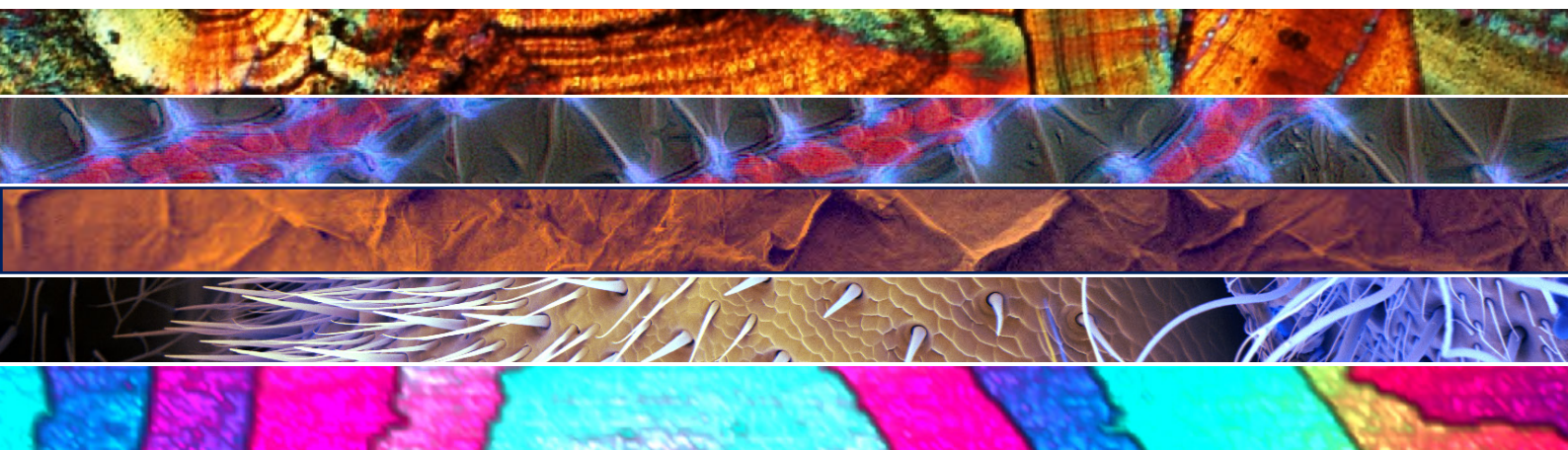




Microscience Microscopy Congress

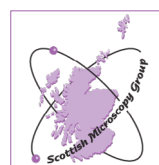
incorporating **EMAG 2019**



**1 - 4 July 2019, Manchester Central, UK**

# Conference Programme

This Conference Programme  
booklet is kindly sponsored by:



# Executive Scientific Organising Committee

## Programme Chairs

Professor Rik Brydson  
RMS Honorary Secretary Physical Science

Professor Maddy Parsons  
RMS Honorary Secretary Biological Science

## Co-organisers

Professor Michelle Peckham  
RMS President

Dr Peter O'Toole  
RMS Vice President

Professor Grace Burke  
RMS Vice President

Dr Kerry Thompson  
Chair of Outreach & Education Committee,  
Honorary Secretary Education

Dr Debbie Stokes  
RMS International Secretary

Dr Lynne Joyce  
RMS Honorary Treasurer

Professor Sonia Contera  
SPM Section Chair

Mr Alex Sossick  
Light Microscopy Section Chair

Dr Claire Wells  
Life Sciences Section Chair

Dr Lucy Collinson  
EM Section Chair

Mr Derek Davies  
Flow Cytometry Section Chair

Professor Beverley Inkson  
Engineering & Physical Sciences Section Chair

Dr Andy Brown  
EMAG Chair

Professor Ana Sanchez  
EMAG Secretary

Professor Ursel Bangert  
President, Microscopy Society of Ireland

Dr Alison Dun  
Chair, Scottish Microscopy Society

# General Information

## Registration

The Registration Desk in the entrance hall of Manchester Central will be open during the following times:

Monday 1 July: 0930 – 1930

Tuesday 2 July: 0800 – 1800

Wednesday 3 July: 0800 – 1800

Thursday 4 July: 0800 – 1500

## Organisers Office

The Organisers Office is located by the Registration Desk. It can also be contacted by telephone: +44 (0)161 827 7641.

## Badges

Participants and exhibitors are kindly requested to wear their badges during all congress events. Admittance to the scientific sessions, exhibition and social events may be refused if the required badge cannot be presented.

## Wifi

Free wifi is available throughout Manchester Central. Details are available at the Registration Desk

## Congress App

The mmc2019 Congress App gives you access to the full conference and exhibition

programmes and all the talk and poster abstracts. You can plan your own schedule of talks, add notes to each of them which you can send to yourself so they will be waiting in your inbox when you get back to work.

