Thin Films and Surfaces Group

Newsletter

Comments from the Chair

I only recently took over as the chair of the TFSG, at the AGM earlier this year, and writing this introduction for the Newsletter has come as one of my first official duties in the post. Having been a member of this community for many years, it is clear to me that surface and interface science and thin film growth and characterization, are research fields that are continuing to develop strongly and diversify year on year. It is also clear that surface and interface phenomena now underpin an enormous range of technological applications as well as offering a fundamental view of new materials on the nanometer scale. Indeed, as has been said on many occasions, our particular field has made a major contribution, if not the major contribution, to the development of nanoscience and nanotechnology. The continuing development of all aspects of nanoscience represents an enormous challenge for us to extend our traditional interests, as well as offering tremendous opportunities for those of us who have always worked on this length scale. In addition, new areas of research, in particular at the Life Sciences Interface, are opening up the possibility of collaborations with the medical and biological sciences. Exciting times are ahead.

Overall, the aims of the Institute, and our Group, will be to continue to address new initiatives and new areas of research, as well as persisting in our long-established and valuable activities. As an example of the former, we have recently supported meetings relating to; Biomolecule Interactions with Surfaces, Laboratory Studies of Astrochemical Processes, and Thin Films of Organic Molecules, all with great success. In addition, the Interdisciplinary Surface Science Conference, our regular flagship meeting, was this year held in Liverpool (ISSC-14) and attracted the largest ever number of delegates. We were also able to announce the locations of ISSC-15 (Cardiff, 2005) and ISSC-16 (St. Andrews, 2007) ensuring that the tradition of holding this meeting at institutions with a strong commitment to surface and interface science and thin film growth will continue.

I would like to conclude by thanking all those who give their time to organize meetings and the other activities of the TFSG. As the new chair I have been very fortunate to have the help and advice of an experienced committee, in particular Wendy Brown, who is an outstanding Honorary Secretary, and Martin McCoustra, who has done an excellent job in producing the newsletters. The aim is to continue to publish two issues per year, summer and winter, but to do so requires your help and support. *If there is anything you would like to see included in the Newsletter, please contact Martin directly.*

To conclude, if you have any comments you wish to make on the activities of the group or suggestions for future activities, please feel free to contact me or any other member of the committee.

I wish you all a good summer and conference season!

Dr. 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 at http://www.cse.clrc.ac.uk/cmg/NETWORKS/TFSG/index.shtml.

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. Wendy Brown (TFSG Secretary).

Dr. Wendy Brown
(Secretary TFSG)
Department of Chemistry, UCL
(w.a.brown@ucl.ac.uk)

Diary

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

Surface Science of Biologically Important Interfaces Fifth Network Meeting

National Railway Museum, York
17th – 18th September 2003

The EPSRC-funded network aimed at improving the dialogue between physical and biological scientists will be holding its fifth network meeting this coming September at the National Railway Museum in York. This two-day meeting will include research talks from

S. Higson
Cranfield University

G. Renaud
ESRF

R. Hill
Imperial College London

J. Richardson
The Robert Jones and Agnes Hunt Orthopaedic and District Hospital NHS Trust

G. Marletta
University of Catania, Italy

D Williams
University of Liverpool

S. McArthur
University of Sheffield

and a workshop of surface science for biologists with contributions on XPS and ToF-SIMS from D. Briggs, on STM from S. Tear and on reflection anisotropy spectroscopy from P. Weightman. A briefing on developments in synchrotron radiation in the UK from W. Flavell (4GLS) and S. Dhesi (the Diamond XPEEM beamline) completes the formal programme. For anyone who is interested in this field and would like to know about the 5th meeting of the SSBII network taking place on September 17th and 18th at the National Railway Museum in York, further details are available from the SSBII website at http://www.eastman.ucl.ac.uk/~ssbii.

