Thin Films and Surfaces Group

Newsletter

Comments from the Chair

Welcome to the February 2005 edition of the TFSG Newsletter. I hope that this will again be a busy year for the group as a whole, and there is already much to report on and to look forward to in the coming months. I also hope that by now you are familiar with our new web site, accessible at http://groups.iop.org/TF, and that you already have it firmly placed in your favourite web-sites list. We aim to keep this site as current as possible so as to keep you informed of all the group's activities, conferences, bursary opportunities and sponsored meetings.

This year we are already looking forward to the latest in the series of our flagship meetings, the *15th Interdisciplinary Surface Science Conference* ISSC-15 (June 27-30, University of Cardiff), and the second *Surface Science Summer School* (August 21-26, University of Nottingham), both in the same year. These follow on directly from the success of the ISSC-14 meeting in Liverpool in 2003 and the first *Surface Science Summer School* in Warwick in 2002. We are also supporting other meetings including; *UK Scanning Probe Microscopy* (21-22 March, University of Warwick), *New Astronomical Challenges in Surface Science* (April 18-19, UCL) and *Ice Surfaces & Interfaces* (April 21, University of Cambridge), as well as a number of other one and two–day meetings across the increasingly wide-range of group activities.

As chair of the TFSG it is very gratifying for me to see that we are still able to provide support for a number of research students to attend workshops and conferences specific to their research areas, and to present their work to an international audience, mostly for the first time. The bursary scheme continues to have an important role in the group's activities and a number of reports from a range of meetings are also included in this issue.

Finally, if you have any comments you wish to make, suggestions for future group activities or meetings and events you wish to publicise, then please contact Dr. Martin McCoustra at Nottingham (Secretary), Dr. Wendy Brown at UCL (Webmaster) or any other member of the TFSG committee.

My very best wishes to you for 2005.

Professor Chris McConville
(Chair, TFSG)
Department of Physics, University of Warwick
(C.F.McConville@warwick.ac.uk)

Contents

Further details of the group and its activities, including an up to date diary of supported meetings and conferences, are to be found on our website http://groups.iop.org/TF/

Support for Meetings and Conferences

The committee is very happy to offer the support of the TFSG to any meeting or conference in the relevant areas of thin films and surface science organised by the UK scientific community. We would also welcome suggestions from group members for topical one-day meetings that the TFSG could organise alone or in collaboration with other IOP subject groups. If you are organising a meeting or conference and would like to find out if support is available or if you have an idea for a topic meeting, please contact Dr. Martin McCoustra (TFSG Secretary).

Dr. Martin McCoustra
(Secretary TFSG)
School of Chemistry, University of Nottingham
(martin.mccoustra@nottingham.ac.uk)

Diary

The following meetings will be of interest to group members and have been organised with the support of the TFSG.

Thin Films and Surfaces Group, Institute of Physics, 35th Annual General Meeting
Tuesday 22nd March 2005, University of Warwick

The 35th AGM of the Thin Films and Surfaces group will be held at 12.30 p.m. during the lunch break in the second day of the UK SPM meeting (http://www.warwick.ac.uk/go/spm2005) being held at the Westwood Training and Conference Centre, near to the University of Warwick (http://www.westwood-centre.com) on Monday 21st and Tuesday 22nd March 2005. Further details of the UK SPM meeting itself, which is co-sponsored by the TFSG, can be found at the website above.

UK Scanning Probe Microscopy Conference 2005
Monday 21st March and Tuesday 22nd March 2005, University of Warwick

The UK Scanning Probe Microscopy 2005 meeting will be held at The University of Warwick on Monday 21st March and Tuesday 22nd March. The scientific programme is being jointly arranged by Dr. Gavin Bell (Department of Physics) and Dr. Julie MacPherson (Department of Chemistry), while the meeting is organised by the Royal Microscopical Society. The web link is;

http://www.warwick.ac.uk/go/spm2005

Topics to be highlighted at the meeting include:

Biological Processes and Bio-Imaging
Polymers, Self-Assembled Monolayers and Organic Materials
Spectroscopy and Theory
Nanostructures, Patterning and Manipulation
Single Crystal Surfaces and Crystal Growth
Electrochemical and Solid-Liquid Interfaces
Instrumentation and Probe Development

