Chemistry Newsletter

Spring 2023

Inside your Newsletter:

Important Dates

Semester 2:
Mon 30th Jan to Sat 17th June 2023

Semester 2 Exams:
Mon 22nd May to Fri 10th June 2023

Public Holidays/UoS Closure days:
Mon 29th May 2023
Mon 28th Aug 2023

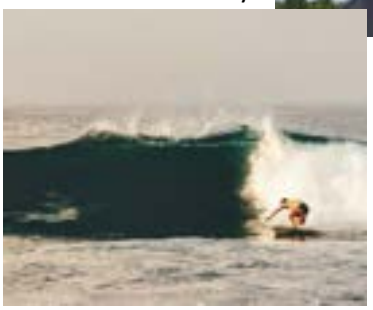
Summer Graduation
19-28th July 2023
Chemistry Graduation Ceremony:
Fri 21st July 2023, 9:30-11:15

2023/24 Autumn Term
Welcome week: Sat 17th Sept 2023
Induction: Mon 25th Sept 2023
Autumn term:
Mon 3rd Oct 2023 to Sat 17th Dec 2023

Say hello to some of our new staff

George Williams

I am a member of the Chemical Biology section and am interested in the development of molecules and materials for sensing and drug delivery, with applications in cancer treatment and to combat antimicrobial resistance. Outside of the lab I am an avid surfer and climber and can often be found stuck in traffic on my way to Cornwall!



Greg Perry

Hi everyone, I am really excited to join the School of Chemistry and set up our new research group. A career in academia is a tough one, but it has given me lots of great moments that I am very proud of.

I know I wouldn`t have got to this point without support from others, so at Southampton I want to support all of you. Please come and chat if you ever think I can help. Our research is in the area of organic synthesis and catalysis, with a current focus on sulfur chemistry and carboxylation/decarboxylation. Away from work I spend time with my young family: my wife, Chizuru, and our two daughters, Juno and Nina. Hobbies come and go but have been known to include sky diving and baking. I look forward to working with you all 😊

Athena SWAN Silver Award

Do you have an article you wish to contribute to a future edition?
Please email Julie Herniman J.M.Herniman@soton.ac.uk or Dawn Dunlop D.Dunlop@soton.ac.uk

Syed Zaheer Abbas

In Jan 2023, I joined the department of Chemical Engineering as a Lecturer at University of Southampton. My research is devoted to the process intensification (chemical looping, Carbon dioxide capture and utilization, hydrogen) applied to sustainable routes for energy and chemical production by using experimental and modelling techniques.

I obtained a PhD at the University of Leeds in 2013. Prior to joining the University of Southampton as Lecturer, I was a post-doctoral researcher at the University of Manchester (2019 – 2022), where I was involved in several international projects related to chemical looping, carbon dioxide capture and utilization technologies.

I also worked as an Assistant Professor in University of Engineering and Technology, Lahore (2017 – 2019), where I taught and supervised various undergraduate and postgraduate students. Since 2019, I have been involved in several research projects (with a credit share > £ 2m) including decarbonisation of steel industry EPSRC BREINSTORM and H2020 project C4U.

Beside my professional activities, I love spending time in painting. I use acrylic colours and capture the nature in most of my artwork.

Afaf El Sagheer

I obtained my PhD at University of Southampton with Prof. John Mellor and then moved back to Egypt to become Professor of Chemistry at Suez University.

I have been working with Prof. Tom Brown in Southampton and Oxford since 2005, focusing on applications of oligonucleotides in biology, the use of click chemistry to assemble novel modified DNA and RNA constructs with artificial biocompatible backbones, oligonucleotide-based therapeutics and gene editing.

I have published more than 150 papers, patents and book chapters. My current work is on therapeutic nucleic acids including antisense oligonucleotides, siRNA, chemically modified mRNA constructs and their delivery. In 2023 I became a Lecturer in Chemistry at University of Southampton.

My hobbies are reading and walking.

Do you have an article you wish to contribute to a future edition?
Maybe a piece on your hobbies or interests outside of Chemistry?
We also welcome your feedback on the newsletter.
Please email Julie Herniman
J.M.Herniman@soton.ac.uk

or Dawn Dunlop
D.Dunlop@soton.ac.uk

Graduations and Awards

Congratulations to the following students on their Awards since our last newsletter:

Master of Philosophy:

Suyin Pan - *Optimization of Small Molecule Ligands of p53-Y220C*

PhD

Alexander Black – *Characterisation and Application of Weakly Coordinating Solvents for the Electrodeposition of Semiconductors*

Joao Morado - *Methods for Accurate and Efficient Simulation of the Conformational Landscape of Ligands*

Sergio Garcia - *Prevention of Silver Corrosion Issues in Oil-Filled Power Transformers*

Kamolrat Somboon - *Computational Simulation Studies of Substrate Translocation Pathways in Bacterial Membrane Proteins*

Clementine Bavington – *Synthetic Organic Approaches for the Covalent Inhibition of Protein-Protein Interactions*

Marzanna Szwaj – *Nonlinear Optical Endoscopy with Anti-Resonant Hollow-Core Fibre (ARF) for Cancer Diagnosis*

Andreas Panagiotopoulos – *Study of Deposit Formation Chemistry in Gasoline Fuels and Gasoline Direct Injection Systems Using Chromatography and Mass Spectrometry*

Panashe Mhembere – *Design of Bimetallic Nanoparticles for Sustainable Catalysis*

Laura Powell – *Quantifying the Approach and Retreat of Objects from a Solid Interface using Electrochemical Techniques*

Lawrence Tam – *Towards the Efficient and Scalable Synthesis of Fluorinated Lead Components*

Domenico Romano – *Electrochemical Oxidation and Reduction of Hydroxyalkenes*

James Craswell – *Optimising the SICLOPPS-RTHS Screening Methodology to Identify More Potent Cyclic Peptide Inhibitors of IDOL*

Tom Crickmore – *Metal-Organic Framework Composites for Nuclear Waste Clean-Up*

Matthew Fitzpatrick – *Stimuli-Responsive Disassembly of the Mechanical Bond: Synthesis and Properties of Cleavable 2,2'-Bipyridine Macrocycles*

Michael McCoy - *Identification & Development of Novel Wnt/ß-Catenin Signalling Inhibitors*