Condensed Matter and Materials Physics (CMMP) 2004

University of Warwick
4th – 7th April 2004

CMMP is the major national conference organised by the Condensed Matter and Materials Physics Divsion of the IoP. This coming year it will be held at the University of Warwick and will run from 4th-7th April. The TFSG, as an affiliated Group of this Division, will be sponsoring and co-sponsoring a total of four symposia at this meeting. These symposia (and organisers) are:

Theory of Surface Processes
(Professor S. Holloway and Dr. W. Hofer, University of Liverpool)

Organic & Inorganic Thin Films: Surfaces to Multilayers
(Professor N. V. Richardson, University of St. Andrews
and Professor T. S. Jones, Imperial College)

Self-Assembly on Surfaces
(Professor S. D. Evan, University of Leeds and Professor R. Raval, University of Liverpool)

Atomic Manipulation
(Dr. P. Moriarty, University of Nottingham)
(Joint Session with the Nanotechnology Group)

Members of the TFSG are encouraged to support these symposia, and CMMP in general. If you'd like further information on any of these symposia, please contact the organisers directly.

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://www.cse.clrc.ac.uk/cmg/NETWORKS/TFSG/index.shtml).

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

Conference Reports

Third International Workshop on Oxide Surfaces (IWOX3) – Sapporo, Surfaces and Snow!
(Sapporo, Japan, 27th-31st January 2003)

The IWOX3 conference took place in Sapporo, Japan between 27th and 31st January 2003. I was fortunate to be able to attend the meeting, thanks to some financial assistance from CCP3 and the Thin Films and Surfaces Group of the IoP.

The journey to the snow-covered island of Hokkaido was long but well worth the effort. The town of Sapporo is situated in a valley surrounded by mountains. This provides a very scenic backdrop, particularly at this time of year when everything is covered in snow. This was my first visit to Japan and I came away with very enjoyable memories of both the country and the people.

The workshop comprised a series of 52 lectures by leading oxide surface scientists, with a very good balance between experimental and theoretical work being covered. The lectures, in themselves, were very informative and provided an interesting overview of the range of current research being undertaken in oxide surfaces across the world.

As my research is strongly theoretically based, I was particularly interested in lectures that used theoretical methods to gain understanding for the data gleaned from experimental techniques. For

me, two talks illustrated this approach. Firstly, Gianfranco Pachioni of Milan University gave a fascinating review of the interplay between experimental and theoretical methods in the understanding of F centres. Secondly, Hans-Joachim Freund's discussion of the surface structure and chemistry of vanadium oxide surfaces provided an excellent overview of the current state of research in this area.

However, for me personally, the most interesting part of each lecture came during the discussion time allocated at the end of each talk. This appeared to facilitate the bringing together of the wide cross-section of expertise present in ways that provided fresh insights and new ideas. Furthermore, exchange of information did not end with the start of the next lecture. It was very evident that many of these discussions would lead to future collaborations.

In addition to the formal lecture programme there was also a poster session, held on the Thursday afternoon. 57 posters in total were presented, again covering a wide range of topics related to oxide surfaces. I presented my poster, *A Periodic Implementation of the MNDO Method*, during this session. The poster session was very well attended and provided a very rich source of discussion. I felt honoured to be able to discuss my research with experts from so many different experimental and theoretical backgrounds. As a consequence, I found the whole experience enormously enjoyable. This was further consolidated when my poster was picked, by the judges, as one of the best posters presented by a student.

It was not all work though! The evenings were mainly free and this provided the opportunity to taste the local cuisine. Along with the expected sushi, there were a few culinary surprises. One particularly successful evening was spent at the Sapporo beer factory where a speciality dish called "Kubla Kahn" was served. this turned to be an eat-all-you-can, self-barbecue meal and it was delicious. A couple of evening events were organised by the conference organisers. An evening trip to one of the local ski-resorts was very well received and those of us who attended enjoyed a terrific evenings skiing. The conference banquet was traditionally Japanese. The food was excellent and arranged beautifully with the table-centre comprising a very impressive 4-foot tall ice carving of a fish. The sake ceremony provided a very fitting and colourful way to mark the end of this excellent conference.

