



Chemistry Admissions

February 2020 NEWSLETTER

We're delighted to have some of the happiest chemistry students in the UK



The Department of Chemistry has received **94% for 'Overall Satisfaction'** in the 2019 National Student Survey (NSS). The NSS is a nationwide survey of final-year students in higher and further education that encourages them to give honest feedback about a variety of aspects of their university experience, including their department and course. This helps prospective students to make informed choices and also influences real change in future students' experiences, from institution-level to course-level.

The Department placed first out of the surveyed Russell Group universities in five areas – 'Assessment and Feedback', 'Academic Support', 'Learning Community', 'Learning Opportunities' and 'Learning Resources'. We achieved also over 90% satisfaction in four of the assessed areas:

- **Teaching on my course (91%)**
- **Learning opportunities (93%)**
- **Learning Resources (95%)**
- **Overall Satisfaction (94%)**

The results were welcomed by Head of Department, Professor Duncan Bruce. He said:

Staff across the department work very hard to ensure our students have the best possible learning opportunities and it is very pleasing to see that effort recognised in these strong NSS results.

Chemistry Reps, and particularly the Departmental Rep, Alvaro Lopez-Acosta for their hard work and dedication.

Professor David Smith received the award for 'Most Inspiring'. The Award was presented by Department of Chemistry YUSU Rep, Alvaro Lopez-Acosta, who said Professor Smith had received more individual nominations than any other winner in the history of the awards, and talked about how he manages, by authentically being himself, to draw students into wanting to learn.

A Hat-trick of Top Four Rankings

Chemistry at York is in fourth place in all three major University League Tables 2020.

The Department of Chemistry has been named one of the UK's most highly regarded departments for our subject. We are ranked **4th in the UK** in the 'Times and Sunday Times', the 'Complete University Guide' and the 'Guardian' university league tables for 2020.

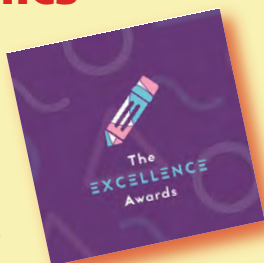


Published annually since 2007, the **Complete University Guide** ranks 131 UK universities, 13 Arts, Drama and Music colleges and conservatoires, and 70 subjects by quality measures important to students. The Department's ranking is based on a range of measures including graduate prospects, student satisfaction and research quality. Head of Department, Professor Duncan Bruce, said

We are delighted to be recognised among the very best Chemistry departments in the country and are particularly proud to be the most highly ranked in the Russell Group for student satisfaction.

YUSU Excellence Awards for Chemistry Academics

Three Chemistry academics were recognised as winners in the York University Students Union Excellence Awards 2019. The YUSU Excellence Awards



presented to **Professor Peter O'Brien, Dr Alison Parkin** and **Professor David Smith** are based on student nominations from across campus in twelve different categories, with up to four leading nominees being shortlisted in each category. This year, the Department of Chemistry had five shortlisted nominees, three of whom won awards.

Professor Peter O'Brien received the prestigious 'Teacher of the Year' Award. Students described him as 'an icon of the Department' and commended him as 'an incredibly engaging lecturer that never fails to enthuse and enlighten'.

Dr Alison Parkin was recognised for her work as Chair of the Staff Student Committee with the Award for 'Supporting the Student Voice'. Students described her as 'synonymous with efficiency' and really appreciated the strong support for student representation. Alison thanked the YUSU



Drilling down into final year research opportunities

Our staff talk about our final year projects – how they are organised and what is involved

BSc Chemical Communication Projects

Our BSc research projects give our students the opportunity to do an original piece of work, covering a wide spectrum of different types of research, from the synthesis of novel compounds, to designing new analytical methods, to completely non-lab-based projects.

