

In this Issue:

Welcome article	1
TFSG Student Bursaries	1
Upcoming TFSG Events	2
TFSG Treasurer achieves IOP Fellowship	2
Call for research highlights and new Twitter account	2
David Tabor Prize	2
Woodruff Thesis Prize 2022	2
Nominations for the Woodruff Thesis Prize 2023	3
Reports of supported events	3
TFSG-relevant Facilities	6
PhD Opportunities	6
TFSG Committee	7

Welcome from the Secretary

Dear members,

Welcome to the latest edition of the TFSG Newsletter. I would firstly like to extend a warm welcome to Dr Stefania Moro, University of Birmingham, and Dr Steven Schofield, University College London, who have been elected as ordinary committee members last summer. I would also like to thank Dr Hem-raj Sharma, University of Liverpool, for his valuable contribution to the committee over the past 5 years.

Our flagship event for the year is the **Nanoscience@Surfaces** summer school, scheduled to take place at the University of York on the 22-25th of July, organised by committee member Dr Andrew Pratt. This is followed by our **Surface Science Day 6** event to be hosted at the University of Nottingham in September (TBC), organised by Dr Alex Saywell. Further information and registration details will be communicated to all members via IOP email messages as well as our X (Twitter) account [@IOPTFSG](#). So please stay tuned.



I am pleased to announce our support for a diverse array of events in 2024, starting with [Advances in Photovoltaics](#) on 13th March at the IOP headquarters in London, and the [Synchrotron Electrochemistry](#) workshop on 18-19th March at the University of Oxford. Furthermore, this year we support a joint European-UK Vacuum event [EVC17/ECOSS37](#) on 17-21st June at Harrogate, that brings together the 17th European Vacuum Conference (EVC-17), the 37th European Conference on Surface Science (ECOSS-37), and the 13th Vacuum Symposium UK (VS-13). The [Condensed Matter and Quantum Materials](#) conference follows on 2-5th July at the University of St Andrews, and then the [Physics by the Lake](#) summer school on 5-16th August at the University of Stirling. Additionally, the Plasma Surfaces and Thin Films conference will be held this summer (TBC).

Reflecting on last year's activities, I am delighted to highlight the success of our flagship event, [ISSC24](#), at Manchester Metropolitan University, organised by committee member Dr Glen West in April 2023. It brought together academic and industrial experts in a wide range of experimental, theoretical and computational aspects of surfaces, interfaces and nanoscale physics. Our one-day event, [Surface Science Day 5](#), was held on the 9th of June at the University of Chester, organised by group secretary Dr Theodoros Papadopoulos. This was also a well-received event with talks in a wide range of experimental and computational topics. Josh Ellingford, Plasma Quest Ltd, has assumed the role of Newsletter editor and has done a wonderful job compiling reports of events we organised and supported in 2023. So please read further in the following pages.

Nominations for the Woodruff Thesis Prize are now open! This is an award that recognises the best PhD thesis completed in 2023, with a prize of £250. Please download the application form from the [TFSG website](#) and submit it to our chair, Dr Karen Syres, ksyres@uclan.ac.uk, before the deadline on **30th April 2024**.

In terms of member statistics, TFSG membership is at 1430 individuals with an average age of 44 years. It is promising that 25% are in the 20-29 age group, showing an improved gender balance of 32% female members!

We are constantly looking for further collaborations to support events, to enhance visibility of facilities and members' research efforts, and to extend outreach, so please do get in touch.

Warmest regards,

Theodoros Papadopoulos, TFSG secretary, University of Chester.

TFSG Student and Early Career Bursaries

The Institute of Physics provides financial support to research students and early-career professionals to attend international meetings and major national meetings.

Research Student Conference Fund (RSCF) bursaries* are available to PhD students who are a member of the Institute and of an appropriate Institute group. Students may apply for up to **£300** during the course of their PhD and may apply more than once, for example they may request the full amount or decide to request a smaller amount and then apply for funding again for another conference at a later stage.

Note that grants will normally cover only part of the expenses incurred in attending a conference and are intended to supplement grants from other sources. All recipients are asked to produce a report on return from their conference before receiving payment. For details and application form please look at.