Invited speakers include:

Prof. Flemming Besenbacher, *University of Aarhus*
Dr. Alastair Smith, *University of Leeds*
Prof. Martin Hegner, *University of Basel*
Prof. G.J. Vansco, *University of Twente*
Dr. Werner Hofer, *University of Liverpool*
Dr. Stephen Driver, *University of Cambridge*
Dr. Margret Giesen, *Institut fur Oberflachen und Grenzflachen ISG, Julich*
Prof. Patrick Unwin, *University of Warwick*
Prof. John M. R. Weaver, *University of Glasgow*

New astronomical challenges in surface science
18-19 April 2005, Department of Chemistry, University College London
This meeting will act as the launch pad for a new EPSRC-sponsored network in surface science applications in laboratory astrophysics, which aims to bring together scientists from a range of disciplines with a common interest in understanding the interaction of the gaseous interstellar medium with the surfaces of dust grains. Plenary presentations by Paola Caselli, Ted Madey and David Clary will set the scene. Contributions, both oral and poster, are sought from those currently working in this area and are especially encouraged from those who feel that they may have something to contribute to broadening activity in this rapidly evolving field.

Registration and abstract submission details can be found at
http://www.chem.ucl.ac.uk/astrosurf/challenges/index.html

For further information about the Network, or the meeting, please e-mail astrosurf@nottingham.ac.uk

Registration and abstracts must be completed by 14th March 2005

Ice Surfaces and Interfaces
21 April 2005, Wolfson College, University of Cambridge
This meeting will cover the important areas of formation of ice surfaces, and adsorption and reactions on these surfaces. Topics covered by the meeting will include:

- Water adsorption on solid surfaces
- Growth of thin ice layers
- Adsorption/reactions on ice
- Atmospheric and Interstellar Water Chemistry

Invited speakers at the meeting include Dr. H. Fraser (Strathclyde, Glasgow, UK), Dr. C. Girardet (Besançon, France), Dr. A. Hodgson (Liverpool, UK), Dr. A. Horn (Manchester, UK) and Dr. A. Michaelides (FHI Berlin, Germany).

Registration and abstract deadline 7th April 2005.

Further information about this meeting can be obtained from one of the organisers: Georg Held (gh10009@cam.ac.uk) or Martin McCoustra (martin.mccoustra@nottingham.ac.uk).

ESF Research Conference on Biological Surfaces and Interfaces
Sant Feliu de Guixols, Spain, 18-23 June 2005
Interfaces between synthetic materials and biological systems – bio interfaces – constitute one of the most dynamic and expanding fields in science and technology. The field is driven both by a number of growing industrial and clinical applications and by the desire to understand bio interface processes at a basic level. During this conference, various aspects of bio interfaces will be addressed.

More information can be found on the web site at http://www.esf.org/conferences/pc05187

13th International Congress on Thin Films/8th International Conference on Atomically Controlled Surfaces, Interfaces and Nanostructures (ICTF13/ACSIN8)
Stockholm, Sweden, 19-23 June 2005
Please visit the Congress website: http://www.congrex.com/acsin8 for more information about the Congress and for online registration and abstract submission.

The deadline for abstract submission is 28 February 2005.

15th Interdisciplinary Surface Science Conference (ISSC-15)
University of Cardiff, Wales, 27–30 June 2005
ISSC is the flagship conference of the Thin Films and Surfaces group. The next conference in this highly successful series will be held at the University of Cardiff in June 2005.

Invited speakers include:
Flemming Besenbacher (Aarhus)
Hans-Joachim Freund (Fritz-Haber Institut)
Wayne Goodman (Texas)
Peijun Hu (Belfast)
David King (Cambridge)
Tim Jones (Imperial College)
Ronan McGrath (Liverpool)
Matthias Scheffler (Fritz-Haber Institut)
Mark Welland (Cambridge)

Registration fees (including conference dinner, meals and poster session drinks) are as follows:

IOP member:	£200.00	
Non IOP member:	£250.00	Reduced fee deadline: March 31st 2005
Students:	£100.00	Registration deadline: April 30th 2005
Accommodation:	£100.00	

Call for Papers
Abstracts for oral or poster presentations on all aspects of surface science are now invited. Contributions from postgraduate students are particularly encouraged.