The app will also allow you to find out more about the exhibiting companies, vote for your favourite micrograph in the RMS Scientific Imaging Competition and network with other delegates who you may have heard speak or who have authored a poster that stood out.

The mmc2019 Congress App is available to download for free from your app store, just search for mmc2019.

## Refreshment Breaks

Tea, coffee, water and catering areas for lunch are available throughout the day in the exhibition hall. Thank you to JEOL for their sponsorship of the tea and coffee and to TESCANA for sponsoring the reusable water bottles and water coolers.



## Transport and Parking

Information on travelling to and around Manchester is available on the Visit Manchester website – [www.visitmanchester.com/travel](http://www.visitmanchester.com/travel)

## Exhibition Opening Times

The exhibition will be open as follows:

Tuesday 2 July: 0915 – 1800

Wednesday 3 July: 0915 – 1800

Thursday 4 July: 0900 – 1500

## Poster Sessions

The poster sessions will take place in the exhibition hall at the following times:

1. Tuesday 2 July: 1600 – 1800

2. Wednesday 3 July: 1600 – 1800

3. Thursday 4 July: 1200 – 1315

A selection of refreshments will be available during the poster sessions. Thank you to JEOL for sponsoring these sessions.

# Meetings & Workshops

## Monday 1 July 2019, Workshops

Three mmc2019 workshops will take place on Monday 1 July in Manchester Central. They are a great way to learn the most up-to-date tips and techniques to help with your research.

The three confirmed workshops are:

### ImageJ Workshop

1330 - 1630, Cobden Rm 3

*Scientific Organiser: Dr Kees Straatman (University of Leicester, UK)*

ImageJ is a powerful public domain image processing and analysis program written in Java, freely available for download from the internet. Fiji is an ImageJ distribution focussed on the visualisation and analysis of microscope images in 2D, 3D, 4D and 5D.

This workshop gives a brief introduction on the use of ImageJ/Fiji and will account for all learning styles as a mix of lectures, demonstrations and hands-on sessions.

### SPM Workshop

1330 - 1630, Cobden Rm 4

*Scientific Organisers: Professor Sonia Contera (University of Oxford, UK), Dr Charles Clifford (National Physical Laboratory, UK) & Dr Oleg Kolosov (Lancaster University, UK)*

This workshop provides an advanced in depth introduction to Scanning Probe Microscopy (SPM) at a level suitable for graduate students who have started using or developing SPM in their own research, and for experienced electron and optical microscopists who would like to know how they could use SPM. The workshop will cover imaging and force measurements in atomic force microscopy, the most ubiquitous form of SPM, with an emphasis on the practical knowledge and tips required for effective application in the areas of material science, energy materials, biomedicine.

The workshop will include presentations and associated hands on practical demonstrations, supported by SPM instrument manufacturers. There will also be ample opportunity to discuss your specific applications and problems with the expert presenters.

### EMAG Workshop - Deep Learning

1330 - 1630, Cobden Rm 2

*Scientific Organiser: Dr Donald MacLaren (University of Glasgow, UK)*

With recent advances in detector and camera

technologies, the rapid acquisition of images, diffraction patterns or spectroscopic signals is propelling advanced electron microscopy to enter a new phase. The practice of working with a few images or spectra is increasingly being replaced by rapid acquisition and analysis of large datasets of images and multi-dimensional spectra, with gigabyte dimensions. Examples are time-lapse movies of In Situ experiments, systematic images series in ptychography, exit wave reconstructions and tomography, or hyperspectral imaging for elemental and functional localization. An emerging trend is to take advantage of increased hardware capabilities and the equally rapid advance in data science to analyse these huge datasets more efficiently and to providing statistically meaningful information about the analysed materials to yield insights that were not previously possible.

This workshop introduces the concepts, applications and practical details of applying some of these data science techniques to the analysis of microscopy images and spectra. It will begin with an overview by Prof. Paul Rees of Swansea University, who will demonstrate applications of data science in image analysis. This will be followed by a hands-on demonstration of deep learning for image, text and sound analysis to provide a taste of building your own machine learning model for pattern recognition, facilitated by Dr Coorous Mohtadi, Deep Learning Engineer at Mathworks. A web-based version of MATLAB will be provided for the participants of the workshop.

## Monday 1 July 2019, Meetings

The Microscience Microscopy Congress brings together a number of smaller meetings, allowing you to meet and discuss with colleagues working in your field as well as with cross-disciplinary peers, all at the same event.

As part of mmc2019 these will include:

### BiolmagingUK Meeting - Monday 1 July

1330 - 1630, Central 3, 4

*Scientific Organiser: Professor Maddy Parsons (King's College London, UK)*

This meeting provides an opportunity for the UK Bioimaging community to discuss priorities and strategies in training, development, careers and ways to share knowledge across different disciplines. The

session will consist of short talks from members of the BiolmagingUK organising committee, BBSRC, and industrial/institute collaboration partners (Royce, RFI, Faraday) to update on progress, new opportunities and initiatives. There will be interactive Q+A sessions to encourage discussion and enable emerging priorities and ideas to be highlighted. The meeting is open to everyone with an interest in bioimaging.

