

October 2022

## Welcome from the Head of School of Physical and Chemical Sciences

Dear readers, this newsletter marks the start of our first post-transition year as the School of Physical and Chemical Sciences. The School was formed on 1 August 2021 from the School of Physics and Astronomy and the Department of Chemistry which at the time was part of the School of Biological and Chemical Sciences (now Biological and Behavioral Sciences). It has been my privilege to be appointed as the first Head of the new School and supported by my executive team and all my colleagues, to help us make our new School an even greater success than the sum of its constituent parts.

In our school we have a Department of Physics & Astronomy, headed by Professor Adrian Bevan and a Department of Chemistry headed by Dr Isaac Abrahams. Our goal during the first year has been to draw on excellence in both Departments and to seek to adopt best practice in education, research, and administration learning from what has worked well (and what has not) in the individual parts that came together just over a year ago. This process is far from complete, but already I can see some very significant improvements in our practice that we are adopting for the new academic year and I am sure that this time next year we will be working more smoothly and efficiently to the benefit of all staff and students.

We have had some great things to celebrate as a new School, not least the REF2021 outcomes for both units of assessment (UoA). Here is a link to Chemistry (UoA8) <https://results2021.ref.ac.uk/profiles/units-of-assessment/8> where chemistry was ranked 8th for impact and 9th in the UK for research outputs. Here is the one for Physics & Astronomy (UoA9) where we improved in every assessed category and doubled the number of staff submitted <https://results2021.ref.ac.uk/profiles/units-of-assessment/9>,

Recently the A-level results were released to students who had applied to study our programmes and I am delighted to report that we have significantly increased the number of students we expect to see starting their degrees across both Departments this month. We are certainly making progress towards helping the Faculty and University achieve the ambitious 2030 strategic targets.

I am delighted to congratulate eight of our academic colleagues who have succeeded in their recent promotion applications, effective from 1 August 2022. To Professor: Chris Clarkson (Professor of Cosmology) and Matteo Palma

(Professor of Physical Chemistry and Nanomaterials)

To Reader: M Buican (Reader in Theoretical Physics), Chris Chen (Reader in Space Plasma Physics) and Christian Nielsen (Reader in Organic Materials)

To Senior Lecturer: Giorgio Chianello, Stoichko Dimitrov and Seth Zenz

I would like to thank all my colleagues who have been so supportive during a very challenging year which I know has been stressful and, even though COVID-19 has been less of a critical issue, somewhat unsettling.

Best wishes, Professor Peter Hobson

## WELCOME

Dr Jan Soetaert joined us as the Technical Facilities Manager. Jan will primarily be responsible for, Overall Technical Team line management; overseeing the provision of efficient and effective technical support for the purposes of teaching, research and commercial partnership, Strategic resource planning for research space, technical infrastructure and staffing and Capital projects and buildings management. Jan was the former manager of the Blizzard Advanced Light Microscopy Facility., and is based in GO Jones office 119.

Nina Booty joined us as the School Marketing Manager. Nina will primarily be responsible for Developing and implementing an effective marketing and student recruitment strategy, The marketing and promotion of our educational programmes, Management and organisation of student recruitment events and Promotion of the School's activities generally in line with the Universities strategic objectives. Prior to joining the School, Nina worked for the Institute of Dentistry and has also worked as a Research Analyst in the property and financial sector, Nina will be based in GO Jones 107/ Dept W.

Ahmed Ali is our new stores management assistant. We can already see the incredible difference he has made to the smooth running of stores. Now that all parcels arrive and are collected in the Joseph Priestly, I am sure you will run in to him. Please say hello next time you collect a parcel so he can put a face to the name.

Dr Abigail Waldron, who has joined us as a new lecturer in the PPRC. Abigail has an excellent track record in neutrino physics and beyond. She received her D. Phil in particle physics from Oxford, working on T2K across many aspects of the experiment - with contributions to detector and software commissioning and a leading role in the combination of the T2K and MINOS electron neutrino appearance results. After a brief period working on the MARS prototype neutron detector at Oxford, she then moved on to the University of Sussex as a PDRA working on NOvA. Abigail then took a break from particle physics for a few years, working first as a consultant in machine learning in the Netherlands, and then running a computer science education business in Sweden. Returning to particle physics research in 2019 as a PDRA at Imperial College London, Abigail began her work on DUNE, contributing to the development of the DAQ system for ProtoDUNE and working on prototype readout for a high pressure TPC for the DUNE near detector. Most recently she was awarded a Marie Skłodowska-Curie fellowship, working on DUNE and MINERvA, also at

Imperial. We are delighted to have Abigail joining us as the newest member of our group and very much look forward to working with her over the coming years and is based in GO Jones office 401.

