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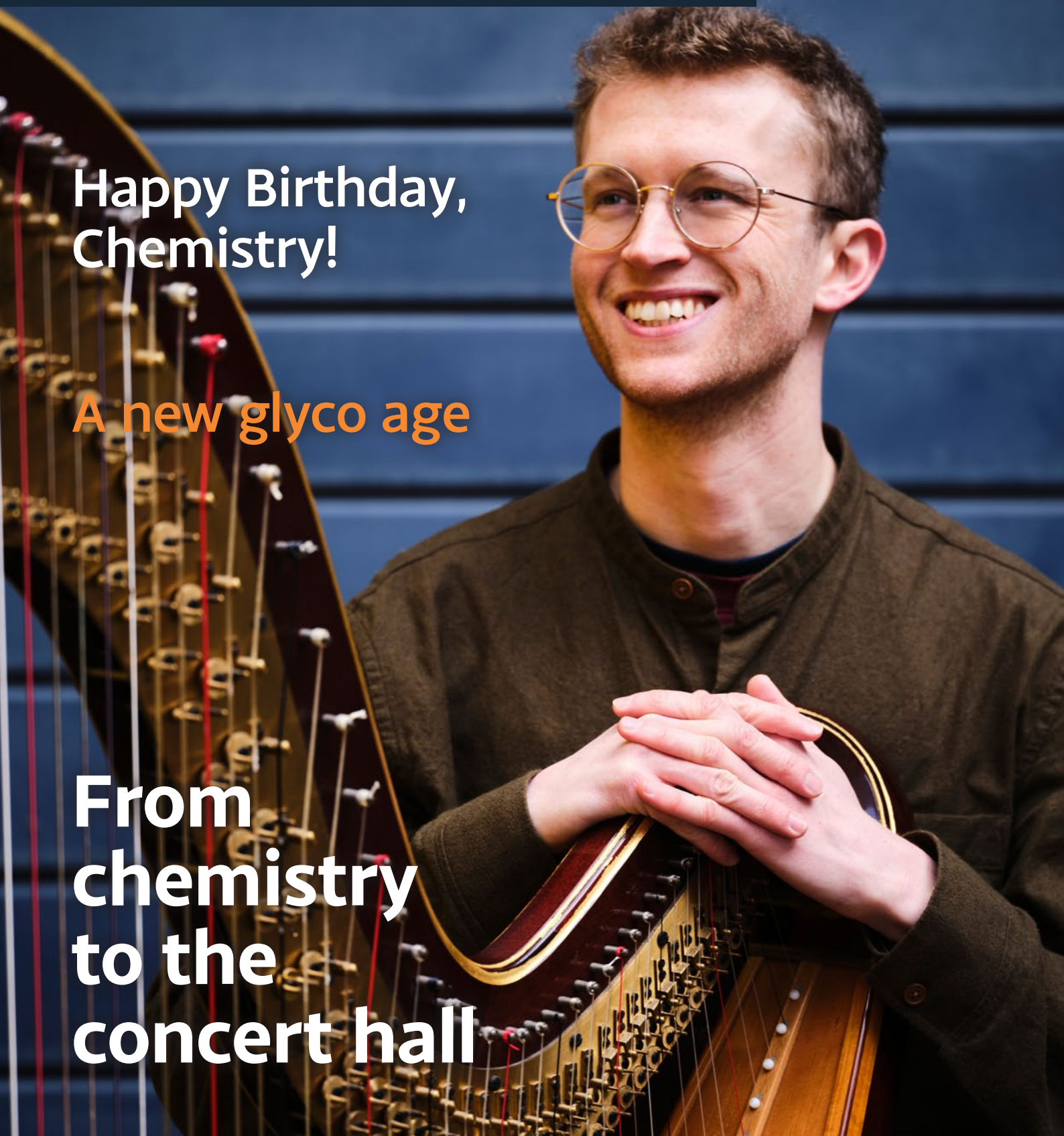
UNIVERSITY of York

ChemYork

HIGHLIGHTS FROM A LEADING UK CHEMISTRY DEPARTMENT



Happy Birthday, Chemistry!

A new glyco age

From chemistry to the concert hall

Sixty and Counting

I'M WRITING THIS PIECE AS I RETURN FROM A HEADS OF CHEMISTRY UK MEETING – A ROYAL SOCIETY OF CHEMISTRY EVENT WHERE THE LEADERS OF UNIVERSITY CHEMISTRY DEPARTMENTS COME TOGETHER TO COMPARE NOTES.

My takeaway from the meeting is that there are lots of issues in the Higher Education sector at the moment and my colleagues are all having a tough time of it. We've seen closures of a number of Chemistry departments and today I've heard of more chemists being put at risk of redundancy. It's evident to me that in York Chemistry we are in a better position than some – and that is down to three main things. Firstly, we have consistently good student numbers. Second, our research strength, spread across many different funders and with good success rates, puts us in a good position. And third, we have such amazing staff – academic, research, technical, and administrative (look out for the article celebrating this group) – all pulling together when times are challenging.

Autumn is always a busy and exciting time in the Department, as we welcome lots of new students. This year is no different with 215 undergraduate students arriving in September, along with 25 taught postgraduates and around 40 research postgraduates. This autumn, the first with our new leadership team in place, is also a time for reviewing and refreshing our strategies for research, for reflecting on teaching programmes, and for agreeing future plans with the Faculty.

Looking back over the past six months, the highlight has to be the series of events surrounding the celebrations of the 60th anniversary. On Friday 12th September we hosted a set of talks looking back at some of the most impactful research that had been carried out in the Department – focusing on some of the Impact Case Studies that were submitted by the Department for the Research Excellence Framework in 2021 and 2014. With talks from colleagues in atmospheric chemistry, and in chemical and structural biology, we heard about research including ozone chemistry, air pollution, insulin, enzyme chemistry and computational methods.

