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**Article:**

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<https://doi.org/10.1111/jmi.12391>

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## Preface

This issue contains selected invited and contributed presentations from the 19<sup>th</sup> international conference on '*Microscopy of Semiconducting Materials*' which was held at Murray Edwards College, University of Cambridge, 29 March - 2 April 2015.

The meeting was organised by the Institute of Physics and supported by the Royal Microscopical Society, the European Microscopy Society, Materials Research Society of the USA and, as Platinum sponsor, HREM Research.

The conference series, inaugurated by Anthony ('Tony') G Cullis in 1979, has since been held biennially in odd years. It deals with advances in semiconductor studies carried out by all forms of microscopy, with emphasis on electron and scanning probe microscopy techniques with high spatial resolution. This field has been flourishing for now more than three decades, due to the need for materials and device characterisation at the atomic level to continuously explore new materials and concepts for electronic and optoelectronic applications.

As semiconductor devices continue to shrink further, new routes for device processing and characterisation need to be developed, and, for the latter, methods that offer sub-nanometre spatial resolution are highly valuable. The various forms of imaging, diffraction and spectroscopy available in a modern transmission electron microscopy (TEM) are powerful tools for studying the lattice structure, electronic structure, chemistry and also electric fields in semiconducting materials. Advances in instrumentation during the past decade, from lens aberration correction in both TEM and scanning TEM (STEM) instruments, to the development of a wide range of scanning probe techniques, as well as new methods of signal quantification have been presented at this conference.

This meeting was attended by 118 delegates from 22 countries, comprising 14 EU countries as well as Australia, Israel, Japan, Nigeria, Russia, Switzerland, Taiwan and the USA. We had a total of 117 scientific contributions, which included 15 invited talks, 42 contributed talks and 60 poster presentations.

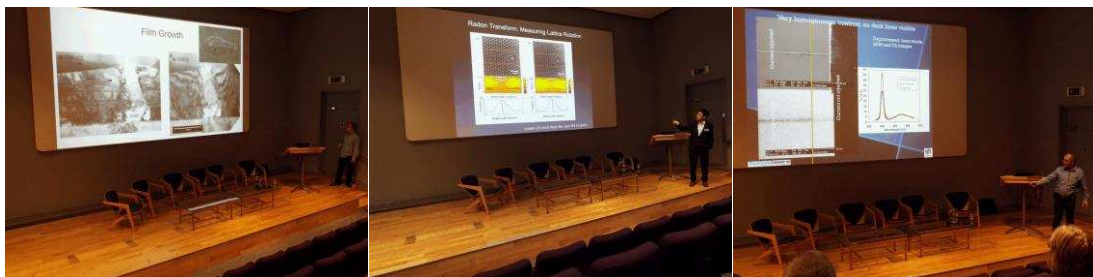
In 2013, when the meeting had been held in Oxford, we had the honour to welcome as invited speaker Hiroshi Amano who a year later was awarded a share of the Nobel Prize in Physics 2014. Late in 2013, Enrique Grünbaum, who pioneered dark-field electron microscopy and was the most senior attendant of MSM-18, died. His spirit was always supportive at many previous conferences, and will be dearly missed.



**Figure 1.** Conference photo taken at the college entrance, with about half of the attendees, just before a punt tour on the free Tuesday afternoon



**Figure 2.** The punt tour on the river Cam started in the rain but ended with sunshine



**Figure 3.** On the last day, many interesting talks were given on lattice defects and nitride semiconductor devices

Instead of publishing a single conference proceedings volume as in previous years, it had been decided at the last conference that we would publish two special issues in different scientific journals: *Journal of Microscopy* would present microscopy technique based contributions while *Semiconductor Science and Technology* (Walther and Sanchez, 2015) would receive the more materials or device oriented manuscripts. All submissions would undergo a full peer review process by at least two independent reviewers, leading to a higher rejection rate but possibly higher visibility in the scientific community.

This issue contains 8 contributions, two of which were invited presentations (marked by asterisks). These papers can be classified into the following four topics:

1. cathodoluminescence spectroscopy and mapping (Gustafsson\*),
2. electron energy-loss spectroscopy and mapping of plasmon losses (Eljarrat *et al.*\*, Walther and Wang) or core losses (Angadi *et al.*, Griffiths *et al.*),
3. annular dark-field STEM imaging (Beyer *et al.*, Bonaf *et al.*) and
4. electrical measurements in an SEM (Fauske *et al.*).

Three students were awarded prizes for the high quality of their presentations: Duncan Johnstone (Cambridge), Natalia Stolyarchuk (Berlin) and Jürgen Münzner (Marburg). Their contributions covered a broad range of techniques and materials, documenting the excellent standard of microscopy that is now achieved by younger scientists.

The organisers are grateful to the following companies who contributed to the success of the meeting by presenting trade stands on 30 and 31 March as well as on 1 April: Agar Scientific, Cameca, Fischione, Gatan, Hitachi, HREM Research, Linkam, LOT and Quorum Technologies.

We express our gratitude to Murray Edwards College for provision of excellent accommodation, superb lecture facilities including technical support, and the friendly catering staff.

We would like to also thank the staff of the Institute of Physics for their expert help in planning and running this meeting - in particular Dawn Stewart and her assistants for their excellent professional support and always joyful approach to anything.

Finally, we are grateful to Jill Hobbs as the Editorial Office Manager for the *Journal of Microscopy* at Wiley and the RMS, to Alice Malhador and the Editorial staff for *Semiconductor Science and Technology* at IOP Publishing, as well as to the numerous contributors and reviewers for helping us to put together these special issues.

December 2015

Thomas Walther  
Richard Beanland

## Reference

Walther T and Sanchez AM (2015) Preface Microscopy of Semiconducting Materials 2015. *Semicond. Sci. Technol.* 30, 110301