Kathie M. Yeowell
(Postgraduate Student)
Department of Chemistry, Imperial College
(kathie.yeowell@ic.ac.uk)

SVC Technical Conference 2003

(San Francisco, USA, 3rd – 8th May 2003)

My name is David Lusk and I am 3rd year PhD student at the University of Paisley, working within the Thin Film Centre. Earlier this year, I attended the above conference where I presented a paper, entitled *Omnidirectional Mirror Coating Design for IR Applications*, about a certain area of my research. The conference is held annually by the Society of Vacuum Coaters and within the conference there is a blend of oral and poster presentations, as well as an exhibition and short courses. In the main, two areas were being discussed. These were thin film coatings and deposition systems and techniques. In terms of my research, the most important area was in thin film coatings. The sessions on optical coatings were of main interest, as the design of various optical coatings is the main part of my research. This area was well covered with presentations about various kinds of optical filters including DWDM's, AR coatings and bandpass filters. Recent developments in some characterisation techniques were presented. This included improvements in measuring reflectance and determining optical constants from spectroscopic ellipsometry.

My contribution at the conference was to present a paper on my research. My paper discussed the design of omnidirectional mirrors for infrared (IR) applications, as well as the deposition and

fabrication techniques that were used. I managed to get some positive feedback from my presentation and gained some advice from a fellow attendee which may improve the performance of my coating.

This conference was extremely important to me as this was the first time that I had attended such an important conference, as it is widely regarded as the most important in the vacuum and thin film coating industry. By presenting at the conference, it gave me vital experience in talking to a large audience, far larger than I had encountered before and this is invaluable for future presentations that I may have to make. Communicating with technical people and discussing problems with them made me feel that I was involved at the conference and as time went on, I felt that I was becoming more and more comfortable around them. In my mind, most importantly, I managed to make contacts for future prospects after I have finished my PhD regarding getting a job. Also, it was nice to finally meet people who I had read about and who had produced some important work in thin films.

All in all, this conference has given me invaluable experience and raised my profile and knowledge within the thin film community. I would like to thank the Thin Films and Surface Group for contributing towards my costs for the conference as without their help I would have missed out on an excellent conference.

David Lusk
(Postgraduate Student)
Thin Film Centre, University of Paisley

UK Laboratory Studies of Astrochemistry Workshop

(UCL, London, 4th June 2003)

A One-Day Workshop entitled *Laboratory Studies of Astrochemistry* was held at University College London on June 4 2003. The world-wide astrophysical community is gradually appreciating that vital data for modelling and understanding astrophysical phenomena can be provided by laboratory experiments and by quantum chemical techniques employed by Chemists and Molecular Physicists. Indeed, the term *astrochemistry* arises from the appreciation of the key role Chemistry plays in interstellar space, not least in the synthesis of molecules which provide a vital cooling mechanism in the collapse of molecular clouds to form stars. Research groups in the UK are at the forefront of the application of laboratory-based techniques to the study of the chemistry, both heterogeneous and gas-phase, involved in molecular synthesis in interstellar clouds. This experimental work is also supported, and stimulated, by high-level theoretical initiatives.

The aim of this workshop was to bring together the groups of Chemists and Molecular Physicists in the UK who work in the field of astrochemistry. This gathering,, served to emphasise both the co-operation and complimentarity between the research groups represented and, more importantly, the significant amount of internationally recognised research being performed in this topical area at UK universities. These research efforts, of course, require appropriate support if the UK's word-leading position in this field is not to be lost. This One-Day meeting was supported by sponsorship from the Thin Films and Surfaces group.

Dr. Wendy Brown
(Secretary TFSG)
Department of Chemistry, UCL
(w.a.brown@ucl.ac.uk)

14th Interdisciplinary Surface Science Conference (ISSC-14)

(Liverpool, UK, 16th – 19th June 2003)

ISSC is the main UK conference within the field of Surface Science, organised by the Thin Films and Surfaces group of the Institute of Physics, and takes place every two years. The latest conference in this series took place at the University of Liverpool from the 16th to the 19th of June

2003. The conference was well attended, with some 186 delegates in total. Of these 154 were from the UK, 27 were from Europe and 5 were from the rest of the world. The aim of ISSC has always been to be a student-oriented conference and, in line with this aim, 59 of the delegates at ISSC-14 were students, both from the UK and overseas.