Following a meal in the City in the evening, the next day we hosted 150 alumni, former staff and current colleagues in the Department to look back over the 60-year history of the Department and forward to the future. I'm very grateful to my wonderful colleagues Jamie Blaza, Helen Sneddon, Chris Spicer, and Charlotte Willans for giving accessible talks on some of the areas of Chemistry that are great importance now and in the future. A real highlight was hearing Nigel Lowe and David Pugh talk about teaching and teaching labs through the ages. David had pulled together a great slide show of photographs documenting, among other things, the construction and destruction of the old C block, the building of the new teaching labs (F block) and the aftermath of the fire of 2012. Meanwhile lots of old memories were shared over lunch, refreshments and looking at some examples from the Departmental photo archive (including old year-group mug shots, and photos from the aftermath of 'Great Fire' of 1980).

It is my intention that the 60th event is just the start of a new relationship between the Department, alumni, and those who have worked here in the past. I've entered into a discussion with the University archivist to see if we can get more of the Departmental photograph collection digitised, and we will also be asking if people have items that might form part of a wider York Chemistry archive (photographs, testimony, paperwork of many sorts) from across our 60 years. Watch this space.

So, I'm approaching the end of 2025 feeling positive about the future. The contents of this version of ChemYork should also give reason to be cheerful. These include articles on research relating to the York Structural Biology Laboratory and an insight into the policy work emanating from the Wolfson Atmospheric Chemistry Laboratories. We introduce our newest colleague, Max Veit, and catch up with alumnus Oliver Wass, who following graduation from his Chemistry undergraduate degree went on to study music and is now Professor of Harp at the Royal College of Music. Following our celebration of the technicians in the previous edition of ChemYork, there is a piece highlighting the crucial work of the Administrative Support Staff in the smooth running of Chemistry. This is a group that I have worked closely with as Chair of the Board of Studies, Deputy Head of Department (Teaching) and now as Head of Department. The Support Staff are absolutely critical to the running of the Department. Whether it is supporting research, teaching, student experience, admissions, technology, finance and many, many more things, the Department would grind to a halt without them. These teams have undergone a lot of change in the past few years, but we have worked hard to maintain the sense of community upon which the Department is built. Happy reading!

> "It is my intention that the 60th event is just the start of a new relationship between the Department, alumni, and those who have worked here in the past.

Front cover image: *Chemistry graduate and Professor of Harp, Oliver Wass*
Compiled by *Duncan Bruce*
Designed by *Cookie Graphic Design*

Writing for a sustainable future

NEW UNDERGRADUATE REBEKAH HALD WAS NAMED AS A FINALIST IN THE INTERNATIONAL ESSAY COMPETITION 'YOUNG VOICES IN THE CHEMICAL SCIENCES FOR SUSTAINABILITY'.

Rebekah Hald has just joined the Department as a first-year student after completing a gap year working in the Pharmacy Department at the Royal Papworth Hospital in Cambridge. While there and studying towards some qualifications in dispensing, she came across the essay competition *Young Voices in the Chemical Sciences for Sustainability* conceived and organised by the International Organization for Chemical Sciences in Development based in Namur in Belgium and run in conjunction with the Royal Society of Chemistry.

With over 180 entries from around the globe, Rebekah was chosen as a Europe and Central Asia finalist for her essay entitled *Chemical Sciences: Changing How Plastics are Recycled; a Review of Current Research and Innovation*, which can be downloaded here*. However, the scale of Rebekah's success is brought into even clearer focus as the seven regional winners were all either postgraduate students or postdoctoral fellows. Hers is quite some achievement. Rebekah said, "I'm really interested in green chemistry and creating a sustainable future, so I focused my research on different chemical methods to break down plastic polymers to create new and useful materials".

The complete collection of finalists' essays, including Rebekah's, can be read and downloaded here, which also contains links to the winning essays (published in RSC Sustainability).

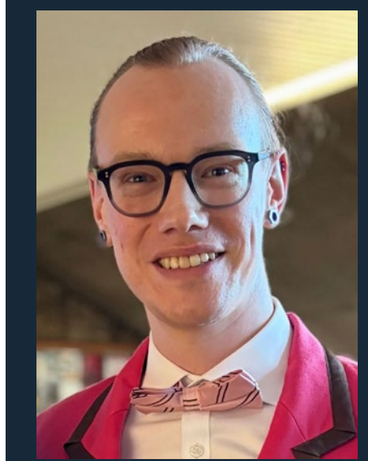
Well done, Rebekah!

** We thank IOCD for permission to extract Rebekah's essay from the winning collection.*

Welcome, Max

MAX VEIT RECENTLY JOINED THE DEPARTMENT AS A LECTURER IN DIGITAL CHEMISTRY.

Max has spent his life on both sides of the Atlantic, growing up near Hamburg, Germany and moving as a child to beautiful Minnesota, USA. While his early hobbies of skiing and rock climbing would be destined to remain hobbies, his other hobby – computer programming – quickly turned into a full-blown academic passion.



After a first degree in Physics and Computer Science at the University of Minnesota in 2014, Max moved to the UK for his PhD, working with Professor Gábor Csányi at the University of Cambridge, whose group pioneered the technique of machine learning potential energy surfaces. This technique allows highly accurate atomistic simulations at a tiny fraction of the original computational cost, unlocking a new level of realism in atomistic and molecular simulations. He next moved to a postdoctoral position at EPFL in Switzerland with Professor Michele Ceriotti, where he extended the technique with molecular dipoles and condensed-phase polarisation, followed by another position at Aalto University, Finland, with Professor Miguel Caro. Here he began working on simulations of realistic, disordered systems with technological applications, particularly lithium-ion battery anodes. Before joining us in York, Max held a six-month UNITE! visiting professorship at the TU Darmstadt, Germany.