- **Research student conference fund:** <https://www.iop.org/research-student-conference-fund>
- **Early-career researchers fund:** <https://www.iop.org/about/support-grants/early-career-researchers-fund>

* Please note that bursaries are not available for meetings organised by the Institute of Physics including those organised by IOP groups.

UPCOMING EVENTS in 2024

- 13 March, [Advances in Photovoltaics](#)
- 18-19 March, [Synchrotron Electrochemistry](#)
- 17-21 June, [EVC-17/ECOSS-37](#)
- 17-21 June, [Vacuum Symposium](#)
- 2-5 July, [Condensed Matter and Quantum Materials](#)
- 22-25 July, [Nanoscience@Surfaces Summer School](#)
- 5-16 August, [Physics by the Lake](#)



2023 David Tabor medal and prize winner, Prof Lev Kantorovich, King's College London

TFSG Treasurer achieves IOP Fellowship

Congratulations to TFSG treasurer Dr Kieran Cheetham for achieving Fellowship with the Institute of Physics. Kieran works as a Quality System Manager at STFC Daresbury Laboratory. His career highlights include the promotion of industrial and interdisciplinary collaboration, a portfolio of over a dozen patents granted internationally, the organisation of various public physics events in the UK, service on national and international professional committees, and chartership with the IOP in 2014. Kieran said of his achievement: "I am honoured to have received this recognition. I always try to embody the fellowship values of leadership, inspiration, and opportunity, and intend to continue to strive to be an advocate for science to benefit future generations."

Call for research highlights and TFSG Twitter account and Newsletter

We are keen to highlight significant achievements and profile research in Surface Science and Thin Films within the UK to demonstrate the vibrancy of our field. If you have a research highlight story or achievement to share or would like your research group profiled in the newsletter, please contact our Editor, Joshua Ellingford at the following email address: joshua.ellingford@plasmaquest.co.uk

Research highlights, achievements, upcoming events, and any updates in the field are also welcomed to be posted on our Twitter account [@IOPTFSG](#). So please do get in touch and follow us!

2023 David Tabor medal and prize

Prof Lev Kantorovich has won the [2023 David Tabor medal and prize](#) for new theories of molecular diffusion and kinetics of two-dimensional assembly of molecules on surfaces, and origins of atomistic resolution in atomic force microscopy imaging, energy dissipation and molecular manipulation.

The 2023 IOP Awards are now open for nominations. If you or someone you know is doing brilliant work in surface or nanoscale physics, please submit your nomination at <http://iop.org/awards>.

Woodruff thesis prize 2022

We are pleased to announce that Dr Fabian Thiemann is the winner of the Woodruff Thesis Prize 2022. The Woodruff Thesis Prize is an award for the best PhD thesis in Thin Films and Surfaces in the stated year.

Fabian carried out his PhD at UCL and his thesis was titled "Properties of Low-dimensional Materials Explored with Machine Learning Potentials". His thesis focuses on graphene and its inorganic analogue, hexagonal boron nitride. The first part of his thesis deals with exploration of the two main routes to nanoengineer the morphology of 2D materials, namely strain and defects, by performing machine



Dr Fabian Thiemann, winner of the 2022 Woodruff thesis prize.

learning-driven atomistic simulations. The second part of his thesis is dedicated to the one-dimensional counterparts of graphene and hexagonal boron nitride, carbon and boron nitride nanotubes, which show great promise for desalination and blue energy harvesting. His thesis illustrates how subtle details such as lattice imperfections, atomic vibrations, and differences in the electronic structure can significantly affect the material properties offering great potential to control the behaviour of matter at the nanoscale.

As the winner of the prize, Fabian receives £250 and will have the opportunity to present his work at the next Interdisciplinary Surface Science Conference (ISSC-25). The ISSC conference is held every 2 years and ISSC-25 is planned for spring 2025.

Thank you to all the students and their supervisors who submitted nominations this year. The committee enjoyed reading the theses and we look forward to receiving nominations for the Woodruff Thesis Prize 2023.

Woodruff thesis prize 2023: Call for Nominations!