The Astronomy Unit welcomes Dr Heli Hietala into the Space Plasma Physics Group! Dr Hietala is a Royal Society URF and proleptic lecturer. She obtained her PhD from the University of Helsinki, Finland, in 2012 and then went on to postdocs at Imperial College London and University of California, Los Angeles. Her research is in shock waves and magnetic reconnection, and how particles are energized in structures emerging in their environment and interaction, using space based observations to reconstruct the size, shape, and motion of elusive plasma structures.

Eliza has joined us as the new Outreach, Widening Participation and Public Engagement Officer. Eliza was previously been employed as Research Associate at University of Bristol. She brings substantial outreach experience through her 4 years' role as STEM Ambassador at University of Bristol. Eliza holds Phd in Chemistry from University of Bristol, with MChem (MSc) degree from University of Liverpool. Eliza is based in GO Jones office 107.

Dr Laura Iacconi who joins the the Astronomy Unit to work with Dr David Mulryne on inflation and very early Universe Physics. Laura recently completed her PhD at the Institute of Cosmology and Gravitation in Portsmouth focusing on gravitational wave signatures from the very early universe and will be based in GO Jones office 116.

Dr Eugenia Pyurbeeva has recently completed her PhD at QMUL and will continue to work with Dr Jan Mol as a Post Doctoral Research Assistant. Her latest PhD results on controlling entropy of a single-molecule junction were published in [Nano Letters](#). Building on these achievements, she will now explore electronic entropy measurements in a variety of molecular and nanoscale quantum systems in collaboration with researchers at the University of Oxford, UCLouvain (Belgium), the University of Cape Town (South Africa), and the University of Waterloo (Canada).

Jo Dodd, Education Services Officer. Jo will be taking on demonstrator recruitment in the first instance and will be working hard to fill all of the available positions. She will work with Pauline de Bigault de Cazanove to assist with Chemistry Lab Demonstrator recruitment. She will also help with module selections and timetabling and will shadow the Chemistry UG and PGT SEBs with a view to take over in the near future. Jo is based in GO Jones office 110.

Aska Rahman, Education Services Administrator. Aska will be primarily focusing on student support and student engagement, help us identify students at risk and work with Harvey and myself to flag students who are disengaging. She will support Harvey with EC's, Welcome Week and working to boost the school's overall reputation amongst students and will shadow the Physics and Astronomy PGT SEB with a view to take over in the near future. Aska is based in GO Jones office 110.

Zarnab Qureshi has started as the Teaching & Research Laboratories Assistant, Zarnab will be working closes will Saqib in the Physics Teaching Labs.

Dr Laurentiu Rodina has joined the Centre for Theoretical Physics (CTP). He was awarded a Horizon 2020 MSCA fellowship with the title "*Bootstrap and Uniqueness for Form Factors and the S-matrix*" and he will work on this project in collaboration with Prof Andi Brandhuber and Dr Congkao Wen from CTP.

Dr Zongde Chen has joined the ATLAS Inner Tracker team within the Particle Physics Research Centre (PPRC), where he will contribute to the testing of silicon microstrip sensors and support structures. He completed his PhD in 2019 at CCPM, the Marseille Particle Physics Centre (CNRS/Aix-Marseille University), studying CMOS pixel sensor development for ATLAS. He subsequently worked at the Diamond Light Source, testing and validating data from the Timepix3-based Tristan detector. We welcome Dr Chen and look forward to the challenge of constructing this new detector for the LHC over the coming years.

## Congratulations

**Dr Linda Cremonesi** who has successfully completed the Queen Mary Academy's taught programme Postgraduate Certificate in Academic Practice (PGCAP) this year, and has been registered for an Advance HE Fellowship:

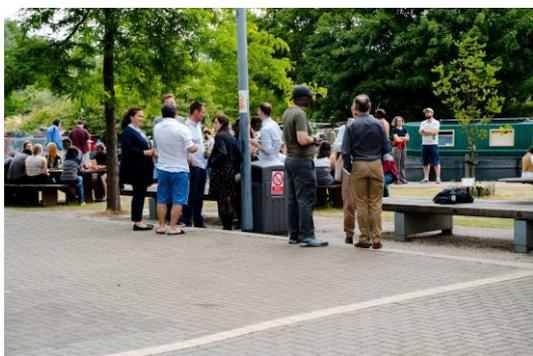
Dr Rachel Crespo-Otero and Dr Alston Misquitta,

