Chemistry Update

Newsletter 343, 29 April 2022

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Calendar of Events

Organic Seminar
Speaker: Dr Joëlle Prunet, University of Glasgow
Date: Wednesday 4 May
Time: 1pm—2pm
Location: C/A/101

Research Seminar
Speaker: Dr Thomas Snaddon, Indiana University Bloomington
Date: Monday 9 May
Time: 3pm—4pm
Location: C/A/101

Organic/Inorganic Seminar
Speaker: Dr Mónica H. Pérez Temprano, ICIQ
Date: Wednesday 11 May
Time: 1pm—2pm
Location: Virtual

Physical/Atmospheric Seminar
Speaker: Dr Katrianne Lehtipalo, University of Helsinki
Date: Wednesday 18 May
Time: 1pm—2pm
Location: C/A/101

Departmental Seminar
Speaker: TBC
Date: Wednesday 25 May
Time: 1pm—2pm
Location: C/A/101

Date of Next Issue:
27 May 2022

New Director for Green Chemistry Centre of Excellence

The Green Chemistry Centre of Excellence (GCCE) in the Department of Chemistry has appointed Professor Helen Sneddon, previously a Scientific Team Director at GlaxoSmithKline (GSK), as its new Director.

The Green Chemistry Centre of Excellence (GCCE) is a world-leading academic facility pioneering green and sustainable chemical research. It has a strong emphasis on waste valorisation, clean technologies and providing high quality education and training programmes. Since its inception, the GCCE has been led by Professor James Clark. With Professor Clark stepping down from his role, the Department of Chemistry embarked on the search for a new Director.

Professor Helen Sneddon carried out her MSci and PhD at University of Cambridge, where she studied the use of dithianes in organic synthesis in Professor Steve Ley's group. She then moved to University of California Irvine, to work with Professor Larry Overman exploring the catalytic asymmetric chemistry of palladium(II) as a Royal Commission for the Exhibition of 1851 research fellow.

Professor Helen Sneddon giving a lecture in York.

She then worked at GSK for 15 years. She started in Medicinal Chemistry, but became increasingly involved in making synthetic processes and research operations as efficient and sustainable as possible. In 2011, she successfully pitched that GSK should have a group focussed solely on Green Chemistry, and she has led Green Chemistry for GSK ever since.

During her time at GSK, she halved the use of chlorinated solvents across GSK's UK R&D sites. This involved research into the scope and limitations of replacement solvents, and significant work to change pre-conceptions about solvent choices across the company. Professor Sneddon improved the routes to numerous drug candidates – via new routes, changes in reaction media or reagents, and reaction optimisation, including finding a suitable replacement for a toxic and environmentally-damaging chromium(VI) oxidant, where it had previously been considered impossible.

On becoming Director of the GCCE, Professor Sneddon intends to initiate new research on carbon-halogen bonds. Halogens are ubiquitous in the pharmaceutical industry – indeed, almost half of the best-selling small molecule drugs contain aryl halides. She intends to apply data-driven and experimental approaches to develop more benign ways of creating these vital molecules.

For some years, Helen has worked with the GCCE as a visitor, giving lectures and workshops to their Masters students. She plans to build on this and help refresh the undergraduate curriculum. She is looking forward to discussing with students how they would like to see additional industrial context and Green Chemistry incorporated in their learning.

Reflecting on her move to York, Helen said: “I’m incredibly lucky to be coming to work with such a talented team, with deep expertise across solvents, microwaves, biobased mesoporous materials, clean synthesis and sustainable organic synthesis. I am looking forward to developing new collaborative projects across the GCCE and with the wider Department, and increasing the GCCE’s impact across academia and industry.”

Head of Department, Professor Caroline Dessent said: “We are absolutely delighted that Helen has joined the Department. She brings an exceptional combination of academic achievement and industrial experience that makes her uniquely well suited for the role of Director of the GCCE. The appointment comes at an important time for the University of York, since it has identified sustainability as one of its key strategic priorities. Professor James Clark has been an international leader of the field of Green Chemistry over the last several decades, and we are confident that Helen will ensure the York's GCCE remains a beacon for Green and Sustainable Chemistry internationally.”