Nominations for the Woodruff Thesis Prize are now open, with a closing date of **30th April 2024**. The Woodruff prize is awarded annually for the best PhD thesis completed by a student member of the TFSG group. The value of the prize is £250 and is established to encourage and recognise high quality research and scientific writing in the field of thin films and surfaces.

The application form and further information is available online on the following IOP link:

<https://www.iop.org/physics-community/special-interest-groups/thin-films-surfaces-group/woodruff-thesis-prize>

Report on ISSC-24

Organised by the Thin Films and Surfaces Group, the Interdisciplinary Surface Science Conference held its 24th biennial event at the Faculty of Science and Engineering at Manchester Metropolitan University. Over three days 10 invited presentations were delivered, along with 17 high-quality contributed papers covering a range of fundamental surface science topics, the state-of-the-art in surface modification and cutting-edge surface analytical techniques. A lively poster session and dedicated industrial exhibition helped to provide a highly engaging event.

A special thanks goes to our IOP Sponsors (Thin Films and Surfaces Group, Ion and Plasma Surface Interactions Group, Materials and Characterisation Group, Nanoscale Physics and Technology Group, Vacuum Group); and also our Exhibitors: (Edwards Vacuum, Hiden Analytical, Institute of Physics, Korvus Technology Ltd., Manchester Fuel Cell Innovation Centre, Scanwel Ltd., Scienta Omicron, Torr Scientific Ltd.)

*Dr Glen West
Manchester Metropolitan University.*



Group photograph of delegates at Peptide Self-Assembly 2023

Report on Peptide Self-Assembly

Peptide research as a new direction of biomaterials development is challenging but fascinating! The development of the community is fast. Peptide Self-assembly 2023 has been successfully held in Manchester during 25-27th July 2023, with speakers and participants coming from all over the world and the total number reached 150! This conference has truly worked as a hub to get alike minded scientists together in the post Covid era! Participants enjoyed face-to-face discussions and sharing foods and drinks under the same roof! The Scientific Programme included topics ranging from new peptide design and discovery, synthesis, characterisation, bionanomaterials, surface functionalisation, delivery vehicles, development of peptide therapeutics, to demonstrations and early clinical assessments of antibacterial, anticancer and immune modulation peptides. The next peptide conference will be held in 2025 in the USA!

Dr Jian Lu, University of Manchester

Report on Vacuum Symposium

VS12 was held on 13th & 14th June 2023 at Daresbury Laboratory, Warrington, UK drawing nearly 100 visitors. The UK's premier vacuum technology event is now in its 12th year attracting both academia and industry, accentuating its importance across a wide range of applications.

Vacuum Symposium is an annual event that aims to educate and inform in all aspects of vacuum across the many and varied applications. VS attracts a varied audience and promotes a great willingness to share knowledge, ideas, and experiences amongst the participants.

The Welcome Reception on Tuesday evening was well received with an informative talk from Professor Jim Clarke (Director of ASTeC at Daresbury Laboratory) on "History of the Synchrotron Radiation Source". This was an informal gathering sustained with food and drinks that spilled out into the hot evening sunshine.

The low-cost Vacuum Training courses put on by VS proved once again to be very popular. Few people working



Dr Graham Rogers (R) of Leybold Vacuum receiving the Harry Leck Memorial Medal from Dr Andrew Chew (L)

with vacuum have received any formal training and the courses, ranging from introductory to specialist, provide knowledge that can be taken back to the workplace. Year after year we receive great feedback about “highly inspiring lecturers” and “what I’ve learnt will be very helpful on a daily basis”.

