

Chemistry Update

Newsletter 322, 26 June 2020

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Calendar of Events

Watch again: University of York Open Lectures

Although there are no open lectures taking place on campus during this term, you can find masses of previously recorded lectures and digital content to watch at home on the [Open Lectures webpages](#), including YorkTalks, Festival of Ideas and 3MT events.

Date of Next Issue:

31 July 2020

York is a major player in two new Marie Skłodowska-Curie Innovative Training Networks

Two high-profile European-Commission-funded projects will bring four early career researchers to the Department of Chemistry, with York research groups collaborating with a wide range of institutions and industrial partners across Europe.



Dr John Slattery and Dr Jason Lynam attended the CCIMC Kick-Off meeting with other beneficiaries and industrial partners at the Frederich Schiller University of Jena, earlier this year.

The 4M-Euro project [CCIMC](#) (Coordination Chemistry Inspires Molecular Catalysis), coordinated by the Laboratoire de Chimie de Coordination (LCC) in Toulouse, is one of the two projects. It aims to push back the frontiers of knowledge in ligand design, coordination chemistry, precatalyst development, catalyst recovery and catalytic process implementation. It will see 15 PhD students engaged in a

coordinated research and training programme across Europe, three of whom will spend half their degrees in the Department of Chemistry with Dr Jason Lynam, Dr John Slattery and Professor Simon Duckett.

CCIMC addresses the current lack of coordinated doctoral training at the European level on molecular catalysis and aims to enhance European competitiveness in numerous industrial processes. York is one of its nine academic beneficiaries from seven European countries, which will work on coordinated research projects, along with eight partners from the industrial sector.

CCIMC runs for four years, from March 2020 until February 2024. The network has recently completed the recruitment phase and aims to start the research/training programme in October 2020.

York is also a beneficiary of the [PUSHH](#) (Palaeoproteomics to Unleash Studies on Human History) Consortium, which has been set up to provide state-of-the-art doctoral training for 14 early-stage researchers, pursuing palaeoproteomics to advance knowledge about the biological and cultural evolution of humans. Currently, very few specialists have been trained to analyse ancient proteins, in contrast to the study of aDNA, which is an issue that PUSHH seeks to address.



Dr Kirsty Penkman and Prof Jane Thomas-Oates represent the University of York in the PUSHH consortium, pictured here at the startup meeting in Copenhagen. Credit: Mikal Schlosser.

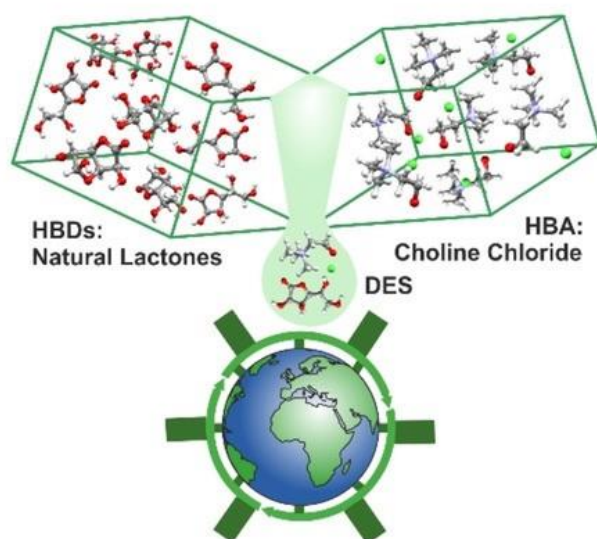
A PUSHH early-stage researcher is currently under recruitment to work with Dr Kirsty Penkman and Professor Jane Thomas-Oates at York from October, in the area of Amino Acid Racemisation-Based Chronology. In addition, Professor Jane Thomas-Oates is to be co-supervisor to a second student based at the University of Bordeaux.

The Department of Chemistry at York is one of 18 leading high-profile research units, institutions and enterprises, across Europe and worldwide, in the multidisciplinary PUSHH consortium.

Both CCIMC and PUSHH are [Marie Curie](#) network projects of the [Horizon 2020](#) programme.

