so another opens. Thus, with support from the university, we have made many new and exciting appointments, recruiting two established professors, and ten staff to their first academic positions (five in Teaching and Scholarship), with a further appointment to follow quite soon. In addition, it has been exciting to watch our existing staff go from strength to strength. There has been a wealth of recognition and success witnessed by a plethora of international and national prizes and fellowships, among which I note particularly the election as Fellows of the Royal Society of Pratibha Gai and Lucy Carpenter, with Pratibha also being honoured as a Dame of the British Empire. Ultimately it is people that make the Department what it is – all of our students, all of our staff and, unseen to most, all of those who have supported many aspects of the Department's work so generously. I cannot thank them enough for their support, which I know they will all extend to Caroline later in the year.

Front cover image: The Eleanor and Guy Dodson Building
© Gavin Thomas

Compiled by David Smith and Christina Surdhar

Designed by Cookie Graphic Design

Department awards

Ian Fairlamb awarded prestigious Royal Society Industry Fellowship

Professor Ian Fairlamb has been awarded a four-year Royal Society industry fellowship to work in collaboration with Johnson Matthey, on a project that will enable more efficient use of the planet's natural resources.

The funded fellowship will allow Professor Fairlamb to spend 50% of his time working collaboratively with Johnson Matthey, a global leader in sustainable technologies. The collaboration will explore the precious metal palladium catalysts, which are embedded within the production of many important commercial products including advanced materials, devices and medicines, with a particular focus on making their use more sustainable. A primary aim of the fellowship is to identify methods for the sustainable deployment and recovery of palladium catalysts.

Professor Fairlamb said: "The Industry Fellowship represents a fantastic opportunity. Our academic studies and findings are increasingly becoming important to industrialists, especially in Process Chemistry, where understanding what is going on within a catalytic reaction mixture very much matters. In order to make palladium sustainable we intend to develop reactions that are as efficient as possible - using less, while recovering and recycling more."

The interaction between Professor Fairlamb and Johnson Matthey will enable exchange of knowledge about complex reaction mechanisms (academic insight) to be translated to an industrial setting. Professor Fairlamb will benefit from exposure to the real-world challenges involved in large-scale industrial processes, including palladium catalyst manufacture.

Professor Fairlamb is the Department's second recent recipient of a Royal Society Industry Fellowship; in 2019 Professor Peter O'Brien was awarded a three-year fellowship to work in collaboration with the Fragment Chemistry Group in AstraZeneca, Cambridge. The award of two industrial fellowships in consecutive years highlights that industrially-aligned academic research is vibrant within the Organic Chemistry section.

'Outstanding Contributions' to Green Chemistry recognised with major European Award

York Academic and Global Green Chemistry Pioneer, Professor James Clark has been recognised with the 2021 European Sustainable Chemistry Award (ESCA)

The prestigious award, from the European Chemical Society recognises Professor Clark's track record in the commercialisation of fundamental green chemistry research alongside his outstanding contributions in the development of green chemistry as a distinct area of chemistry and in the creation of a global green chemistry community.

The ESCA 2021 will be presented to Professor Clark during the 5th European Chemical Society Conference on Green and Sustainable Chemistry, to be held virtually on 26 and 29 September 2021.

Professor Clark is the founder and Director of the Green Chemistry Centre of Excellence at the University of York. He established the leading scientific journal, Green Chemistry, and the world's largest private membership network, the Green Chemistry Network. He has a strong interest in industrial symbiosis and waste utilization – making chemicals, fuels and materials from chemical, food and other wastes – solving both the problems of increasing waste and diminishing resources.

Professor Clark said: "I am delighted to receive this important award which I believe reflects the outstanding pure and applied research carried out by the York team past and present."

Driving Global Impact in Research

As reported in the last issue of ChemYork, Dr Peter Edwards had been nominated for a prestigious Nature Research Award for Driving Global Impact. In the end he was runner-up for this award - the only UK scientist to be recognised by this year's Nature Awards.

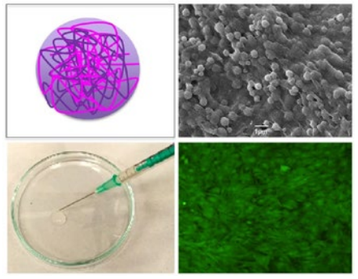
The award acknowledges his work in the Wolfson Atmospheric Chemistry Labs to understand the chemical processes controlling global challenges such as air pollution and climate.