### Early Career Pre-Congress Symposium - Monday 1 July

1400 - 1630, Central 5, 6, 7

*Scientific Organiser: Rebecca Thompson (University of Leeds, UK)*

The RMS Early Career Pre-Congress Symposium is an event for early career microscopists (students and post docs) to network and present their work ahead of the main mmc conference.

The meeting will also include a keynote lecture, an introduction to the newly-formed RMS student council, and a networking activity. Overall this will be a fantastic opportunity to meet fellow microscopists ahead of mmc2019.

## Tuesday 2 July 2019, Meeting

### Quality Control Focussed Interest Group Meeting

1600 - 1800, Workshop 3

*Scientific Organiser: Alex Laude (Newcastle University, UK)*

With this inaugural Quality Control FIG Meeting we hope to kick-start discussions within the UK light microscopy community to address the issue of microscope QC initially focussing on widefield and confocal platforms but later expanding to super-res. The aim is to agree on what QC measurements to make, with what standard samples at what frequency to make them. We hope to incorporate standard QC sample manufacturers (Argolight, GATTAquant & Alex Corbett (Uni of Exeter)) as well as microscope manufacturers and image analysts. The goal is firstly to agree on QC practices but also automate the process of image capture, analysis and archive. To succeed will require a community effort and buy-in from all microscope manufacturers.

This meeting is free to attend, there is no need to book in advance nor register for the conference.



## Friday 5 July, Satellite Meeting

### Super-resolution Workshop - Friday 5 July, University of Leeds

*Scientific Organiser: Professor Michelle Peckham (University of Leeds, UK)*

Designed to talk about the current challenges in developing and using super-resolution microscopy with lots of time for discussion, this year the workshop will focus on the topic of labelling. Thoughts and ideas are encouraged to help define what is good/best practice around these challenging techniques, and give an insight into future potential developments.

Confirmed speakers include:

- Siân Culley, University College London
- Ulrike Endesfelder, MPI, Marburg
- Marisa Martin-Fernandez, UK Research and Innovation
- Izzy Jayasinge, University of Leeds
- Sebastian van de Linde, University of Strathclyde
- Brian Patton, University of Strathclyde

The cost of this workshop is £35. To register please visit the event page on the RMS website.

## Associated Meetings

One of the great features of the Microscience Microscopy Congress Series is that it embraces established popular meetings to bring together different groups under one roof to network, learn, collaborate and of course, to enjoy one of Europe's largest microscopy and imaging events.

The meetings and groups incorporated with mmc2019 are:



### Frontiers in Bioimaging 2019

The 8th meeting in the successful Frontiers in Bioimaging series will be held during mmc2019.

Focusing on the latest biological applications and optical imaging developments, it brings together technology developers, application specialists and end users to share their work and future vision. The aim of the meeting is to create a network of multidisciplinary scientists focused on aspects of advanced imaging and its application.

With a mix of leading research leaders, their postdoctoral, PhD and technical staff, this is an ideal event for researchers to engage with a broad range of image approaches and to make useful contacts with key groups using similar technologies. We hope that this will lead to many future collaborations and ensure that recent funding awards are well promoted and benefits maximised.

The Frontiers in Bioimaging sessions take place on 2 & 3 July, they are:

- Label-free Quantitative Optical Microscopy
- Biological Applications of Fluorescence Microscopy Beyond the Diffraction Limit
- Developments in Super-resolution Microscopy
- Light Sheet Microscopy: Imaging Complex Biological Samples in Time and Space





## RMS SPM Meeting

The Annual RMS Scanning Probe Microscopy (SPM) Meeting will be held during mmc2019. This meeting is unmissable for anyone using SPM in their work or studies and will cover a wide range of topics associated with SPM including main techniques such as atomic force microscopy and scanning tunnelling microscopy as well as more specialised versions.

The SPM conference sessions at mmc2019 are taking place on 2 & 3 July, they are:

- Advancing Materials Science via Scanning Probes (This session is sponsored by Bruker & Scanwel Ltd)
- SPM of Soft and Biological Matter
- SPM: A tool for Pharmaceutical and Applied Biological/Biomedical Research
- Nanomechanics for Biology and Biomedicine

## IOP Institute of Physics Electron Microscopy and Analysis Group

### EMAG 2019

Organised by the Institute of Physics' Electron Microscopy and Analysis Group (EMAG), the 2019 EMAG conference will be part of mmc2019.