The highlight of the conference was the presentation of the TFSG award (a Caithness Glass paperweight, aptly named *Catalyst*) to Professor Wilson Ho, which was followed by his plenary lecture on the subject of *The Atomic and Molecular Basis of Nanoscience*. This talk was a fascinating insight into the atomic world of scanning tunnelling microscopy and stimulated much discussion. This talk set the tone for what proved to be a highly stimulating series of invited, and contributed, talks throughout the conference. Of particular note were the talks given by students and the prize for the best student talk was awarded to Esther van Vroonhaven from the Solid State Physics Group at the University of Twente in the Netherlands. Her talk was entitled *Hot Surface Science with LEEM: The (2´1)-(1´1) Phase Transition of Ge(001).*

The lively poster sessions took place in an old chapel in the Foresight Centre at the University of Liverpool and were well lubricated by refreshments supplied by the generosity of the sponsors! All of the posters were excellent and the judges had a very difficult job to determine who should be the winners of the student poster prizes. After much deliberation, the first prize was presented to Alex Knight from the School of Chemistry at St Andrews for his poster entitled *Growth and Structure of Diphenyldiketopyrrolopyrrole (DPP) Thin Films on Cu(110): Clean and Oxygen Modified Surfaces*. The 2nd prize was jointly awarded to Davy Nieskens from the Schuit Institute of Catalysis in Eindhoven for his poster entitled *The decomposition of Ethylene on Rh(100)* and to G. Alexandrowicz from the Cavendish Laboratory at the University of Cambridge for his poster entitled *Tilted Projections: A Method for High Resolution Measurements of Surface Phonon Lifetimes using a ^{3}He Spin Echo Spectrometer*.

The conference dinner took place in the rather grand surroundings of Liverpool Town Hall. Pre-dinner drinks were followed by an excellent meal during which the wine flowed plentifully! The after dinner speech was provided by Professor Sir David King, who provided an informative, and entertaining, viewpoint on his role as the Chief Scientific Adviser to the government. Earlier in the day, he had also given a talk describing his research, which is still actively underway in the Department of Chemistry at Cambridge University. At the conference dinner the announcement was made that the next conference in the series, ISSC-15 in 2005, will be organised by Professor Mike Bowker and will take place in Cardiff. He has a hard act to follow after the excellent conference that took place in Liverpool! The organising committee of ISSC-14, chaired by Professor Rasmita Raval, did an excellent job in ensuring that the conference ran smoothly and that the science presented was of the highest quality.

Dr. Wendy Brown
(Secretary TFSG)
Department of Chemistry, UCL
(w.a.brown@ucl.ac.uk)

EURESCO Conference on Biological Surfaces and Interfaces

(Castelvecchio Pascoli, near Pisa, Italy, 21st – 26th June 2003)

It still appears that collaborative research between physicists and biologists is all too often hampered by an inability to "speak the same language". There are obvious exceptions to this gross generalisation, of course. In the early days of biochemistry, for instance, the most famous example of good interaction between physical and biological scientists lead to the discovery of the helical structure of DNA. Today, a rapidly expanding area of research which is exciting both physicists and biologists is the investigation of surfaces and interfaces which reside within the biological environment. Interactions at solid surfaces, for example, have implications in a wide range of applications such as biomaterials development, cell control and tissue engineering, inhibition of

bacterial colonisation, control of biomineralisation, immobilisation of biocatalytic enzymes and biosensors.