One option for our final year BSc chemistry students who are considering a career such as teaching, is to undertake a **Chemical Communication** project in place of a more traditional lab-based research project. There are two styles of project to choose from. One is school-based, in which a student spends a minimum of ten days across two terms in a local secondary school, observing and helping with (mainly) chemistry and other science lessons. The second style of project involves designing and running an outreach event for visiting school groups. The activities that the participants take part in are based on areas of chemistry research at the University of York.

The chemical communication projects have been running for 14 years, and several of our former students are now teacher mentors for our current cohort. If a student is considering teaching, this is an excellent way for them to dip their toe in the water to see if this is the career for them.

Dr Annie Hodgson

MChem Year Abroad

We support students in various ways both prior to, and during, placements at a university abroad. Students in years 1 and 2 are invited to attend information sessions at the start of each academic year. This gives an overview of the programme and what students need to do to prepare. Students interested in spending a year in a country where English is not the first language are encouraged to take part in language courses via the LFA (Languages for All) programme. The **Department covers the fees for these courses** for students enrolled on the MChem(Abroad) scheme.

At the end of year 2, students submit their preferences for the different destinations/ research topics. The MChem(Abroad) coordinator works with students during year 3 to organise nominations for placements. The focus is on finding placements and research projects that fit with students' interests. Although some destinations can be oversubscribed, the Department uses a transparent/fair system to make decisions on nominations. It is usually possible to secure placements for most students interested in the programme at one of the destinations they are keen to visit.

The coordinator offers support to students preparing to spend year 4 abroad, with assistance from our Centre for Global Programmes.

Dr John Slattery

MChem Year in Industry

Our recruitment process for year 4 placements starts in the Summer Term of year 2. A handbook is issued containing details of at least thirty regular placement companies. Students research these companies to find out the sort of chemistry they do and their location (companies are based throughout the UK and some in western Europe). At the end of the Summer Term students select their 8 favourite companies and register their interest in the scheme.

After the summer exams **we organise CV writing and interview sessions** so that students can brush up on these skills. Over the vacation, students prepare CVs/supporting letters for their chosen companies and submit these at the start of year 3. The Department attaches a reference from the College tutor, then forwards this information to the companies, who hopefully offer our students interviews, starting in October. New companies usually become available throughout the year.

It is a competitive process and we cannot guarantee every student will secure a placement (students will always have the opportunity to complete their MChem degree at York if they change their mind or if they don't secure a placement) – on saying this, we typically place around 50 students per year.

Dr Brian Grievson

MChem Year in York

Our research projects are 'real world', open-ended and as tailor-made and individualised as possible. By the end of year 3, many students will have clear, informed ideas about their research interests/future plans, and **we offer and support a wide range of projects** supervised by academic staff.

We start the process with an introduction session, early in Spring of year 3. Students then explore opportunities for projects by talking with academic staff. If students have suggestions of their own, we are usually able to accommodate these. At the end of the Spring Term, students submit four project choices, in order of preference. Typically, we assign at least 90% of projects according to first or second preferences. When oversubscription issues arise, the module coordinator brokers the best possible alternatives between students and academic staff, but we never assign projects that did not feature on the students' project choices.

Assignments are usually completed around the middle of the Summer Term, when the module coordinator shares all choices and final assignments to ensure maximum transparency. Students are asked to contact their project supervisor(s) to discuss the latest developments/plans, and collect reading for the summer, to prepare for a smooth start in the next academic year.

Dr Angelika Sebald



R

New research on ancient rhino tooth could unlock evolution mysteries

York researchers were involved in a project to extract original proteins providing genetic data from a 1.77 million-year-old rhino tooth. It marks a breakthrough in the field of ancient biomolecular studies by allowing scientists to accurately reconstruct evolution in mammals from further back in time than ever before – offering the potential to solve some of the biggest mysteries of animal and human development. Researchers identified an almost complete set of proteins in the dental enamel of the rhino, the largest genetic data-set older than one million years ever to be recorded.