Professor Duncan Bruce, Head of Department said: "I am absolutely delighted to see this recognition for the work that Pete has devised and led. His approach is truly holistic from design of sensitive instruments and testing their function in the lab, to deploying them in real-world situations to collect data and then using computational approaches to process those data. These are the marks of a true polymath and Pete is applying his expertise in an area of real global significance, showing the positive impact that Chemistry has in tackling environmental issues."

Injectable self-assembled microgels enhance stem cell growth

In a major breakthrough, Dr Carmen Piras, working in the research team of Professor David Smith developed a new technology to fabricate injectable biocompatible microgels, with sub-micrometre diameters, that can release bioactive agents and hence enhance stem cell growth.

Self-assembled gels that spontaneously and reversibly assemble from small-molecule building blocks have great potential in drug delivery and tissue engineering. However, they are often very weak, and this can make it difficult to fabricate them with controlled shapes and sizes. In particular, it is very challenging to make microgels with sub-micrometre particle sizes. Such microgels would have applications in biomedicine



because their small size potentially allows them to be injected, meaning they could play a role in tissue repair or drug delivery.

In EPSRC-funded research published in *Chemical Science* 2021, 12, 3958, the team reported a simple process using alginic acid, a naturally-occurring polymer found in seaweed, to stabilise sub-micrometre self-assembled gel particles, further demonstrating their stability to injection and storage. In collaboration with Dr Alasdair Kay and Professor Paul Genever in the Department of Biology, Carmen then went on to demonstrate that these microgel beads could release heparin, encouraging enhanced stem cell growth.

As Carmen explains: "Stem cells are being explored to encourage recovery after tissue damage or major surgery. A simple, injectable, biocompatible microgel that can encourage greater stem cell proliferation in the damaged area would be of great potential value."

Taking mechanistic snapshots of important synthetic reactions

In a landmark study, Professor Ian Fairlamb and Dr Jason Lynam, working with scientists from Syngenta and the STFC Central Laser Facility have gained new mechanistic insights into C-H activation, a vital chemical reaction process.

The activation of a C-H bond at a metal centre, and its subsequent functionalization, is undeniably one of the most important breakthroughs in organic and synthetic chemistry in the last 15 years. It provides access to important chemical building blocks for the agrochemical, materials and pharmaceutical sectors. Even though scientists have figured out how to carry out many complex C-H activation processes, there remain mysteries around the mechanistic steps that take place.

In research published in *Journal of the American Chemical Society* 2021, 143, 1356, the team used fast laser methods to understand the deprotonation step, which allows C–H

bond activation at a manganese(I) centre. The activation of a C-H bond by formal deprotonation is extremely difficult to observe because of how rapidly the process takes place.

The team achieved this by careful observation and quantification of the microscopic reverse of the deprotonation process, information which can then be directly translated into the forward C-H bond activation process. Time-resolved infrared spectroscopy (TRIR) was used to take snapshots of the catalytic reaction over picosecond to millisecond time scales. This gave compelling evidence for the key intermediates and processes predicted within the reaction mechanism for the first time with unprecedented levels of detail.

Latest lockdown had less impact on UK air pollution levels than the first

Research from atmospheric scientists in the Department of Chemistry proved that the UK lockdown in Winter 2021 did not have the same impact on air pollution levels as the first lockdown in 2020. Greater disparities between the lockdowns for NO_2 pollution were observed in large urban areas, such as London

During the Spring 2020 UK lockdown, nitrogen dioxide (NO_2) decreased by 52 per cent on average compared with only 28 per cent on average in the lockdown which started in January 2021. NO_2 is a key pollutant caused by vehicles and other emissions.

The research was led by undergraduate student Rhianna Evans and Dr Will Drysdale, and used data from roadside monitoring stations across the UK. They found that although restrictions were similar, the impact of the winter lockdown reduced pollution less. The team argued that this was due to factors like people working from home and therefore using more heating, while others who were going into work, started cars in colder conditions which creates more pollution.

Undergraduate student Rhianna Evans said: "It is important to consider this diversity of sources for future reductions in air pollution. The winter lockdown scenario shows that a shift in society's behavioural patterns can produce pollution from other sources."

Dr Drysdale added: "The key difference in the winter is the weather. Air pollution is heavily influenced by this, for example concentrations are lower on windy days, as it spreads out more. The model we have used

takes this kind of effect into account however. In this case the colder temperatures influence our activity, which in turn leads to us emitting more. This seems to have muted the reductions from lockdown this time around.