Guidelines for submission
Abstracts should be no longer than one A4 page and posted or sent as an email attachment to: Miss Alison Rowlands, ISSC15 Secretary, School of Chemistry, Cardiff University, Cardiff, CF10 3TB.
Email: RowlandsAC@cf.ac.uk
(For full details see: http://www.cardiff.ac.uk/chemy/surfsci/ISSC15/
Abstract submission deadline: 31st March 2005

Conference Programme
Opening 2pm 27th June 2005
Conference dinner 7.30 pm 29th June 2005
Poster sessions 8pm 27th & 28th June 2005
Close 1pm 30th June 2005

Registration
Registration forms are available from the web site or by post from the address below.

Exhibiting at ISSC 15
A conference exhibition will be held alongside the oral sessions in the hall outside the lecture theatre, and in the conference refectory (next door to the lecture theatre hall). Companies wishing to exhibit, or to sponsor the Poster session & dinner receptions should contact Prof Mike Bowker at the address below or by email (BowkerM@cf.ac.uk)

Conference Venue
The conference will be held in the newly built Julian Hodge lecture theatre with en-suite accommodation in the next door Aberconway and Colum Halls. The site is within 10 minutes walk from the city centre. Cardiff's is the youngest capital in Europe and celebrates its centenary in 2005. It is a compact city, with acres of public parks, a wide range of cultural and leisure activities and an exciting waterfront development.

Getting to Cardiff
By Air: Cardiff Airport is 11 miles from the city centre. http://www.cial.co.uk/
By Rail: Frequent services between all major British cities: Cardiff-London Paddington,(1 hrs 55 mins) http://www.nationalrail.co.uk/planmyjourney/
By Road: Cardiff is served by the M4 and is easily accessible from all parts of Britain.

Further information & registration forms
Web site: http://www.cardiff.ac.uk/chemy/surfsci/ISSC15/
Postal address: Miss. Alison Rowlands, ISSC 15 Secretary, School of Chemistry, Cardiff University, Cardiff, CF10 3TB
Email: RowlandsAC@cf.ac.uk
Tel: +44 (0) 29 2087 4023; **Fax** +44 (0) 29 2087 4030

Surface Science Summer School
21-26 August 2005, University of Nottingham
The 2005 UK Summer School in Surface Science will be held at the University of Nottingham from August 21st to August 26th 2005. The Nottingham School builds on the success of the Summer School which was held in Warwick in 2002. The 2005 Summer School research themes have been carefully chosen so as to provide a comprehensive overview of the current state-of-the-art and 'hot topics' in modern surface science/ nanoscience and span: Single Molecule/Nanoparticle Spectroscopy, Electronic Structure, Self-Organisation and Pattern Formation, Surface Science at Central Facilities, Surface Science Out of UHV, Biological Interfaces, Surface Science in Environmental and Astronomical Sciences, and Surface Science in Industry.

In addition to providing scientific talks and 'hands-on' workshops spanning the gamut of the field, the Summer School will feature a dedicated careers session (led by Prof. Peter Feibelman, Sandia National Labs). Furthermore debates, workshops, and discussion sessions related to the future and societal impact of surface- and nanoscience will complement the lectures and workshops.

The Organising Committee for the Summer School comprises: Philip Moriarty, University of Nottingham (Chair); Martin McCoustra, University of Nottingham; Clive Roberts (University of Nottingham); Frances Jones (Eastman Dental Institute, University College London); Georg Held (University of Cambridge); and Nic Harrison (Imperial College London and Daresbury Laboratory).

Further details are available from Philip Moriarty philip.moriarty@nottingham.ac.uk,
Tel: (0115) 9515156.