William Raimbach - *Flow Photochemical Routes to Indoles and 8-membered Lactones, and their Application in Target Synthesis*

Aran Amin - *Flexible Thermoelecric Energy Generators for E-Textiles*

Sergio Cancho Gonzalez - *The Analysis of Polymeric Excipients using Ultra-High- Performance Supercritical Fluid Chromatography and Mass Spectrometry*

Punam Rattu - *Optimising Nanopores for DNA sequencing: A Computational Perspective*

Jacob Valentine - *Using RTHS/SICLOPPS to Identify Inhibitors of the c-MYC/MAX Interaction, and Developing Next Generation Sequencing Approaches to SICLOPPS*

Chemistry Publications: UG contributions to research papers

Important research outcomes are the result of work undertaken by undergraduate project students and summer placement students. Recent examples include:

M. Zhang, **T. Caldwell,** A. L. Hector, N. Garcia-Araez and **J. Falvey**,
Solvothermal synthesis of nanoscale $BaTiO_3$ in benzyl alcohol-water mixtures and effects of manganese oxide coating to enhance the PTCR effect,
Dalton Trans., 52, 2023, 297-307.
DOI: 10.1039/D2DT03307K

M. Zhang**, J. Falvey**, N. Garcia-Araez and A. L. Hector,
Effects of the reaction temperature and Ba/Ti precursor ratio/concentration on the crystallite size of barium titanate in hydrothermal synthesis,
RSC Adv., 12, 2022, 27809-27819.
DOI: 10.1039/D2RA03707F

Chemical Engineering Facilities Opening

On the 2nd November 2022 the new state-of-the-art Chemical Engineering facilities opened on Highfield Campus which will equip our students with the skills and knowledge they need to respond to the changing landscape of the industry.

Dr. Mohamed G. Hassan-Sayed, Director of Programmes and Reader of Chemical Engineering said: "The 2nd of November 2022 marked the culmination of 3 years of hard work leading the establishment of Chemical Engineering courses at the University of Southampton. As we celebrate this event with our internal & external stakeholders and our distinguished guests from the Institution of Chemical Engineers, the Royal Society of Chemistry and the World Association for Sustainable Development, we must recognise all the hard work of different bodies in the University and its members whose commitment and dedication led to the successful inauguration of the course".

Dr. Nuno Bimbo, Associate Professor in Chemical Engineering said: "The formal opening of the labs was a really great event, where we were able to welcome and thank many of the people that have contributed to establishing the programmes here at Southampton. This includes colleagues at Southampton, guests from our industrial advisory board and external examiners. We also had the pleasure of welcoming Prof David Bogle, President of the IChemE, who has very kindly opened the laboratories".

Official Opening: Prof Michael Butler; Prof Mark E. Smith; Prof David Bogle; Dr Mohamed Hassan Sayed; Prof Andrea Russell; Dr Nuno Bimbo; Prof David Richards; Prof Jonathan Essex

A £5.3million investment in the new Chemical Engineering facilities, demonstrates the University's commitment to providing a high-quality education environment. The spaces include a new teaching laboratory, a virtual control room and computing, design and study spaces.

Our Chemical Engineering degrees have a distinct focus on sustainability, which is maintained throughout both the content of the modules and in the practical, design and research components of the programme.

Professor Michael Butler, Dean of the Faculty, said: "The Chemical Engineering Programme is a great example of collaboration between Schools, in this case Engineering and Chemistry. I thank the colleagues from both Schools who led the development of the programme from its inception and those who are now involved in delivery of the exciting new programme. I look forward to seeing the programme grow from strength to strength. I also thank those involved in the opening event, especially the great organising work led by Ros Mizen."

President and Vice-Chancellor, Professor Mark E. Smith, attended the official opening of the facilities alongside Professor David Bogle, President of the Institution of Chemical Engineers (IChemE), Professor Gill Reid, President of the Royal Society of Chemistry, University Chemical Engineering staff and students and members of the Chemical Engineering Industrial Advisory Board.

Ros Mizen, Executive Officer at the School of Chemistry said: "The Chemistry Faculty Operating Service team did a great job supporting the official opening of our Chemical Engineering facilities. We are very proud to have been able to showcase the School and grateful to our speakers and guests who attended the event. Thank you to everyone who helped make the event a success behind the scenes: the planning team, administrators, porters, catering, domestic services, events, marketing, media, and photographer".

Celebrations and Congratulations

Congratulations to Chemistry PhD student Topaz Cartlidge who has been selected from more than 1,500 nominations from around the world to participate in the Global Young Scientists Summit in Singapore.

The conference brings together Nobel Prize and Turin Prize winners with Early Career Researchers (ECRs) and science's top minds to discuss the future global challenges of all aspects of science and technology. This year the conference received overwhelming nominations and Topaz was delighted to be chosen to be a delegate where she will get the chance to discuss her research with other scientists from a huge variety of backgrounds.

Topaz said: "I was absolutely ecstatic to be selected to attend the summit. It gave me the boost that I am doing well and that my PhD is within my grasp.

"The conference will be invaluable for my career. There will be so many academics from so many different fields that will give me a huge insight into the possible research area I could pursue after my PhD.

"It will broaden my research horizon and hopefully open some new doors for me. Not many people get the chance to connect with so many Nobel prize award winners. I'm hoping it will put me in good stead for both networking and research opportunities."

Topaz' PhD builds on her undergraduate degree in Chemistry and it focuses on using nuclear magnetic resonance (NMR) to develop a technique to study the diffusion of molecules through complex porous systems.

"The aim of my project is to develop a tool using NMR to measure how the structure and design of a scaffold will impact the success of a cell culture. These cultures can go on to form tissues that are inserted into patients and animals as replacement tissue."

"My project is mainly centred within Dr Giuseppe Pileio's research group, but I also work with Professor Marcel Utz, the Zepler Institute cleanrooms and I am hoping to be able to carry out some fluorescent imaging at the University Hospital Southampton."

"I have acquired so many new skills during my PhD from coding to cell culturing and it has really opened the doors to so many possible areas I could work in.

"Chemistry at Southampton was a great course and with the new labs they have built, I believe it is only getting better. The research quality is amazing, and I believe I have made connections I would not otherwise have been able to make. The lecturers are approachable and happy to help, and the range of topics covered within the course give great insight into the huge depth of research covered within chemistry."