Vitamin boost for green solvents

Naturally-occurring analogues of Vitamin C have been used to form deep eutectic solvents for the first time. These environmentally-friendly solvents may have applications as natural antifreezes or antibacterial agents.



Deep eutectic solvents (DESs) are formed when two solid materials mix to give a liquid phase. If the two solids are environmentally-friendly, then the resulting solvents are one of the most promising green technologies to emerge in recent years.

In the pursuit of new sustainable DESs, Dr Avtar Matharu and his research team report the preparation of DESs based on natural lactone analogues of L-ascorbic acid, Vitamin C. The researchers combined these natural lactones with choline chloride, a well-established component in sustainable DESs.

This work, produced in the Green Chemistry Centre of Excellence, expands the current array of DESs that can be produced using naturally occurring components. Given their potential to be bio-derived, interesting physicochemical properties (e.g. propensity to supercool and vitrify) and apparent antibacterial nature, the researchers proposed that these new DESs may be useful across a range of applications.

Dr Matharu said, "This is an excellent piece of research conducted by Andrew Maneffa during his PhD. Andrew was able to make the connection between vitamin C and its analogues to develop these new deep eutectic solvents."

PhD student, Andrew Maneffa said, "This work is an illustration of how we can take the building blocks provided to us by nature and re-tool them in a way that offers potential uses in some intriguing applications."

The research is published in [ChemistryOpen](#).

Prof Paul Walton receives Vice-Chancellor's Teaching Award

The award, which recognises excellence in teaching and learning support, will be formally conferred later in the year at one of the 2020 graduation ceremonies.



Professor Paul Walton giving a demonstration lecture to students on the chemistry of oxidation and reduction.

Professor John Robinson, Pro-Vice-Chancellor for Teaching, Learning and Students, wrote to Professor Walton:

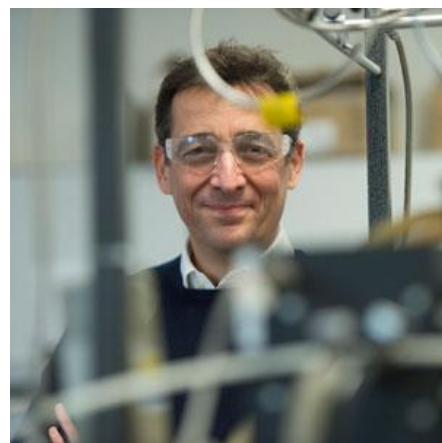
“The panel was impressed with your exceptional and sustained contribution to teaching within the Department, including small group teaching innovations that have entered into the culture of the wider department. Your support for students and quality of feedback are exemplary; you are renowned

amongst current and former students for going the extra mile to demonstrate what you are teaching in front of a packed lecture theatre. The Panel recognised the tremendous impact you have made on how teaching is organised and delivered in the department that is felt positively by all students and staff.”

In nominating Professor Walton for the Award, Dr Derek Wann said:

“Throughout his career Paul has introduced innovations in teaching and learning that have gone on to become part of the furniture of the Department of Chemistry. The extent to which his teaching is valued is borne out in comments from students.”

Dr Wann gave special mention to Professor Walton's role in the development of the Department's trademark small-group teaching, his introduction of 'study groups' in which volunteer students from higher years help to tutor Year 1 students, and his creative approach to teaching which regularly elicits student comments on the entertaining and engaging nature of his lectures.



Professor Walton's teaching also received recognition in 2000, when he received the Royal Society of Chemistry's Higher Education Teaching Prize.

Professor Paul Walton joined the Department of Chemistry in 1993 as a lecturer and also served as Head of Department from 2004 to 2010. Currently, as well as contributing to small-group teaching within Chemistry's college system, he contributes with lectures in core modules to chemists and natural scientists, and teaches on the Bioinspired Chemistry option module in Year 3, where he can draw on his outstanding research in bioinorganic chemistry.

The [Vice-Chancellor's Teaching Awards](#), introduced in 2006, are one of the ways in which the University rewards excellence in learning and teaching.