Student Bursaries

We are happy to encourage postgraduate students to apply for bursaries to assist their attending major national and international conferences. To be eligible for a bursary, applicants must be a student member of the TFSG or the SSUK group of the RSC and be presenting a talk or a poster at the conference. In addition, bursary recipients will be expected to prepare a one-page report on the conference that they attended for the TFSG Newsletter. Student members of the group interested in applying for a bursary to attend a conference should contact Dr. Georg Held (Department of Chemistry, University of Cambridge) for further details. Application forms can be downloaded from the group website (http://groups.iop.org/TF/).

Dr. Georg Held
(Bursary Co-ordinator TFSG)
Department of Chemistry, University of Cambridge
(gh10009@cam.ac.uk)

Conference Reports

UK Coatings Forum and UK Forum on Friction and Wear

(National Physical Laboratory, 10-11 November 2004)

A joint meeting of the UK Coatings Forum and the UK Forum on Friction and Wear, was held at the National Physical Laboratory on the 10th and 11th November 2004. Both have the remit of bringing together industry, academia and government organisations to share best practice, the latest research output and provide networking opportunities. This meeting was organised by the NPL Materials Performance Team with support from the Institute of Physics Thin Films & Surfaces and Tribology Groups. Aimed at industrial users and suppliers of coatings, the specific theme was "The Characterisation and Performance of Thick Coatings". The event, which attracted over 40 delegates, was centred around a series of industrially relevant talks from industry, academia and research organisations such as NPL and TWI. All delegates were invited to contribute to a combined exhibition and poster display.

The first day focussed on coatings, in particular thick thermally sprayed and electroplated coatings. These are used in many different applications to enhance the mechanical performance of components, the corrosion resistance of structures, and to renovate and repair components that have been damaged in service. The Coatings Forum examined the drivers for the characterisation of thick coatings and the measurement techniques available for characterising their mechanical properties, adhesion and corrosion resistance. A particularly motivating talk concerned the need to characterise existing processes and coatings that are faced with replacement as a result of legislative and environmental pressures. The meeting also provided an opportunity to hear the latest news about international standardisation of coating measurement methods.

The second day of the meeting focussed on the application of thick coatings (greater than 50 μm) to control wear and friction. Wear is a major cause of losses to UK industry through factors such as loss of efficiency, unpredictable loss of manufacturing plant due to wear related failures and the

unreliability of equipment. Surface engineering is often used to provide the surfaces of components and parts with the required wear and friction behaviour to give the necessary performance. The presentations at the meeting showed how physically based insights into the mechanisms of wear can enable better selection and design of surface engineering systems to achieve improved component performance. Of particular interest were the optimisation of HVOF spraying parameters and attempts to characterise the synergetic effects of combined wear and corrosion.

This year's meeting was a great success, with delegates finding the two-day format to be more efficient than the previous practice of each Forum holding a separate one-day meeting. It is therefore planned to hold another joint meeting, with an expanded exhibition and poster session on 28th-29th September 2005 at NPL. To register an interest in future meetings, please send a request with contact details to materials@npl.co.uk or contact the NPL Materials Enquiry Point on 020 8943 6701.

Giles Aldrich-Smith
National Physical laboratory, Teddington

QENS 2004 (7th International Conference on Quasi-Elastic Neutron Scattering)
(September 2004, Arcachon, France)

QENS 2004 was the seventh in a series of meetings keeping the quasi-elastic neutron scattering community in close contact for a little over the last decade. This latest conference was held in the picturesque seaside town of Arcachon on a delightful Atlantic bay a short distance from Bordeaux, France.

The conference focused on recent dynamics measurements resulting from neutron scattering techniques and considered developments in the instrumentation and complementary theoretical calculations. Current areas of research were discussed with sessions encompassing the fields of nanoporous systems such as the diffusion of H_2 adsorbed on carbon nanotubes, metallic and ionic systems with applications to solar cells and biological systems measuring the dynamics of various proteins in solution. The talks concluded with presentation of work on the dynamics of polymer melts and gels.

My role at the conference was to support the introduction of helium-3 spin-echo spectrometry as a complementary technique to the neutron spin-echo used to obtain many of the results presented. The recently developed Cambridge Helium-3 Spin-Echo Spectrometer has the advantage of being able to perform dynamics measurements which are exclusively surface sensitive in contrast to the bulk properties of neutrons. I was pleased at the level of interest in my poster, 'High resolution QHAS measurements of microscopic diffusion on surfaces', which presented a summary of the technique and some of the most recent results from studies of the diffusion of carbon monoxide and benzene on copper surfaces.