In November, Viridi CO2 celebrated their 1st year anniversary with a cake. More on ViridiCO2 later in the newsletter!

Congratulations for Long Service Awards to the following Chemistry academics celebrated in December 2022:

- Professor Phil Bartlett 30 years
- Professor Sumeet Mahajan 10 years
- Professor Graeme Day 10 years

Congratulations to Professor Gill Reid, President of the Royal Society of Chemistry, who has been selected as one of the 12 awardees for the **IUPAC 2023 Distinguished Women in Chemistry or Chemical Engineering Awards.**

To celebrate International Day of Women and Girls in Science this February 11th, the International Union of Pure and Applied Chemistry (IUPAC) has announced the awardees of the IUPAC 2023 Distinguished Women in Chemistry or Chemical Engineering.

The International Day of Women and Girls in Science is a global day celebrating achievement and promoting full and equal access to and participation in science for women and girls. The day marks a call to action to further achieve gender equality and the empowerment of women and girls. The year 2023 is also the International Year of Basic Science for Sustainable Development.

Commenting on her recognition Gill said: "I am both delighted and honoured to receive this award from IUPAC. I firmly believe that Chemistry and Chemical Engineering are pivotal to finding solutions for many of society's greatest challenges, be that delivering better health, sustainable energy, high quality education or effectively tackling the climate crisis. The International Day of Women and Girls in Science is an important opportunity to increase inclusivity, encouraging girls to follow careers in science. To solve these big challenges, it is vital that we draw on the inputs from talented people that reflect the full diversity of society".

The awards program, initiated as part of the 2011 International Year of Chemistry celebrations, was created to acknowledge and promote the work of women chemists/chemical engineers worldwide. Each year since 2011, the award has gained more attention in the global community.

These 12 awardees have been selected based on excellence in basic or applied research, distinguished accomplishments in teaching or education, or demonstrated leadership or managerial excellence in the chemical sciences.

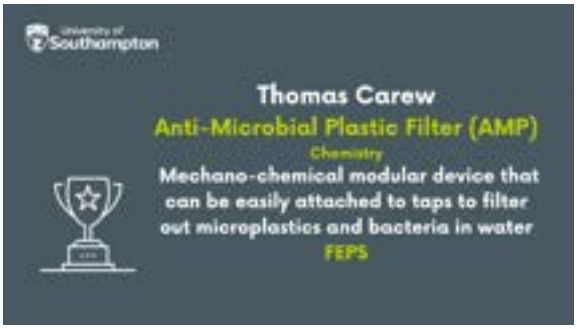
The Awards Committee has been particularly interested in nominees with a history of leadership and/or community service during their careers. The awards presentation will be **Celebrating inclusivity and diversity** - made during the IUPAC World Chemistry Congress to be held in August 2023

IUPAC was formed in 1919 by chemists from industry and academia. Since then, the Union has succeeded in fostering worldwide communications in the chemical sciences and in uniting academic, industrial and public sector chemistry in a common language.

IUPAC is recognized as the world authority on chemical nomenclature, terminology, standardized methods for measurement, atomic weights and many other critically evaluated data. In more recent years, IUPAC has been pro-active in establishing a wide range of conferences and projects designed to promote and stimulate modern developments in chemistry, and also to assist in aspects of chemical education and the public understanding of chemistry.

Congratulations to PhD Researcher Tom Carew who was one of winners in the 100 Big Ideas Competition. Winners were announced at a Student Founder Showcase event in the Turner Sims in October 2022.

Tom's idea is an Anti-Microbial Plastic Filter (AMP), a mechano-chemical modular device that can be easily attached to taps to filter our microplastics and bacteria in water.



In January 2023 Chemistry held a visitor event with the RSC and EDI members of the University discussing inclusion and diversity at work.

Pictured above are (L-R) Pascal Matthias (Vice President elect EDI & social justice), Paul Duckmanton, Julie Herniman, Joanna Jasiewicz (RSC Race & Ethnicity unit lead), Gill Reid and Laura Reyes (Programme manager, RSC Race & Ethnicity unit).

They were joined by several early career researchers and Principal Teaching Fellow, Thomas Logothetis for a tour of the recently refurbished teaching labs. Their visit included discussions around BAME recruitment and retention; and general EDI in Chemistry. They were particularly impressed with the improvements in the teaching labs, including the variable height fume hoods and benches, use of tablets to improve note taking and accessibility, and provision of quiet break out rooms.

Congratulations to Professor David Read who has achieved a significant milestone in his career by becoming the first member of the School to receive the Principal Fellowship of the Higher Education Academy (PFHEA). This prestigious award recognises his exceptional contributions to teaching and student learning, cementing his status as a leading figure in Higher Education.

Professor Read's latest recognition as the first member of the School of Chemistry to receive the Principal Fellowship of the Higher Education Academy (PFHEA) reflects his strategic leadership in enhancing student learning and teaching quality at an institutional, national, and international level. Professor Read's work on the use of in-class voting technology, pre-laboratory resources, recorded lectures, and flipped learning has had a significant impact on enhancing teaching quality.

David expressed his gratitude and delight on receiving the PFHEA, saying: “I am delighted to have been awarded PFHEA. I am especially grateful to the many colleagues I have worked closely with throughout my time at the University, who have all played a role in getting me to where I am today.”

Congratulations to Dr Daniel Stewart who has been named in the Forbes 30 Under 30 Class of 2023 in the Manufacturing and Industry Category.

ViridiCO2 offers technology that takes carbon dioxide that would otherwise be released into the atmosphere and turns it into chemicals that can be used in the production of greener and more sustainable products. This includes personal consumer products, cosmetics, furniture, and clothing. Daniel Stewart, the company's CEO, has raised $4.8 million to date.

Congratulations to Dr Sylwia Ostrowska Barker, one of the winners of the AWERBs 3Rs Awards 2023.

The applications were reviewed by the AWERB committee and winners for each of the categories finalised. All applications that were received showcased the fantastic work that is taking place across the University involving the 3Rs.

The winners are as follows:

- Reduction: Sylwia Ostrowska Barker
- Replacement: Rhianna Blyth
- Refinement: Lewis Dolman

Dr Sylwia Barker, a Senior Research Assistant in Chemistry, has won the prestigious 3R award in the Reduction category for her team's innovative work on developing a new device to reduce animal testing in drug development.