Department of Chemistry retains position in the UK top five

The rankings released this week the Department continues to be among the UK's most highly regarded departments for the subject of Chemistry. The Department is ranked 5th in the UK in the Complete University Guide 2021.



Published annually since 2007, the [Complete University Guide](#) ranks 130 UK universities, 14 Arts, Drama and Music colleges and conservatoires, and 70 subjects by quality measures important to students.

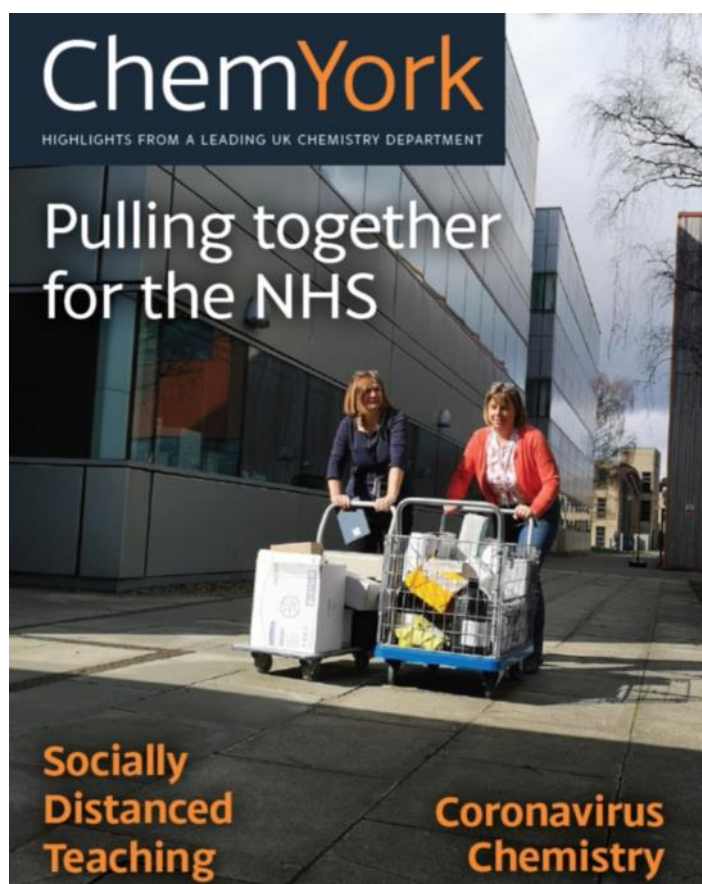
The Department's ranking is based on a range of measures including graduate prospects, student satisfaction and research quality. Head of Department, Professor Duncan Bruce, said "It is fantastic to see Chemistry at York retain its place in the top five: one of the very best places to study our subject in the UK. This is real recognition of the hard work and commitment of all staff across the department in providing a first-rate educational experience for our students and a reflection of the excellent students who we are very proud to graduate each year."

In total, six departments at the University were ranked in the UK top ten: Archaeology (9th), Chemistry (5th), English (6th), History of Art (6th), Nursing (7th) and Social Work (6th).

ChemYork

We're especially proud of the [latest issue of ChemYork](#), which tells how the Department stepped up to help the NHS, and also brings you the latest on cutting-edge Coronavirus research going on in the Department.

There's an interview with Dr Derek Wann and Dr Nigel Lowe on socially-distanced teaching, a look at how our Chemistry Workshops Technicians have been helping produce PPE for key workers, and all the usual news and stories on aspects of research, teaching and recent successes. We hope you enjoy.



Oldest ever human genetic evidence clarifies our ancestral evolution

Genetic information from an 800,000-year-old human fossil has been retrieved for the first time. The study, led by the University of Copenhagen, sheds light on one of the branching points in the human family tree, reaching much further back in time than previously possible.



Homo antecessor fossils were found in sublevel TD6.2 at the Gran Dolina site, Sierra de Atapuerca (Burgos, Spain). Credit: Prof. José María Bermúdez de Castro.