As a new lecturer in the Department, he is looking forward to finding new applications of the data-driven methods he has helped create, applying them in collaboration with experimental experts across the Department to gain better insights into the physical basis of different chemical processes. He has started teaching on the MSc in Data Science and has a particular interest in the department's EDI initiatives, through which he is especially keen to make sure that the voices of neurodivergent and LGBTQ+ people are heard. Outside of work, he most enjoys cooking and travelling with his partner Ann.

A Diamond Year for the Department

OVER TWO DAYS IN SEPTEMBER, THE DEPARTMENT CELEBRATED ITS FOUNDATION BACK IN 1965 AND WELCOMED BACK A NUMBER OF FORMER STAFF AND STUDENTS.

Celebrations for the 60th Anniversary were in two parts, kicking off on the Friday afternoon with an exposition, chaired by Professor Anne Duhme-Klair, of some of the science behind Impact Case Studies that the Department has submitted as part of its submissions to the last two Research Excellence Framework (REF) exercises. Impact Case Studies give the Department the chance to describe and celebrate the effect, influence and real-world benefits of its research.

The first session saw presentations from members of YSBL. The late Guy Dodson had been at the heart of a long-standing collaboration with Novo in Denmark and **Marek Brzozowski** described how YSBL has been involved in all key insulin research discoveries that had helped in the understanding of insulin as a pharmaceutical product for diabetes, including the clinically important fast- and slow-acting insulins.

Gideon Davies described York's long history of working with Novo-Nordisk/Novozymes/Novonesis on the structure and function of enzymes for societal application. York's insights cover the enzymes of biofuel production, through baking and brewing, to all the enzymes of washing powders: proteases to remove protein stains, engineered lipases that remove fat stains, cellulases for particulate removal and colour brightening, and amylases for starch removal.

Kathryn Cowtan then went on to show how YSBL has been involved in the development of software for protein X-ray crystallography for many decades. One package in particular, Coot, developed around the turn of the century, has achieved almost universal usage due to its ease of use, modern design and the adoption of open source principles.

Friday's speakers (L to R): Anne Duhme-Klair, Gideon Davies, Rosie Chance, Derek Wann, Lucy Brown, Kathryn Cowtan, Ally Lewis and Marek Brzozowski.

After the break, **Ally Lewis** presented research from WACL which has shown that, while the use of hydrogen as a low-carbon fuel is seen as attractive, when blended with natural gas, emissions of NO_2 rise, leading to a reduction in air quality. These findings have subsequently been cited by government agencies in recommending against the use of hydrogen as a fuel.

Ozone can be both beneficial as when found in the stratosphere where it can act to filter UV radiation, and harmful when it is in the lower atmosphere and a toxic component of the air we breathe. **Lucy Brown** and **Rosie Chance** presented research led by Lucy Carpenter in WACL that has shown the way in which marine sources of halogens, in particular iodine and bromine, can deplete ozone levels. These data are essential in generating accurate and credible forecasts of ozone layer recovery, which feed subsequently into the Montreal Protocol.

The next day saw a gathering of many former students along with both current and former staff members, in which a good deal of catching up and reminiscing was punctuated by a series of forward-looking research and teaching talks. Vice Chancellor Charlie Jeffery kicked the day off by reminding everyone about the University's founding principles, after which Head of Department Derek Wann followed with a potted history of the Department's development from Dick Norman and David Waddington planning the buildings and syllabus, right up to the present day with York Chemistry ranking 4th in the UK according to the 2026 Times and Sunday Times Good University Guide.

Nigel Lowe on presents Developments in Teaching.

Some of the participants at Saturday's event.

> "I thought the 60th Anniversary day was a wonderful celebration of the Chemistry Department.

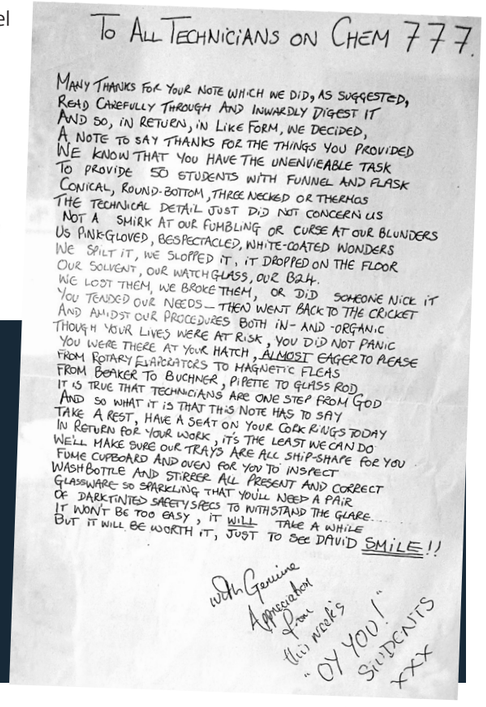
There followed four research talks, kicked off by **Jamie Blaza** from YSBL (The Chemical Basis of Life within Living Cells), followed by **Helen Sneddon** (Green Chemistry Centre of Excellence – Part of the Solution), **Charlotte Willans** (Emerging Technologies for a Sustainable Future in Chemistry) and **Chris Spicer** (Chemical Tools for Biological Challenges). The audience was wowed with their ambitious research aims and progress, together with their enthusiasm, communication skills and collaborative outlook. The focus then shifted to teaching with a real *tour de force* from Nigel Lowe and David Pugh entitled 'Developments in Teaching in Chemistry@York', which mapped the changes in the teaching structure and in laboratory classes over the 60 years. Noteworthy were the continuing success in recruiting high-quality chemistry students (from 55 in 1965 to 220 in 2025), fitting them all into the Teaching Lab and the great success of the four-year MChem courses with a Year in Industry or a Year Abroad in Canada, continental Europe, Japan, New Zealand and Singapore.