A recent EURESCO conference on Biological Surfaces and Interfaces, which was kindly supported by the Thin Films and Surfaces Group of the IoP, was the first in a new series initiated to drive forward the application of traditional and less traditional surface science techniques to problems of biological interest. The conference was held in Castelvecchio Pascoli, near Pisa, in June this year. The chair and co-chair were Dr. Andrew Thomas (Department of Physics, UMIST) and Dr. Frances Jones (Eastman Dental Institute for Oral Healthcare Sciences, University College London). Dr.'s Thomas and Jones lead the UK-based EPSRC network *Surface Science of Biologically Important Interfaces (SSBII)*, which has held several meetings within the UK. It was primarily the success of these meetings that highlighted the need for a similar European forum and, accordingly, an application was made for funding from the European Science Foundation and the European Commission Human Potential Programme. The timeliness of the application was reinforced by the relative scarcity of research groups in Europe offering training in this interdisciplinary field.

As was pointed out at the meeting, the field of surface science has blossomed over the last half century. Less than 40 years ago, determination of the mode of adsorption of CO on single crystal metal surfaces was proving to be demanding. This "simple" system is now well understood and surface science has subsequently risen to the challenges presented by applied fields such as catalysis, where the so-called "pressure-gap" has largely been bridged. New challenges include the ability to examine interactions of larger molecules (such as peptides, proteins, carbohydrates and lipids) and to resolve the disparities between the traditional surface science ultrahigh vacuum environment and the environment experienced by biological entities (might one call this the "bio-gap"?).

The conference, subtitled *Understanding and Improving Specific Interactions*, aimed to address this by covering a wide range of research from the very fundamental to the very applied. The most fundamental studies were perhaps the UHV-based investigations of amino acid adsorption described by Neville Richardson (University of St. Andrews, UK) and Trolle Linderoth (University of Aarhus, Denmark). Other roles of "traditional" surface science techniques (XPS, ToF-SIMS) were also discussed (Sally McArthur, Sheffield, UK) as were SPM techniques which find particularly important applications in measuring intra- and intermolecular forces (Stephanie Allen, University of Nottingham, UK and Claudia Friedsam, Ludwig Maximillians University Munich, Germany). The important forces and interactions experienced in the biological environment were summed-up by Jacob Israelachvili (University of California at Santa Barbara, USA) whose research is concerned with mimicking the *in vivo* interactions *in vitro*, Paul Cremer's investigations of ligand-receptor interactions using microfluidic and array based designs (Texas A&M University, USA) and Roland Netz's discussion of static and dynamic aspects of charged surfaces (Ludwig-Maximillians University Munich, Germany).

A number of presentations examined the use of new experimental techniques and novel applications of existing techniques. These included synchrotron-based experiments such as surface sensitive X-ray diffraction for investigations of crystal growth in solution, with potential application in studies of biomineralisation (Elias Vlieg, University of Nijmegen), soft X-ray microscopies such as scanning transmission X-ray microscopy (STXM) and X-ray photoemission microscopy (XPEEM) for studies of protein-biomaterials interactions (Adam Hitchcock, McMaster University, Canada) and the potential of grazing incidence small and wide angle X-ray scattering (Gilles Renaud, CEA Grenoble, France). The use of X-ray and neutron scattering for probing lipid bilayers (Tim Salditt, University of Göttingen, Germany) and studies of interfacial protein unfolding using neutron reflection (Jian Lu, UMIST, UK) were also presented. Christof Cremer (University of Heidelberg, Germany) gave a fascinating talk on intracellular interfaces (*e.g.* the nuclear membrane) and how

the complexity of "biomolecular machines" might be probed using light optical nanoscopy methods (*e.g.* spatially modulated illumination microscopy and spectral precision distance microscopy) to push the resolution limits.