An important advance in human evolution studies has been achieved after scientists retrieved the oldest human genetic data set from an 800,000-year-old tooth belonging to the hominin species *Homo antecessor*. The findings by scientists from the University of Copenhagen (Denmark), in collaboration with colleagues from the CENIEH (National Research Center on Human Evolution) in Burgos, Spain, and other institutions, including the University of York, were [published in Nature](#).

“Ancient protein analysis provides evidence for a close relationship between *Homo antecessor*, us (*Homo sapiens*),

Neanderthals, and Denisovans. Our results support the idea that *Homo antecessor* was a sister group to the group containing *Homo sapiens*, Neanderthals, and Denisovans”, says Frido Welker, Postdoctoral Research Fellow at the Globe Institute, University of Copenhagen, and first author on the paper.

By using a technique called mass spectrometry, researchers sequenced ancient proteins from dental enamel, providing the most secure genetic position of *Homo antecessor* in the human family tree. The human and the chimpanzee lineages split from each other about 9-7 million years ago, and scientists aim to better understand the evolutionary relations between our species and the others, all now extinct, in the human lineage.

“Much of what we know so far is based either on the results of ancient DNA analysis, or on observations of the shape and the physical structure of fossils. Because of the chemical degradation of DNA over time, the oldest human DNA retrieved so far is dated at no more than approximately 400,000 years”, says Enrico Cappellini, Associate Professor at the Globe Institute, University of Copenhagen, and leading author on the paper. “Now, the analysis of ancient proteins with mass spectrometry, an approach commonly known as palaeoproteomics, allow us to overcome these limits”, he adds.

“This study is an exciting milestone in palaeoproteomics. Using state of the art mass spectrometry, we determine the sequence of amino acids within protein remains from *Homo antecessor* dental enamel. We can then compare the ancient protein sequences we ‘read’ to those of other hominins, for example Neanderthals and *Homo sapiens*, to determine how they are genetically related”, says Jesper Velgaard Olsen, Professor at the Novo Nordisk Foundation Center for Protein Research, University of Copenhagen.

However a major challenge when studying ancient proteins is ensuring the molecules analysed are original; any contamination or loss to the environment of these ancient proteins can make

interpretation difficult. In this study the Copenhagen team analysed tooth enamel belonging to two hominin species, one 800,000-year-old (*Homo antecessor*), and one 1.77-million years old (*Homo erectus*). However it proved very challenging to get protein sequence information from the older *Homo erectus* sample, so the York team used their expertise in analysing ancient proteins to determine if the protein was original.



Digital reconstruction of specimen ATD6-69 from the *Homo antecessor* collection. Computerized microtomography (micro-CT) techniques were used to perform this reconstruction. Credit: Prof. Laura Martín-Francés

Using the predictable degradation pathways of amino acids and proteins, Dr Marc Dickinson and Dr Kirsty Penkman determined that the proteins present in the *Homo erectus* enamel were original, but showed very high levels of degradation. A protein sequence is made up of a chain of amino acids; the order of these amino acids in the chain enables evolutionary relationships to be unpicked. Unfortunately many of the links between the amino acids were broken down in the *Homo erectus* sample, meaning that much of the sequence information had been lost. However this data helps to validate the proteomics sequence data generated by the Copenhagen team.

“Finding original organic material, which has survived for millions of years is fascinating,” says Marc Dickinson. “It is incredible that these samples are still able to provide scientific information so long after their creation.”

The *Homo antecessor* fossils, which did yield useful proteomic information, were found by palaeoanthropologist José María Bermúdez de Castro and his team in 1994 in stratigraphic level TD6 from the Gran Dolina cave site, one of the archaeological and paleontological sites of the Sierra de Atapuerca, Spain. “I am happy that the protein study provides evidence that the *Homo antecessor* species may be closely related to the last common

ancestor of *Homo sapiens*, Neanderthals, and Denisovans. The features shared by *Homo antecessor* with these hominins clearly appeared much earlier than previously thought. *Homo antecessor* would therefore be a basal species of the emerging humanity formed by Neanderthals, Denisovans, and modern humans”, adds José María Bermúdez de Castro, Scientific Co-director of the excavations in Atapuerca and co-corresponding author on the paper.

