

Institute *of* Physics

Electron Microscopy and
Analysis Group

Newsletter

February 2006

ELECTRON MICROSCOPY AND ANALYSIS GROUP

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EMAG COMMITTEE - 2005/2006 SESSION

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CO-OPTED MEMBERS	<p>Prof. Rik Brydson Department of Materials University of Leeds Leeds LS2 9JT Tel: 0113 233 2369 Fax: 0113 242 2531 Email: mtlrmdb@leeds.ac.uk</p>
	<p>Prof. Bruce Hamilton (IoP NPT group) Department of Physics UMIST PO Box 88 Manchester M60 1QD Tel: 0161 200 3180 Email: B.Hamilton@umist.ac.uk</p>

A LETTER FROM THE CHAIRMAN

Dear All

The overall feedback on EMAG-NANO 2005 has been very positive. Our thanks to Rik Brysdon and the local organisers at the University of Leeds for maintaining the traditions of EMAG and hosting an excellent scientific conference. Thanks also to the CEM group for their professionalism in organising a very impressive Trade Exhibition, and our thanks to the IoP conference staff for their attention to detail, holding the show together.

The final task of this biannual conference cycle has been to chase through the proceedings to publication. The proceedings are presently at the printers, following final proof reading, and hopefully these will be sent out to delegates shortly. Many thanks to all of you for trialling the new IoP system for the electronic production of proceedings for J. Phys: Conference Series.

In time honoured tradition, we now have a slight change to the EMAG committee membership, as part of the natural process of change. I'd like to take this opportunity to thank (in his own words) the 'organisationally challenged' Andrew Bleloch for his sterling work on the committee over many years. I'd also like to welcome Gunter Moebus from the University of Sheffield who was elected to join the committee at the last AGM.

One of the EMAG aims is to support the next generation of UK research scientists through sponsorship to attend conferences. We were pleased therefore to have covered the registration fees for 27 students to attend the EMAG-NANO 2005 event, providing an excellent opportunity for many to give their first presentation at conference.

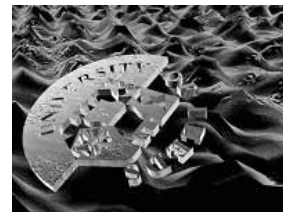
Please note that the next EMAG 1-day meeting, with a theme of 'In-situ microscopy,' will occur on Friday 30th June, at IoP in London, following on from Micro 2006, organised by the RMS.

Finally, may I invite you to attend the next conference in the EMAG series in September 2007, in Glasgow!

Paul D Brown, University of Nottingham
EMAG Chairman

EMAG-NANO 2005 : CHAIRMAN'S REPORT

The biennial conference of the Electron Microscopy & Analysis Group (EMAG) was co-hosted with the Nanoscale Physics and Technology (NPT) Group of the Institute of Physics and held at The University of Leeds from 31 August to 2 September. The conference attracted 151 delegates from 16 countries. As part of the “Einstein” International Year of Physics, the conference focused on the dominant themes of Imaging, Analysis and Fabrication on the Nanoscale.

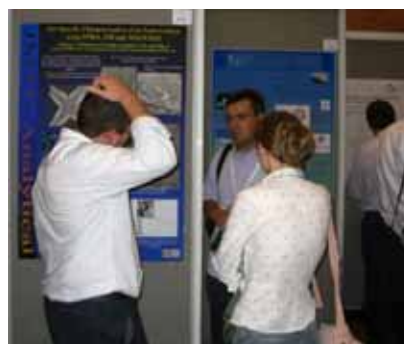


Logo designed by Terry Bambrook

EMAG and NPT co-organised the scientific programme, allowing three parallel sessions to run along the lines of (1) Microscopy techniques for nanotechnology; (2) Investigating structure-property relationships in advanced materials; and (3) Nanophysics and nanotechnology. In addition to the 4 plenary lectures, there were 13 invited oral presentations and 77 contributed oral papers that ran in three parallel sessions. Furthermore, 44 posters were presented throughout the three days.



Prof. Colin Humphreys providing the final plenary talk of the conference entitled Future Challenges in the Electron Microscopy of the Nanoworld.



Poster session discussions – possibly worth a caption competition?

In time honoured tradition, an Advanced School preceded the conference, with tutorial lectures on Imaging in the Electron Microscope; Analysis in the Electron Microscope; STM and Nanostructured Surfaces; and Functionality of Nanoscale Solids, to help research students gain a wider appreciation of the keynote scientific issues and to provide a background to the detailed conference themes. Indeed, one of the motivations for running this conference series has been to encourage and develop the next generation of research scientists, to help maintain the UK's international profile in the areas of microscopy, analysis and innovation in micro- and

nanotechnology. In this context, EMAG provided bursaries to cover the registration fees for 27 research students to help meet their costs of attending this event.



