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Welcome from the Chair

Dear members,

Happy New Year! Welcome to the Thin Films and Surfaces Group (TFSG) winter newsletter.

Over the summer, elections were held for vacant positions on the TFSG committee, and I have been elected as the new Chair of the committee. I would like to welcome our new Secretary, Theodoros Papadopoulos, and four new Ordinary Members, Beaujolais Bussell, Andrew Pratt, David Ward and Mhairi Rogan.

It has been another tough year for everyone with the ongoing pandemic. It has been nice to see some return to normality over the past few months, with face-to-face conferences taking place and international travel opening up.

The big event for the committee this year was the Interdisciplinary Surface Science Conference ISSC-23, chaired by Neil Curson at UCL in April 2021. The event was held online and was a huge success. The TFSG also sponsored several other online conferences and meetings in 2021. You can read the chair's report on ISSC-23 and other sponsored meetings in the newsletter.

Our main event in 2022 will be the Surface Science Summer School, chaired by George Darling at the University of Liverpool in July. This event is aimed at PhD studying surfaces, interfaces, materials science and other related areas of research. It will consist of talks, workshops, a careers session, poster event and social events. We have held this event twice in recent years, previously at the University of Cambridge, and we hope the 2022 event in Liverpool will prove as popular.

Once again, we received outstanding nominations for the Woodruff Thesis Prize. This is a prize of £250 that we award for the best PhD thesis completed by a student in the stated year. Congratulations to Dr Mohammed Azzouzi of Imperial College London, who has been awarded the 2020 Woodruff Thesis Prize for his thesis titled "Voltage Losses and Recombination Mechanisms in Organic Solar Cells". Nominations are now open for the 2021 Woodruff Thesis Prize. The application form can be found on the [TFSG website](#) and submitted to me, Karen Syres (ksyres@uclan.ac.uk) any time before the closing date of 30th April 2022.

All the best for 2022!

Karen Syres, TFSG Chair, UCLan



TSFG Student and Early Career Bursaries

The Institute of Physics (IoP) provides financial support to research students to attend international meetings and major national meetings.

Bursaries* are available to [PhD students](#) and [early career researchers](#) who are a member of the Institute and of an appropriate Institute group. They may apply for up to **£300**, and may do so 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 the above links.

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

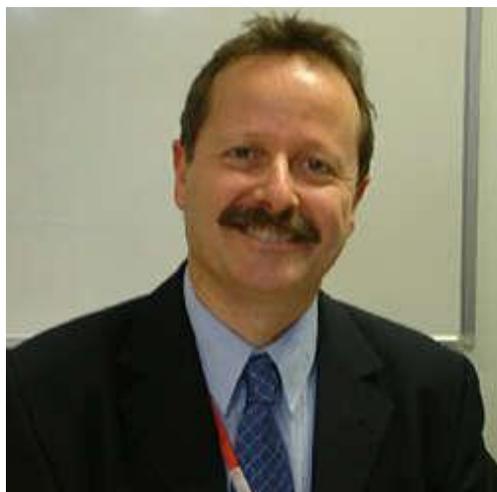
UPCOMING EVENTS in 2022

- Mar 23: [Advances in Photovoltaics](#), London
- Apr 20-22: [Photoelectron spectroscopy and the future of surface analysis Faraday Discussion](#), London
- Jun 9: [Plasma, Surfaces and Thin Films](#), London
- Jun 20-22: [Condensed Matter and Quantum Materials](#), Bath
- Jul 4-6: [Peptide self-assembly](#), Manchester
- Jul: Nanoscience@Surfaces, summer school, Liverpool
- Aug 21-26: [CMD29](#), Manchester
- Dec: Surface Science Day 5
- TBC: [Vacuum Symposium](#), Daresbury
- TBC: Surface Science of Biologically Important Interfaces

2021 David Tabor medal and prize

[Prof Leigh Canham](#), University of Birmingham, has won the [2021 David Tabor medal and prize](#) for founding the field of nanostructured silicon, discovering and correctly attributing its efficient luminescence to quantum confinement effects, and for uncovering the remarkable biological properties of nanostructured silicon and demonstrating their applications.

The 2022 IOP Awards are now open for nominations and close at midday on **14th Feb. 2022**. If you or someone you know is doing brilliant work in surface or nanoscale physics, please submit your nomination at <http://iop.org/awards>.