This change in behaviour may mimic future scenarios where emissions from road transport continue to decline, either through uptake of electric vehicles or work patterns including a greater remote component. It is worth examining as we look forward to continuing to improve air quality."

Mastering the structural chemistry of a new gallium catalyst

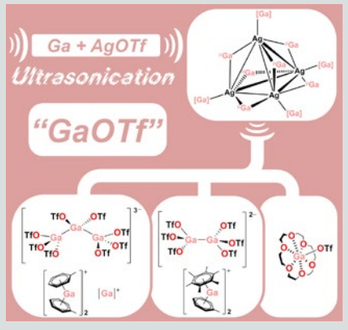
Research performed by Masters students in York has provided unique new insights into the unusual structures formed by an exciting new gallium-based catalyst.

Gallium is a fascinating metallic element, with its chemistry being dominated by the +3 oxidation state. However, in recent years, there has been increasing interest in lower oxidation state forms of gallium for their use in catalysis.

One particularly interesting compound in this regard is gallium(I) triflate. This catalyst is simple to prepare and has been shown to promote carbon-carbon bond forming reactions, key steps in the formation of valuable molecules such as pharmaceuticals, agrochemicals and polymers.

However, almost nothing was known about the true composition of gallium(I) triflate, holding back the understanding of how it functions as a catalyst.

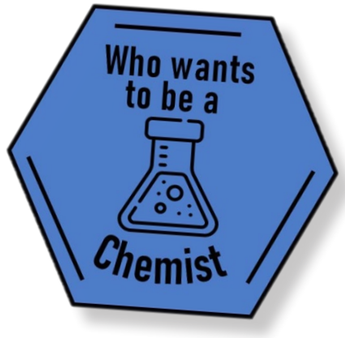
A team led by Dr John Slattery discovered that a wide range of gallium-containing compounds can, in fact, be isolated from catalytically-active solutions of 'gallium(I) triflate'. Careful structural analysis in collaboration with Dr Adrian Whitwood demonstrated that this seemingly simple catalyst is actually a complex mixture of compounds containing gallium in several different oxidation states. This work, published in *Angewandte Chemie International Edition* 2021, 60, 1567, provides valuable insights that will aid the development of



new gallium-based catalysis in the future.

The laboratory work for this study was performed by three Masters students. Joe Boronski and Matthew Stevens were final-year undergraduate MChem project students, while Bono van Ijzendoorn was an MSc student. This clearly illustrates the Department's research-led teaching approach and demonstrates the important role that undergraduate students at York play in supporting the Department's research activities during their Masters projects.

Students in virtual schools



EVERY YEAR, SOME OF OUR BSC STUDENTS CARRY OUT 'CHEMICAL COMMUNICATION' PROJECTS IN WHICH THEY CREATE AN EDUCATIONAL INTERVENTION TO USE IN LOCAL SCHOOLS, OR DEVELOP AND RUN A LIVE OUTREACH EVENT. HOWEVER, IN TIMES OF COVID, AND WITH MANY OF THE SCHOOLS ACTUALLY CLOSED, THIS CREATED HUGE CHALLENGES. WHAT HAPPENED NEXT WAS REMARKABLE, WITH OUR STUDENTS HELPING LOCAL SCHOOLS PIVOT TO ONLINE TEACHING. WE GET TOGETHER WITH VICE CHANCELLOR'S TEACHING AWARD (2019) WINNER DR ANNIE HODGSON, WHO TELLS US MORE.

How did you feel about this year's projects?

Before the start of the academic year I was really concerned about the Chemical Communication projects, because I could not see how we would be able to guarantee that the students would get the experience they had signed up for. I didn't know how students could engage at all with schools in times of social distancing. I was delighted that our nearest school, Archbishop Holgate's, agreed that any of the students could, if they chose, observe some teaching during the Autumn Term. I also made the decision that we would say up-front, that we could not run an outreach event. As it turns out, this was the correct decision - we were in full lockdown when the event should have taken place. However, it was clear from very early on that there was no way the projects could be anything like normal.

How did you start putting projects for the students together?