New starters

Dr Sannia Farooque, Associate Lecturer
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Dr Saeed Akkad, PDRA in Synthetic Carbohydrate Chemistry
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Amina Qadir, Technician
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Simone Andersen, PDRA in Experimental Atmospheric Science
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Professor Helen Sneddon, Professor of Sustainable Chemistry and Director of the GCCE
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Professor Ron Hester (1936 – 2022)

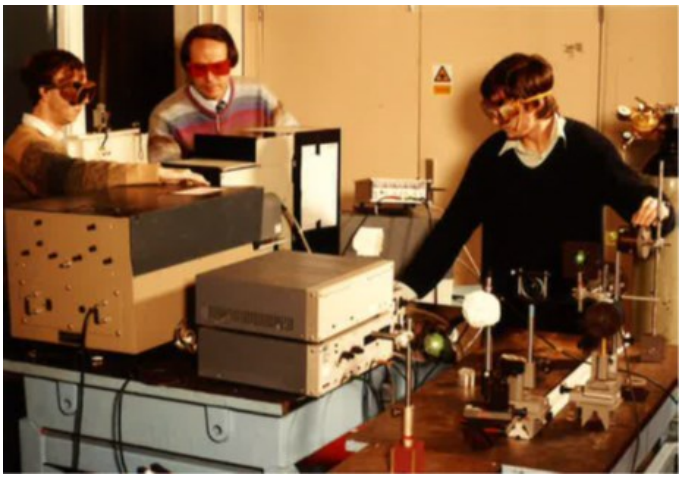
Ron Hester, one of the original group of lecturers who set up the Department of Chemistry in York, died last month aged 86. These reminiscences come from his students, postdocs and colleagues and have been compiled by Robin Perutz.

Ron Hester was one of our original lecturers starting at time zero in 1965, was promoted to a chair in 1983, and continued here until retirement and beyond. He shaped many of our undergraduate courses, initiated links with industry, influenced University policies and national scientific policy. Ron had enviable skills both as a speaker and a writer. Scientifically, he was a pioneer of time-resolved vibrational spectroscopy who believed in the importance of top-class instruments. He brought scientific ambition and experience of working in one of the world's best chemistry departments. He played a major role in developing the Lasers for Science Facility at the Rutherford Appleton Laboratory (RAL) that is important to several of us today. He also made an impact that continued in his retirement by editing books on environmental issues. His influence through former members of his research group has spread beyond the UK to the USA and India. Ron was a great host at his summer parties at his home in Crayke and a sports partner for squash, skiing, golf or croquet, and he was always competitive. Indeed, I don't think I ever won a squash game. What came through most strongly as I collected reminiscences was his outstanding influence and record as a mentor. If you read nothing else, do look at the reminiscences from his research group.

Ron obtained his BSc from the University of London and his PhD from Cornell. He moved to Cambridge as a post-doctoral fellow before returning to Cornell as an assistant professor. Dick Norman (our first Head of Department) recruited Ron on a tour of the USA in 1965. Ron's friend Bill Grossman takes up the story. "When Ron was appointed, he asked me if I would like to spend a year in his lab. Of course I said yes. We applied successfully for an NIH fellowship for me, and with Jim Matthew, who was also at Cornell then and had been hired in the York Physics Department, booked a passage by sea on the liner SS France. I left my passport at home on the day of departure. My father promised to air mail it to the French Line offices in London, and they let me board the ship. Ron, Jim, and I had a very enjoyable five-day trip, but of course there was no passport when we arrived. Ron was equal to the situation, and with Jim's help (young, clean-cut British scientists! Reversing the Brain Drain!) persuaded the immigration authorities to let me in."

The science: Ron's PhD with Robert Plane in Cornell served as his introduction to the power of Raman spectroscopy for studying speciation in aqueous solution and in molten salts. In the 1970s, he started using the strong enhancements of the resonance Raman effect on cobalt corrinoids, organic radical ions and metal peroxo complexes. He demonstrated in 1981 that the excited state of $[Ru(bpy)_3]^{2+}$ in solution can best be described as a charge-transfer state with the charge

localised on a single bipyridine – the nature of this excited state became a paradigm for many thousands of subsequent applications. Ron's experiment demonstrated that a sub-microsecond lifetime was no obstacle to characterisation with steady state spectroscopy under continuous laser irradiation. He also obtained spectra of $[Ru(bpy)_3]^+$ by using the enhancement at a silver electrode (Surface-Enhanced Raman Spectroscopy). He continued to exploit these techniques, especially for biological molecules, including proteins and nucleic acids.