In keeping with the established EMAG traditions, EMAG 2019 will include

- Three days of talks each with two parallel streams covering various electron microscopy themes in the life and physical sciences.
- Lively poster sessions.
- An impressive list of world class EMAG invited speakers.
- Plenty of social activities with opportunities to catch up with old friends and to make new ones.

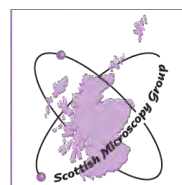
But by being a part of mmc2019, EMAG delegates can enjoy:

- A larger than usual trade exhibition of microscopy and imaging equipment, with an expected one hundred companies demonstrating the widest range of equipment and consumables.
- Benefit from the opportunities for interaction and cross disciplinary discussions with participants from other complementary meetings occurring simultaneously in the same venue including Scanning Probe Microscopy and BioImaging UK.
- Links with more workshops and training events than were possible with a stand-alone EMAG, as well as opportunities for participants to contribute to the RMS International Scientific Imaging Competitions.

The EMAG 2019 conference sessions at mmc2019 are taking place throughout the three days and are as follows:

- Electron Microscopy of Functional Materials
- Advanced Scanning Electron Microscopy

- Electron Microscopy of Functional Oxides
- In Situ Microscopy Techniques
- Electron Crystallography and Diffraction
- Structural Materials and Metallurgy
- Phase Sensitive Techniques
- Low Dimensional Materials (2D and 1D)
- Spectroscopy
- Electron Microscopy of Nanomaterials



## SMG & MSI Sessions

The Scottish Microscopy Society (SMG) & Microscopy Society of Ireland (MSI) are combining at mmc2019 to bring together sessions featuring research in life and material sciences.

Invited talks by members of both societies will be complemented by short presentations selected from submitted abstracts. The SMG and MSI hope to see not only members of their societies at the session, but also those who want to find out more about the work done by their members using the fabulous range of microscope facilities available in Ireland and Scotland.

The SMG & MSI sessions are taking place on Tuesday 2 July, they are:

- Applications of Super-resolution from the Nano to the Atomic Scale
- Trials and Tribulations of Electron and Light Beam Induced Radiation Effects





# Conference Sessions

The conference at mmc2019 will consist of six parallel streams comprising 35 sessions, with excellent speakers and vibrant supporting poster sessions.

The conference sessions are as follows:

## Scottish Microscopy Society (SMG) & Microscopy Society of Ireland (MSI) Sessions

### SMG & MSI: Applications of Super-resolution from the Nano to the Atomic Scale

*Tuesday 2 July, 1000 – 1200, Central 5, 6, 7*

All microscopy techniques come with their caveats; bleaching due to powerful lasers, cytotoxic effects, sample deformation due to sample prep or acquisition method. However many of these caveats can be transformed into an advantage to better resolve structure in both biological and non-biological materials. Some great examples of this include the use of: mechanical probes to examine the structure of small and soft natural polyhedral structures called Clathrin in AFM, highly powerful lasers to bypass resolution and reveal structure in super-resolution microscopies such as STED and RESOLFT as well as electron-beam probe effects in Electron Microscopy techniques. In this session we will hear more about these techniques and learn how accessible they are for you in your research.

*Session Chair: Charlotte Buckley (University of Strathclyde, UK)*

*Invited Speakers: Ilaria Testa (KTH Royal Institute of Technology, Sweden) & Michael Lherbette (Heriot-Watt University, UK)*

### SMG & MSI: Trials and Tribulations of Electron and Light Beam Induced Radiation Effects

*Tuesday 2 July, 1400 – 1600, Central 5, 6, 7*

This session will address ways to overcome probe and dose induced issues, and moreover, to advantageously exploit beam and physical probes of varied properties (e.g., regarding dose, energy, strength) for characterisation of samples across the entire materials spectrum, using assessment by all types of (e.g., physical probe, light, electron) microscopy. Contributions are furthermore invited to demonstrate direct effects and result outcomes from visualising, imaging and

spectroscopically assessing materials, ranging from inorganic to organic and bio materials.

*Session Chair: Ursel Bangert (University of Limerick, Ireland)*

*Invited Speakers: Ilke Arslan (Argonne National Laboratory, USA) & Patricia Abellan (SuperSTEM and University of Leeds, UK)*

## Frontiers in Biolmaging Sessions

### Frontiers in Biolmaging: Label-free Quantitative Optical Microscopy

*Tuesday 2 July, 1000 – 1200, Charter 2*

The session will cover methods to image biological cells and tissues label-free, including quantitative phase imaging, quantitative differential interference contrast microscopy (qDIC), vibrational microscopy (spontaneous Raman, coherent Raman), Brillouin microspectroscopy, second and third harmonic generation microscopy, autofluorescence. Specific emphasis will be on quantitative techniques and image analysis methodologies.