Prof Leigh Canham, School of Physics and Astronomy, University of Birmingham.

Woodruff thesis prize 2020

We received excellent nominations for the Woodruff Thesis Prize 2020. This is a prize of £250 that we award for the best PhD thesis completed by a student in the stated year. We would like to thank all the students and their supervisors who submitted nominations. The committee were impressed by the quality of the theses submitted.

After a very tough decision, the committee awarded the prize to Dr Mohammed Azzouzi of Imperial College London. His thesis, titled "Voltage Losses and Recombination Mechanisms in Organic Solar Cells", combined molecular and device simulation approaches with experiment to explore the correlation between molecular properties of semiconductors and losses in devices. His work helps to refine our understanding of voltage losses in organic photovoltaic devices and how to improve them. As the winner of the prize, Mohammed will also present his work at our next Interdisciplinary Surface Science Conference (ISSC-24). The ISSC conference is held every 2 years and our next conference is planned for spring 2023.



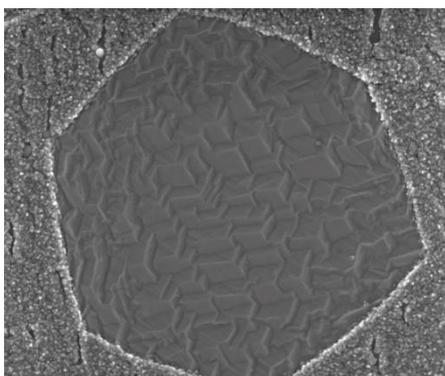
Dr Mohammed Azzouzi, winner of the 2020 Woodruff thesis prize.

Call for Nominations for the Woodruff thesis prize 2021

Nominations for the Woodruff Thesis Prize 2021 are now open, with a closing date of 30th April 2022. The Woodruff prize is awarded annually for the best PhD thesis completed by a student member in 2021. 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. 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>

Call for research highlights and introduction to new TFSG Twitter account

We are keen to highlight significant achievements and profile research in Surface Science 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 Theodoros Papadopoulos t.papadopoulos@chester.ac.uk. Research highlights, achievements, upcoming events, and updates on the group's activities are also posted on our new Twitter account [@IOPTFSG](https://twitter.com/IOPTFSG). So please get in touch!



Interdisciplinary Surface Science Conference (ISSC-23) – Report

The biennial flagship TFSG conference Interdisciplinary Surface Science Conference was nominally held at University College London (UCL), but was run virtually, taking place on 19-21 April 2021. The conference followed 22 previous successful meetings, most recently at Swansea, Manchester, and Birmingham. ISSC-23 attracted 184 delegates, with high profile invited speakers from Europe, the UK and the USA. The conference consisted of 13 invited talks, 27 contributed talks and 5 exhibitor talks. The virtual nature of the conference also allowed us to have two plenary speakers, Stacey Bent (A Surface Scientist's take on Atomic Layer Deposition) and Hari Manoharan (Designer Quantum Matter), both from Stanford University.

There was a special themed session on oxides to celebrate the 65th birthday of Geoff Thornton, with talks from a number of leaders in the field including Hans-Joachim Freund, Ulrike Diebold, and Sir Richard Catlow. We were delighted to have an invited talk from the recent winner of the TFSG Woodruff Thesis Prize. This was given by Veronika Sunko, covering her PhD work on achieving giant Rashba splitting in transition metal oxide surface states.

The virtual format of the conference allowed some innovative ways for the presenters to interact with the audience. The electronic poster boards were extremely popular, with the posters being in a multimedia format

that could include embedded data and videos. The poster judges had a hard time choosing the **poster prize winner**, due to the high standard being assessed, however the prize was won by Yuhan Zhu from University of Oxford, with the poster "The edge structure of Nb₂O₃ honeycomb monolayers on Au(111)". The runner up was Felix Reichmann from IHP – Leibniz-Institut für innovative Mikroelektronik, with the poster "The Electronic Structure of the Sn/Ge(001) Interface Studied by Angle-Resolved Photoelectron Spectroscopy and First-Principle Calculations". Given the virtual nature of the conference, we were very grateful for the support from our exhibitors, who presented via virtual exhibition stands, but also had brief slots in the main scientific programme to introduce themselves. The exhibitors were Bruker, Cryogenic, Henniker Scientific, Quantum Design UK and Ireland, Scanwell, Scienta Omicron and Specs.