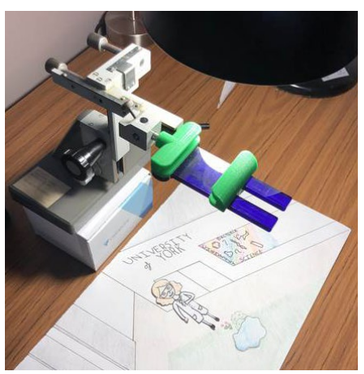
I was worried that I would not be able to find enough schools to work with. Surprisingly, however, in spite of the massive workload on teachers, schools were enthusiastic, and many were keen to develop resources they needed to help deliver the new style of teaching they were having to adopt due to the pandemic. The University of York Science Education Group (UYSEG) and Centre for Industry Education Collaboration (CIEC) were also keen to develop and deliver innovative outreach resources during the pandemic. I began to realise that there was a chance for our students to get very actively engaged, and to play a real role in helping schools with the sudden switch to online teaching.

What kind of projects were available for the students?

The students did a remarkable range of things, and created some incredible educational resources - helping the online provision of some of our local schools and also engaging with learners much more widely than would usually happen.

Holly Bisset produced a very professional video showing lab experiments for Year 7 students at Huntington School. This was originally requested by the school to be shown in class. However, when the school closed in January, she also adapted it to make bite-sized chunks and created some written exercises to go alongside these for remote online delivery.

Katie Hancock devised two games to aid revision of GCSE chemistry. One of these is delivered via an interactive PowerPoint and is based on the format of Who Wants to be a Millionaire? The other is a physical snakes and ladders type board game, where you need to answer questions to be able to progress. Katie took great care to consider an accessible format that would assist students with dyslexia.

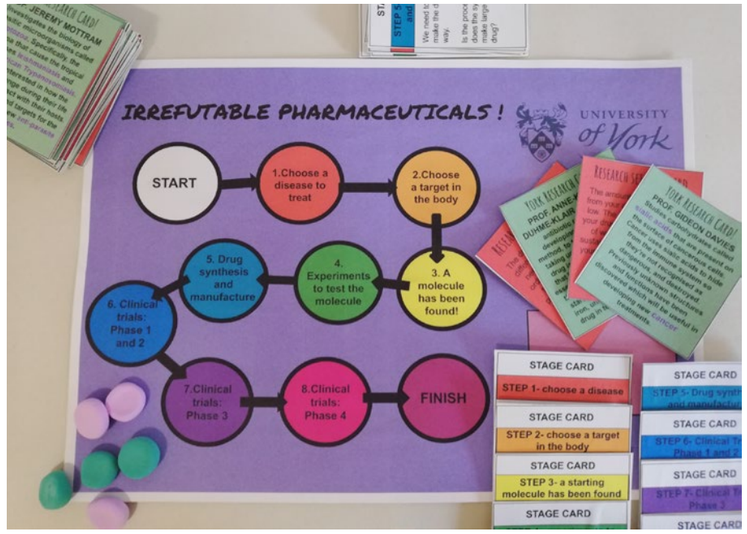


Alisa Mohamed Azhar created written resources. Although initially commissioned to use in class, when schools closed these were delivered remotely. She chose a range of contexts to engage students, such as "Ginger – more than just a spice?", "Sweet science" and "Sports and science". A number of schools in York made use of these resources to engage their students.

Rebecca Smith produced a board game about the process of drug discovery, linked to research at York in Biology and Chemistry. She produced a dozen sets of the game, which were delivered to families to play during lockdown, who sent feedback via an online form. Teachers in schools across North Tyneside also provided feedback on these resources.

> "There was a chance for our students to get very actively engaged, and to play a real role in helping schools with the sudden switch to online teaching

Tom Dugdale produced two videos for the CIEC aimed at primary school students - a real challenge in effective communication skills. Jemima Campbell, Mollie Garratt and Chrissy Su all worked with Lynda Dunlop in UYSEG to develop discussion workshops that were conducted with groups of students as far afield as Surrey, via Zoom, on topics ranging from lab-grown meat to geoengineering. In particular, Mollie Garratt aimed to highlight the significance of misinformation in news releases and articles, raising the awareness of the participants in how to detect 'fake news'.



Given the challenging circumstances, how did the projects go?

I have been delighted to see how well the projects have gone - some of the most successful ever. Freed from the necessity to analyse lots of classroom lessons and record their observations and evaluations in a Log Book, students have been able to spend much longer developing their resources, resulting in high-quality products. Others have been able to deliver repeat workshops to a wider variety of audiences than would normally have been possible. Conducting workshops online has meant students can engage with learners across the UK and even beyond.