*Session Chair: Paola Borri (Cardiff University, UK)*

*Invited Speakers: Daniele Fioretto (Università Degli Studi Di Perugia, Italy) & Gabriel Popescu, (University of Illinois Urbana-Champaign, USA)*

### Frontiers in Biolmaging: Biological Applications of Fluorescence Microscopy Beyond the Diffraction Limit

*Tuesday 2 July, 1400 – 1600, Charter 2*

The rise of super-resolution has involved the development of probes, labelling strategy, hardware acquisition software and analysis algorithms. With super-resolution system now commercially and widely available, new insight is now being generated on a range of biological frontiers. These include neuroscience, immunology, microbiology and others. This session will showcase this new understanding and is open to anyone developing, or just using, super-resolution to make new biological discoveries.

*Session Chair: Dylan Owen (King's College London, UK)*

*Invited Speakers: Daniel Davis (University of Manchester, UK) & Ulrike Endesfelder (Max Planck Institute for Terrestrial Microbiology, Germany)*

## Frontiers in Biolmaging: Developments in Super-resolution Microscopy

*Wednesday 3 July, 1000 – 1200, Charter 2*

All the latest developments in light microscopes that beat the diffraction limit (STORM/ PALM, SIM, STED etc.). Including the latest improvements in high resolution, high speed, multicolour, multimodal or correlative super-resolution microscopy. As well as developments in probes and algorithms. Plus anything else that involves making microscopes less blurry.

*Session Chair: Seamus Holden (Newcastle University, UK)*

*Invited Speakers: Suliana Manley (EPFL, Switzerland) & Sebastian Van De Linde (University of Strathclyde, UK)*

## Frontiers in Biolmaging: Light Sheet Microscopy: Imaging Complex Biological Samples in Time and Space

*Wednesday 3 July, 1400 – 1600, Charter 2*

The great potential of light sheet imaging is the ability to image dynamic biological events in 3D samples. This session will focus on the application of light sheet and other advanced microscopy techniques to imaging dynamic processes within complex 3D samples. It will cover the challenges of imaging fast events (such as the beating heart), events which occur over long periods of time (e.g. angiogenesis, embryonic development) or imaging biomolecules in thick tissue sections. It will also cover the multiplexing of light sheet with other modalities, such as super-resolution or multiphoton microscopy to help overcome these challenges.

*Session Chair: Steve Thomas (University of Birmingham, UK)*

*Invited Speakers: Willy Supatto (Ecole Polytechnique, France) & Katrin Heinze (University of Würzburg, Germany)*

## SPM Sessions

### SPM: Advancing Materials Science via Scanning Probes

*Tuesday 2 July, 1000 – 1200, Central 3, 4*

Development of modern materials and devices increasingly relies on their nanoscale structure and local properties. Scanning Probe Microscopy (SPM) plays a critical role in establishing connections between

the structure, physical and chemical traits on materials at the nanoscale and the final material performance. SPM is vital to both fundamental and applied research, creating paradigms for novel materials and guiding development of engineering devices. This symposium will report on the latest scanning probe developments advancing wide areas of materials science and engineering, and link the champions in the SPM field and leading material scientists establishing new synergetic collaborations.

This session is sponsored by Bruker & Scanwel Ltd



*Session Chair: Oleg Kolosov (Lancaster University, UK)*

*Invited Speakers: Cyrus Hirjibehedin (MIT Lincoln Laboratory, USA), Franco Dinelli (Istituto Nazionale Di Ottica, CNR-INO, Italy) & Olga Kazakova (National Physical Laboratory, UK)*

### **SPM of Soft and Biological Matter**

*Tuesday 2 July, 1400 – 1600, Central 3, 4*  
Scanning probe microscopy (SPM) techniques have unique capabilities for exploring the properties of soft matter and biological systems. These systems frequently have heterogeneous structural, mechanical and chemical properties that vary over length scales of just a few nanometres, can combine ordered and disordered regions, and often change dramatically with time, all impacting on their ultimate properties and function. This session will showcase the capabilities of SPM to help understand such complex systems, including applications to polymer and

biological systems of imaging, measurement of mechanical and chemical properties, force spectroscopy and high speed scanning.

*Session Chair: Jamie Hobbs (University of Sheffield, UK)*

*Invited Speakers: Alice Pyne (University College London, UK) & Felix Rico (Aix-Marseille University, France)*

### **SPM: A tool for Pharmaceutical and Applied Biological/Biomedical Research**

*Wednesday 3 July, 1000 – 1200, Central 3, 4*

The applications of scanning probe microscopy in Pharmaceutical and Biomedical research, in both industry and academia, are diverse. From studies into the fundamental basis of disease and the identification of new biological targets, to the characterization of physiochemical properties of drug-substances, the optimization of novel drug-delivery formulations and development new materials for cellular therapies and regenerative medicine. This session aims to provide an opportunity for researchers to present their latest research in this area. Abstracts are encouraged in all of the above areas.