In a statement, Sylwia expressed her excitement about the award, saying, "I am thrilled to receive the 3R award in the Reduction category. I believe that by combining cutting-edge technology with innovative approaches, we can continue to make significant progress towards more ethical and effective drug discovery methods."

The device combines Lab-on-a-Chip technology and nuclear magnetic resonance spectroscopy to analyse tissue samples. This allows researchers to use one animal for many tests instead of using a new animal for each test, reducing the number of animals used in testing.

“I am a research fellow at Marcel Utz’s group focused on commercialising our technology that integrates cutting-edge tissue-on-a-chip technology with magnetic resonance spectroscopy (MRS) and imaging (MRI). Our goal is to closely monitor how living tissues react to various factors, such as drugs, to gather valuable data on their metabolism over time. This breakthrough technology has the potential to transform our comprehension of tissue metabolism and disease progression, leading to the creation of more effective treatments and therapies. Our mission is centred around reducing animal testing in drug development, and by utilizing tissue samples, we can reduce animal testing by 100-fold since each organ can be used in multiple experiments. We are actively seeking individuals in the pharmaceutical, cosmetics, and agrochemical industries to collaborate with, so please reach out if you know anyone who may be interested.”

Winter Graduation 2022

The University of Southampton’s winter graduation returned for the first time since the Covid-19 pandemic. The ceremonies took place over three days in mid-December, and this was the first time they had taken place in the city centre since the 1970s.

A small number of Chemists graduated at the first ceremony held at the O2 Guildhall on Tuesday 13th December. The graduates were greeted by Professor Phillip Wright (Senior Vice-President- Academic) and Professor Jeremy Frey (acting as Head of School).

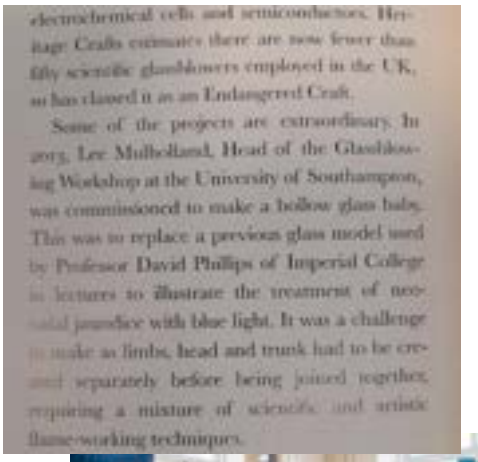
Pictured are Julie Herniman and Andreas Panagiotopoulos who both graduated with PhDs in Chromatography and Mass Spectrometry together with supervisor Professor John Langley

Celebrating successes with the UoS Glassblowers

Mr Przemyslaw "Shamack" Tryc recently won a prestigious national glassblowing competition at the recent, "British Society of Scientific Glassblowers annual symposium" on 16th Sept 2022 at Oulton Hall hotel, in Leeds.

He was presented with the "Flack Award," which is presented for "most outstanding artistic glassware" submitted for the charity auction that takes place at the symposium and is voted on by the attendees.

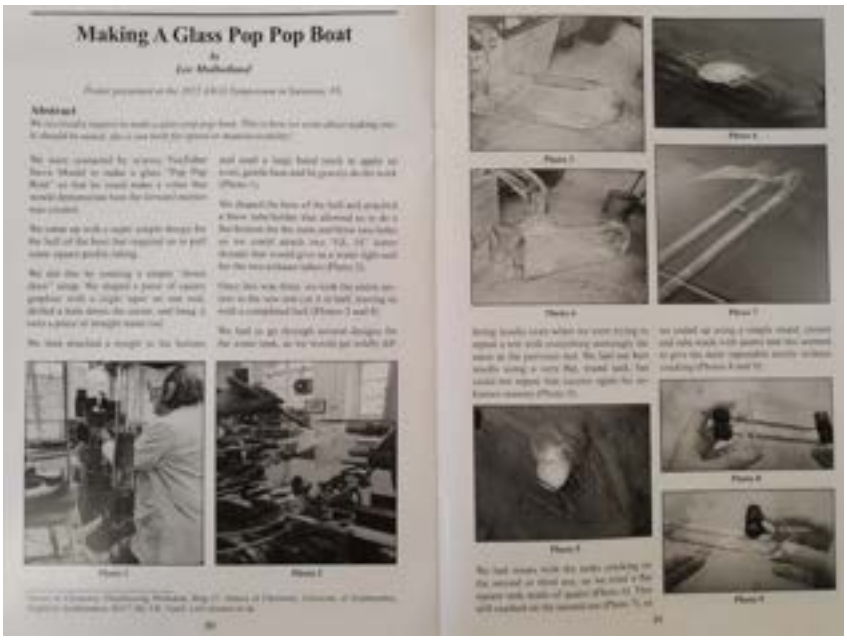
Lee Mulholland has appeared in this extract from a new book entitled Craft Britain: Why Making Matters. This was regarding the commission he received in 2013 to make a hollow glass baby for Professor David Phillips of Imperial College.



electrochemical cells and semiconductors. Heritage Crafts estimates there are now fewer than fifty scientific glassblowers employed in the UK, so has classed it as an Endangered Craft.

Some of the projects are extraordinary. In 2013, Lee Mulholland, Head of the Glassblowing Workshop at the University of Southampton, was commissioned to make a hollow glass baby. This was to replace a previous glass model used by Professor David Phillips of Imperial College in lectures to illustrate the treatment of neonatal jaundice with blue light. It was a challenge to make as limbs, head and trunk had to be created separately before being joined together, requiring a mixture of scientific and artistic flame-working techniques.

Lee Mulholland also presented the following poster at the 2022 American Scientific Glassblowing Society annual symposium in Florida, subsequently published in their quarterly journal called Fusion.
Lee said "This was about the glass pop pop boat that we were commissioned to make by Steve Mould for his YouTube channel https://www.youtube.com/watch?v=3AXupc7oE-g&t=541s This video has now received 6.8M views!"
Inspired by Lee's presentation there will be a "Great Glass Pop Pop Boat Regatta" held at this year's symposium in Vancouver Washington. Lee and Shamack will be attending with a boat made by the team of glassblowers.