Surface modification strategies for studying biomaterial-biomolecule and cellular interactions included nanofabrication and biochemical patterning (Bengt Kasemo, Gothenburg, Sweden), plasma techniques (Hans Griesser, University of South Australia, Australia) and molecular assembly techniques for chemically well-defined or patterned surfaces (Marcus Textor, ETH Zürich, Switzerland and Graham Leggett, University of Sheffield, UK). Barry Moore (University of Strathclyde, UK) described a novel method for organising biomolecules at water-soluble micro-crystal surfaces, while Jean-Claude Voegel (INSERM, Strasbourg, France) spoke about surface functionalisation by multilayering of polyelectrolyte films. Interpenetrating polymer networks which alter the kinetics of differentiation of mammalian cells (Kevin Healy, Berkeley, USA) and protein resistant surfaces (Michael Grunze, University of Heidelberg, Germany) were also described. It was particularly interesting to note that the use of coatings which are free of carbon chain polymers dramatically decreases the rate of restenosis (tissue re-growth leading to blocking) in stents.

Tilo Pompe
with his prize

Postdoctoral Researchers

Winner

Tilo Pompe (Institute of Polymer Research Dresden, Germany)	Physicochemical modulation of interactions of fibronectin with polymer substrates to control adhesion, proliferation and differentiation of endothelial cells.

Runners up

Cristina Satriano (University of Catania, Italy)	Biological systems onto irradiated polymer surfaces
Mihaela Gheorghiu (International Center of Biodynamics, Bucharest, Romania)	Combined impedance and bioaffinity assay for the detection of targeted cells: Escherichia coli

Research Students

Winner

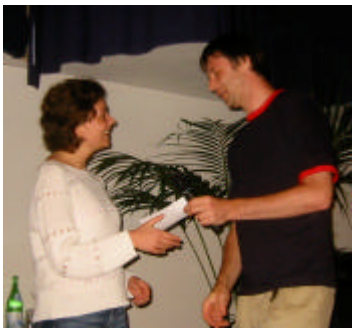
Marit Sletmoen (The Norwegian University of Science and Technology, Trondheim, Norway)	Enzymatic mode of action studied by AFM force spectroscopy.

Runners up

Erik Reimhult (Chalmers University of Technology, Gothenburg, Sweden)	Intact vesicle adsorption and biomembrane formation from vesicles in solution studied by QCM-D and combined SPR and QCM-D: Influence of surface chemistry, vesicle size, temperature and osmotic stress
Didier Falconnet (Swiss Federal Institute of Technology (ETH), Zurich, Switzerland)	Biomolecular patterning by lift-off to create model surfaces for cell studies

EURESCO conferences are typically structured so that all the talks are from invited speakers. However, other delegates had an opportunity to present their work at two poster sessions. Younger researchers also gave very brief (five minute) talks introducing their posters and prizes were

awarded for the best poster / oral presentation combinations. Runners up were awarded bottles of wine, while the winners received €50 vouchers to spend at Amazon.com.



Marit Sletmoen receives her prize from Dr. Andrew Thomas

The co-chairs would like to take this opportunity to thank the TFSG, who sponsored the conference with a donation of £500, which was put towards the cost of speakers' travel and prizes for younger researchers.

Anyone who is interested in this field may like to know about the next meeting of the SSBII network, which will take place on September 17th and 18th at the National Railway Museum in York. Further details are available from the SSBII website at http://www.eastman.ucl.ac.uk/~ssbii. The second conference in the EURESCO series will take place at San Feliu de Guixols, Spain in June 2005. Details will be available from either the SSBII website or the ESF website http://www.esf.org.

Dr. Fran Jones
Eastman Dental Institute for Oral Healthcare Sciences, UCL
(f.jones@eastman.ucl.ac.uk)

Towards the Fourth Generation Light Source

Many of you will have heard that, in April 2003, the Department of Trade and Industry issued a press statement with the heading *£11.5 MILLION FOR WORLD-LEADING PROJECT AT THE DARESBURY LABORATORY.* This was of course the first tranche of funding for the Fourth Generation Light Source (4GLS). The £11.5 million is made up of £3.5 million of CCLRC staff costs in support of 4GLS and £8 million of new money. The funding is for the research, development and design phase of the 4GLS project and the specific recommendations approved by RCUK are:

(i) to focus on the research and development work needed for the design and exploitation of the facility
(ii) to establish an ERL prototype test facility
(iii) to undertake detailed design studies leading to a technical design report
(iv) to proceed with Gateway preparations

A 3 year programme of research and development studies based around a prototype facility is now well underway.