E

Research Highlights

Core-shell gel bead 'doughnuts'

Dr Carmen Piras, working in the lab of **Professor David Smith**, found that core-shell gel beads could easily and reproducibly be manufactured. Rather like a tiny doughnut filled with jam, the end result is a firm shell filled with a soft gel. Importantly, the unique properties of the gel filling give the core-shell gel beads their unique properties and characteristics, just like doughnuts. Professor Smith said: *"The best thing about this approach is that in principle, we can fill these shells with all kinds of different self-assembled gels in order to shape them and hence better harness their unique functions."*



S

New way to test for drug resistant infections

Scientists from across the University of York, including researchers from the Department of Chemistry, have developed a method to test whether an infection is resistant to common antibiotics. Antimicrobial resistance is a major global threat accelerated by the inappropriate use of antibiotics. Beta-lactam antibiotics (such as penicillin) are one of the most important classes of antibiotics, but resistance to them has grown to such an extent that doctors often avoid prescribing them in favour of stronger drugs. **Dr Lisa Miller**, a postdoctoral researcher working in the team of **Professor Anne Duhme-Klair**, modified an antibiotic from the beta-lactam family so that it can be attached to a sensor, enabling the detection of bacteria resistant to treatment. The new method could lead to clinicians being able to rapidly detect whether an infection is treatable with common antibiotics, reserving stronger alternatives for the patients that need them most.

Marine viruses inspire synthetic chemistry

Researchers from the Department of Chemistry have contributed to the discovery of a remarkable new enzyme from a marine virus that is capable of adding iodine atoms to a diverse array of small organic molecules with remarkable selectivity. The discovery that important iodine-containing molecules can be made using these enzymes is expected to have numerous implications in the many fields that rely upon their synthesis. Halogenated compounds are widespread in the pharmaceutical and agrochemical industries.

E



C

Is your sunscreen as good as it could be?

York scientists have developed a novel method of isolating sunscreen molecules, like oxybenzone, in the gas phase and can test the ability of these sunscreens to absorb UV light after exposure to UV photons from a laser. They found evidence that certain forms of oxybenzone display a tendency to break down when they interact with light, limiting its ability to protect against UV rays. This research provides a basis for developing more rigorous testing regimes, to investigate more commonly-used sunscreen chemicals, so that manufacturers and consumers can be more informed about the best sunscreen products for protecting themselves for as long as they are in the sun.



A

Sweet success of parasite survival could also be its downfall

An international team, including researchers from York, have discovered how a parasite responsible for spreading a serious tropical disease protects itself from starvation once inside its human host. Researchers found that *Leishmania* make an unusual carbohydrate reserve, called mannogen, that protects them from fluctuating nutrient levels in the host, enabling their survival. The findings provide a new understanding of the metabolism of the *Leishmania* parasite and this new knowledge could potentially be used in its eradication. The disease the parasite causes is called Leishmaniasis and it is spread by the bite of sand flies. It kills between 20–40,000 people every year and there is currently no effective vaccine against it.



R

European collaboration shines a light on enzyme discovery for industry

Scientists at York are playing a key role in a European consortium which has provided a disruptive technological breakthrough to allow the discovery and characterisation of novel enzymes for industrial biotechnology. The technology will open the way to more efficient industrial processes such as in the biofuel, animal feed and paper and pulp industries. The breakthrough, termed activity-based protein profiling, allows the immediate visualization of the activity of enzymes in complex samples secreted by wood-decaying fungi and bacteria, whose enzymes are central to many current and planned industrial processes.