Making A Glass Pop Pop Boat

New electron diffraction equipment in Chemistry will revolutionise crystal structure determination - Simon Coles and Mark Light

This summer we will take delivery of and install a revolutionary new piece of equipment that in the coming years will completely reset the boundaries of what is possible for structure analysis by single crystal diffraction. For over 100 years we have been using X-rays for this and most of you will be aware that we already have one of the most powerful facilities in the world for this technique. However, despite this great firepower and expertise there are still limitations – you need to be able to grow good micron size crystals. This means that those of you who are only able to produce crystalline powders are not able to access the same level of atomic resolution, structure and bonding information. Using electrons as the radiation source for these experiments is the answer to this problem as they interact with solid material 10,000 times more strongly than X-rays do!

We, Mark Light and Simon Coles, were recently successful in making a bid to the EPSRC Strategic Equipment programme to fund a new kind of instrument – a dedicated Electron Diffractometer. For decades diffraction experiments have been possible in Transmission Electron Microscopes, but technical limitations meant that it was extremely difficult to use this information to solve crystal structures. The necessary technology has recently moved on and over the last three years we have been working with Rigaku, the same company that provide our high-powered X-ray instruments, to develop a new type of instrument. This has recently made electron diffraction a viable technique for obtaining single crystal structures from nanocrystals i.e., an order of magnitude smaller than those we can currently measure, even using a synchrotron. This is a game-changer for solid-state inorganic and MOF chemistry, but also for those of you whose compounds stubbornly refuse to grow larger crystals!

Thanks to this £3.2 million research grant, we will partner with Rigaku and the University of Warwick to build a **National Electron Diffraction Facility** which will be part of the National Crystallography Service. It will be the first instrumentation of its type in the UK and only the second outside of the factory in Japan - Warwick and Southampton will each get a Rigaku XtaLAB Synergy-ED instrument (https://tinyurl.com/57n3mpax)

In Southampton we will install the instrument on the ground floor of B30a and plans for building and refurbishment of the space near the current NCS office (30:1091) are well advanced. We are also in the process of recruiting a postdoctoral level Research Technician to help set up and operate the facility. We expect both sites to have instruments installed and available for use before the end of the summer – with the hope that local users will be able to do some of the first experiments in Southampton by late August. As well as determining the structures of hitherto intractable samples we will be using other techniques already well established in electron microscopy to answer bigger scientific questions. We were also recently successful in applying for further equipment funds to add accessories to the instrument. Energy Dispersive X-ray Spectroscopy will be incorporated to simultaneously assess chemical composition of the sample and enable coupled structure – chemical mapping.

We will also have a number of sample environment options: cryo transfer will mean that we can manipulate and then study highly volatile compounds/materials at liquid nitrogen temperatures; variable temperature structural studies (under a controlled atmosphere) will be possible up to ca 1000°C; a gas cell/holder will enable studies of porosity and reactivity with almost any gas/mixture imaginable.

Around 25% of instrument time can be made available for Southampton-based work and we encourage all colleagues in Chemistry to consider how they might make use of this new opportunity – please do talk to Mark and Simon about suitability of samples, how they might need to be prepared, etc. Initial work will involve commissioning the new instrument and we are looking for high profile collaborations that we can publish together quickly. In due course access to the instrument will be run in much the same way as with other Chemistry facilities i.e., licences and full economic costs on grant proposals.

Geoff Hyett has costed access to the facility in a recent funding application, noting that "the ability to determine atomic resolution crystal structures for samples where it is not possible to grow single crystals larger than a few nm will be transformative to our research, in particular for more speculative materials discovery projects."

Not only is this one of the first instruments of its type in the world, but others will be slow to follow as they take a long time to make, and the additional capabilities provided by the accessories will be unique for quite some time to come. There is thus a massive opportunity for many of us to do solid-state research that others quite simply cannot, so please do come to us with ideas so we can plan proposals and cost access into funding applications!

This is what the instrument will look like: Simon Coles and Rob Bannister at the Rigaku application laboratory in Frankfurt.

Enterprise in Chemistry

InnovateUK Young Innovators Award – Sam Munday

Congratulations to Sam Munday, Co-Founder of the Chemistry spin-out Data Revival. Sam has been selected as one of the Innovate UK Young Innovators Awardees.

The Young Innovators Awards empowers young people, aged 18 to 30, to turn their innovative idea into a reality.

The annual competition from Innovate UK supports and celebrates young entrepreneurs with ground-breaking business ideas. It is open to innovators from any background and any UK nation or region, with the aim to encourage greater diversity in innovation and build a more inclusive system for the future.

This year, 94 Young Innovators Awards winners were selected from hundreds of applicants. The winners are tackling some of our most pressing environmental, economic and societal challenges.

The range and scope of their ideas is truly impressive, including Sam's Data Revival project, using deep-learning artificial intelligence (AI) neural networks to unlock data sources in chemistry.

The idea for starting Data Revival came from a feeling. Founder Samuel Munday says he strongly believed that he could apply his knowledge of chemistry, maths and programming to create impactful solutions in society.

The team is developing a set of AI tools that unlock historical and current data sources in the field of chemistry and chemical research.

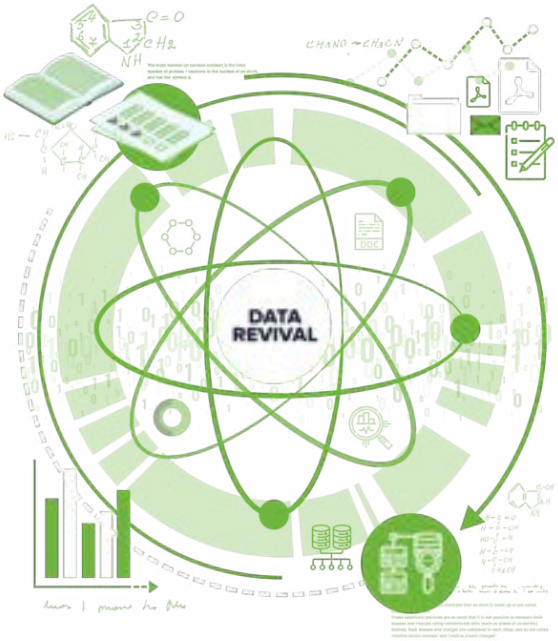
The Data Revival system can quickly extract accurate information from any document format and create links between information types – such as charts and their labels, or chemical structures and their written formula.