A very generous lunch followed with the decibel level rising steadily as old friends reunited and old students reminisced with (and about) their tutors, teaching lab technicians, lecturers and research supervisors. Many visitors then went on tours of the department and came back amazed at the quality of the new teaching and research laboratories and the state-of-the-art equipment.

The celebration brought home the caring and supportive nature of the Department, as established by the founders and continued to the present day and was summed up beautifully in an email to Bruce Gilbert after the event from Lindsay Reynolds (née Nelson, 1970-73), who wrote: 'I thought the 60th Anniversary day was a wonderful celebration of the Chemistry Department. I'm sure that you, as one of the founder members, must be very proud of the thriving place it is today.' And so say all of us!

Poetry in Motion

One aspect of the Department's history that wasn't covered in the celebrations was the fact that for some 20 years it played host to Open University Summer Schools, which were a formative experience to hundreds of students and tutors. Many of you reading will remember Dave Lindsey (who retired in 2010) in the teaching labs who, when not keeping our own undergraduates in line, assisted in the delivery of these courses. Dave clearly had quite an impact on the OU students, too, as at the end of one of these courses, they presented him with this splendid poem.



To All Technicians on Chem 777

Many thanks for your note which we did, as suggested,
Read carefully through and inwardly digest it
And so, in return, in like form, we decided,
A note to say thanks for the things you provided
We know that you have the unenviable task
To provide 50 students with funnel and flask
Conical, round-bottom, three necked or thermos
The technical detail just did not concern us
Not a shirk at our fumbling or curse at our blunders
Us pink-gloved, bespectacled, white-coated wonders
We spilt it, we slopped it, it dropped on the floor
Our solvent, our watch glass, our balk.
We lost them, we broke them, or did someone nick it
You tended our needs — then went back to the cricket
And amidst our procedures both in- and -organic
Though your lives were at risk, you did not panic
You were there at your hatch, almost eager to please
From rotary evaporators to magnetic fleas
From beaker to Buchner, pipette to glass rod
It is true that technicians are one step from God
And so what it is that this note has to say
Take a rest, have a seat on your cork rings today
In return for your work, it's the least we can do
We'll make sure our trays are all ship-shape for you
Fume cupboard and oven for you to inspect
Wash bottle and stirrer all present and correct
Glassware so sparkling that you'll need a pair
Of dark-tinted safety specs to withstand the glare.
It won't be too easy, it will take a while
But it will be worth it, just to see David smile!!

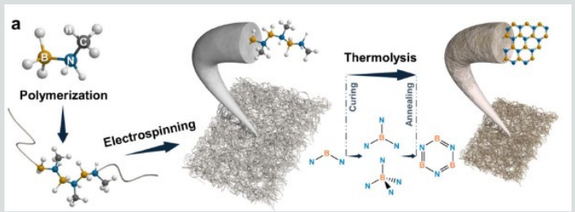
With Genuine Appreciation from this week's "Oy You!" Students xxx

STOP PRESS STOP PRESS STOP PRESS

Hexagonal-boron nitride (hex-BN) fibres can outperform carbon fibres in extreme environments. New collaborative work from York (**Professor Andy Weller**) and Oxford (Professor Nicole Grobert) reports a straightforward synthetic approach to hex-BN fibres using catalytic methods for the controlled synthesis of BN-based inorganic polymers.

The teams have developed and patented a new, straightforward, route to hexagonal boron-nitride (hex-BN) fibres, which are lightweight, oxidation resistant, mechanically strong, and electrically insulating materials. While they are of particular interest for use in extreme environments where carbon fibres can fail, existing routes to hex-BN fibres use BN polymer precursors which are difficult to source and manufacture .

The collaborative study reports efficient, catalytic synthesis of a new class of BN-containing polyaminoboranes, which gives precise control of the chain-length of the resulting polymer on a scale useful for onward exploitation. The Grobert group then used their expertise in electrospinning to fabricate well-defined polymer fibres that can then be heated to produce hex-BN fibres. The work, which could transform the take-up of these materials in next-generation technologies, is published in Advanced Composites and Hybrid Materials.



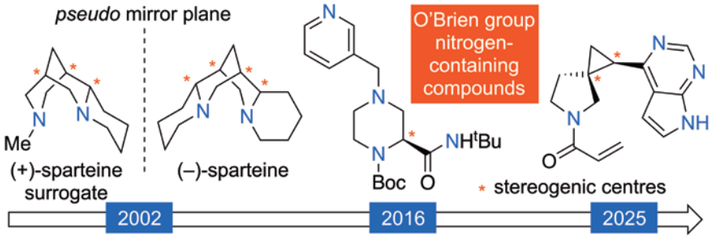
Dr Martin A. Fascione has been awarded the prestigious 2025 RSC Dextra Carbohydrate Chemistry Award, recognising his exceptional contributions to the field of carbohydrate chemistry and chemical glycobiology.

The RSC Dextra Carbohydrate Chemistry Award is one of the UK's leading prizes in the field, honouring early-to-mid-career researchers whose work demonstrates excellence and innovation in carbohydrate science. Dr Fascione is being recognised for his innovative approaches in chemical glycobiology that explore and disrupt key biological mechanisms, with broad implications in biomedicine, infectious disease research, and drug development.