I was also really pleased with how the students worked together, supporting each other. I was worried that they may feel rather isolated, but we managed to arrange a socially-distanced 'kick off' session back in October, and since then, they have formed a lovely community. It has been an absolute pleasure working with them.

What did the teachers and their students think?

The teachers and students have been genuinely impressed with the resources and interventions that the students created.

One of the teachers at Huntington School in York said of Holly's video: "what she has produced is excellent and all the feedback we've had indicates that it'll remain in our scheme for a long time."

Players of Rebecca's game commented that they enjoyed learning about research in York and found the drug discovery theme really interesting.

Student feedback on Alisa's resources said: "I really enjoyed how it was engaging and helped me learn about a new topic I didn't know anything about before reading the resource," and "I liked how the layout was easy to find the things you were looking for and the relevance of the content was perfect for the task we had been set."

How about our undergraduates - how did they find the experience?

I think it's best if I let one of the students explain in their own words - their feelings were shared by the rest of the cohort.

"Despite being completed during lockdown this is definitely my favourite part of my degree, it's really confirmed for me that my passion and career lies in teaching chemistry and ensuring inclusivity and accessibility in the classroom. I've learnt so much during my research about accessible design which under the standard BSc projects I would not have discovered. It challenged me to rethink how I explain complicated chemistry concepts at a level the audience can understand. I'm looking forward to applying everything I've learnt in the future." Tom Dugdale.

I'm a scientist!

CHEMISTRY PHD STUDENT, AMELIA GILIO, TOOK PART IN A MAJOR NATIONAL EVENT TO ENGAGE WITH SCHOOL STUDENTS AND WAS VOTED THE WINNER.

'I'm a Scientist Get Me Out of Here' is an online, student-led STEM enrichment activity that connects school students with scientists through energetic real-time text based chats. Across a whole month, researchers help students stay connected with science, their teachers and classmates, by chatting with students and teachers using a text-only platform through which they answer students' questions about working in science. Over the course of the month, as well as answering students' questions, the scientists compete for votes to win £500. In February 2021, Amelia Gilio took part alongside 23 other scientists, engaging with almost 1000 students across the UK. Amelia was voted the overall winner.

Amelia carries out her PhD research under the supervision of Professor Gideon Grogan in YSBL. In her research, which is part-funded by Pfizer, she investigates imine reductase enzymes that enable the synthesis of chiral amines, an important functional group found in many active molecules. Amelia uses protein engineering and crystallography with the goal of optimising these enzymes for use in the synthesis of pharmaceuticals, making the process more environmentally friendly.

During her month-long involvement with 'I'm a Scientist', Amelia was asked a wide variety of questions, on topics ranging from career advice to her own research. Amelia explains:

"The older students were more career focussed and wanted to find out about my route into science or how they can become scientists. I think it is really important to heighten awareness that anyone can become a scientist no matter what their background. There are many first-generation university students and scientists out there, just like myself.

I also particularly enjoyed speaking to the younger students as they were very inquisitive about the research that we do and asked surprisingly thoughtful and insightful questions. Many students asked me how I grew crystals and then how I used them to help make medicines? I enjoyed the challenge of coming up with simplified explanations and examples from my own work."

The 'I'm a Scientist' charity works worldwide. In the UK, it focuses its activities on schools with large numbers of students from disadvantaged backgrounds, or which are a long way from a research intensive university. It aims to provide school students with 'science capital' and help them to see that scientists are people just like them who come from all sorts of different backgrounds with everyday interests and hobbies, but a passion for answering big questions about the world.

Amelia plans to use her prize money to develop outreach activities based around her work with protein engineering for use at future in-person outreach events with her research group.

Undergraduate project leads to publication success

GROUNDBREAKING WORK WHICH BEGAN AS A LAIDLAW SUMMER PROJECT IN THE DEPARTMENT OF CHEMISTRY HAS RESULTED IN PUBLICATION FOR TWO GRADUATING STUDENTS.

Laura Berga (MChem 2020) and Isobel Bruce (MChem 2020) achieved publication of their project work in *Cellulose* 2020, 27, 9593.

Laura began work on the project in 2017 as a first-year undergraduate student, when she was awarded a prestigious Laidlaw Scholarship to explore the use of ionic liquids as solvents for biomass processing, with Dr Seishi Shimizu.