The decision to fund the project followed the outcome of the Gateway 1 Review of 4GLS by the Office of Government Commerce, which was conducted in October/November of 2002. The review gave the project the status: *GREEN* and concluded that *the 4GLS project provides an opportunity for the UK to take a world lead at the forefront of the science and application of accelerators.*

In addition to work on an ERL prototype, and on the research and development issues, the 4GLS team are preparing for Gateway 2, which is scheduled for summer 2004 and is concerned with the procurement strategy for 4GLS, and for Gateway 3, which is scheduled for the end of 2005 and is concerned with the investment decision for 4GLS. We also intend to ensure that the science case for 4GLS is kept up to date and relevant to the needs of the UK scientific community so please feel free to suggest ways in which your own future research plans would benefit from the establishing of facilities on 4GLS.

A meeting to consider the application of 4GLS to biological systems is being held at the Daresbury Laboratory on the afternoon of the 9th September 2003 immediately proceeding the synchrotron radiation users meeting. Further information can be found at http://www.srs.ac.uk/srum/satellite_4.htm.

Professor Peter Weightman
Department of Physics, University of Liverpool
(peterw@liv.ac.uk)

The IOP and Your Career

On-line Careers' Discussion Forum

The Institute's career website, http://careers.iop.org has been developed further to include an open access discussion area. Members are encouraged to post questions or comments and share their own wealth of experience by answering the questions of others. The Discussion Board will be a permanent part of the website and I hope you find it useful in the future.

Career Break Support

The IOP offers a number of services in support of members taking a break in their careers. In the first instance, members on a career break are entitled to a *Reduced Membership Subscription Rate*, which is currently just £10. All you need to do is email membership@iop.org, including your membership ID number in the text, to qualify for this rate.

The Institute's *Career Break Grants* help members to stay in touch with the wider physics community by providing contributions towards attendance and associated costs at conferences *etc.* Members can apply by going to http://careers.iop.org/resources or by emailing cbg@iop.org. Of course, members can attend all IOP conferences at a reduced *Career Break Rates for Conferences*.

Alex Byrne
Professional Development Officer

Committee and Contact Details

<table>
<tr><td>Chair</td><td colspan="2">Dr. 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. Wendy A. Brown
Department of Chemistry
University College London
20 Gordon Street,
LONDON, WC1H 0AJ.
(w.a.brown@ucl.ac.uk)</td></tr>
<tr><td>Ordinary Members</td><td>Dr. Giles Aldrich-Smith
Materials Centre,
National Physical Laboratory,
Queens Road
TEDDINGTON,
Middlesex, TW11 0LW.
(giles.aldrich-smith@npl.co.uk)

Dr. Zoe Barber
Department of Materials Science
University of Cambridge
Pembroke Street
CAMBRIDGE, CB2 3QZ.
(zb10@cam.ac.uk)

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

Professor Andrew Fisher
Department of Physics and Astronomy,
University College,
Gower Street,
LONDON, WC1E 6BT.
(andrew.fisher@ucl.ac.uk)

Dr. Georg Held,
Surface Science Group
Department of Chemistry
Lensfield Road
CAMBRIDGE, CB2 1EW.
(gh10009@cam.ac.uk)</td><td>Professor Stephen Holloway
Surface Science Research Centre,
University of Liverpool,
LIVERPOOL, L69 3BX
(stephen@ssci.liv.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)

Professor Neville Richardson
School of Chemistry,
University of St Andrews
North Haugh
St. ANDREWS,
Fife, KY16 9ST.
(nvr@st-andrews.ac.uk)</td></tr>
<tr><td>Newsletter Editor</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>Webmaster</td><td colspan="2">Dr. Adrian Wander
CLRC Daresbury Laboratory
Daresbury
WARRINGTON, WA4 4AD
(a.wander@dl.ac.uk)</td></tr>
</table>