A multidimensional approach to blood serum analysis

H

Until now, biomedical applications of infrared spectroscopy have been prevented because water absorbs IR light at the same wavelength as proteins, masking a vital piece of the blood serum molecular jigsaw. A research team, involving York chemists, has demonstrated that 2D-infrared laser spectroscopy can avoid this problem by measuring the concentration ratio of albumin and globulins (the major protein fractions in serum) across a clinically relevant range. **Professor Neil Hunt** said: *"This new technique opens up a straightforward spectroscopic approach to measuring levels of serum proteins that are currently only accessible via biomedical laboratory testing and could play an important role in the analysis of complex samples."*



Improving Chemical Handling in Teaching Labs

The ability to handle chemicals safely is a key aspect of the learning development of chemistry students. Previously, however, there have been no investigations of the quantity of chemicals spilled by students during lab experiments, neither are these skills routinely assessed. Clearly, spillage of chemicals can potentially have safety implications, as well as environmental implications in terms of waste.

Alongside two final year project students, **Aimilia Tsokou** and **Alix Howells**, **Dr Moray Stark** developed a unique intervention for our first-year chemistry undergraduates. Their methodology used paper liners to allow easy assessment of the volume of liquid spilled by students during an analytical chemistry experiment. On average, the students spilled approximately 1% of the total volume handled, however, on the individual level, spillage varied greatly, by almost a factor of 1000, from 0.02% to 10% of the total.

In an innovative step, the researchers developed feedback to give to the students on the potential safety significance of the volume of chemical they each had spilled, and then carried out a randomized controlled trial to test whether this intervention improved chemical handling. Dr Moray Stark said:

It was really pleasing to see that explaining to students the safety implications of spillage improved their chemical handling ability. The approach we have developed can provide meaningful feedback to the student, as well as potentially improving safety and skills in the laboratory.

York laboratory awarded Queen's Anniversary Prize

The **University of York's Structural Biology Laboratory (YSBL)** in the Department of Chemistry has been awarded a prestigious Queen's Anniversary Prize. The YSBL researchers study protein molecules: developing methods for looking at them, determining what the molecules look like and how they work, and how this knowledge can be exploited. The methods developed at York are used by thousands of scientists around the world across many areas of science and industry. Studies of individual proteins in YSBL have revolutionised understanding of fundamental living processes. These insights can directly contribute in the development of new medicines, such as modified insulins for treating diabetes, and also be used in industrial processes to improve sustainability and food security.



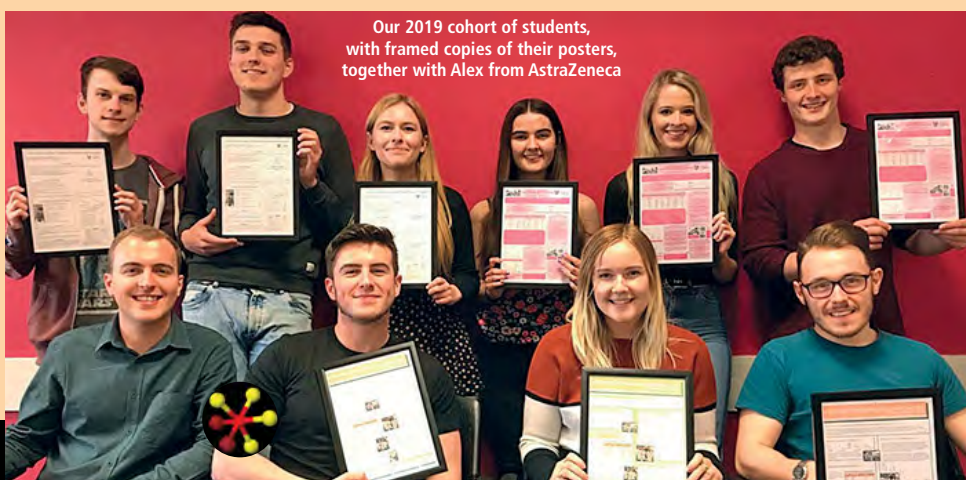
Learning About Green Pharmaceutical Synthesis



A recent educational study from the Department outlines an innovative approach to teaching students about environmentally-friendly methods of pharmaceutical synthesis. This project, developed by **Professor Andrew Parsons** and **Dr Graeme McAllister**, gives students the opportunity to prepare a blockbuster medicine in an authentic context. It has motivated and enthused students and is further enhanced through collaboration with AstraZeneca chemists. Working in teams of 8–12 people, students synthesise the antiulcer medicine esomeprazole. To provide insight into the modern process chemistry industry, they have to propose, and then perform, environmentally-friendly modifications to the asymmetric oxidation synthetic step.