- Horizon-MSCA PF-EF "Phosphorescent Matrix-Impurity Crystals" (PI: R. Crespo-Otero, Maria E. Salinas )
- Horizon-MSCA DN " Physics, Accuracy and Machine Learning: Towards the next-generation of Molecular Potentials" (PI: Alston Misquitta, Co-I: R. Crespo-Otero)
- Dr Alston Misquitta (consortium PI), Horizon Europe Marie Curie Doctoral Network (formerly known as an ITN). Physics, Accuracy and Machine Learning: Towards the next-generation of Molecular Potentials. Cost to funder(to QMUL/CCMP): £499,289 (total project cost £1.95M). Currently at contract negotiation stage with EU.
- Prof Kostya Trachenko, Horizon Europe Marie Curie Fellowship (Oliver Dicks). High entropy oxides: understanding their unique properties and dynamics using machine learning interatomic potentials – Horizon Europe. Cost to funder (to QMUL/CCMP): £228,212. Currently at contract negotiation stage with EU.
- Prof Kostya Trachenko: Developing next-generation DL\_POLY for the benefit of the modelling community. Cost to funder (to QMUL/CCMP) £460,764 (total project cost £538,952).
- Dr Matteo Palma, award of £64k from the Queen Mary Impact Fund for my work on Nanoscale Biosensors and the award of £99k from DSTL for a PhD Studentship on "Bio-molecular nanocarbon junctions for low-power computing"

Dr Andrea Larosa has been awarded AGU's Fred L. Scarf award. This award goes to one (international) recipient annually for their PhD work in space physics. more details can be found [here](#) and [2022 AGU-section-awardees-and-named-lecturers](#)

## School Summer BBQ

The School had its first Summer BBQ on 24th June 2022, which gave colleagues from both Department of Physics and Astronomy and Department of Chemistry to meet and interact as a new School.



## PhD Symposium 2022

On the 17<sup>th</sup> May, we ran the first School of Chemical and Physical Sciences PhD Symposium, which was held at the People's Palace foyer.

The afternoon began with the year one poster competition. Students from both departments displayed posters that described their projects and the progress they have made over the past few months. The winner was announced as Isabelle Ye with Choudhry Amjad as the runner up.

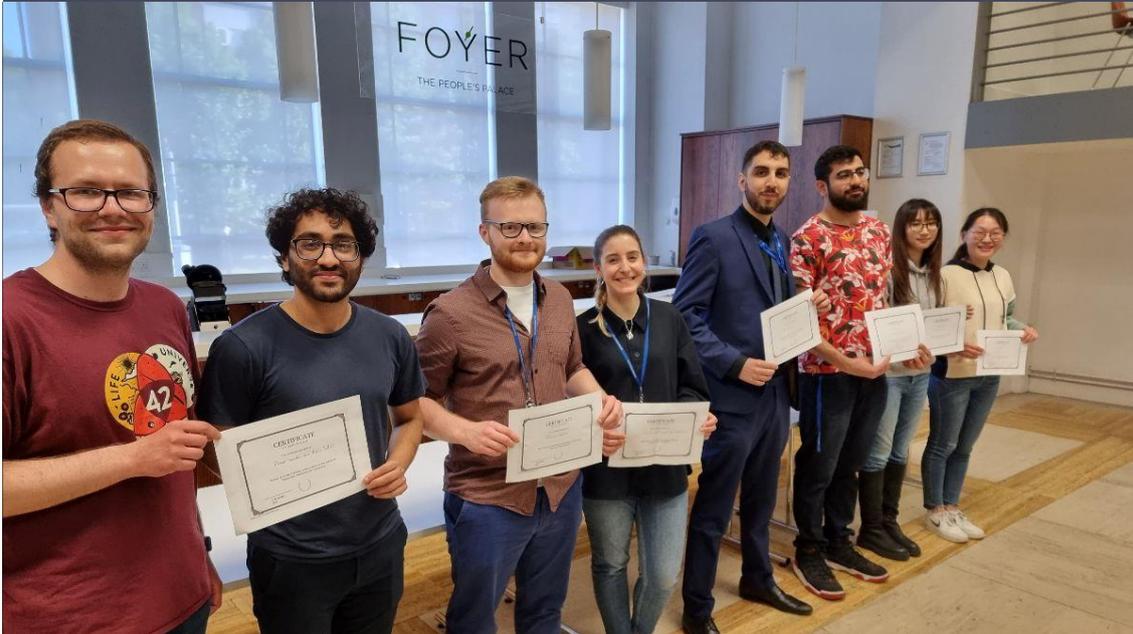
After this, the presentations were held in PP1 and PP2, where third and final-year students from both departments presented their work to a full group of students and academics. All of the presentations were of the utmost quality, but it was judged that Thomas Keenan won the Department of Chemistry award for best presentation, with joint runners up being Roman Halaksa and Amir Sidat. On the Department of Physics and Astronomy side, the winner was judged to be Ali Barlas, with Zaid Dhorat as the runner-up.