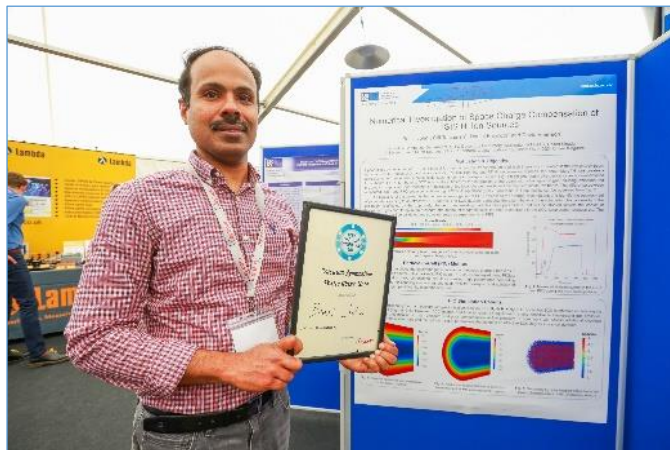
The Vacuum Symposium meeting is also an opportunity to present the Harry Leck Memorial Medal for distinguished contributions in vacuum science and applications. The 2023 winner was Dr Graham Rogers (R) of Leybold Vacuum seen here receiving the award from Dr Andrew Chew (L), last year’s winner. The growing winners list demonstrates a prestigious accolade amongst our community and nominations are invited for the 2024 award.

The free to attend Technical Meeting at VS12 was organised by the IOP Vacuum Group “Vacuum in Medical Applications”. There were six presentations from industry experts that stimulated a great deal of discussion and interaction.

Outside the meeting rooms was a large marquee for the Vacuum & Technology Exhibition, organised by Nu-tech Associates, with table-top displays from over 40 companies. The free buffet lunch provided in the marquee provided a great opportunity to network and talk to the exhibitors.

The Marquee also housed the VS Poster Session with the £100 prize being awarded to Benzi John (pictured next to the winning poster), Scientific Computing Department, STFC Daresbury Laboratory, who with colleagues, presented ‘Numerical Investigation of Space Charge Compensation of ISIS H- Ion Sources’.

Dr Steve Shannon
SS Scientific Ltd



Vacuum Symposium poster prize winner Benzi John.

Report on Condensed Matter & Quantum Materials

The Condensed Matter and Quantum Materials conference was held at the University of Birmingham on 29-30 June 2023. This conference is the home of the U.K.'s condensed matter community. It is a meeting where researchers from different subject areas can meet and interact, and where students can give their first conference presentation. The number of invited speakers was increased to 33, a level selected to ensure that prominent U.K. researchers can expect to be invited every few years. There were talks on quantum computation, high-temperature superconductivity, metallic monolayers, and on the open questions in development of lithium-ion batteries, among many others.

Plenary talks were given by Prof. David Cobden, of the University of Washington, and Prof. Peter Littlewood, of the University of Chicago. There were two focus sessions: one in memory of Prof. Joe Vinen, a pioneer in research on superfluid helium and quantum turbulence, and the other to highlight the work of the Materials For Quantum Network (M4QN), a recently-founded network of researchers on materials that are relevant for quantum technology. In addition, Prof. Carl Chinn, a famous historian of the Midlands, gave a talk on the history of industry in the city of Birmingham. The number of registrations was increased from 156 for CMQM '22 to 208 for CMQM '23.

Dr Clifford Hicks
University of Birmingham

Report on Plasma, Surfaces and Thin Films

The Plasma, Surface and Thin Films meeting took place on 15 June 2023 at the IOP Headquarters in London. This 1-day meeting was organised by the Ion and Plasma Surface Interactions, Thin Films and Surfaces and Vacuum groups and this year focussed on the areas of Plasmas & Liquids, Ion Beams, and Optical Coatings.

The programme had 3 themed sessions with an invited speaker and a contributed talk as well as a poster session



Alex Rubinstein from the University of Surrey receiving the TFSG prize for best student presentation from TFSG Ordinary Member Joshua Ellingford.

during lunch. The first session was on Ion Beams with an invited talk by Yiwen Pei of the National Physical Laboratory on “Use of Argon Cluster Ion Beam for Polymeric Nanoparticle Systems”. Then there was a session on Plasmas where Juliet Ojiako from Loughborough University gave an invited presentation on “Deformation of a Liquid Film by an Impinging Plasma Jet: Modelling and Experiments”.

After lunch, the last session was a session on Optical Coatings. Andrew Parker from the University of Oxford gave a presentation on “Optical Multilayers and Vivid Colour Coatings”.