Using deep-learning AI neural networks, Data Revival passes information from structured and unstructured data, extending its knowledge over time.

So far, Sam has developed a minimum viable product (MVP) which he's trialling with potential customers. He hopes it will enable the industry to use its data better and improve its ability to innovate faster.

Sam said "I hope to use the programme to fail fast and have a safe space to get all the mistakes out the way as I grow Data Revival. If I come out the other end as a more rounded and knowledgeable founder, it will seriously increase my chances of business success."

"The exciting thing about Data Revival isn't just its unique ability to draw meaning out of unstructured data, it's the almost boundless application potential. We've already run successful pilots at a multinational chemical company and academic institutions, and have seen interest from the legal and healthcare sectors. With the right backing I believe Data Revival has the potential to become the Google for unstructured data."



Enterprise in Chemistry

Funding update for ViridiCO2 – Dan Stewart

Congratulations to Daniel Stewart and ViridiCO2 for securing £3m in Seed Funding to make Chemical Products from CO2.

ViridiCO2 has invented a radical solution with the creation of technology that converts waste carbon dioxide into high-value chemical products such as surfactants, polymer feedstocks and small molecules. Through the doctorate studies of co-founder Dr. Daniel Stewart, ViridiCO2 uses a solid catalyst technology that can be retrofitted into existing chemical processes, allowing them to use CO2 in place of petrochemicals.

Daniel Stewart Co-Founder and CEO, ViridiCO2, stated: "The foundation, formulation and chemicals industries are some of the world's greatest polluters and many have aims to reach carbon neutrality by 2050. ViridiCO2 is focused on assisting the chemicals industry to decarbonise by putting the 7 billion tonnes of industry waste CO2 to good use, creating sustainable products, and a new income source."

"The use of our technology by the high emitting chemicals industry reduces the reliance on fossil-fuel petrochemical-based materials and valorises the waste CO2 that would otherwise be realised into the atmosphere and further contributing to the climate crisis. In the face of climate change, businesses have realised that sustainability is the fulcrum of their corporate strategy, rather than an add-on - our technology truly helps these heavy emitting manufacturers transition towards a circular economy, reduce scope 1, 2 & 3 emissions and enable the first 'carbon-positive plastics' to hit the market."

Since spinning out from the University of Southampton in November 2021, ViridiCO2 has used funding from its Angel investors, many of which are Southampton alumni, along with grant funding from Innovate UK, to prove kilogram production capability and to validate it on a chemical manufacturer's site.

The £3 million seed financing will be used to accelerate the development and commercialisation of ViridiCO2's technology and will progress the technology to TRL 7, a system prototype demonstration stage in an operational environment, and then work with manufacturing partners to scale the solution in line with the market demand.

Ali Mitchell, Partner, EQT Ventures, said: "We look to back generation defining companies and ViridCO2 is definitely one that has the potential to accelerate the energy transition of a whole industry. Daniel and his team have invented a revolutionary solution to convert waste CO2 into high-value chemical products, plastics and essential items that are still needed in the world today. The tech enables the chemical industry to cut the use of petrochemicals – with a path to removing this feedstock completely - and reduce CO2 emissions which is crucial to limit global warming to below 2 degrees Celsius, to save our planet from a climate catastrophe. The team has created a solution that is a true win-win for business and the world.

"Being a Southampton alumnus myself, it is great to see such a game-changing company with the technology and potential to transform the sector and the world spinning out of one of the UK's top universities. I look forward to supporting Daniel and his team accelerate the development and commercialisation of the tech and revolutionise the way the world utilises waste CO2."

Emma Burke, Innovation Lead for Commercialisation at Innovate UK, said: "The UK is ideally positioned to lead the global development and deployment of CCU with its strong industrial sector, world-class universities, and favourable capital investment landscape to enable innovation and growth, making it one of the most attractive business environments for CCU technology. ViridiCO2 is a fantastic example of how a company supported by Innovate UK's ICURe programme, can grow, develop, and commercialise such critical technology enabling users to enhance their green credentials, save money and reduce their emissions."

Gill Reid, President of the Royal Society of Chemistry & Professor of Chemistry at the University of Southampton, said: "Daniel and the team at ViridiCO2 have developed innovative technology that has the potential to deliver real solutions that can play a pivotal role in achieving net zero emission targets globally and drive forward the emissions reduction solutions for the chemicals industry. It is fantastic to see a home-grown university spin-out that was recognised as a winner of our prestigious 2020 Emerging Technologies Competition continue its journey to scale and become a successful UK business."

Chemistry Student Community

Denis Henry Desty Scholars 2023

The Denis Henry Desty scholarships recognise and reward the achievement ambition of underrepresented groups within Chemistry. The scholarships are funded by a bequeathed donation from the family of Denis Henry Desty, an eminent chemist and chemical engineer and alumnus of Southampton.

Denis was a pioneer in the fields of chromatography and combustion science whose contributions were recognised by multiple prizes, learned societies and being elected as a Fellow of the Royal Society. A prolific inventor, he devised many practical techniques, authoring nearly 500 patents, for applications ranging analytical hydrocarbon separations, combustion, gas-flares, the treatment of oil spills and a variety of other achievements.

The donated funds provide financial support and long-standing recognition to those who are awarded the Scholarship. Denis's surviving family show a keen interest in the Scholarship with an annual reception where they get to meet the new Scholars and catch up with those awarded previously. The undergraduate and postgraduate Scholarships are awarded via a competitive process with this year successful applicants being

Rebecca Collins (UG)

Beth Rawlings (UG)

Robert Clarke (PG)

We are sure they will do Denis' legacy proud and continue in his footsteps of scientific excellence and creativity.

Russell Minns

Royal Society of Chemistry Broadening Horizons Scheme

Hello! I am part of the first cohort of the Broadening Horizons Programme. This is a three-year pilot scheme to support chemistry students and graduates from minoritised racial and ethnic backgrounds to pursue careers in chemistry.

One of the reasons I joined the scheme was because I have really struggled to know what options/careers are available to me, and how to develop myself effectively as a scientist to give myself the best opportunity once I graduate.