Edmund Ward receiving the award for best student oral presentation from Paul Spellward of Gatan.



John Walker receiving the award for best student poster presentation from Mike Palmer of EDAX.

A student competition was run during the conference with prizes awarded for both oral and poster presentations, as follows:

Oral presentations

1st Prize: Edmund Ward (University of Cambridge). Talk entitled ‘Nano-metrology of platinum-ruthenium bimetallic catalysts and the cluster –to-crystal transformation.’

2nd Prize: David Eustace (University of Glasgow). Talk entitled ‘ELNES as a probe of magnetic structure in mixed oxides.’

Honourable Mention: Aslam Zabeada (University of Leeds). Talk entitled ‘Growth of carbon nanotubes from supported metal catalysts.’

Poster presentations

1st Prize: John Walker (University of Sheffield). Poster entitled ‘Site specific SEM/FIB/TEM for analysis of lubricated sliding wear of aluminium alloy composites.’

2nd Prize: Lionel Cervera-Gontard (University of Cambridge). Poster entitled ‘Linear delocalisation on nanoparticles.’

Honourable Mention: Kirsten McLaughlin (University of Cambridge). Poster entitled ‘The analysis of plastic and elastic deformation from indentation.’



Trade Exhibition in the University Sports Hall

In addition, a Trade Exhibition was fully integrated into the conference site in the University Sports Hall, within close walking distance of the lecture theatres, giving delegates the opportunity to discuss recent developments in analytical instrumentation. In keeping with the previous EMAG 2003 conference at Oxford University, provision was made for commercial workshops for the promotion of products by the manufacturers and ‘question and answer’ sessions. The companies on show spanned the range of mainstream electron and scanning probe instrument makers, combined with a broad spectrum of smaller companies providing ancillary equipment, from services for sample preparation to vacuum system support. As ever, we are grateful to the exhibitors and sponsors for their valued contribution to this conference series.



The conference dinner was held in the War Gallery at the Royal Armouries museum



Music during the Trade Reception was provided by the Yorkshire building society brass band.

Finally, may one thank the many people who helped with the running of this conference. On behalf of both the EMAG and NPT groups I'd like to take the opportunity once again to thank the local organising committee of Rik Brydson, Andy Brown, John Harrington and Andy Scott.

Thanks also to Dave McComb and Bruce Hamilton for collating the scientific programme, to Stephen Donnelly for co-ordinating the award of student bursaries, and to Richard Baker and Bruce Hamilton for guiding the editing of the proceedings. I'd also like to acknowledge the exceptional contribution of Jill Cowlard and Nicola Deedman of the CEM Group for co-ordinating the Trade Exhibition, and Claire Pantlin and Jasmina Bolfek-Radovani of the IoP without whom there'd be no show on the road! A special thanks also to Jane Lowe of the IoP for her sterling work collating the proceedings!

**I am pleased to tell you that the EMAG--NANO proceedings
will be available online from 27th February, 2006 :**

<http://www.iop.org/EJ/toc/1742-6596/26/1>

Hard copies should be delivered in 4--6 weeks.

*May I invite you all to attend the year 2007 conference in the EMAG series, to be held in
Glasgow.*

Paul D Brown, University of Nottingham (EMAG Chair)

Co-Sponsors

EMAG-NANO 2005 is co-sponsored by the Institute of Materials
Mining



The Institute of Materials, Minerals & Mining

Sponsorship

We gratefully acknowledge sponsorship from:



New committee member : Dr Guenter Moebus

Guenter Moebus has been active in the field of electron microscopy for 16 years. His original degree is in physics from Stuttgart University. After one year of research in laser optics, he moved to the Max-Planck-Institut for Metals research to join the Electron Microscopy Group of Prof Ruehle for a PhD study plus five postdoctoral years. The major topics were in TEM resolution testing, HREM image simulations, and in atomic structure retrieval of interface structures by digital image matching.

From 1998 he was awarded an EPSRC Advanced Fellowship, held first at Oxford University and then at Sheffield. Since 2004 he is a Senior Lecturer in the Dept of Engineering Materials at Sheffield University. His current research topics are in developing electron tomography for nanomaterials applications, nanoscale analysis of glasses and glass / composites, and in nanomanipulation / nanometrology.

SuperSTEM

The latest SuperSTEM newsletter can be viewed at,

<http://www.superstem.dl.ac.uk/>

FREE - MEMBERSHIP OF EMS

EMAG members are reminded that they are all automatically members of the European Microscopy Society, at no cost to themselves. However, in order to receive information from the EMS, it is essential to send your e-mail address to the EMS secretary - this cannot be sent by the IoP due to the Data Protection Act. This is important, since almost all communications from the EMS are sent by e-mail, including information for voting for the next Executive Board.