The Thin Films and Surfaces Group Prize for the best student presentation was won by Alex Rubinstein of the University of Surrey for his presentation on “XPS Depth Profiles and TRIDYN Simulations for Metal Oxides” (see photo).

During the lunch break, we enjoyed our lunch while talking to the presenters of posters. Topics ranged from laser ablation to thin film deposition and ion beam sputtering.

Overall, it was a relatively small but very successful event. Many thanks to Hayley Brown and Oliver Greenwood for the excellent organisation.

Prof Erik Wagenaars
University of York

Report on Surface Science Day 5

[Surface Science Day 5](#) (SSD5) was the fifth in a series of one-day events that are organised by the IOP Thin Films and Surfaces group. They aim to attract PhD students, Postdocs, and early professionals by covering a wide range of research in surface science. SSD5 was hosted on the 9th of June 2023 at the University of Chester, with 9 invited speakers in three experimental and one computational sessions that were attended by 46 participants. The day featured a well-rounded programme of talks related to techniques such as relativistic ultra-fast electron diffraction, polarised X-rays, He spin-echo, large scale and linear scaling of density functional theory, and more. In addition, there was a poster session for contributed research, and a £100 poster prize and certificate, that was awarded to Matt Ord from the University of Cambridge



Matt Ord from the University of Cambridge receiving the Poster Prize from TFSG Chair, Karen Syres.

for his work on H tunnelling on metal surfaces. The organisers gratefully acknowledge support from the following IOP groups, and industry: IOP Nanoscale Physics and Technology group, IOP Vacuum Physics group, IOP Ion and Plasma Surface Interactions group, Scanwel Ltd, and Hidden Analytica Ltd.

Dr Theodoros Papadopoulos
University of Chester

Report on Physics by the Lake

Physics by the Lake is a two-week residential summer school aimed at condensed matter theory PhD students in the UK at the end of their first year. It has been running since 1997, funded by EPSRC until 2016 when their switch to a CDT of graduate training meant we could no longer apply for funding for the summer school. Since then, we have continued by asking for a larger contribution to the cost from the students, as well as a number of smaller grants from IOP groups and various CCP projects. Information about the content of the school is contained in the accompanying document so will not be repeated here.

Some key points from this school:

- The cost per student was set at £1000. This is set because (as far as we are aware) it is a common limit for travel money for PhD students in UK universities per year. We do not want to increase this next year.
- The £1000 roughly covers the individual cost per student of accommodation and food, but does not significantly contribute to fixed costs such as lecture rooms and expenses of lecturers. These come from external funding.

- We had 23 students this year – 25 signed up but 2 cancelled on short notice for personal reasons. We are also increasing the number of international students we attract, despite not advertising outside the UK. The cohort is still predominantly UK based however, although many are coming at different times during their PhD (i.e. not at the end of the first year). This is no problem – while aimed at first years, the school works for anybody who has not been before.

- The feedback from the students was overwhelmingly positive, praising good lecturers, good organisation, a good environment (meeting each other is one of the key aspects of the school). Other feedback we often get from students is that they have almost no relevant graduate level lectures at their own institutions (in the UK) meaning they find the school particularly useful.

- The view of the organisers was that this year had a particularly engaged group of students, who participated in lectures and workshops asking many questions making the lecturers think, having two very lively poster sessions, and getting on very well with each other (almost none of the students knew each other before the school).

- The university of Stirling works very well as a location as it is a nice campus university (with everything needed on campus) a bit outside the town, and has no physics department of its own so all students are in the dorm together cohort building. It also is cheaper than anywhere else we have looked at. Costs are however going up with inflation and we expect the school next year to be about 10% more expensive overall next year. As already mentioned, we do not wish to pass that cost on to the students as we have no indication that university travel budgets are going up with inflation. It is important for us to raise enough money through other sources to keep the school sustainable.

- This year, we received £9750 from IOP groups – £3750 from the TCM group and £1000 each from the Computational, Low-Temperature, Magnetism, Semiconductor Physics, Superconductivity and Thin Films groups. We would like to ask for the same again for next year.