*Session Chair: Stephanie Allen (University of Nottingham, UK)*

*Invited Speakers: Dimitrios Lamprou (School of Pharmacy, Queen's University Belfast, UK) & Polina Prokopovich (Cardiff University, UK)*

### **SPM: Nanomechanics for Biology and Biomedicine**

*Wednesday 3 July, 1400 – 1600, Central 3, 4*

Nanomechanics using AFM offers the possibility to characterize biological samples at the nanonewton and piconewton scale in physiological conditions, often in conjunction with advanced light-based imaging. Given the multiparametric outputs and mapping possibilities of the latest instruments, larger areas can be explored and more mechanical estimates found, providing a richer mechanical picture that can be extended up to tissue and organ levels. Similarly, faster and more precise systems also have expanded the possibilities of force spectroscopy approaches to better characterize the mechanical behaviour of individual proteins or biomolecules. Finally, while nanomechanics expands its range towards smaller and larger scales, more complex mechanics models are being

proposed to better characterize these increasingly-specialized experiments.

*Session Chair: Nuria Gavara (Queen Mary University of London, UK)*

*Invited Speakers: Sergi Garcia-Manyes (King's College London, UK) & Jamie Hobbs (University of Sheffield, UK)*

## **Life/Physical Sessions**

### **Bio Applications: Imaging in Disease**

*Thursday 4 July, 0930 – 1130, Charter 2*

Imaging cells in fixed samples and living tissue is transforming our view of disease progress from neurological disorders to cancer. This session aims to highlight the latest developments at high resolution and in vivo imaging with an emphasis on highlighting advances in the field. Contributions to this symposium are solicited from any area of research where imaging techniques are being applied to the study of human disease.

*Session Chair: Claire Wells (King's College London, UK)*

*Invited Speakers: Milka Sarris (University of Cambridge, UK) & David Entenberg (Albert Einstein College of Medicine, USA)*

### **Imaging the Immune System**

*Thursday 4 July, 1330 – 1530, Charter 2*

The immune system is a highly sophisticated and dynamic group of cells and organs that constantly have to adapt to maintain healthy tissues in the body. While, traditionally, flow cytometry has been the stalwart fluorescence workhorse of the immunology community, fluorescence microscopy techniques now provide fantastic platforms to enable researchers to delve into the behaviour of live immune cells, study population traffic, homing and signalling both in vitro and in vivo. This session will showcase the latest developments using imaging at high resolution and in vivo. Contributions to this symposium are solicited from any area of research where imaging techniques are being applied to the study of immunology.

*Session Chair: Theresa Ward (London School of Hygiene & Tropical Medicine, UK)*

*Invited Speakers: Cristina Lo Celso (Imperial College London, UK) & Olivier Theodoly (CNRS, France)*

## Using Cryo-electron Microscopy to Investigate Macromolecular Structure

*Tuesday 2 July, 1000 – 1200, Charter 4*

The recent advances in cryo-electron microscope hardware and software have revolutionised the field. This session focuses on how both single particle and tomography data collection approaches, combined with method developments, are enabling cryo-EM to tackle increasingly complex biological questions.

*Session Chair: Rebecca Thompson (University of Leeds, UK)*

*Invited Speakers: Holger Stark (Max Planck Institute for Biophysical Chemistry, Germany) & Werner Kühlbrandt (Max Planck Institute of Biophysics, Germany)*

## Correlative Microscopy

*Tuesday 2 July, 1400 – 1600, Charter 4*

Correlative microscopy is a combination of different microscopy techniques to observe the same object/event, enabling to extract more information and details than from a single method on its own. This has allowed the understanding of the dynamic behavior of cellular components and tissues, and their connections in different scales. This session will reflect the latest developments and applications of Correlative Microscopy in different research studies and areas.

*Session Chair: Leandro Lemgruber (University of Glasgow, UK)*

*Invited Speakers: Wanda Kukulski (MRC Laboratory Of Molecular Biology, UK) & Gaia Pigino (Max Planck Institute of Molecular Cell Biology and Genetics, Germany)*

## Imaging in the Big Data era: Large Data Sets Rich in Information

*Wednesday 3 July, 1000 – 1200, Charter 4*

Advances in technology are allowing us to image at unprecedented resolution with enormous fields of view. Where we once relied on piecing together information from 2-dimensional images we are now capable of imaging in multiple dimensions across a multitude of length scales. With the increase in data acquisition capability the apparent complexity of the techniques is increasing. However, the imaging community is made up of people with differing, complementary, skill sets which are working together to make

the techniques easier to interpret. Material scientists have been moving the technology forward increasing throughput and the number of layers of information. Biologists are developing and adapting specimen preparation techniques to maximise information gained from their samples. New techniques are increasing the amount of information that can be gleaned from the large data sets. Beyond the data collection, advances in computational techniques are allowing users to interrogate their data to find the new truths. New analysis techniques harness the power of large-scale computing resources and the latest computational methods, including machine learning. This session will highlight some of the ongoing development in 3D imaging techniques along with methods that allow us to interpret and extract meaning from huge complex imaging data sets.