“I really look forward to seeing what palaeoproteomics will reveal in the future”, concludes Enrico Cappellini.

The study of human evolution by palaeoproteomics will continue in the next few years through the recently established EU-funded “Palaeoproteomics to Unleash Studies on Human History (PUSHH)” Marie S. Curie European Training Network (ETN), led by Enrico Cappellini, and involving many of the co-authors on the paper, including the University of York.

The research is mainly funded by VILLUM FONDEN, the Novo Nordisk Foundation, and the Marie Skłodowska-Curie Actions Individual Fellowship and International Training Network programmes. Research at York was funded by the Leverhulme Trust and NERC.

Undergraduate students take part in RB Webinar



In recent years, RB one of our top chemistry employers, has visited the Department each year to talk to our second year undergraduates about assessment centres. Not to be deterred by the lockdown, Chemistry alumni Zoe Fitch and Sophie Clark kindly agreed to brave the technology and run their very first webinar over Microsoft Teams.



Joining the 'Introducing RB' Webinar

Over 70 students joined, mainly from Chemistry but we opened it out to Biology and Natural Sciences students as well. Despite a few technical issues it was a fantastic session. We heard about the RB's values and the 'compass' that guides the company, which produces many well-known Hygiene and Health products such as Dettol, Nurofen and Strepsils. It was interesting to hear about the impact of Covid-19 on the business which has had to ramp up production due to unprecedented demand of cleaning and healthcare products. In the second part of the webinar there was some fantastic advice on what to expect at an assessment centre including tips on how to prepare and a lively Q&A with lots of great questions from our students.

The webinar was part of a series of interview preparation activities designed to help our year two undergraduates prepare for both placement year and graduate scheme interviews which both increasingly use online tests and assessment centres as part of the recruitment process.

In addition to VLE based activities and live practice workshops over zoom, students also had access to the new shortlist.me mock interview tool which allows students to record themselves answering common interview questions from AstraZeneca, NHS digital and Teach First. There is even an interview with questions relating to the Covid-19 pandemic that may be encountered in future interviews for jobs and internships. All of the Year 2 employability resources including the Careers Symposium and '*Ideas for keeping busy over the summer*' have also been made available to all undergraduates in the Chemist's Toolkit on the VLE.

- Leonie Jones, Employability and Diversity Officer

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](#).

Equality monitoring for staff – update your record today

The University has launched a more inclusive set of equality monitoring questions which staff can now update via their MyView accounts. For the first time, the questions include: religion and belief, sexual orientation and gender identity.

We strongly encourage you to check and update your records if you have not done so already. We are particularly keen to have more accurate ethnicity data. This data is vitally important to the equality work of both the Department and the University and having more accurate information, will help us understand important issues such as the University's ethnicity pay gap.

The data will not be used to identify individuals, anonymised trend data will be made available to departmental committees that are involved with monitoring and/or accreditation schemes such as Athena SWAN, but it will only show anonymous trend data and statistics.

There is more information about the [launch of the scheme here](#), including a quote from our own Dr Avtar Matharu, who is Chair of the University Staff Race Equality Forum.

You can **update your information**:

- 1) Log in to [MyView](#) (if off-campus you will need to do this through the VON or VDS)
- 2) Select 'My Equality and Diversity'
- 3) Update your details using the drop-down options and select 'Update now'

The screenshot shows the MyView portal interface. The top navigation bar includes the 'zellis' logo, a user welcome message 'Welcome, LEONIE', an 'Account' dropdown, and a 'Sign Out' button. The left sidebar lists various user sections: 'LEONIE Employability & Diversity Officer', 'Dashboard', 'My Personal Details', 'My Equality & Diversity' (highlighted with a red circle), 'My Pay Documents', 'My Bank Details', 'My HESA Details', 'My Time', and 'My Changes/Request History'. The main content area is titled 'Equality Monitoring' and contains the following text:

Your help in providing information relating to equality is vital in helping us to anticipate and provide appropriate support services and to ensure that we are addressing gaps in achieving diversity within our staff community.