In My Element – Professor Peter O'Brien

As an organic chemist, it would have been tempting to choose carbon as my favourite element. However, I've gone for nitrogen because it's the element that has dominated my research throughout my nearly 30 years at the University of York. From using chiral lithium amide bases during my PhD to the latest publications from my research group, nitrogen, in the form of amines, has been a constant companion. And, for more than ten years, I have delivered a third-year lecture course which teaches our students all about the methods commonly used in the pharmaceutical industry to synthesise nitrogen-containing compounds. My favourite feedback from that course was "Big molecules do not scare me any more!"

Our work is focused on the development of new methodology for the synthesis of medicinally relevant, nitrogen-containing compounds. Essentially, we target methods that could be useful for the synthesis of the pharmaceuticals of the future and, to do this, we have collaborated with a range of the large and small pharmaceutical companies. Specifically, we love to work on the synthesis of compounds that have nitrogen in a ring with one or more chiral centres (more correctly, stereogenic centres as I like to remind the undergraduates!) – see Figure. The work for which we are best known and which was disclosed in 2002 (*J. Am. Chem. Soc.* 2002, **124**, 11870) is the development of a compound that we christened the '(+)-sparteine surrogate', a chiral diamine that behaves as the mirror image of the widely-used chiral ligand (–)-sparteine. The (+)-sparteine surrogate also featured in a 2016 paper on the asymmetric synthesis of piperazines, a common motif in drug molecules (*J. Am .Chem. Soc.* 2016, **138**, 651). Over the last few years, in collaboration with AstraZeneca, we have been developing new synthetic methodology for use in fragment-based drug discovery. This culminated in our modular synthetic platform, reported this year, that delivered a cyclopropyl pyrrolidine compound that inhibited the JAK3 protein with IC50 = 69 nM (*J. Am. Chem. Soc.* 2025, **147**, 29292). As you can see, nitrogen has served us well thus far and we have lots more ideas of where to take it in the future!



Where are they now?

Oliver Wass – BSc(Hons) 2015

AFTER GRADUATING WITH FIRST-CLASS HONOURS IN 2015, OLIVER WASS FOLLOWED HIS OTHER PASSION AS A HARPIST. NOW A PROFESSIONAL SOLOIST AND MEMBER OF THE PELLÉAS ENSEMBLE, WHICH HE CO-FOUNDED, HE WAS RECENTLY APPOINTED PROFESSOR OF HARP AT THE ROYAL COLLEGE OF MUSIC.

You come from a musical background, so it was inevitable that music would form some part of your life. Can you tell us something of your journey with the harp?
My mum is a professional harpist, so I grew up sitting on her knee while she was teaching, later hanging around backstage at the Royal Opera House while she was playing. She wasn't keen on me also playing the harp at all, hoping for something more sensible, so my choice to take it up at the age of 9 was my (admittedly rubbish) way of rebelling.

Nonetheless, in a recent Radio 3 interview, you told of being something of an alchemist in the basement of the family home. Where did your passion for Chemistry come from?
From quite a young age I was obsessed with fireworks. I was home educated - although that term implies significantly more structure than I had. I would take apart fireworks to see how they worked, and use the components to make my own. My dad is a woodworker and general handyman, so I think something of that practical and inquisitive nature passed to me.

My parents were happy to let me get on with doing my own thing. Back in the early 2000s you could buy most common oxidisers and colour-forming Group 2 compounds on eBay. They bought me a ball mill, so I could make my own black powder, and then with my potassium nitrate, sulfur, charcoal, sodium benzoate, potassium perchlorate and various Group 2 compounds, I was away! Aside from once setting fire to the roof of the house, I had a fairly successful career as an amateur chemist.

> "I'm very proud of my degree from York

Enjoying both Chemistry and Music, can you tell us about your choice of degree and how the course structure at York helped?
I loved Chemistry and was extremely excited to study it, but knew from the start that I wanted to be a professional musician. I practised the harp for three to four hours every day, playing in various university orchestras and ensembles at York, and travelling to London to perform at weekends. This was quite a workload while trying to do a Chemistry degree. However, the degree structure at York allowed me to follow this unusual combination as I could receive course credits by taking optional modules - *i.e.* Music modules in Years 2 and 3. This was a crucial factor in my choice of York as a place to study. While I'm sure I missed out on some interesting biosynthesis of polyketides, terpenes and alkaloids (sorry Dr Routledge), it meant that my hours of practice were recognised formally. I also had an incredibly supportive Supervisor in Chemistry – Brendan Keely – who understood the balance I was trying to strike.

With labs, lectures and tutorials, much of your week was structured. How did you balance these demands while still practising and performing?
It wasn't easy and was often stressful and pressured. I wouldn't necessarily recommend doing what I did, and a look at my lab report cards might show some corners were cut. Pro tip: you can run eight TLC samples at the same time if you curve a long bit of strip round the inside of a beaker.

You won the Blake Music Prize in York with the highest ever mark for a final recital, next winning a full Masters scholarship to the Guildhall School of Music and Drama. Then, in your first year, you were the first ever harpist awarded their Gold Medal in its 110-year history. What inspires you to such musical heights?

Science and music do often go together, and excellence in one doesn't preclude the other. Einstein was a dedicated violinist, while Alexander Borodin, the famous Russian composer, was primarily a chemist, most notable for his co-discovery of the aldol reaction. My meagre talents in chemistry mean that I've got a lot of making up to do in the music department. Practising an instrument from a young age, memorising a lot of music, and having to structure your own practice means you get good at learning things. The discipline and understanding of how to learn are readily transferable skills.

You've played in venues all over the world. Is there one where you particularly enjoy performing?
It's the people I'm performing with, the audience, and my own state of mind that make a performance special. I've had uplifting performances in village halls, and a stressful and not very enjoyable experience playing in Carnegie Hall. It's not always the venue!