Send your e-mail address (and preferably your other details, postal address, phone & fax numbers) to

wisse@cyto.vub.ac.be and to hawkes@cemes.fr

and indicate whether you agree to include this information in the EMS Yearbook. If you do NOT wish to appear in the Yearbook, your e-mail address will be used solely for the dispatch of information by the EMS secretary (Prof. Dr E. Wisse, Free University of Brussels).

In Situ Electron Microscopy and Analysis

An EMAG one day meeting

Friday 30 June 2006 (IoP, London)

The application of *in situ* techniques in Electron Microscopy and analysis is a strongly expanding area of great interest to both the academic and industrial research communities. The imaging and analysis of the modification of materials in real-time has a host of applications across the spectrum from fundamental scientific studies to the solution of technological challenges of great commercial importance. Some of the diverse processes studied include the growth mechanisms of silicon and germanium quantum dots at a range of temperatures in the SEM; the active sites for polymerization reactions on a heterogeneous catalyst at high temperature and under reactant pressure in the TEM; measurement of the Young's modulus of a single carbon nanotube in the SEM; High Resolution TEM study of the crystal structure transformations with temperature of Xe inclusions formed in Aluminium at very high pressures; the effect of redox pretreatments and reaction conditions on the morphology and composition of supported-metal catalysts; damage caused to semiconductor structures fabricated by ion bombardment techniques.

We are pleased to confirm the presentations by the prestigious speakers listed below and we invite abstracts for poster and oral presentations in all areas of the application and development of *in situ* techniques in Electron Microscopy and associated analysis techniques. The aim of the meeting is to bring together those with an interest in this area in order to learn about the state-of-the-art, communicate new findings and discuss future directions.

Pioneering development of atomic resolution *in situ* environmental transmission electron microscopy (ETEM) and applications

Professor Pratibha L. Gai (DuPont and University of York, UK)

In-situ transmission electron microscopy of ion-irradiated materials

Professor Steve Donnelly, (University of Salford, UK)

Surface kinetics of metal oxidation

Professor Judith Yang (University of Pittsburgh, USA)

Abstract Submission

Both oral and poster contributions are invited for the above areas of interest. The abstracts (200 – 250 words in length) should be submitted by email by no later than **Friday 26th May 2006**. Instructions and an abstract template can be obtained by sending a blank email to the conference coordinator with '*in situ instructions*' as the subject.

Conference Coordinator: Dawn Stewart, Institute of Physics. Email: dawn.stewart@iop.org

The Institute of Physics, 76 Portland Place, London W1N 3DH. Telephone +44 (0)20 7470 4800, Fax: + 44(0)20 470 4900 Email registrations@iop.org, www: <http://www.iop.org>

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In Situ Electron Microscopy and Analysis

Friday 30 June 2006, Institute of Physics, London.

If you would like to receive further information please fill in the reply slip below and return it to

Registrations, Institute of Physics, 76 Portland Place, London W1N 3DH.

Name. _____ **Tel.** _____

Address _____

IOP member: Yes / No

Email: _____

*The Institute of Physics, 76 Portland Place, London W1N 3DH. Tel. +44 (0) 20 7470 4800, Fax: + 44 (0) 20 470 4900
Email registrations@iop.org, www: <http://www.iop.org>*

MEETING REPORTS

3rd ICMAT and 9th ICAM conference. (3-8 July 2005)

This summer Singapore not only hosted the Olympic committee but also the joint 3rd ICMAT and 9th ICAM conference. The conference ran from the 3-8 July 2005 and was held in the impressive Suntec Convention and Exhibition Centre.

The conference was a truly international event with over 3000 abstracts received from around 2000 delegates from around the world. The conference consisted of 25 symposia covering all the frontier areas of materials science and technology. Each morning started with a plenary lecture where I was fortunate to hear inspirational presentations from three distinguished noble laureates – Professor Steven Chu, Professor Carl Wieman and Professor Roald Hoffman. The rest of the day was split into parallel morning and afternoon sessions consisting of keynote, invited and oral presentations. With such a range of topics and speakers the standard of presentation was exceptionally high, however to highlight a few, those by X. S. Zhao (NUS), Q. Li (Curtin), K. Y. Koon (Nanyang) and S. Johnson (MIT) were outstanding.

My main interest lay with symposium T – Novel Porous Materials for Emerging Applications – but I also attended many interesting presentations on photonic crystals and ferroelectric materials. The final session of the week was, for me, the most interesting and relevant to my work. Chaired by X. S. Zhao and entitled Self-Assembly, Macroporous Materials and Photonics the focus was forming good quality photonic crystals to be used as templates for the formation of macroporous materials. On the Wednesday afternoon I presented two posters in this symposium which proved to be both enjoyable and challenging. The location was a massive conference hall with hundreds of other student and academic researchers, providing a unique opportunity to meet and discuss with a diverse range of photonic crystal researchers as well as those working in related fields.