The conference provided an excellent opportunity to increase awareness of the advantages and potential of helium spin-echo and to encourage collaboration between the two complementary techniques. I am most grateful to the TFSG for providing generous support towards the costs of attending the meeting and also to Arnaud Desmedt and the local organising committee for a most pleasant conference.

Holly Hedgeland
Postgraduate Student
Cavendish Laboratory, University of Cambridge

AVS 51st International Symposium & Exhibition

(14 – 19 November, 2004. Anaheim, USA)

The AVS conference is the US flagship conference on surface science and related phenomena. This year's 51st meeting was held in Anaheim, CA. I had the opportunity of presenting part of my PhD work "Surface and subsurface oxidation of Ni(100) and Ni(111) studied by medium energy ion scattering" in a 20 minute talk in the Surface Science session (metal oxides and clusters I: formation and structure). Due to the large number of delegates, around 2000, the conference was run in many parallel sessions, however the schedule of the talks allows the attendees to swap from one session to another looking for the talk of their interest. I took the opportunity to attend a range of very interesting talks in different areas of surface science, sometimes the presentations were not related at all with my current work. In any case, they were very interesting and useful opening new insights of surface science. In addition, I attended the talks of invited scientists such as R. M. Tromp and G.A. Somorjai whose work and publications are extremely relevant to my PhD. The poster session was a meeting point in which more detailed questions could be formulated and also provided an opportunity to establish some links for future research. The vast amount of talks involving scanning tunnelling microscopy (STM) was quite surprising. This technique can provide useful information when complemented with other techniques, however when it is used on its own it is often unable to give conclusive solutions to a given problem.

Among all the very interesting talks there was one that re-opened a problem that was considered solved. Oxygen adsorption on the Ag(111) surface is a system that was thought to be completely understood but new investigations have found quite the opposite leading to a range of new questions about our understanding of oxide surfaces. In summary, it was a good experience and the fact that I could discuss my work was very useful as I am currently in the process of thesis writing. Finally, I would like to thank the Thin Films and Surfaces Group for the funding provided to cover part of the expenses of this conference.

Miguel Ángel Muñoz Márquez
Postgraduate student
Department of Physics, University of Warwick

World Polymer Congress – Macro 2004

(4 - 9 July 2004, Paris, France)

Thanks to the funding that I got from Institute of Physics and the Thin Films and Surfaces Group, I was able to attend World Polymer Congress in Paris, from 4-7 July 2004.

The conference proved to be a successful scientific meeting in bringing together scientists from the forefront of all sectors of the world polymer community. With an audience of over 2000, either from academia, governmental institutions or from industrial companies, more than 250 invited lectures were presented, together with 350 contributed oral presentations and more than 1500 posters. I was surprised and pleased to find the expansion of polymer science in the last few years. I attended several oral presentations of interest to me and obtained a few ideas for my own research, particularly the application of polymers in drug delivery. Hyaluronan, the main biopolymer in my research, has been used widely in the pharmaceutical field. Most of its biological functions are known but not totally understood physically, which made my poster of particular interest to some other attendants. We were able to discuss and exchange ideas on Hyaluronan from different aspects. To conclude, I am delighted to have been able to attend the conference and am satisfied at what I have learned from the conference. I am grateful to my supervisor, the physical chemistry department at Oxford, Exeter College, and the Institute of Physics TFSG group for their supportive help.

Lei Jiang
Postgraduate student
Department of Physical Chemistry, University of Oxford

Vacuum ultraviolet conference XIV

(Cairns Australia)

Vacuum ultraviolet conferences, held every 4 years, are usually a soft X-ray affair but due to the imminent arrival of Australia's first synchrotron there was the decision to include hard X-rays at VUV XIV in Cairns, luckily for me!