In preparing for this interview, I found that, despite your success with the harp in your now chosen career, your degree in Chemistry always gets a mention. What did the time in York mean to you?
I'm very proud of my degree from York; it always gets a mention near the top of my biography and audiences seem to appreciate it. The many friendships I made at York are extremely important to me. I don't know if lab partners are still allocated in alphabetical order but I had the good fortune of sharing a fume hood with a Mr Wainwright, who was my best man when I got married last year.

Glycans and the Glyco-Future

YSBL'S GIDEON DAVIES WAS AWARDED A PRESTIGIOUS ROYAL SOCIETY KEN MURRAY RESEARCH PROFESSORSHIP IN 2017, WHICH WAS RENEWED IN 2021. WITH THE AWARD COMING TO AN END NEXT YEAR, GIDEON REFLECTS ON OPPORTUNITIES AND OUTCOMES ALIKE.

I recall when you applied for the RS Professorship and then when you learned you had been successful. How did it feel at the time?

It was my second or third attempt, so there was confusion, absolute joy, and relief all at the same time. I'd applied before and the first time, the email with the outcome started with the word 'Congratulations'... for *almost* getting a Professorship. So, when I was eventually successful, you can imagine that I read and re-read the email, just to be sure. I was emotionally spent before I could begin to celebrate.

What was the thrust of the research programme that you proposed?

I focused the application around three themes shaped by what I described as a 'new glyco-age'. The first was a personal scientific programme centred on human and medical glycochemistry and I coined the phrase 'retrobiology', mirroring the concept of retrosynthesis. My vision therefore involved backward-mapping an analysis of biological questions, with the glyco phenomenon systematically deconstructed into simpler mechanistic and key chemical/enzymological events and interactions, right down to tractable experiments.

I wanted then to focus on the roles of carbohydrates in neurodegeneration, cancer and the imaging of human and pathogen enzymes in health and disease. I particularly wanted to develop new inhibitors and probes based on 3-D structure and curly arrow mechanism.

The second was to give this work a wider vision and demonstrate huge added value. In my case that was about a wider expansion of chemical biology and, as described below, the enhancement of capability and infrastructure to secure a legacy beyond my scientific outputs.

Thirdly, it was important for me to keep my undergraduate teaching in this space to enthuse and encourage our students towards using chemistry to tackle biology.

The application had said 'To deliver new translational glycoscience on key mammalian targets, to drive major cross-campus investment in York, and to inspire a new generation of chemical biologists in York trained to solve the challenges of future society'. Yikes. Did I really write that? Well, I believe we went a long way towards making it a reality.

> "It is a real honour to be funded by a man who did so much to study the enzymes of modern biotechnology.

What difference did the Professorship make in allowing you to undertake this work?

The major change was how it allowed us in York Chemistry to expand both chemical and structural biology. The RS Professorships demand the appointment of at least one new academic in your defined area, and we recruited Dr Lianne Willems. We were then able to use a significant gift from Tony Wild to leverage funding for both the CryoEM (appointing Professor Jamie Blaza in the process) and the Eleanor and Guy Dodson building. It also allowed us to raise money to replace the ageing X-ray equipment. I feel this has gone a long way in establishing a lasting legacy.

One of the greatest benefits was the time, intellectual freedom and space it provided. I could engage more deeply with my group and, with the available 'pump-priming' support, launch new projects and especially new collaborations. So, in 2020 I was fortunate to receive an ERC Synergy grant (£2.7M to York) to work with Carme Rovira (Barcelona) and Herman Overkleeft (Leiden) on the development of activity-based probes. The back-and-forth grant writing, dealing with incredibly detailed and challenging feedback was made so much easier through the time and flexibility that the Professorship allowed.

Perhaps the biggest personal shift was the move into mammalian glycochemistry. YSBL had a tradition of gene expression in bacterial systems, but these, (*e.g. E. coli*) very rarely work for expression of human and other mammalian proteins which demand Baculovirus/insect cell or human cell line expression systems. However, these are slow, phenomenally costly and require very specialist skills and equipment. My professorship, in tandem with Professor Marek Brzozowski getting funding to work on the insulin receptor, allowed YSBL to set up mammalian gene expression and to study larger, more complex human proteins. In my case this was the enzymes of carbohydrate synthesis and degradation, making a transformative change in the kinds of projects my group could tackle.

This all led to a sea change in the training we could offer. Former group members from this period now hold academic positions in Southampton,

Oxford, Leeds, Berlin and Wrocław. They all use mammalian gene expression in their jobs. Many more use these mammalian-expression skills in industry both in the UK and abroad. Their success is the real testament to the impact of the Professorship.

What have been your most important findings?

Findings – oh gosh – that's a difficult question. I think given the mammalian glyco-medicine focus, I would point to the areas where the work genuinely followed a mechanism-to-structure-to-human cell work translational flow.

O-GlcNAc is a sugar that can bind reversibly to, and is implicated in the stability of, brain proteins such as tau, amyloid and α-synuclein (the 'Parkinson's protein'); the enzymes responsible for its installation and removal are key drug targets for many neurodegenerative diseases. The Professorship allowed us to reveal the first 3D structure (using the newly acquired CryoEM!) of one of O-GlcNAc's key enzymes, whilst our work on the drug target O-GlcNAc hydrolase has been foundational to the groups and companies that have O-GlcNAc modification inhibitors in clinical trial. To have enabled a lot of that work is very pleasing.

I love our human heparanase work; one of the most sought-after structures in glycoscience and one which our mammalian gene expression first enabled. That led to activity-based probes with Overkleeft, which then evolved into specific curly-arrow-based inhibitors that work in anti-cancer animal models better than any in clinical development. Whether anyone takes up the patent, or whether our small startup company in the Netherlands succeeds, we will see. But going from an idea, through human work to cellular and animal models is exactly what I had in mind when I started writing the application, so to see it come to fruition was wonderful. I'd never have done that without the Professorship.