Please note that adding or changing your equality monitoring information (for example your disability status) will not alert anyone automatically; in order to start the process of identifying any access, adjustments or support needs that you may have, please contact your Line Manager or HR Adviser directly.

Please use the link to the right of this page to view the University's Equality Monitoring page for guidance.

If you are a member of academic staff, the following items of equality data, including Age, will be passed in an anonymous format to the Higher Education Statistics Agency (HESA) for overall monitoring of equality within the Higher Education sector:

- Legal Sex
- Ethnicity
- Disability

At the bottom of the main content area, there are two buttons: 'Personal' and 'Complete'.

Viewpoint: Clinically Extremely Vulnerable Chemist

By Dr Leonie Jones, Employability and Diversity Officer

Regina Brett wrote that *"If we all threw our problems in a pile and saw everyone else's, we'd grab ours back."* This quote has always resonated with me, that no matter how bad our problems seem, it could be worse and this has helped to give me a sense of perspective.

I'm what the government calls 'clinically extremely vulnerable' judged to be at the greatest risk of severe illness from coronavirus, my lungs are restricted from a combination of scoliosis and damage from subsequent chest infections. Close to the end of my PhD, I wound up in intensive care in respiratory failure and I have been on home ventilation for around 12-14 hours a day ever since. To help me balance my work and health I have always made use of [Chemistry's flexible working](#) arrangements, I use a laptop and I often do large chunks of my work in bed.



On 10 March, with the support of my line manager I packed up my things and moved to home working, feeling very awkward when attending meetings remotely a few days later. My partner James and I had some tough conversations, he reluctantly cancelled a trip to the football, for a while he continued to go out but every trip felt like a risk until events somewhat overtook us. Meetings and work trips abroad started to be cancelled, the government advised those who could to work from home.

Those of us deemed to be most vulnerable were asked to 'shield' for a period of three months. This meant some difficult choices. The people you live with don't have to shield, but if they don't, then you have to shield from them as well, that means sleeping and eating in separate rooms, using separate dishes and staying 2 metres away (3 steps) at all times. This is what we did until James moved to home working and we were able to relax a bit.

My first week of lockdown was extremely productive but after that things became much much harder. Having experienced respiratory failure, I had a very real sense of what catching Covid-19 might mean for me. I wrote a new will. I spent hours trying to secure supermarket slots. Everything that came in the house was washed or quarantined. Television images of people on ventilators or oxygen brought back visceral memories of intensive care. I started to wake up very early. When I sat down to work I was so exhausted by 2:30pm that I'd fall asleep for hours. I found it impossible to make a start on the work my line manager and I had hurriedly planned on my last day in the office.

Somewhere along the way things started to get easier, people started to talk about "the new normal" and I was able to relax my vigilance a bit. Sainsbury's gave me priority slots, colleagues have been great at touching base and it has been lovely to have lunch or after work drinkies over Zoom. Moving my

teaching online have been a whole new world of pain but I am finally feeling like I can build a VLE site and create a video recording. Having virtual seminars brings exciting new possibilities for inviting international speakers. Holding careers workshops and one to one appointments has made me feel useful.

Overall, working at this University, we are in a fortunate position. Despite a slow start our employer (and most certainly our Department) has been pretty amazing and certainly in comparison to other sectors. However, listening to the experiences of friends and colleagues it is clear that everyone's situation is different. There are those living alone who haven't seen a soul for months; those with large families living on top of each other; those who are key workers or have family working on the front line; single parents juggling 'home-schooling' and work; those who are desperate for their kids to go back to school; those who are terrified; those who have been sick with Covid-19; those who have been bereaved.

But as labs gradually start to reopen, and colleagues and students start to return to face-to-face work, I wonder where that leaves those of us who are shielding or who have children still at home? What will the new normal look like for us? Will we be left behind?