- We are still finalising the budget from this year (this can be provided to you if you want when we have it) – we have a small surplus of funding from various CCP workshops grants from a few years ago that we are using to cover costs. We plan to ask some of the CCP committees for some money again for next year to make up the remainder of the budget.

- We believe this school is invaluable for UK PhD students in all areas of condensed matter theoretical physics (and related areas) and would like to make sure it can continue running. Thank you all for your support this year, and please continue to support us next year.

Dr Sam Carr
University of Kent

Facilities relevant to TFSG

Diamond Light Source

Diamond Light Source at Harwell campus operates several beamlines catering to the needs of the surfaces and thin-film

communities. One is the Versatile Soft X-ray (VerSoX) beamline, comprising two independently operated branches. Among the most exciting developments is the work on gas and liquid cells for studying surfaces and thin films under realistic conditions. Examples are looking at heterogeneous catalysts interacting with gases at 1 bar and at operating temperatures or the electrodes of a fuel cell in the presence of electrolytes, while applying a potential. To facilitate this, a new endstation has successfully been commissioned (TCUP2) on the NAP-XPS (near-ambient-pressure X-ray photoelectron spectroscopy) branch (B07C), allowing fast and easy loading of various cells, giving users a lateral sample travel of 1–2 cm—an order of magnitude improvement—making cell alignment a breeze! This setup, in combination with atomically thin membranes (graphene or free-standing oxides), enables XPS in liquids or in gases at real atmospheric pressure.

The high-throughput branch (B07-B) provides 2 endstations for measurements across a wide pressure range. One is dedicated to high-throughput UHV XPS and traditional surface science experiments with full sample preparation capabilities, the other to ambient pressure NEXAFS and is also compatible with electrochemical and high pressure gas cells. Access to the XPS endstation has recently become available via the Harwell XPS Service (an EPSRC national research facility) to improve accessibility for non-traditional synchrotron user groups. Inter-compatible sample holders with a vacuum suitcase enables transfers without exposure to air.

I07 is the surface and interface diffraction beamline of Diamond Light Source. The beamline science program is focused on the characterization of surfaces, interfaces, thin films and 2D materials in a variety of sample environments, ranging from Ultra High Vacuum conditions to physiological environments. Thanks to the high flux hard x-rays energy source the beamline is very well suited for the in-situ/operando characterization of chemical and electrochemical processes in real reaction conditions. I07 is equipped with different electrochemical cells and has recently made available to the user community a new flow reactor for the characterization for catalysis experiments at the solid-gas interface. The system can operate at pressures up to 20 bar and allows to investigate structural dynamics in real reaction conditions.

PhD Opportunities

“Biomimetic Model Systems for Catalytic Reduction of Nitrogen”. The project is a joint venture between the University of Salford (Rosa Arrigo), and Diamond Light Source (Matthijs van Spronsen). <https://www.diamond.ac.uk/Careers/Students/PhD-Studentships/2024-projects/STU0531-Biomimetic-Model-Systems-for-Catalytic-Reduction-of-Nitrogen.html>

TFSG Committee

Chair

Dr Karen Syres
University of Central Lancashire
ksyres@uclan.ac.uk

Secretary

Dr Theodoros Papadopoulos
University of Chester
t.papadopoulos@chester.ac.uk

Treasurer

Dr Kieran Cheetham
Science and Technology Facilities Council
kieran.cheetham@stfc.ac.uk

Ordinary Members

Mr Joshua Ellingford, Plasma Quest Ltd
Dr Stefania Moro, University of Birmingham
Dr Andrew Pratt, University of York
Dr Steven Schofield, University College London
Dr Steven Stanley, Light Coatings Ltd
Dr Matthijs Van Spronsen, Diamond Light Source
Dr David Ward, University of Cambridge
Dr Glen West, Manchester Metropolitan University
Dr Sebastian Wood, National Physical Laboratory

TFSG Newsletter Editor

Mr Joshua Ellingford
Plasma Quest Ltd
E-mail: joshua.ellingford@plasmaquest.co.uk

<http://tfsg.iop.org>

Institute of Physics
Thin Films and Surfaces Group
37 Caledonian Road
London
N1 9BU