Cellulose is a key component of biomass but utilising it is a challenge. Strong hydrogen bonding makes it insoluble in many solvents. Ionic liquids can readily dissolve cellulose, but there are many challenges with using them, such as their high costs, sensitivity to water and difficulty to regenerate the solvents after their use.

The project, which addressed these challenges, attracted the interest of Worn Again Technologies, a start-up company developing a novel solvent-based technology for textile recycling. In addition, Bioniqs Ltd, another start-up company, and the Japan Agency for Marine-Earth Science and Technology joined the collaboration. Worn Again Technologies sponsored both Laura (2018 and 2019) and a second York Chemistry undergraduate, Isobel Bruce (2019), to continue the work in their research laboratory at Nottingham during the summer, where Dr Joshua Reid supervised the project towards completion.

The subsequently-published paper explained how the challenges of cellulose dissolution could be addressed using a novel approach to protic ionic liquid solvents, which are more cost effective than traditional ionic liquids and can significantly simplify the solvent regeneration process.

Project Supervisor Dr Seishi Shimizu said: "Laura's outstanding drive, determination and resilience made all this possible and Isobel made important contributions at just the right time. We are grateful to the Laidlaw Scholarship for this opportunity."

Dr Avtar Matharu shortlisted for 'Masters Teacher of the Year' Award

DR AVTAR SINGH MATHARU, COURSE DIRECTOR FOR THE MSC IN GREEN CHEMISTRY AND SUSTAINABLE INDUSTRIAL TECHNOLOGY, HAS BEEN NOMINATED FOR A PRESTIGIOUS 'TEACHER OF THE YEAR' AWARD.

The 'FindaMasters' Masters teacher of the year award aims to celebrate the individual who has created the most positive and encouraging learning environment, who gives their students high-quality constructive feedback, who is approachable, passionate about their subject, and always put the student first.

Dr Matharu is being recognised for his work as Course Director of the MSc in Green Chemistry and Sustainable Industrial Technology. This unique taught-course allows students to discover how green and sustainable chemistry can help with the industrial challenges faced by increasing global demand for sustainable products and processes. Students are empowered in critical-thinking, research and leadership skills.

In recent years, working closely with colleagues in the Chemistry Graduate Office, this course has grown to a size of well over 30 students each year, who come from all corners of the world and receive supervision and guidance from Dr Matharu throughout their time in the Department. As well as being Course Director, he leads the 'Principles of Green Chemistry' module which begins the students' study in York. Alongside the academic content, Avtar helps the students to find their own place in this unique learning community.

FindAMasters is an online database of Masters degree programmes and related opportunities. Established in 2005, it lists over 25,000 postgraduate courses at institutions around the world and includes detailed funding and advice sections for students.

Dr Matharu was nominated for the award alongside six other academics from across the UK.

The Eleanor and Guy Dodson Building

© Gavin Thomas

SPRING 2021 HAS SEEN THE OPENING OF AN EXCITING NEW FACILITY IN THE DEPARTMENT - THE MUCH AWAITED ELEANOR AND GUY DODSON BUILDING.

The new building provides research groups within the York Structural Biology Laboratories (YSBL) and beyond, with a dedicated space where the techniques of cryo-EM, X-ray crystallography and NMR for structural biology can be brought together. It also houses purpose-built laboratory spaces for sample preparation for cryo-EM and NMR, and for crystallisation experiments.

"Due to delays caused by Covid and the installation of new hardware, we are having a staggered opening," said Dr Jamie Blaza, UKRI Future Leader Fellow and the academic lead for cryoEM at YSBL,"But now the majority of the building is operational and being put to very good use. Doing anything in Covid is harder than in normal times but all the peripheral kit required for our experiments is in place and people are happily setting up crystal trays and freezing new cryoEM grids."

The building work on the new facility was completed just before Christmas 2020, slightly later than originally planned due to the pandemic, but just in time for the crates containing the new Electron Microscope to be delivered straight to their new home. Work could then begin on setting up the labs.

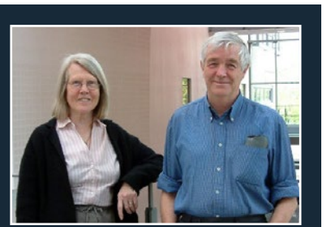
"As the temperature and humidity are tightly controlled for various spaces, we spent some time ascertaining that the requirements were met," explained Dr Johan Turkenburg, Senior Technical Specialist X-ray and cryo-EM at YSBL. "Initially this involved putting in some logging devices and taking a break over Christmas and New Year!"