Similarly, through the ERC Synergy grant we have been able to apply a similar ethos to anti-viral targets. During Covid we worked on host cell enzymes that can be inhibited to reduce release of active virions. More recently we have worked on powerful anti-influenza compounds that work exceptionally well in classical cellular anti-flu assays. I hope they go forward. This work is particularly pertinent not least in the way it leads neatly into the next question...

The Professorship was funded using a bequest from a previous fellow – Professor Ken Murray FRS – who was born 30 miles down the road from here and who was a chemist turned molecular biologist. How has that more personal nature of the funding been important to you?

There is something extremely humbling about being funded from a personal bequest. That someone has given up their own personal money to enable science is quite beautiful.

Ken Murray was born just South of Leeds, started as a technician in pharmacy and did a degree part time. His research life actually started with a disaccharide of mannose and glucosamine; two of my favourite and most studied sugars! At one point, he accepted a job at the then newly founded University of York, but following a 'difficult exchange' with a senior administrator about a delay in starting – following a serious car crash – he resigned essentially before starting.

It is a real honour to be funded by a man who did so much to study the enzymes of modern biotechnology such as those used to cut DNA at specific positions (restriction enzymes), and who later moved into applied science with the first recombinant vaccine – one against Hepatitis B. Given my ethos to move from fundamental enzyme work to societal application, it is a profound privilege to be following a path shaped so strongly by his example.

The Engine Room

OUR PROFESSIONAL SERVICES STAFF (PSS) ARE CRUCIAL TO THE SMOOTH FUNCTIONING OF ALL THE ACTIVITIES THAT OCCUR WITHIN THE DEPARTMENT, YET SO MUCH OF WHAT THEY DO CAN BE UNSEEN. IN OUR LAST EDITION WE INTRODUCED OUR TECHNICAL TEAM, WHILE IN THIS EDITION WE FOCUS ON OUR ADMINISTRATIVE SUPPORT STAFF.

It is difficult to capture the range of things that need to happen to make a Department like Chemistry run smoothly. With over 230 staff, 140 postgraduate research students and 650 taught students (plus 290 Biochemistry undergraduates), with an annual financial turnover in excess of £25M, and with a research and teaching function spread out across four sites from WACL, CHyM and YSBL to A-F Blocks, it is immediately clear that we are a large and complex operation.

Just over a year ago, much of the PSS function in Chemistry was merged with that of Environment and Geography to create a single team across both Departments. Complemented by members of other teams who work across the wider Faculty, there is a well-developed support infrastructure that covers all aspects of the Department's day-to-day functioning. Thus, there are staff supporting the Department's senior management and technical functions, HR, Careers, Equality and Diversity, IT Support, Research Support, Timetabling, Finance, Admissions, Outreach and Student Support (UG and PG taught and research).

The wide range of functions does not, however, reflect the way that so many different aspects are interrelated, so that in just one example, the **Research Support** team help in preparing bids for funding and managing successful applications, which in turn relies on support from **HR** (appointing research staff) and the involvement of **Finance** in the strategic planning and monitoring of income and expenditure streams.

A large grouping is the **Student Services** team, split across four areas and looking after the whole student journey from STEM outreach at secondary schools, through admissions, arrival, all the way through to exams and graduation. Within **Student Experience**, colleagues look after the Department's work in outreach and admissions (more than 1,000 applicants each year) as students are choosing where and what to study. Then, once the students are here, the team is concerned with course engagement and a good degree of student wellbeing, providing support to those who require extra help or adjustments, or who may need to take a break from their studies. Working alongside them is the **Undergraduate** team, whose role it is to look after all of the academic matters concerning the current undergraduate cohort, such as timetable, exams, marks, tutorials and all of the accompanying record keeping. A very similar role is performed by our **Postgraduate Taught** team who concentrate on all things related to students studying on one of our taught Masters programmes.

The **Postgraduate Research** team are then responsible for our research MSc and PhD students, dealing with, in addition, contracts, teaching laboratory demonstrating, funding, progress meetings, final submissions and viva examinations. This group deals also with the complexities arising from allocating students to the multiple different funding streams in this area, from direct UKRI and charity support, Doctoral Training Partnerships and Entities, and the generous philanthropic support provided under the auspices of the Chemistry Wild Fund.

One of the joys of working in Chemistry is its diverse nature and this is seen in, and embraced by, every aspect of the Department's workings. The diversity is reflected not only in our student and researcher populations, but in the work that PSS administrative staff do to support equality, diversity and inclusion activities embedded in our culture and processes.

Student Services Manager, Alison Edmonds said, "Looking back over the last three years, we have seen such a change with the Student Services Team, now working entirely digitally and together in a large, bright and newly refurbished space and learning new skills to support our students better."

Head of Faculty Operations across the two Departments, Matthew Badham, agrees commenting, "Becoming a unified team was a huge challenge alongside the many changes that are happening to professional services across the University. I think we've managed this significant change with great success and without losing a sense of the departmental cultures that we continue to support across both Departments."

In the cameos opposite, some team members give an insight into their role.

> "With over 230 staff, 140 postgraduate students and 650 undergraduate students, and with an annual financial turnover in excess of £25M, it is immediately clear that we are a large and complex operation.

Nick Abbott

I have worked in the Chemistry Department since 2006 and am now part of the Student Experience Team. It's a varied role dealing with enquiries, supporting students with Support Plans, ensuring students with special requirements for teaching and exams have their needs met and monitoring laboratory attendance and following up non-attendees. In addition, I assist with student and Departmental events, including Visit Days and Open Days, deal with the processing of handouts, monitor parking permits, log lost property, maintain stocks of teaching supplies in teaching rooms and deal with post and staff pigeonholes.