The combination of the stone floor and unheated shower room of my Melbourne accommodation did their best to help me fight the effects of jet lag during the 2 day informal satellite meeting at Latrobe University, if only winter over here was so short and mild that it wasn't always required to install central heating! It was a good opportunity to meet various people and the talks included detailed discussion of the proposed surface science beam lines at the Australian Synchrotron.

Before leaving Melbourne for the main conference in Cairns I looked up Chris Pakes, one of my old Post grad lab demonstrators from my time at Birmingham University. He currently heads the molecular manipulation group at Melbourne, part of Australia's quantum computing push. Beer was involved, of course, but there was still time to have a tour of the labs and discuss each others work with a view to collaborate in the future. Learning synchrotron based techniques would be handy when there's one a stones throw away! I'm very grateful to Chris for his hospitality; I'll have to take him back to Birmingham for a Balti when he's over next.

The main conference in cairns was well attended and I was feeling quite chuffed with myself as the oral abstract acceptance rate was only 10%. My talk "Does an encapsulated atom feel the effects of adsorption?" focused on Endohedral-surface interactions. The work involved various techniques including normal incidence X-ray standing wave spectroscopy. On the whole, the quality of the presentations was good and my talk was well received. Since I was the only UK presenter I couldn't let the side down! Of course a big thanks to the TFSG for the bursary and to my supervisor Dr Phillip Moriarty for his constant enthusiasm.

Committee and Contact Details

<table>
<tr><td>Chair</td><td colspan="2">Professor Chris McConville
Department of Physics
University of Warwick,
COVENTRY, CV4 7AL.
(c.f.mcconville@warwick.ac.uk)</td></tr>
<tr><td>Honorary Secretary and Treasurer</td><td colspan="2">Dr. Martin McCoustra
School of Chemistry,
University of Nottingham
NOTTINGHAM, NG7 2RD
(martin.mccoustra@nottingham.ac.uk)</td></tr>
<tr><td></td><td>Dr. Giles Aldrich-Smith
Materials Centre,
National Physical Laboratory,
Queens Road
TEDDINGTON,
Middlesex, TW11 0LW.
(giles.aldrich-smith@npl.co.uk)

Dr. Bill Allison
Cavendish Laboratory
University of Cambridge
Madingley Road
CAMBRIDGE CB3 0HE
(wa14@cam.ac.uk)

Dr. Janet O’Brien
Pilkington Glass PLC,
Prescot Road,
St. HELENS, WA10 3TT.
(janet.o’brien@pilkington.com)

Dr. Wendy A. Brown
Department of Chemistry
University College London
20 Gordon Street,
LONDON, WC1H 0AJ.
(w.a.brown@ucl.ac.uk)

Dr. Manfred Buck
School of Chemistry
University of St. Andrews
North Haugh
St. Andrews
FIFE KY16 9ST
(mb45@st-andrews.ac.uk)</td><td>Dr. Jamie Cole
School of Physics
University of Edinburgh
James Clerk Maxwell Building
King's Buildings
Mayfield Road
EDINBURGH EH9 3JZ
(rjc@ph.ed.ac.uk)

Dr. Georg Held,
Surface Science Group
Department of Chemistry
Lensfield Road
CAMBRIDGE, CB2 1EW.
(gh10009@cam.ac.uk)

Dr. Marcus Jacka
Department of Physics
University of York
Heslington
YORK YO10 5DD
(mj13@york.ac.uk)

Dr. Jessica Maclean,
Quest,
QinetiQ Ltd.,
Malvern Technology Centre,
MALVERN, WR14 3PS.
(jomaclean@QinetiQ.com)

Dr. Philip Moriarty
School of Physics and Astronomy,
University of Nottingham,
NOTTINGHAM, NG7 2RD.
(philip.moriarty@nottingham.ac.uk)

Professor Peter Weightman
Department of Physics
University of Liverpool
LIVERPOOL, L69 3BX.
(peterw@liv.ac.uk)</td></tr>
<tr><td>Newsletter Editor & Webmaster</td><td colspan="2">Dr. Wendy Brown
Department of Chemistry
University College London
20 Gordon Street,
LONDON, WC1H 0AJ.
(w.a.brown@ucl.ac.uk)</td></tr>
</table>