© Jamie Blaza

In January, the installation of the Electron Microscope began and in March the 700MHz NMR was moved into the building from Chemistry. Equipment for sample preparation and the crystallisation trays were moved from Biology K block in early April. The new X-ray kit arrived on 12 April, was installed a week later, and at the time of writing it is being commissioned.

"It has been a very exciting couple of months, and it has been great to see it all come together," said Johan. "The cryo-EM is very busy, and users are finding that the building works well. Both the NMR and X-ray will come into full use in the not too distant future."

Eleanor and Guy Dodson



The building name pays tribute to the pivotal role played by Eleanor and the late Guy Dodson in establishing the world-renowned York Structural Biology Laboratory (YSBL) within the Department of Chemistry in the years after Guy's appointment at York in the mid-1970s. It also recognises the pioneering work, directed by Eleanor, in the development of computational methods for solving the three-dimensional structures of proteins from X-ray data.

Decolonising Chemistry

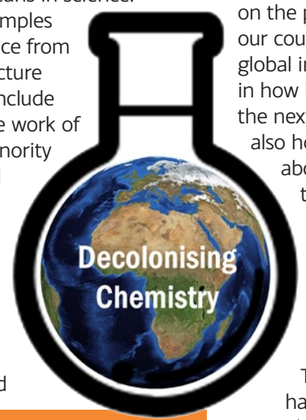
THE DEPARTMENT HAS BEEN WORKING TOWARDS 'DECOLONISING' OUR CURRICULUM. THIS WORK IS BEING DONE IN COLLABORATION WITH THE UNIVERSITY'S INCLUSIVE LEARNING AND TEACHING GROUP, AS PART OF EFFORTS TOWARDS "LIBERATING AND DIVERSIFYING THE CURRICULUM".

The Department is beginning to understand what 'decolonising the curriculum' means for staff and students working in chemistry. In a broader sense, decolonisation involves identifying colonial systems, structures and relationships, and working to challenge those systems. It's important to understand that decolonisation isn't just about the inclusion of academic work of non-white cultures in our course work. It should provide a focus for us to think more generally about how we teach and assess, and should allow for the possibility of a culture shift that provides a space for different views and ways of studying.

Why? One of the key reasons we are doing this is because our students have asked us to - both student members of Equality and Diversity Group as well as our staff-student committee. There is also a growing body of evidence that reflects the fact that not all students are having equivalent educational experiences. Nationally, there is a 16.1% gap between the number of high-quality degrees awarded to white UK-domiciled students compared to ethnic minority UK-domiciled students. Furthermore, 42% of black students say that the curriculum does not reflect issues of diversity, equality and discrimination. A major report noted that many ethnic minority students reported that they do not feel a "sense of belonging" at university. Baroness Amos, who led the UUK review, said "Scientists come from all over the world, they don't just come from the UK, the United States and other countries in Europe. It is really just about broadening our perspectives." Indeed, we believe that our undergraduate courses must ensure all of our students have equal opportunities to thrive.

How? In taking an approach to decolonisation, we are in no way advocating that chemistry departments should de-emphasise the key principles and theories of science – obviously these are vital. However, we are encouraging those teaching in the Department to reflect critically on the context in which they teach these principles, and the applications with which they choose to exemplify them. We suggest that where it is possible to present a meaningful global view with diverse influences and applications, and reflect on ethics and hierarchies alongside the science, then this opportunity should be taken. This approach can be applied not only to 'decolonisation' but also when considering the contributions and contexts of a variety of minoritised groups working in science. We have so far taken a number of active steps:

- Fact-finding on what decolonising a curriculum means in science.
- Collecting examples of good practice from our current lecture courses that include presenting the work of role model minority scientists, and exploring the diverse histories or global applications of chemistry. These have been compiled into a document, and circulated to all staff with encouragement to consider refreshing their courses using similar examples.
- Compiling highlights of the work of black chemists to provide further examples for incorporating in lecture material.
- Compiling a resource on internationally-recognised scientists from the Indian sub-continent - led by Professor Dame Pratibha Gai.
- Celebrating Black History Month with activities open to all students and staff.
- Commissioning images to be displayed in the Department, highlighting the work of historic global chemists.
- Introducing inclusion of ethnic minority scientists into Equality & Diversity training for Year 1 undergraduates.
- Conducting a Departmental culture survey of our undergraduate students, with results analysed by ethnicity, leading to an action plan for greater inclusion.