*Session Chairs: Tobias Starborg (The University of Manchester, UK) & Martin Jones (The Francis Crick Institute, UK)*

*Invited Speakers: Timothy Burnett (University of Manchester, UK), Louise Hughes (Oxford Instruments, UK), Minh Doan (Broad Institute, USA) & Anna Kreshuk (European Molecular Biology Laboratory, Germany)*

## Believing is More than Seeing: Learning and Models in Quantitative Imaging

*Wednesday 3 July, 1400 – 1600, Charter 4*

A new generation of supervised learning tools have emerged that may become the methods of choice for advanced image processing and analytics. Where once sophisticated edge detection algorithms were cutting edge, convolutional neural networks (CNNs) now rule. Applications for CNNs in segmentation, restoration, classification, and perhaps most exotically, content-based image retrieval are all demonstrated and may become routine. This session will explore applications for this new approach to computational modelling and will aim to assess whether it is time for widespread adoption across biological imaging.

*Session Chair: Jason Swedlow (University of Dundee, UK)*

*Invited Speakers: Virginie Uhlmann (European Bioinformatics Institute - EMBL-EBI, UK) & Florian Jug (Max Planck Institute of Molecular Cell Biology and Genetics, Germany)*

## UK Applied Image Analysis (NEUBIAS UK and IAFIG-RMS)

*Thursday 4 July, 0930 – 1130, Charter 4*

The theme of this session is to highlight and showcase image analysis and to publicise some of the resources and opportunities available to this community from within the UK and beyond. Abstracts are invited to present any form of microscopy image analysis to the community although the emphasis is on shareable technology which is of practical interest. It could be a state-of-the-art technique provided as a shareable plugin or even a reimplement or optimisation of existing code for example. Innovative pipelines of image analysis are also invited for presentation.

*Session Chair: Dominic Waithe (University of Oxford, UK)*

*Invited Speakers: Gabriella Rustici (University of Cambridge, UK) & Shoaib Sufi (Software Sustainability Institute, UK)*

## In Situ Electron Microscopy Applied to Inorganic Materials

*Tuesday 2 July, 1000 – 1200, Charter 3*

Imagine being able to harness the imaging power of an electron microscope under the conditions of the systems that you would like to study, be it in liquid, gas, at temperature of with an applied electric field. Until recently this was the preserve of a few specialised labs, however, the rise of In Situ EM fuelled by MEMS device sample holders has seen a wave of research that was previously out of reach or considered not feasible. In this session we will explore the use of such technology, in particular with heating and biasing stages for research in materials sciences.

*Session Chair: Chris Parmenter (University of Nottingham, UK)*

*Invited Speakers: Layla Mehdi (University of Liverpool, UK) & Marc Willinger (ETH Zurich, Switzerland)*

## In Situ Electron Microscopy Applied to Soft Matter and Biological Systems

*Tuesday 2 July, 1400 – 1600, Charter 3*

Imagine being able to harness the imaging power of an electron microscope under the conditions of the systems that you would like to study, be it in liquid, gas, at temperature of



with an applied electric field. Until recently this was the preserve of a few specialised labs, however, the rise of In Situ EM fuelled by MEMS device sample holders has seen a wave of research that was previously out of reach or considered not feasible. In this session we will explore the use of such technology, in particular with liquid cells for research in soft matter and biological sciences.

*Session Chair: Chris Parmenter (University of Nottingham, UK)*

*Invited Speakers: Joe Patterson (University of California, Irvine, USA) & Deborah Kelly (Pennsylvania State University, USA)*

### **FIB Microscopy and Sample Preparation**

*Wednesday 3 July, 1000 – 1200, Central 5, 6, 7*

FIB microscopes have become highly flexible micro-laboratories, enabling high resolution sample preparation, 2D and 3D characterisation, nano-fabrication and rapid prototyping, in applications spanning from physical to biological sciences. This session will cover two important areas: (1) Novel FIB methodologies and applications and (2) Sample preparation systems/applications. Effective sample preparation is often the key to successful microscopy, and we encourage contributions that use FIB or a wide range of other techniques. The in-cooperated FIB & Prep User Group meeting provides an open forum to share experimental, theoretical and instrumentation advances and tips.