The Department has been very clear that the return to face to face lab working is strictly voluntary and no one must feel under any pressure to go in. For some this is a simple choice but we work in culture of high achievers and it is a horrible feeling to be torn between your health, your family, and your job. "I should be writing" has become "I should be working".

So thinking about the future, how do we include those of us who continue to work remotely or need more flexible hours? How do we avoid missing out on the corridor chats or invitations to dinner where discussions often continue after meetings? Will people forget us? Will we miss out on important opportunities? Many of these issues are already familiar to those with caring responsibilities.

As we consider the return to face to face teaching it is critical that we consider the needs of vulnerable staff and students and are flexible in how we do things. We must also be respectful of people's ability to cope with this unseen danger, individuals have very different approaches to risk and much of this is deeply personal.

On a more positive note, the move to remote working has been a boon to some. Many who did not feel able to work from home have discovered that it is possible. The culture of presenteeism has been forced to change overnight. Disabled people and carers have also found they are able to accept invitations to speak or attend meetings which previously would have involved travel or an overnight stay. I think many people will reevaluate their commute and the lock-down has already seen reductions in traffic emissions and improvements in air quality. I really hope some of these positive changes can be retained.

So as we start to build this new normal, let's try to keep the things that work, be creative in our thinking as we try to fix the things that don't, and most of all keep in mind that everyone has their own challenges to deal with.

Why is EDG trying to motivate the Department to decolonise its undergraduate curriculum?

Members of the Board of Studies will have seen an e-mail recently telling them that the Department's Equality & Diversity Group (EDG) is continuing to conduct work 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 at an early stage in beginning to understand what 'decolonising the curriculum' means for chemists. In a broader sense, decolonisation involves identifying colonial systems, structures and relationships, and working to challenge those systems. For an academic department, it's important for us at the outset to understand that decolonisation isn't just about the inclusion of academic work of non-white cultures in our course work. Decolonisation should provide a focus for us to think more generally about how we teach and assess, including processes such as timetabling and exceptional circumstances, and should allow for the possibility of a culture shift that provides a space for different views and ways of studying.

So why are we doing this? Firstly, it's important to say that one of the reasons we are doing this is because our students have asked us to. This has come through strongly from the student members of EDG, as well as our staff-student committee. Secondly, there is 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 (1st or 2:1) awarded to white UK-domiciled students compared to Black and Minority Ethnic UK-domiciled students.¹ This attainment gap is acknowledged to be present at the University of York. 42% of black students say that the curriculum does not reflect issues of diversity, equality and discrimination. One in ten trans students never feel comfortable to speak up in class and almost one in four women do not feel comfortable to do so. Our undergraduate courses should not disadvantage any student because of their background or characteristics. All of our students should have equal opportunities to thrive in our Department.

UUK published a report in 2019 on closing the attainment gap.² The report makes a strong case that campuses need to become "racially diverse and inclusive environments" if Black, Asian and Minority Ethnic (BAME) students are to succeed academically. BAME students surveyed as part of the review reported that they do not feel a "sense of belonging" at university. The report made clear that decolonisation should apply as much to science subjects as it does to the arts and humanities. 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."

Decolonising our curriculum provides a starting point for us to address racial inequalities, and improve the experience for all of our students. If you are interested in contributing, we have a working group composed of staff and students who are developing an action plan for the Department (e-mail: caroline.dessent@york.ac.uk).

1: <https://www.nusconnect.org.uk/campaigns/liber8-education/liberate-the-curriculum> (accessed 19/06/20)

2: <https://www.universitiesuk.ac.uk/news/Pages/Universities-acting-to-close-BAME-student-attainment-gap.aspx> (accessed 19/06/20)



Chemists' Community Fund

We're here to support our members through life's challenges with impartial, confidential help and advice. That means:

It doesn't matter what you need

Our support covers much more than just financial hardship.

It doesn't matter where you live

The fund exists to support our members, their partners and dependents internationally, not just in the UK and Ireland.

It doesn't matter how involved you've been in our work

Our support isn't contingent on your past levels of activity or previous donations.

So, if you're facing challenging circumstances, contact us.

rsc.li/chemists-community-fund