I have loved being able to meet people who have similar backgrounds, experiences, and motivations as myself, and build a network with likeminded people for scientific and moral support. It has been a supportive, safe, helpful, and friendly space.

While mentoring is available to any RSC member, I have found the mentoring invaluable for myself, because it has allowed me to focus on areas that I am weaker in. I get a dedicated time for advice in specific areas, instead of always bothering my supervisors! I am lucky that I have been given a mentor who has had similar life experiences, which is highly validating and gives me a role model.

The careers advice, open conversations with industrial partners about their commitment to EDI, and industrial connections has also been brilliant. Being able to attend on site visits has been a great way to experience different companies first hand, understand how they work, and formulate criteria for my future working environment. Further, being able to apply for/go on industrial internships has been useful for experiencing what life after a long time in academia will be like!

If you would like to know more, I am more than happy to talk about it further! It has been a great experience for myself, and I couldn't recommend it enough.

Johanna Fish
PhD Student | BBSRC South Coast Biosciences DTP

Chemistry Poster Day

Every year students from Chemistry take part in a poster exhibition in their graduating year. It is not an assessed part of their degrees, but it is a mandatory requirement for all students in their final year.

The posters are evaluated based on content, clarity, organisation, presentation and the ability to describe the work to judges and members of the public.

This year's event was held on Wednesday 22nd March in the Garden Court building at the Staff Social Centre.

Congratulations to this year's prize winners:

- Emily Jones – Chem Bio
- Jonathan Findell – Chem Bio
- Joseph Duerden – Computational
- Sebastiaan Van Dyck – NMR
- Theo Turan – Organic





Chemistry Outreach activities 2023

In January 2023 we held another successful and popular week of Twilight Practical sessions. Here are some of the tweets and photos shared with us from our visiting schools and colleges.

We are already planning the Summer Twilight sessions from 26th June to 10th July, with many sessions fully booked, and look forward to welcoming students.

Dusty's visit to Chemistry

Professor Andrea Russell's dog, Dusty visited the School of Chemistry during the semester 1 exams period in January 2023 to provide some 'exam stress relief' and in fulfilment of Andrea's promise to our students.

Dusty had featured in many of Andrea's online problem classes delivered during the covid lockdowns and restricted face to face teaching in 2020 and was well known amongst the year 1 classes of 2019 and 2020.

In late 2021 Dusty fell ill with an autoimmune condition called polyradiculoneuritis, which over a period of three days meant that she progressively lost the use of all four of her limbs. Andrea and her husband Ian had to rush Dusty to a veterinary neurologist, which meant moving a few lectures online.

Andrea promised that if Dusty made a full recovery, she'd bring her in for students to meet her. Dusty is now nearly back to her old self following hydro- and physiotherapy and quite enjoyed her day out in Southampton.

Dusty doing her physiotherapy exercises

Dusty and Andrea outside B29

Dusty is actually Champion Karnovanda's Diamond Dust and was bred by Andrea's mother, Judy Russell in Michigan. Judy is a top breeder of Siberian Huskies, having started back in 1959, and was recognised as the American Kennel Club's overall Breeder of the Year in 2023. Andrea returns to her 'part time job' as kennel help whenever she visits Michigan. If you are interested, you can visit the karnovandkennls.com website for more details.

Andrea back at Karnovanda Kennels

Support for early career stage colleagues (mainly postdocs and equivalents!): an update

After a difficult time through the pandemic, things are very much looking 'on the up' when it comes to providing better support for postdocs and equivalent-level colleagues. There is a lot of activity related to the Research Concordat, which focusses on the research environment i.e., not specifically related to training etc directly supporting your research, but the whole range of other aspects and softer skills that you find yourself developing in an academic research environment. I thought I would write a few paragraphs to let you know about some of these opportunities…

Firstly, the Faculty has started taking this much more seriously lately and there is a lot going on at that level – we have an enthusiastic leader in ECS, Russel Torah, who I expect you have all had emails from inviting you to events! I am part of the group that considers what training and support the Faculty should make available, so please rest assured that there will be many opportunities in those emails that are relevant to all in this department.

Following on from a very successful activity last year, we are now in the middle of a 1:1 coaching scheme where you can get up to 3 sessions with a personal coach on any topic of your choosing, from career directions to productivity, and anything in between! One of the coaches was a chemist in this very department, so they can provide support tailored specifically to you as a chemist at this university. In a similar vein, we are just embarking on a set of activities around mentoring training that are starting at the 'what is mentoring' level and could arrive at personal coaching specifically on this topic. It's worth bearing in mind that mentoring happens at many formal and informal levels and can range from shaping someone's career direction to looking after an undergraduate project student in the lab, so if you feel that some guidance and support for mentoring would be of value to you there are several different ways to access this right now.

There are also a series of events run by RIS and the faculty aimed at supporting those starting out writing proposals - predominantly funding council grants and fellowships, but we are also looking at providing training to cover smaller and wider ranging types of scheme. These are intended to run in an order that builds up from general background, through writing workshops and mock panels to (narrative) CV writing. In the early summer we also expect to run a 'sandpit' event, where teams come together to develop an idea and make a pitch for some funds to get working on it. Finally, there is the prospect of some targeted 1:1 support from a grant writing professional.

Also, we have an allocation of money specifically for developing skills and the environment for early career stage colleagues in Chemistry. I have a couple of events in the pipeline but am specifically looking for you to come to me with proposals for things you would like to do! Funds can be used for anything from catering and room hire to specialist fees, but there are few rules, so please feel free to step forward with suggestions of any sort!

In late spring/early summer we will run some short workshops to explore the things you need to do to take the next steps in your career. These will be free format and what is covered will depend on what those in the room at the time want to cover, however they will be split into three types – for those who want to continue in academia, for those who want to move into industry, and for those who are considering a complete change of career direction. This will be followed up by an event run by RSC Careers around constructing your CV and will be split into polishing CVs for a career in chemistry and constructing your CV to support a career change.

Finally, we are looking at reinstating and reinvigorating the departmental seminar programme. The plan is that the topic and speaker would be decided by each research section in turn and that there is strong involvement from this community e.g., you have a say in who a speaker should be and get involved with entertaining them on the day of their seminar. You can expect more news on this soon!