> "We believe that our undergraduate courses must ensure all of our students have equal opportunities to thrive.

What Next? We hope that building on the platform described above, our course will become increasingly global in outlook, and inclusive in how it considers chemistry. In the next stages of the process, we also hope to think more broadly about the ways in which we teach - including things like group work, assessment, laboratory teaching and timetabling, to ensure we are removing any structural barriers that may stand in the way of minority groups. This will build on things we have learned from our own students in the Departmental culture survey. We look forward to the ongoing development of our own decolonisation strategy and plan to exchange ideas with other universities undertaking similar activities.

Getting Social!

In these times of social distancing, our social media accounts have been one way in which our staff and students can easily keep in touch with what is happening in the Department. As well as getting all the big news first, if you follow the Department on social media you will also find out about some of the more unique things that are going on! This page features some recent Instagram highlights.

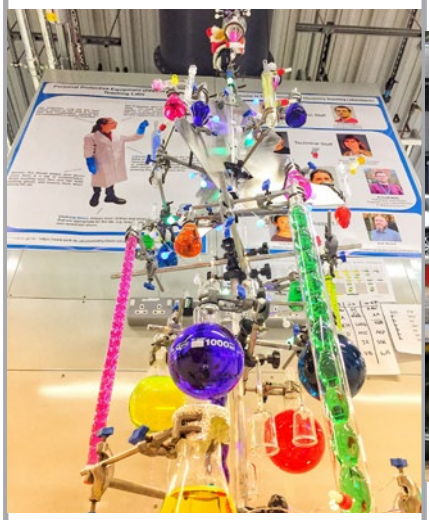
Instagram

Chemistry at York
@chemistryatyork

Fazeelah, @chemistryatyork researcher in Kirsty Penkman's group has contributed some great artwork to the Represent York Art Exhibition which aims to facilitate conversations surrounding race and racism on campus. The pieces shown here are "Colours of Pakistan" and "Priest King". Fazeelah said: "We chemists have a lot more colours in ourselves and we do not all the time deal with chemicals and operating instruments. There is a life apart from the lab as well -, the philosophy in making art and doing research is really the same."

Instagram

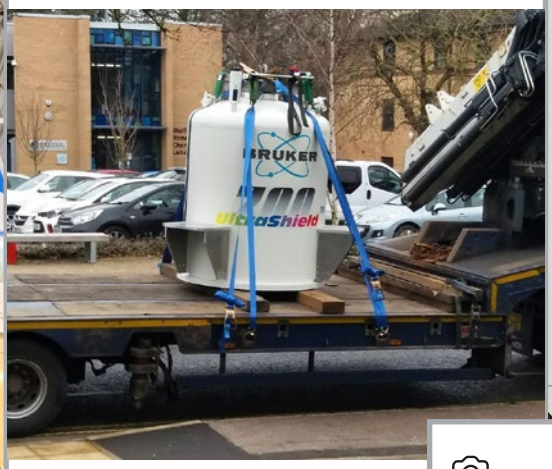
Chemistry at York
@chemistryatyork



Chemistree 2020 celebrates the 10th anniversary of our Teaching Labs Chemistree and is TWICE the size of our usual chemistree. It stands 8ft tall on a giant retort stand specially made in @chemistryworkshops. It showcases some more unusual pieces of chemistry glassware such as coil condensers and fractional distillation columns. It was put together by Helen Burrell and the Teaching Labs team, and is bringing some much needed colour and light to Lockdown 2.

Instagram

Chemistry at York
@chemistryatyork



When the 700 MHz heads on tour... Emma Dux captured this photo of removals going on today at @ chemistryatyork as the 700 MHz NMR spectrometer is moved over to the new Guy and Eleanor Dodson Building. It looks a lot smaller on the truck than it did before!

Instagram

Chemistry at York
@chemistryatyork

We're experiencing quite a cloudburst here, but with the sun still trying to get a look in. This spectacular double rainbow photo was taken from the second floor of Chemistry D Block by Adrian Whitwood.

Get Social with ChemistryatYork

Facebook (all the top Departmental news)
https://www.facebook.com/chemistryatyork

Twitter (a complete overview of the Department)
https://twitter.com/ChemistryatYork

Instagram (a unique insight with beautiful images)
https://www.instagram.com/chemistryatyork/