In the mid-1980s, together with David Phillips, Ron supported the development of the Ultra-violet Radiation Facility based within the Central Laser Facility at RAL where he used pulsed lasers to obtain resonance Raman spectra of excited states and intermediates with even shorter lifetimes. These vibrational spectra provided structural information, not available from UV/vis absorption spectra. The first results on time-resolved resonance Raman (TR^3) spectroscopy of the triplet state of diphenylbutadiene appeared in 1984. TR^3 spectra of quinones, iron porphyrins and biological molecules followed. Tony Parker (then a postdoc) claims that Ron funded the York lab van through SERC (EPSRC's predecessor), enabling the Raman spectrometer to be transported from York for the experiments. By the early 1990s, he was measuring TR^3 spectra and kinetics of much shorter-lived excited states using picosecond lasers. As ever faster pulsed lasers became available, Ron delved into ultrafast infrared and electronic spectra of excited states, for instance of azobenzenes and rhenium complexes. The developments at RAL laid the foundations of the highly successful Lasers for Science facility today. I myself was stimulated to try experiments at the LSF by Steven Bell, one of Ron's postdocs, and had a run of highly successful trips in which we transported the matrix isolation kit in that same lab van. Jason Lynam and Ian Fairlamb have followed suit.

Ron was one of the first in the Department to set up collaborations with local industry – he helped develop kit for quantitative analysis of protein and carbohydrates in milk by infrared spectroscopy, showing the way forward for other external cooperation.

Teaching: Already in Cornell, Ron authored a textbook of inorganic chemistry with his colleagues Sienko and Plane. In York, he brought his clarity of expression to his teaching in lectures and tutorials. He taught many important courses on physical and inorganic chemistry, including group theory, transition metal chemistry and spectroscopy. Generations of Vanbrugh students and their tutors will remember the summer garden parties held at Ron's house in Crayke, where they played volleyball and perhaps joined in a sing-song accompanied by Ron on guitar.

The books: Another aspect of Ron's work was the commissioning and meticulous editing of book series. The first series, edited with the late Robin Clark, started as *Advances in Infrared and Raman Spectroscopy* but broadened its scope as *Advances in Spectroscopy*. Later he edited the RSC series on *Issues in Environmental Science and Technology* with Roy Harrison, covering a remarkable range from the first volume on "Mining and its environmental impact" in 1994 to the last on "Indoor air pollution" in 2019 - there are about 50 volumes. These books brought rigour to the subjects and represent a huge contribution to understanding of the environmental crisis.

The University and scientific community: Ron's knowledge, energy, and organisational skills were widely recognised. He organised international conferences, served as chair of the SERC Chemistry Committee (now defunct) and a member of its Science Board and Council. For RSC, he was a member of Publication Board. Within the University, he contributed to high level policy. During his tenure on national research committees, he helped focus the Department's research profile at a time of large funding cuts under Margaret Thatcher's government.

Reminiscences of collaborators and members of his research group.

Siva Umapathy (Director, Indian Institute of Science Education and Research, Bhopal): "When I arrived at York, I had no laser experience and so did not know much about how to set up a laser experiment or calibrate a spectrometer. After a visit to Rutherford Appleton Laboratory, I told Ron that I would not be suitable for the position since I am not experienced in electronics and computer operations. He told me, 'I know your abilities and let us wait for six months and if you still have not picked up the knowledge and skill, we can discuss other options'. Now when I look back, without such encouragement I would not be where I am."

Steven Bell (Head of Department, Queen's University Belfast): "Ron's great zest for life showed through in his enthusiasm for science and his infectious energy. He was tremendously supportive of younger researchers and encouraged me to apply for a lectureship that I wouldn't have even considered without his help. When I was appointed, he was amazingly generous in giving me free access to all his equipment, lab space and anything I needed to get started. Ron has left a legacy of researchers who continue to build on his foundations. Ron had a big personality and he made a great impression on everyone lucky enough to spend time in his company."

Igor Lednev (Distinguished Professor, State University of New York, Albany): "Ron played the most significant role in my career development. I was absolutely fascinated by experimental Raman spectroscopy when I experienced it for the first time in his lab in 1990. It was a turning point in my professional career because I have been focused on the development and application of this method since then. I was lucky to learn Raman spectroscopy from the best in the field. Ron made a very significant contribution to the field by both developing the theory and pushing the experimental limits."