As chair I would like to take this opportunity to thank the organising committee of Matt Blunt, Chris Howard, Anna Regoutz and Taylor Stock, and in particular George Wiltshire of the IOP, whose support was invaluable in making the conference a success. Most of all I would like to thank all of the speakers, poster presenters, exhibitors and delegates, without whom the conference would not have taken place.

Neil Curson
ISSC-23 chair, University College London

Surgical Scaffolds and Prosthetics – Report

As 2021 came to a close, a meeting which had long been on the radar for the IOP's Medical Physics and Thin Films and Surfaces Group, finally came into being on the 16th of December via Zoom Webinar: a meeting on Surgical Scaffolds and Prosthetics.

Surface and material scientists are very interested in what happens at interfaces be they between gasses, liquids or solids. Similarly, medical physicists are very interested to know what happens at the interfaces between artificial materials and tissue like skin, bone and blood.

This webinar explored these interfaces, starting with the "more conventional", but arguably most critical topic – the interface of support structures with bone tissue. Prof Brigitte von Rechenberg (emeritus professor at the University of Zurich), gave the audience a clear surgeon's perspective of the challenges and her successes of embedding metals and ceramics into live tissue. This set the scene for the day with each speaker addressing biocompatibility, insertion, embedding, integration and, in some cases, absorption.

The second speaker, Dr Magnus Biggs from NUI Galway, provided our first glimpse of a material of the

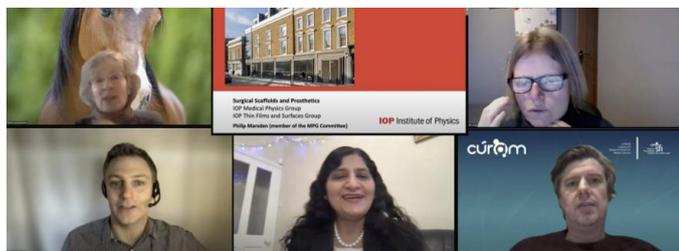
future, a piezoelectric polymer scaffold which he is targeting at tendon repair. Our third speaker, Prof Julie Gough from the University of Manchester, continued this theme of new materials presenting a range of applications for self-assembling peptide hydrogels whose bulk structure and biochemistry offer promising approaches to difficult to repair skin tissue and peripheral nerve repair. The final talk of the afternoon, delivered by Professor Ipsita Roy from the University of Sheffield, focussed on organically manufactured polymers for deployment in a wide range of tissue engineering scenarios from drug delivery to heart tissue repair.

This meeting is now available to view by IOP members from the following on-demand service:

<http://webinars.iopconfs.org/resource>

Dr Phil Marsden

Unitive Design and Analysis Ltd., and ordinary member of the IOP Medical Physics group committee



Surgical Scaffolds and Prosthetics event via Zoom Webinar

Plasma Surfaces and Thin Films – Report

Like many meetings, this was the first Plasma, Surfaces and Thin Films meeting to be held virtually on 9th June 2021 (half day). The meeting consisted of a very strong invited program. Prof Diederik Depla, Ghent University, Belgium, delivered a talk on "Why is the deposition rate low during reactive sputtering?". Prof Alistair Kean, Nikalyte, UK, talked about "Finding bugs and killing them with nanomaterials". Dr Mike Cooke, Oxford Instruments Plasma Technology, UK, talked about "Atomic layer etching", and Dr Janet Hopkins, SPTS Technologies Ltd, UK, delivered on "Adoption of plasma dicing".

This was interluded with 6 short industrial presentations from UK National Ion Beam Centre, Plasma Quest Ltd, Gencoa, Hiden Analytical, Henniker Scientific Ltd and Prevac, Nikalyte Ltd. The event also included a 90-min Gatherly poster presentations, exhibitor stands and networking session.

The presentation sessions worked very well virtually, and each presentation was followed by a series of questions from the audience. Unfortunately, this was

not the same for the Gatherly session, which experienced many technical difficulties, and was not compatible with all internet browsers. Steps have been taken since this meeting to improve the service.