I am hoping there is something for everyone in this update, but if that's not the case then I want to know! I am also happy to elaborate give more specific details on anything mentioned in this article. However, I would rather we communicate as a group about such things and for this reason, we set up a team on Teams, called "Chemistry Postdoc Community" if points are raised and events advertised here, then everyone benefits and can input. You should have been automatically included as a member, so please fire up Teams and look for this group – and then post your questions, proposals, complaints, etc on it, but also keep an eye on it (preferably turning on notifications!).

Simon Coles
(Chemistry Research Concordat Champion)

Teams Site: Scan QR code or copy the link below

https://tinyurl.com/yc5vjss2

Beyond Chemistry:

Emeritus Professor Martin Grossel

Robert Hooke (1635-1703) – England's Leonardo?

Robert Hooke was born in Freshwater on the Isle of Wight. From an early age he showed great artistic talent and considerable mechanical skills. For example, having examined a brass clock he built a working version in wood. After the death of his father, the 13-year-old Hooke moved to London joining the studio of the eminent portrait artist Sir Peter Lely but, being allergic to smell of paint, he entered Westminster School. In 1653, he moved on to Christ Church, Oxford, where he got to know the members of the Oxford Philosophical Club (the future Royal Society). He acted as assistant to the "Chymist" and Anatomist Thomas Willis, and then worked with Robert Boyle for whom he designed and built an air pump, crucial for Boyle's work on gases.

In 1662 Hooke was appointed "Curator of Experiments" to the newly founded Royal Society and moved to Gresham College, its base in London. He was charged "to make detailed experiments with a microscope of his own design" and bring "at least one new microscopical observation to each of its weekly meetings." At one of these Hooke showed the Fellows that slices of cork were full of shallow pores which he called "cells" (the origin of the term biological "cells").


MICROGRAPHIA:
OR SOME
Physiological Descriptions
OF
MINUTE BODIES
MADE BY
MAGNIFYING GLASSES
WITH
Observations and Inquiries thereupon.

Nettle

In 1665 Hooke compiled his observations into a single volume which was published as "*Micrographia*". This reputed to have been the best-selling scientific book of its era. It discusses 60 topics accompanied by 38 schemes which contain remarkably detailed drawings. The subjects include studies of: manufactured objects such as fabrics; the vegetable kingdom, including moulds, mosses and sponges, seeds, and stinging nettles; the iridescent feathers of peacocks and ducks; and insects; as well as observations of the Moon. (He carried out experiments to try and explain the origin of lunar craters.) Other topics concern the question of what is a pure colour and why is diamond transparent but graphite black. Hooke subsequently carried out extensive studies of fossils, questioning their origin and age.

Hooke was also a mechanical genius. In 1678 he published "Hooke's Law" concerning properties of springs and developed a spiral spring-balance watch.

Finally, it should be noted that Hooke played a key role with Sir Christopher Wren in the rebuilding of London after the Great Fire of 1666.

Sadly, no portrait of Hooke is known! Did Newton destroy it?

The text and images from Micrographia can be found at Project Gutenberg: https://www.gutenberg.org/ebooks/15491

2023 Chemistry Culture Survey

Chemistry is a Silver Athena Swan award holder. This award recognises our positive culture that values gender equality and the good practice we have in place. It also requires us to understand and address challenges to further develop and improve our equality, diversity, and inclusion across the School.

This survey is designed for all staff: academic, technical, and professional/support staff, including early career researchers, research assistants and fellowships holders. Your responses will help to assess the current culture within Chemistry, and will contribute to improvements where necessary, benefiting everyone who works in the School.

This information is of particular value when completing the environment element of the Research Excellence Framework or in applying for accreditation within the Athena Swan award schemes.

The survey is open now until 17th May 2023.

https://forms.office.com/e/QAd3gRaKCt

The survey should only take about 15 minutes of your time.

If you have News to share with more widely with the faculty, please follow the links in the image below:

Equality, Diversity and Inclusion

ED&I is central to the ethos in Chemistry, and we have a committed team that works hard to build a positive environment for all members of our School to be able to develop and succeed. As a school we have been involved in the Athena SWAN charter for the advancement and career progression of women in science for many years and its principles run through all we do.

Chemistry holds a Silver Athena SWAN Award, the first department at the University of Southampton to achieve this status twice.

If you would like to know more about our work, there is lots of useful information on our website which also includes our Early Career Support Hub.

https://www.southampton.ac.uk/chemistry/about/Equality/index.page

For more information about Chemistry EDI or to raise any issues or concerns please contact Dr Paul Duckmanton or Dr Julie Herniman

Don't forget to share your news with us for future newsletters.
We also welcome your feedback on the newsletter.
Please email Julie Herniman J.M.Herniman@soton.ac.uk

or Dawn Dunlop D.Dunlop@soton.ac.uk

University of Southampton

Code of Conduct

School of Chemistry

- We are resolute in our commitment to provide a supportive environment in which we value differences, respect diversity and treat each other with equity and respect.
- We ensure individuals are treated equitably regardless of gender and gender identity/ expression, ethnicity, religion, nationality, sexual orientation, race, physical appearance, age or disability.
- We do not condone or tolerate intimidating behaviour, including harassment (verbal, non -verbal or physical), bullying or victimisation.
- We collaboratively preserve a community in which positive working relationships are forged and everyone feels valued, encouraged and supported.
- We strive to maintain an environment free of inappropriate or offensive language or behaviour, where individuals consider their own behaviour and the impact that this can have on others.
- We are dedicated to fostering a culture that empowers all members of our community to act promptly to challenge unacceptable behaviour.
- We provide support to staff, students and visitors who feel they have been subjected to, or have witnessed, harassment, bullying or victimisation.
- We ensure that allegations of harassment, bullying or victimisation are addressed fairly, with respect for the rights and dignity of all those involved.
- Every member of the community is committed to playing an active role in creating and maintaining an environment that does not tolerate harassment, bullying and victimisation.

Together we can continue to ensure Chemistry is an outstanding and inclusive place to work and study.

"The time is always right to do what is right."

Martin Luther King, Jr

If you have experienced or witnessed abuse, bullying, or harassment at work or study, the university Harassment Contacts can offer support, and guidance for further action:
www.southampton.ac.uk/hc

For further information please read the University Dignity and Work and Study policy, Embedding Collegiality and Whistleblower policy.

Athena SWAN Silver Award