Reflecting on the success of the project, Professor Parsons said: *"It is very rare to have an industrial collaboration lasting over 10 years and this has helped us introduce an authentic context into our teaching programme, that has been shown to motivate and enthuse over 100 of our students. Our most recent AstraZeneca collaborator, Alex, is a Process Chemist, who completed an MChem degree at York and actually selected to do this project during the third year of his degree!"*

www.york.ac.uk/Chemistry



2019 Research Award Winners

Professor Lucy Carpenter
Fellow of the Royal Society

Professor Ian Fairlamb
AstraZeneca, GlaxoSmithKline,
Pfizer & Syngenta
Process Chemistry Research

Dr Glenn Hurst
American Chemical Society
Environmental Improvement Award

Dr Alison Parkin
Royal Society of Chemistry
Edward Frankland Fellowship
and Roger Parsons Medal

Professor Jane Thomas-Oates
British Mass Spectrometry Society
BMSS Lecturer 2019

2019 European Research Council Grants



Professor Lucy Carpenter: Awarded £2m to study how ozone in the lower atmosphere interacts with the sea's surface from the prestigious Advanced Grant Fund.

Dr Kirsty Penkman: Awarded a €2m European Research Council Consolidator Grant for a five-year study into the timings and root causes of the evolution and expansion of early humans in Europe.

Dr Lianne Willems: Awarded a five-year research grant worth €1.5m to improve our understanding of a relatively rare but devastating class of muscular dystrophies through the use of cutting-edge techniques in chemical biology.

In Pictures



Professor Sir John Holman demonstrating at the **ChemSoc Christmas Lecture**



Many congratulations to our first year Chemistry students who have been awarded **departmental sponsorships**



Our admissions **Christmas postcards** mailed to our offer holders



Congratulations to fourth-year MChem student Megan, awarded our **MChem Communicator of the Year** (McCOY) Prize by Dr Julia Sarju



Fluorescent solutions prepared by fourth-year MChem student Rob as part of his research project



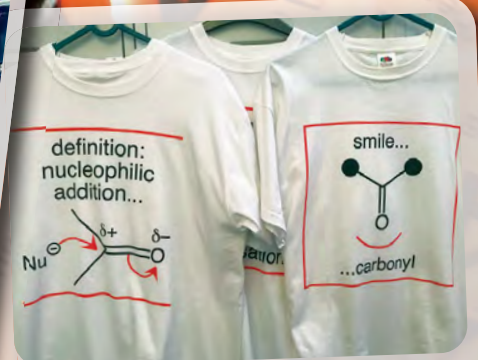
A selection of entries for our **Molecular Modeller of the Year** Competition



Some of our **student ambassadors** on a September Open Day



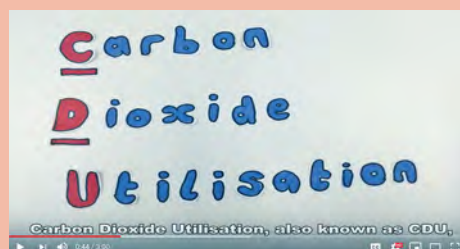
Our stunning **Periodic Table** made by Tim Ayres in our workshops



Lecturer attire to help enthuse our first years about the wonders of organic carbonyls

New funding to create collaboration with Kobe University, Japan

Our researchers are to collaborate with colleagues in Japan to combat ground level ozone - a major pollutant in East Asia. Professor Alastair Lewis, of the Department of Chemistry and the National Centre for Atmospheric Science, and Takuya Saito, of Japan's National Institute for Environmental Studies and Kobe University, will lead the project which will receive **£430,000 in funding**. Ground-level, or tropospheric, ozone results from chemical reactions caused by the interaction of sunlight with pollutants emitted by sources such as transport and power plants. Tropospheric ozone causes lung and cardiovascular problems and can reduce crop yields. By measuring the compounds that fuel tropospheric ozone production, the researchers hope to influence future methods of reducing this form of pollution.