Winner of the IPSI student poster prize was Alexander Rubinstein from the University of Surrey with the title "Molecular Dynamics Modelling of Dynamic XPS Cluster Sputtering"

The ISPI committee would like to thank all who attended and supported the meeting in this experimental format. For this year, the [Plasma, Surfaces & Thin Films meeting](#) will be held on the 9th June 2022, in IoP HQ (COVID permitting) and will also include a Young Researchers section.

Dr Hayley Brown

Commercial Director, Plasma Quest Ltd.

UK Colloids 2021 – Report

Our community's members love to discuss their work among themselves. [UK Colloids 2021](#) was ran as a seven-session, three-day online-only event from 19–21 July 2021. Sessions were as follows: (i) Colloids & nanostructures for sustainable tech, (ii) Colloids for energy, (iii) ECRs in colloid & surface science, (iv) Women in colloid and surface science, (v) Rheology and gels, (vi) Polymers in liquid formulations, (vii) Rideal award lecture and panel discussion. There were 152 registered participants from 18 countries, 36 contributed short presentations, 19 invited speakers and panelists, 7 winners of best contributed talk prizes. We mobilised to run this event for our community as soon as we learned we could, contractually, postpone until 2023 a face-to-face version of triennial flagship event, [UK Colloids 2023](#).

Our organising principles were to make the meeting as interactive, accessible, and diverse as possible. We aimed to abandon the 'death by PowerPoint' that we all have been subjected to over lockdown. We used audience participation, live polling, [social media](#) engagement, and quick-fire talks to maintain engagement with an audience worn out by too much Zoom time. The RSC's online platforms and global reach allowed us to attract a diverse, multinational audience and keep registration costs as low as possible (no more than £20, free for those without salaries).

Registration fees covered the prizes for the seven top contributed talks. Each winner received £50 plus their choice of books from RSC Publishing. The winners were Thomas Parton (University of Cambridge), Clare Rees-Zimmerman (University of Cambridge), James Tinkler (Loughborough University), Beatrice Jones (University of Cambridge), Josh Booth (University of Warwick), Samia Ouhajji (Leiden University), and Ian Williams (University of Surrey).



Ian Williams was the first to receive his book prizes after being selected as one of the best contributed talks

The event culminated with a session dedicated to the achievements of Prof. Colin Bain (University of Durham) for his [Rideal lecture](#). He covered some of his favourite topics from his career to date: making droplets run uphill, coffee rings, and oil on (dirty) water.



Rideal award certificate presented to Prof. Colin Bain

This event could not have happened with the generous time contributions from our contributors and my co-organisers: Ahu Gumrah Parry (University of Manchester), Stefan Bon (University of Warwick), Pete Shaw (Synthomer, retired), Gemma-Louise Davies (UCL), Guido Bolognesi (Loughborough University), Michael Cook (University of Hertfordshire), Lee Fielding (University of Manchester), David Growney (Lubrizol Corporation), Fiona Hatton (University of Loughborough), and Nacho Martin Fabiani (University of Loughborough).

Dr Christopher Blanford
Chair, SCI Colloid and Surface Chemistry Group
University of Manchester

Condensed Matter and Quantum Materials – Report

The Condensed Matter and Quantum Materials (CMQM) 2021 was held between 21st-23rd June 2021. Originally scheduled to be held in person at the University of Bristol, due to COVID-19 it was moved to be a fully virtual event. The aim of the event series is to be a forum for the wider UK Condensed Matter Physics community covering topics of current and general importance ranging from Superconductivity to Magnetism, from Non-equilibrium physics to Topological Materials, and from Surface physics to Semiconductors. Across 3 parallel sessions there were 5 plenary speakers from Australia, Germany, USA and the UK, 15 invited speakers, 58 contributed talks and 55 posters hosted on a remote platform.

The annual CMQM series began in St. Andrews in 2020, and in 2022 it will be host by the University of Bath. CMQM is supported by various groups of the Institute of Physics in addition to the Thin Films and Surfaces. We acknowledge support also from the Superconductivity; Magnetism; Low Temperatures; Theory of Condensed Matter and Nanoscale Physics and Technology Groups. For further information about the upcoming 2022 event, please click [here](#).

Dr Christopher Bell
University of Bristol



Condensed Matter and Quantum Materials (CMQM 2021), held online.