In conclusion the conference provided an extremely valuable experience that enhanced my understanding of the new developments in not just my research field but current world-wide research in materials science. The conference provided me with the opportunity to meet some of the leading names in the field of materials science and a chance to present my work to a wide audience. The modern and vibrant city of Singapore as a setting added a pleasant touch to what was already a fantastic experience. With this in mind I wish to thank the IOP Electron Microscopy and Analysis group for their contribution towards conference expenses.

Catherine Barron (Imperial College London)
sponsored by EMAG bursary

FUTURE MEETINGS OF INTEREST

27 - 31 March 2006, University of Leeds (RMS event)

RMS Spring School in Electron Microscopy 2006

3 - 7 April 2006, Rothamstead Research, Harpenden (RMS event)

A Very Cool View - A Course in Cryo-Technique for Electron Microscopy

3 - 4 April 2006, Oxford (RMS event)

Electron Backscatter Diffraction

5 - 7 Apr 2006, London

Materials Congress 2006 (<http://www.iom3.org/congress>)

17 - 21 April 2006, San Francisco

2006 MRS Spring Meeting

20 - 21 Apr 2006, Exeter

Condensed Matter and Materials Physics (<http://conferences.iop.org/CMMP06>)

26 June 2006, Novotel, London ExCeL (RMS event)

ESEM VII - 7th Annual European ESEM Userclub Meeting

27 - 29 June 2006, ExCel, London (RMS event)

MicroScience 2006 (<http://www.microscience2006.org.uk/>)

30 June 2006, IOP, London (EMAG event)

One day meeting on In-situ Microscopy Techniques

2-7 July 2006, Trinity College, Dublin

ICSM'06 (<http://www.cpreregistrations.com/icsm2006/>)

6 - 10 August 2006, Chicago, IL, USA

Microscopy & Microanalysis-2006 (<http://www.MSA.microscopy.com>)

3 - 8 September 2006, Sapporo, Japan

16th International Microscopy Congress (<http://www.imc16.jp>)

17 October 2006, Shrivenham (RMS event)

Advances in Microscopical Imaging – Applications in Forensics

27 Nov – 1 Dec, Boston

2006 MRS Fall Meeting

11-14 September, 2007, Glasgow

EMAG 2007

ELECTRON MICROSCOPY AND ANALYSIS GROUP

Contact Points

- IoP:** Institute of Physics, Conference Dept., 76 Portland Place, London, W1B 1NT, UK
Tel: +44 171 20 7470 4800, Fax: +44 171 20 7470 4900
Email: conferences@iop.org
<http://www.iop.org/IOP/Confs/conferences.iop.org>
- MRS:** Materials Research Society, 9800 McKnight Road, Pittsburgh,
PA 15237, USA.
Tel: +1 412 779 3003, Fax: +1 412 779 8313
<http://www.mrs.org/meetings/>
- MSA:** Microscopy Society of America, 4 Barlows Landing Road, Suite 8, Pocasset,
MA 02559, USA.
Tel: +1 508 563 1155, Fax: +1 508 563 1211
<http://www.MSA.microscopy.com/>
- RMS:** Royal Microscopical Society, 37/38 St. Clements, Oxford, OX4 1AJ.
Tel: +44 1865 248 768 Fax: +44 1865 791 237
Email: meetings@rms.org.uk <http://www.rms.org.uk/events/>

EMAG BURSARY APPLICATION FORM

PERSONAL DETAILS			
Name		Email	
Address			
Title		Age	
IoP/EMAG Member	Yes / No	IOP Number	Applying for Membership
Current Status	FT Student	Postdoc	Other - specify

CONFERENCE DETAILS		
Name of Meeting		
Date of Meeting		
Place of Meeting		
Title of Paper/Poster		
Has paper been accepted for presentation?	Yes	Don't know yet

SHORT COURSE DETAILS	
Title of Course	
Date of Course	
Place of Course	

FINANCIAL DETAILS		
Estimated Expenditure	Registration Fee	
	Travel Costs	
	Accommodation	
	Subsistence	
	Total	£

Have you been promised a contribution towards your funding from any other sources?	Yes / No
If so, please specify the source and the amount they are prepared to contribute	

Have you received an EMAG bursary within the last 12 months?	Yes / No
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SIGNATURE	DATE
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Please send completed form and

- a letter of support from your academic supervisor and
- a copy of your paper abstract (if applicable)

to : Professor S E Donnelly, Faculty of Science Engineering and Environment, Cockcroft Building (Room 105 Salford University, Manchester, M5 4WT, UK (Email: S.E.Donnelly@salford.ac.uk)