The day ended with the second-year Chemistry poster competition in the People's Palace. Where Pauline De Bigault De Cazanove won the top prize with Simiao Yu as runner up.

This was an end of a day where the full variety of the research undertaken within the School was on display through posters and presentations of the highest quality. We

would like to thank the judges and all those who assisted in putting the day together, but most of all the presenters and fellow PhD students who created such a positive atmosphere throughout the day.

*Picture: from left to right, Pauline De Bigault De Cazanove, Ali Barlas, Choudhry Zahaab Amjad, Limeng Ye, Yu Simiao, Thomas Keenan, Amir Sidat, Roman Halaksa*



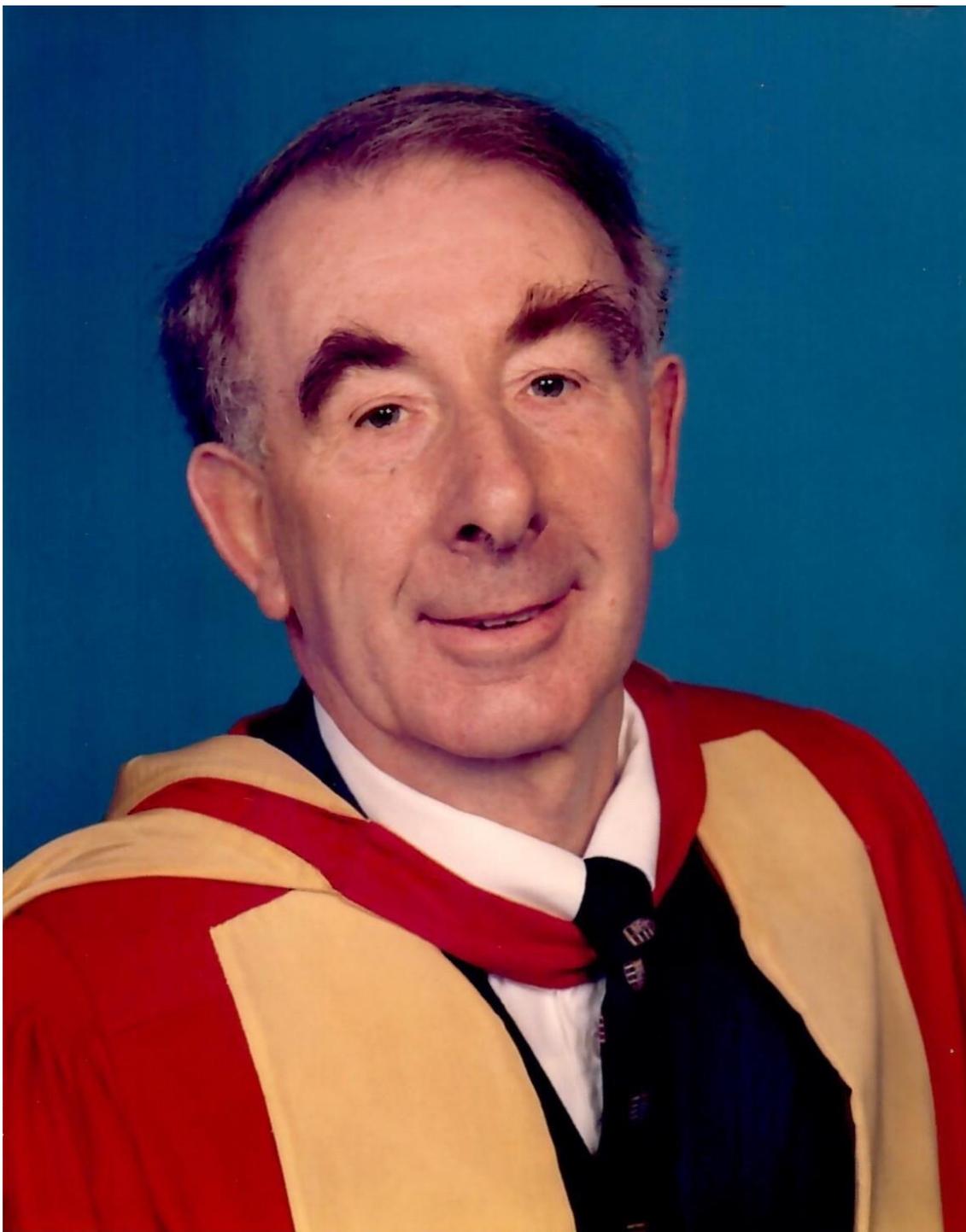
## **Queen Mary is excited to announce that we are establishing our first Race Equality Staff Network**