Faraday Joint Interest Group Meeting – Report

In March 29-31, 2021, the Faraday Joint interest Group (JIG) meeting was organised by the Faraday Division of the Royal Society of Chemistry with sponsorship (amongst others) from the IOP Thin Films and Surfaces group. This meeting was supposed to have been hosted at the University of Sheffield, but the on-going pandemic made a move online inevitable. Despite that, the organizing committee managed to put

together a wide-ranging programme covering many aspects of physical chemistry with talks (invited and contributed) across the spectrum from early career researchers to much more established academics. Highlights included plenary talks by e.g. Prof. Ewine van Dishoeck, about astrochemistry and Prof. Marsha Lester about the spectroscopy of Criegee intermediates and invited talks e.g. by Prof. Dwayne Heard about his work on atmospheric chemistry and Prof. Andy Cooper about his work in the area of materials chemistry. In addition to the scientific sessions, there were also sessions on publishing and career development of ECRs as well as question and answer session with each of the five invited speakers about their careers so far and the lessons they would like to pass on to a younger generation.

All-in-all this was a very successful conference, which will be followed by the next Faraday JIG conference to be held in Sheffield in 2023.

Prof Anthony Meijer
University of Sheffield

Researcher Profile

As a final year physics undergraduate (back in 2010) trying to work out my next step I knew that I wanted a career in science research but was also keen to find an area of research that had clear applications. A special lecture on organic semiconductors from Prof Donal Bradley pointed me in the direction of thin film electronics, and set me off to pursue a PhD in the Plastic Electronics CDT at Imperial College London with Prof Ji-Seon Kim. My research was on organic photovoltaics, and whilst my solar cell efficiencies were far from impressive, I really enjoyed delving into the fundamental physics and gained a love for Raman spectroscopy, which I still maintain.

After my PhD I was keen to continue in research, but also keen to work more closely with industry so that I could see more direct impact from my work. A job at the National Physical Laboratory (NPL) was the perfect fit. NPL is a unique organisation positioned at the 'triple-point' between government, academia, and industry. As the UK's National Metrology Institute, NPL is a government-owned lab with specific responsibility for maintaining and disseminating the SI system of units. In practice my role is to develop new measurement techniques based on optical spectroscopy and atomic force microscopy. Some of my projects include quite fundamental research on emerging materials, whilst other projects have a much more industrial focus to do with scaling-up manufacture or improving quality control for new technologies.

In recent years, I have contributed to research on a wide range of thin film technologies including organic

semiconductors, hybrid perovskites, nanostructured semiconductors, bioelectronics, and 2D materials. A new area that I am currently developing at NPL is wafer-scale metrology for wide bandgap semiconductor (SiC and GaN), where the UK has a growing industry and strategic interest in power electronics. Wide bandgap semiconductors offer many advantages over silicon for high-power applications, such as the power modules in electric vehicles and inverters for solar panel installations. Unfortunately, the performance of these devices is very sensitive to material defects, which are difficult to detect and identify resulting in substantial manufacturing yield losses. To tackle this, I am leading a consortium of 13 organisations from across Europe including national metrology institutes, universities, industrial companies. Together we will develop new metrology methods for bridging the gap between nanoscale defects and wafer-scale quality control. Projects like this are really exciting to me because we will be able to do and publish some measurements that nobody has ever done before as well as produce some technology that will make a real difference to society.

My research projects have given me opportunities to work with a wide range of people from different cultures and backgrounds. I am convinced that scientific research benefits from engaging people who have diverse worldviews and experience. I have a particular interest in the relationship between science and religious (and non-religious) belief, which has historically proven a source of both great scientific progress and antagonism. NPL has supported me and my colleagues in setting up a Faith and Religious Diversity Group to encourage constructive dialogue and understanding in this area.

It is often claimed that the most interesting work lies at the interfaces between disciplines, and I fully agree. The IOP Thin Films and Surfaces Group is as much about the interfaces of physics as it is about the physics of interfaces.

Dr Sebastian Wood
Senior Research Scientist – Electronic & Magnetic Materials Group, National Physical Laboratory, Teddington, UK



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Dr Mhairi Rogan - Novosound Ltd.
Dr Hem Sharma - University of Liverpool
Dr Steven Stanley - Light Coatings Ltd
Dr David Ward - University of Cambridge
Dr Glen West - Manchester Metropolitan University
Dr Sebastian Wood - National Physical Laboratory

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Dr George Darling - University of Liverpool

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