David Phillips (collaborator at RAL, Imperial College, former President RSC): "Raman was a new venture for my group, but through Ron's influence, we quickly came to appreciate the virtues of obtaining structural information on transients in photochemical reactions, particularly when the time-scale of such measurements shortened to the picosecond regions. I am eternally grateful to Ron for his inspiration. One anecdote concerns a time when Ron was external examiner to one of George Porter's students and I was the internal examiner. At the time, supervisors were allowed to be present at the oral. Every time Ron asked the candidate a question, George answered, until eventually Ron told George somewhat forcefully that the next time that happened, he would have to ask George to leave the room. George then fell silent, the candidate did well, and all were happy at the end, but it was a great credit to Ron to admonish a Nobel Laureate in the way he did!"

Ken Williams (research student 1978-81, Director, Spectroscopy Products Division, Renishaw plc): "Ron was a wonderful mentor at the start of my career and an inspiration that provided me with a real passion for the technology. He was very good at offering advice in a subtle way that creates a resonance even now – and that I pass on to new starters in Renishaw. He told me he aimed for his students to be

able to define their own research projects and manage them to completion – it was an excellent philosophy and he provided the support to achieve the aim – I'm forever grateful. Ron was a great writer; his skill to write concisely and produce articles almost in a single draft was a gift. Once Ron stood between the two spectrometers we had in C block. Well, Ron was stood in that gap, not realising he was in the beam path of one of the lasers and telling us there was a strange burning smell – yes he'd burnt a hole in his trouser leg!!"

Derek Gardiner (former postdoc 1972-74, Emeritus Professor, University of Northumbria): "Working with Ron as a post-doc was an illuminating and valuable experience. I learned a lot from him. He was a friend and mentor and often a likable rogue. When I left his research group Ron gave me enough of his original spectroscopic equipment to get my own research work started. He will be missed in the Raman community."

Bill Grossman (Sabbatical visitor, Department of Chemistry, Hunter College and City University of New York): "Ron and I started grad school at Cornell at the same time and were graduate lab assistants in the same course. One of my strongest memories of graduate school is of the two of us, hotshot chem lab instructors, standing at the side of our lab, safety glasses in hand, being publicly berated by one of the old dinosaurs for not wearing those glasses. We were both angry - because, of course, we were completely in the wrong. It's hard to express how enormously important Ron's friendship has been to me - he's been kind, supportive, and fun to be with. I owe Ron a lot, and I'm very sad indeed to lose him, a wonderful friend for many years."

Ken Metcalf (research associate 1981-82): "It was a very good year getting to grips with Raman spectroscopy, getting rather messy dye lasers to work consistently, exploring SERS and some aspects of colloidal semiconductors. I remember, as you'd expect, challenging discussions of the results. I remember also Ron as a distinguished scientist, generous with his time and hospitable to his team. At the end of my year with Ron, I was set to move to UEA and knowing I'd be making frequent returns to York to visit my girlfriend, he offered me his 'stationwagon' at a good price. A pity I couldn't drive! But there you have it – Ron a good and generous man."

Reminiscences of colleagues in the Department, past and present:

Bruce Gilbert: "I clearly remember Ron and Bill Grossman arriving in York in September 1965 having just stepped off a Trans-Atlantic liner on their way from Cornell University. Ron, with his characteristic charm and energy, immediately contributed a large and complementary dose of Ivy League experience to the team. His research and teaching skills were obvious and generously shared. He encouraged me to take a Post-Doctoral year with a Fellowship in Cornell, and then to take over (in 1972) his commitment to teaching Summer School Courses there; it involved six weeks of daily lectures followed by full-day practicals and only proved remotely manageable with the provision of Ron's lecture notes and the course/lab textbooks by Sienko, Plane and Hester. Back in York it was a pleasure and privilege to work with him at all levels and for so many years."

Nigel Lowe: “I got to know Ron better during his retirement than before it. 'Retirement' was a relative term for him and he remained not only as an avuncular, entertaining and supportive presence in the coffee room, but as an active member of the chemistry community. I got to know Ron better via games of tennis, also involving Paul Dyson, and then after his office was relocated closer to mine in the Chemistry Hub. This led to invitations to join Ron in Switzerland on week-long ski trips in January, something that others including Paul, Tom Halstead and Sarah Heath had also joined over the years. They were hosted in the opulent surroundings of his son's property in Verbier. Ron was the consummate host putting everyone at their ease, leading skiing on and off piste and organising the running of the chalet like a military operation but always convivially and leading by example. Even into his 80s, he could be found in the laundry or kitchen at all hours. Ron was a stylish and highly competent skier.”