Staff Networks are places where people with shared identities and backgrounds can connect with colleagues and make positive change across the university. They can fulfil several roles including providing peer support and a forum for social interaction

At Queen Mary our mission is to become the most inclusive university of its kind, anywhere. We recognise that our people and culture are central to progressing and transforming Race Equality at QMUL (Queen Mary University of London), and that the Race Equality Network is an integral part of achieving this goal. To ensure the community is at the heart of decision making, the EDI Team are holding three focus group sessions to co-create this new network with colleagues. We look forward to hearing your ideas and feedback on what you would like to see from a Race Equality Staff Network and what a successful network would like.

The focus group sessions are open to staff members who self-identify as being from a racial minority ethnic background / staff members who self-identify as Black, Asian or any minority ethnic background. You can register your attendance by completing the [Race Equality Network Focus Group form](#).

We hope you can join us and look forward to seeing you there.



### **Obituary**

Dr Frank Alan Hart (always 'Alan'), who died on April 18<sup>th</sup> 2022, joined the staff of QMC's Chemistry department in 1962, finally retiring as Reader in Inorganic Chemistry in December 1990. Despite his high intelligence (Cambridge half-blue in chess), he was a very modest and self-effacing man, who was sympathetic to students. The antithesis of 'celebrity'.

Alan was born on April 11<sup>th</sup> 1929. On leaving Bedford Modern School in 1947, he commenced research! Joseph Chatt had just been put in charge of the Inorganic

Chemistry research department of Imperial Chemical Industries' Butterwick Research Laboratories at Welwyn, commonly known as 'The Frythe'. Chatt's Royal Society memoir says:- 'Initially much of the research was carried out by Joseph himself with the aid of two assistants, Alan Williams and Frank [sic] Hart who although not then graduates made a substantial contribution'. Alan's first two publications with Chatt were to appear in 1952-3. In 1950, Alan went to Pembroke College Cambridge to read Natural Sciences; graduating in 1953, he did a Cambridge PhD with F. G. Mann FRS (1897-1982). Alan worked on the synthesis of organic compounds of phosphorus and arsenic, and their complexes with certain transition metals. Mann was one of the best known chemists in the country. He was an organic chemist who co-authored the standard book on practical organic chemistry at University level ("*Practical Organic Chemistry*", universally known as 'Mann and Saunders' after its authors) but also did a lot of work on transition-metal chemistry from the 1930s to the 1950s at a time when it was a very unfashionable area of chemistry to work in. Alan published several papers with Mann in 1955-1957. After completing his PhD in 1956, Alan then went back to ICI at The Frythe, continuing to work for Joseph Chatt FRS (1914-1994), who was one of the two best inorganic chemists that Britain produced in the 20<sup>th</sup> century (he later headed research on areas like nitrogen fixation at the University of Sussex). Few chemists can have had two such eminent mentors (Chatt was also a former Mann student). Alan carried out a great deal of research on transition metal chemistry, much of which was published in journals like *J. Chem. Soc.* and *Nature*. One odd fact that I recall Alan telling me that he was allergic to compounds of the element palladium. He had to work in a palladium-free laboratory when he was at the Frythe.

After the Frythe closed in 1962, Alan joined the faculty of the Chemistry Department at Queen Mary College. His great achievements were in the chemistry of the lanthanides, often called the rare earths. Today these elements are most important in our everyday lives, responsible for luminescent devices (e.g. colour TVs); fibre optics; catalytic converters; batteries; contrast agents in MRI scans; the magnets in wind turbines and the small magnets used in many parts of motor cars (etc.). At the start of the 1960s, little was known about these elements and their coordination chemistry. These metals have rather similar chemical properties to each other and occur in minerals as mixtures. Scientists had only just managed to find good ways of separating them in a pure state about a decade earlier.