Rhiannon de Palma

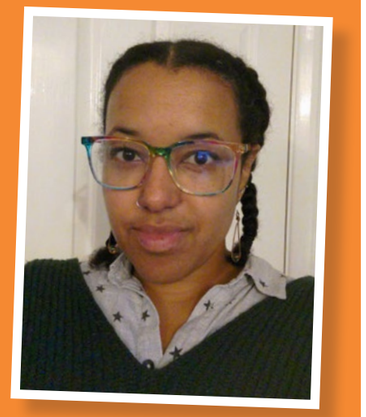
I started in Chemistry in 2019 as an administrator for students from their initial registration through UCAS all the way to graduation. I was asked to take on the industry support role two years ago, assisting Neil Hunt in organising placements and supporting the industry students before and during their year out, developing rapport with contacts from industrial companies and welcoming them into the department on interview days. I also support each year's new intake of undergraduate students, as they embark on their chosen degree programme. I work collaboratively across both departments to maintain a good student experience through induction events, exams and assessments, student changes and wellbeing.

Sarah Higginbotham

I am the Research Environment and Development Coordinator for Chemistry. In this broad and varied role, I collaborate closely with the Deputy HoD for Research and the Chair of Department Research Committee to support the Department's research activity, priorities and culture, including providing tailored support for academic colleagues with research funding opportunities and applications. I graduated with an MChem in 2007, following which I began a 16-year career in publishing as Senior Commissioning Editor for Wiley's chemistry book programme. In Spring 2024, I took the opportunity for a career change and began my current role. While the past 18 months have involved a steep learning curve, I'm really enjoying the challenge and the opportunity to play a role in the thriving, world-class research programme within the Department.

Jade Richards

I've been an administrator in the Staff Administration team and PA to the HoDs in Chemistry and in Environment and Geography since January after working in the Law School for three years. As well as email and calendar management, I support the team with HR tasks, payments, events and various admin queries from the wider department. Outside of UoY, I am a writer and community organiser. It is great to have a role where I am supported to embed my commitment to social justice into my work wherever possible; through events, initiatives and networks that support and build solidarity with marginalised students and staff.



From the Bench to the Corridors of Power

RESEARCH FROM THE WOLFSON ATMOSPHERIC CHEMISTRY LABORATORIES (WACL) HAS MANY REAL-WORLD IMPLICATIONS. DR SARAH MOLLER, WHO WORKS WITH POLICY MAKERS TO DESIGN AIR POLLUTION RESEARCH MORE RELEVANT TO DECISION MAKERS, REFLECTS ON THE CHALLENGES AND OPPORTUNITIES OF THE SCIENCE-POLICY INTERFACE.

How did you first get involved in policy?

During my PhD here, I became interested in communicating science and enjoyed the perspectives on research that came from discussing my work in schools and at public events. Then an opportunity arose for a joint position between the University and the Department for the Environment, Food and Rural Affairs (Defra) to support Defra's Air Quality Expert Group. This role gave me valuable insight into the day-to-day work of civil servants and how to communicate research to them.

How has your work with Defra developed?

I identified opportunities to develop more effective knowledge exchange between Defra and academics, winning two successive Knowledge Exchange Fellowships which allowed me to progress my ideas. This involved developing new mechanisms to get academic research used in policy making, building relationships and establishing myself as a trusted broker. While I retain this role as knowledge broker, we now involve Early Career Researchers and PhD students in research developed in partnership with policy makers. This is now very much a two-way process.

What's the balance between information requested from you and information that you seek to pass on?

It is a fairly even split. In my academic work, I always look for research of interest to Defra, and have regular meetings at which I can raise new ideas, issues and insights. Conversely, I also receive requests from Defra to look into specific areas, which can involve new experiments and analysis that become the focus for my research group. Knowledge exchange is a conversation that evolves over time and often leads to further opportunities, a recent example being a Defra-funded PhD studentship focusing on air pollution inequalities in England.

In your role, you represent not only the work carried out in WACL, but atmospheric science across the UK. How does that work?

First by attending lots of meetings! I don't travel as much as I used to now that I have a small child, so I rely on my reputation to get me the information that I need. People inform me of projects in planning, emerging results and key meetings. I am helped by Dr Daniel Bryant, a postdoctoral researcher in my group, who scans research activity, identifying areas of potential policy interest

You talk to both scientist and non-scientist policy makers in your role. Do you have particular strategies to get your message across?

The key is listening before talking and to know your audience. Be aware of their priority areas, what they are interested in, ways of working that they appreciate and what might be their biggest headache at that point in time. If your communication addresses, or even just appreciates, the challenges and interests they have, a positive response is far more likely.

Is there a piece of work that you've done that gives you particular satisfaction?

I was involved in conversations to develop the Government Clean Air Strategy. The intention was to get expert comment from academics once there was an agreed, near-final draft. I pushed for much earlier engagement and was asked to develop a programme to show how that could work. This led to input from initial idea development, through drafting and into final expert comment. This influenced the strategy itself as well as enabling officials to see the value of more open conversations earlier in the policy process to include the most up-to-date evidence. This approach was then used again in the air pollution target-setting process for the Environment Act 2021 and, as a result, a method developed by one of my students and adapted in partnership with Defra, is now part of the legislation.

What do you think are the biggest societal challenges we face that are revealed by work in atmospheric science?

Climate change and air pollution are huge, linked, global issues identified and described by atmospheric science research; there's nothing bigger than those. However, perhaps the major challenge is to provide evidence that contributes to focusing action, rather than just describing the problem further. To do this, we will need to work with colleagues in social sciences, medicine, health, economics, engineering, chemistry and other environmental sciences, along with policy makers and the public. Knowledge exchange and effective communication will be absolutely key in making progress.