Ron and others, including Tom Halstead, were instrumental in establishing the university ski club not only for cross-country skiing on the local hills, but joining university ski trips to Europe and even taking their young families alongside student groups for trips spent in shared dormitories. Clearly different times, not only snowier but times where families went on university ski trips - wow! I have made good friends and shared some great times with Ron. I will miss his friendly, upbeat presence and sensible advice, both of which he was still sharing via email just a couple of weeks ago.”

Reuben Girling: “We shared much both on and off the campus, attending meetings, organising conferences, selecting equipment and, at another angle, fishing. Our long and fruitful working partnership benefitted from a distinctly shared loyalty. On 12th December 1984, Ron’s Inaugural Professorial Lecture on laser properties and applications drew a packed audience. His measured delivery of carefully chosen words (that included racy humour) brought into play a wholesome spectrum of a ceiling-high murmuration of visible laser light and bench-level Dire Straits sound effects. Oh yes it did! Prof Ron Hester’s lecture concluded with a pyrotechnic display that, like his words alone, invited the audience to respond, which it did whole-heartedly and with almost rowdy academic acclamation. The lasers had worked, the fishing line, a paper clip, theatrical flash powder, the joint visit to the Royal Institution for a behind-the-scenes look, my time selecting and adjusting optics and a single rehearsal had synergised to perfection. I was pleased for Ron. I had not let him down. Decades later, I like to think, that working together for that day we had done a proper job and not been in dire straits.”

Annie Hodgson: “As Ron was such a well-respected senior member of the Department, I felt very honoured that he became my mentor when I was a new member of staff in the early 1990s. For the last ten years we have shared an office, when he became a friend; providing sage advice, chemical knowledge and a good listening ear.”

Tom Halstead: “Ron became an inspiring research leader, a popular lecturer, and a supportive undergraduate supervisor. During a British Council sponsored visit to São Paulo, Ron’s vocal accomplishments came to the rescue of a colleague who, when they were being entertained by a Japanese-Brazilian host at a karaoke club, completely dried up attempting to sing *Que Sera Sera*, but Ron avoided further embarrassment by smoothly taking over.”

John Moore: “I first met Ron when I was a Year 1 PhD student with David Philips at The Royal Institution, helping to initiate the collaboration on TR^3 spectroscopy between the RI and York groups at RAL (see above). Ron was a leader in developments and applications in what was an exciting new field. A few years later, Ron facilitated my return to the UK after a postdoc in Philadelphia, which was when I started as a lecturer in York. Ron and I then worked together again over many years, both in York and at RAL and other facilities. Ron was tremendously supportive throughout: it was a privilege and a pleasure to work with him, and to learn from him.”

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Ron remained a regular visitor to the York Chemistry coffee room and I always looked forward to my conversations with him. Ron passed away at home on 25th March 2022, aged 86. He is survived by his wife Bridget, children Stephen, Alison, David, Catherine, and 10 grandchildren. Ron's wish was for his body to go to medical research. He is with Nottingham University Hospitals NHS Trust, Postgraduate Education Centre for "medical education, training and research”. Donations in his memory can be made to Prostate Cancer UK. Ron loved skiing, golf, wine, music, science, bad jokes, and most of all, his family and friends. There is a tribute webpage at ronhester.muchloved.com.

Robin Perutz, 21 April 2022

York Open Research Awards open for submissions

Message from Dr Luke Wilkinson: This year's York Open Research Awards are now open for submissions. This award scheme provides an inclusive opportunity to celebrate projects and advocacy initiatives across a variety of disciplines, recognising work which encourages dialogue, reflection and broader thinking about some of the issues involved in open research. The awards are open to all staff and students (including postgraduate researchers) and the deadline for submissions is 12 noon on **Monday 16 May 2022**. We are offering individual prizes of **£200 per submission** with the possibility of longer-term funding and operational support to help develop projects or initiatives. All entrants will also receive a goody bag of York Open Research merchandise (subject to availability)!

Chemistry, particularly YSBL, has historically been a strong contributor for Open Research by contributing to open source crystallography software for over 40 years. If you are unsure if you are contributing to Open Research practices or want to learn more about what Open Research means, please check out this page to learn more. The link also provides more details on how to submit your award application.

Online Department suggestion box

The online Equality and Diversity suggestion box has been extended to be a suggestion box for the whole Department. You can submit your thoughts/suggestions/ideas for general Departmental matters as well as matters relating to Equality and Diversity. You can find the Google form at this link.