Alan had several very productive PhD students in the 1960s – Paul Laming, David Cousins, David Durham and Geoff Frost – they made large numbers of stable complexes of yttrium and the lanthanides. These were so important in helping to show that lanthanide complexes usually had high coordination numbers, typically around 8 or 9, in contrast to what had been assumed by chemists previously – the accepted view had been that they were like the transition metals (e.g. chromium, iron, cobalt and nickel) which commonly exhibit coordination numbers of six. At that time X-ray diffraction studies were much slower, so Alan was a pioneer in using instrumental methods to deduce coordination numbers.

Alan's best known research was in what were then known as 'lanthanide shift reagents'. These were paramagnetic lanthanide complexes which helped simplify nuclear magnetic resonance (NMR) spectra of organic compounds. Alan was not the first person to publish this phenomenon, but, working with Dr Gerry Moss of the department, was one of its first popularisers. For over a decade they were routinely used by organic chemists worldwide to help simplify and understand NMR spectra and thus understand the structures of their compounds. The early bench work was carried out by postgraduate Margaret Staniforth, succeeded by postdoctoral worker Graham Catton. Today the gadolinium compounds used as contrast agents in MRI

scans are their descendants.

At the end of the 1960s, Alan's postdoctoral worker, Mohan Singh Saran, made the first alkyls and aryls of scandium, yttrium and the lanthanides, another breakthrough, this time in air-sensitive organometallic chemistry. Then in 1970-3, a brilliant synthetic worker, Dr Joginder Singh Ghotra, made the first three-coordinate lanthanide compounds, a series of alkylamide complexes, in a joint project with Professor Don Bradley (the head of inorganic chemistry at QMC). On the other side of the bench from Joginder, Simon Cotton, Alan's other postdoctoral worker, was fortunate in making the first four-coordinate lanthanide compounds, which also happened to be the first lanthanide organometallic compounds with metal-carbon sigma bonds. Subsequently in the later 1970s and 1980s Alan worked with rare earth complexes of ligands like crown ethers, making further interesting compounds, some with unusually high coordination numbers, such as nine coordinate scandium in  $[\text{Sc}(\text{terpy})(\text{NO}_3)_3]$

Alan also wrote two significant large works. In 1987 he produced the first detailed survey of the coordination chemistry of the lanthanides for the first edition of the multi-volume reference work "*Comprehensive Coordination Chemistry*", published by Pergamon. Earlier, assisted by Simon Cotton, he wrote the book "*The Heavy Transition Elements*", a textbook on the lanthanides and actinides, as well as other metals including the six platinum metals, silver and gold, plus other heavy metals like molybdenum and tungsten (Macmillan, 1975).

By Simon Cotton  
May 2022

## **There are reasons girls don't study physics - and they don't include not liking maths**

This was covered in the [Conversation](#)  
Dr Olivia Keenan

Dr Olivia Keenan has co-written for *The Conversation* on removing barriers to girls' participation in physics. She wrote: "In physics the stereotype is that boys are naturally better at it than girls, and this messaging is still being passed on (both intentionally and unintentionally) to our young people in school, in their home lives and through the the media."

## **SAGEX - At the Frontier of Physics**

Two PhD students from the Department of Physics and Astronomy had a key role in developing an online exhibition "SAGEX - At the Frontier of Physics". The exhibition, (<https://exhibition.sagex.org>) is a web app that, through short videos, games, and interactive elements, allows the user to explore the wonderful world of quantum particles, from basic concepts to cutting-edge ideas. The students are part of the Innovative Training Network SAGEX ([www.sagex.org](http://www.sagex.org)) (Scattering Amplitudes: from Geometry to Experiment), funded by the European Union's Marie Skłodowska-Curie programme.

Take a look and please provide feedback to let the team know how you enjoyed the exhibition!

# SAGEX At the Frontier of Physics

Explore the strange quantum world  
of scattering amplitudes in our  
**virtual exhibition**



## Jobs

We are currently recruiting for a number of positions in the School. For more information please click [here](#)

*If you have any news for the monthly School newsletter. Please contact Sri  
- [s.kulandaivelu@qmul.ac.uk](mailto:s.kulandaivelu@qmul.ac.uk)*



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SPCS School newsletter

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