CO2Chem Video Prize Competition 2019

Congratulations to final year BSc students **Clare Hayes** and **Katie Stott** who were awarded a new science-media prize for their video showing how carbon dioxide utilisation can be used as part of an approach to remove fossil-based carbon from the economy:

www.youtube.com/watch?v=pSFE0fOhWTg

TEDx talk

Professor Andrew Parsons gave a talk at the TEDx Sheffield Hallam University **Orchestrating the Future** event on 9 November. He was nominated for the event

by visitors who had attended a University of York Open Day. His TEDx presentation emphasised

that we are surrounded by chemistry and chemicals and thinking of chemistry differently can help us orchestrate a brighter future. It highlighted how everything around us contains chemicals, and though the term 'natural' has been used to reflect less harmful products, this is not necessarily true.

Free online course

Our online Chemistry programme **Exploring Everyday Chemistry** is run in partnership with FutureLearn. The next course, which is designed to aid the transition from school/college to university, starts on 29 June 2020. It describes the chemistry underlying perfumes, antibiotics, brewing and sport, and makes a distinctive addition to a UCAS personal statement. For more details see:

www.futurelearn.com/courses/everyday-chemistry

visit us

2020 University Open Days



The University will be holding Open Days on **Fri 26 June, Sun 28 June, Sat 19 September, and Sun 20 September**.

For further details including booking:

www.york.ac.uk/study/undergraduate/visits/open-days/

We have organised a number of talks in the Chemistry Department during the day and you will also have the opportunity to tour our **teaching laboratory**. Members of the Chemistry admissions team and current undergraduate Chemistry students will also be on hand.

Our Open Days in 2019 were extremely well attended and we received some **excellent feedback** from visiting students and their parents.



Excellent mini-lecture presented by Prof Andrew Parsons, full of energy, passion, fascinating facts about organic chemistry and some fun audience participation. A real highlight of our day!

One of the most impressive Chemistry departments I have seen. Excellent facilities, course description and I was made to feel very welcome by the whole department.



The chemistry talk was great. The course was explained well and I was impressed by the level of support they gave to students.

Chemistry talk was amazing, very interactive. Lovely students. Nothing was ever too much trouble.

Student Finance

www.york.ac.uk/students/finance/
www.gov.uk/browse/education/student-finance/

The University's Student Financial Support Unit will be able to help with any student financial queries that you may have.

Student Societies

<https://yusu.org/student-life/clubs-and-socs>
York University Students' Union (YUSU) offers an array of societies covering a huge range of activities ranging from the Rubber Duck Society to award-winning media societies.

Student Sports Clubs

<https://yusu.org/student-life/clubs-and-socs>
Enjoy more than 60 different sports clubs.

University Library

www.york.ac.uk/library/
The Library is open 24 hours a day, 7 days a week, 362 days a year.

Chemistry Review

www.york.ac.uk/chemistry/schools/chemrev/
Chemistry Review, a magazine for post-16 chemists, is commissioned and edited at York.

Departmental video links

<https://www.youtube.com/watch?v=iOuk9wlnfJI>
... to show how our Reach Out Chemistry York (ROCy) project aims to engage with prospective Chemistry undergraduates.



<https://www.youtube.com/watch?v=3bQmh45rVhU&t=6s>

...our Life of a Chemistry Student video highlights the journey from preparing to study, to progression through the four years of our MChem degree.



Find out about the latest news in the department using twitter:
<http://twitter.com/chemistryatyork>

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