*Session Chair: Xiang li Zhong (The University of Manchester, UK)*

*Invited Speakers: Joseph Michael (Sandia National Laboratories, USA) & Nabil Bassim (McMaster University, Canada)*

### **Multimode Ion Beam Microscopy: Hybrid-techniques and Spectroscopy**

*Wednesday 3 July, 1400 – 1600, Central 5, 6, 7*

The ability to combine focused ion beam (FIB) methods with the wide range of scanning electron microscopy (SEM) associated techniques, and advanced spectroscopies such as SIMS, has made modern FIB/FIB-SEMs multi-dimensional tools for nano-scale fabrication and chemical/structural analysis. In this symposium, we welcome contributions spanning analytical FIB imaging and spectroscopy (including EDS/SIMS), Xe,

He and Ne FIB, hybrid FIB-SEM techniques, micro or nano-scale milling and 3-dimensional tomography/reconstruction, as well as electron- and ion-beam induced deposition. Innovative developments and novel studies from a variety of fields including engineering, Earth and material science, for fundamental research or technological applications, are intended to demonstrate the true versatility of modern FIB instruments.

*Session Chair: Trevor Almeida (University of Glasgow, UK)*

*Invited Speakers: Amalio Fernandez-Pacheco (University of Glasgow, UK) & Annalena Wolff (Queensland University of Technology, Australia)*

### **X-ray Microscopy: Beyond Attenuation Contrast Tomography**

*Thursday 4 July, 1330 – 1530, Central 5, 6, 7*

X-ray microscopy encompasses projection, tomographic, scattering, and spectroscopic imaging techniques, of static or dynamic specimens. This session will explore imaging approaches and results that exploit physical properties of X-rays and microscopic objects, in modes other than static attenuation contrast. Studies using cutting edge synchrotron beamlines and more accessible laboratory systems and protocols will be welcomed.

*Session Chair: Michael Doube (City University of Hong Kong's College of Veterinary Medicine and Life Sciences)*

*Invited Speakers: Richard Johnston (Swansea University, UK) & Virginie Chamard (Institut Fresnel, France)*

### **Quantitative Microscopy in Earth, Planetary and Archaeological Sciences**

*Thursday 4 July, 0930 – 1130, Central 5, 6, 7*

Quantitative microscopic investigation is critical for advancing our understanding of scientific problems today. Researchers have access to a broad range of analytical equipment including, but not limited to, light, electron and gas ion microscopy, secondary ion mass spectrometry, 3-D correlative microscopy, X-ray tomography and associated spectroscopic techniques. We invite presentations on examples from Earth, Planetary and Archaeological Sciences where novel microscopy techniques have been used to help construct quantitative datasets

preferably with practical outcomes and applications which advance scientific and/or technical understanding.

*Session Chair: Duncan Muir (Cardiff University, UK)*

*Invited Speakers: Cees-Jan De Hoog (University of Edinburgh, UK) & Jennifer Murgatroyd (RSK Environment, UK)*

### **Microscopy of Materials for Health Care**

*Thursday 4 July, 0930 – 1130, Central 3, 4*

Material Science in Health Care has become an integral part of research aiming to develop new approaches e.g. for cellular level treatments of diseases such as cancer or for the development of mineralised tissue for bone or tooth replacements. Increasing advances in treatments, devices and diagnostics have been accompanied by increasingly stringent regulatory demands. This research area requires excellent control of materials' properties and robust characterisation tools to visualise structure and composition with high spatial resolution. Therefore advanced electron microscopy as well as X-ray and light based characterisation tools will be in the focus of this session.

*Session Chair: Roland Kröger (University of York, UK)*

*Invited Speakers: Henrik Birkedal (Aarhus University, Denmark) & Natalie Reznikov (Object Research Systems, Canada)*

### **Tissue Cytometry**

*Thursday 4 July, 1330 – 1530, Charter 4*

Conventional microscopy of tissue sections allows the visualisation of tissue architecture but the definition of complex phenotypic signatures via labelled probes in individual cells is challenging. Recently the power of multiplexing that has been used in flow cytometry for some time has been translated to sections by techniques such as imaging mass cytometry, multiplexed ion beam imaging and laser scanning cytometry. This session will bring together these technologies to explore how 2D and 3D reconstruction of tissues can provide new insights into the relationship between cell types in health and disease.

*Session Chair: Derek Davies (The Francis Crick Institute, UK)*

*Invited Speakers: Febe Van Maldegem (The Francis Crick Institute, UK) & Dario Bressan (Cancer Research UK, University of Cambridge, UK)*

## EMAG 2019 Sessions

### EMAG: Electron Microscopy of Functional Materials

Tuesday 2 July, 1000 – 1200, Charter 1

Session Chair: Donald MacLaren (University of Glasgow, UK)

Invited Speakers: Arnaud Arbouet (CEMES-CNRS, France)

### EMAG: Advanced Scanning Electron Microscopy

Tuesday 2 July, 1400 – 1600, Charter 1

Session Chair: Cornelia Rodenburg (University of Sheffield, UK)

Invited Speakers: Mathieu Kociak (Universite Paris Sud, France) & Carol Trager-Cowan (University of Strathclyde, UK)

### EMAG: Electron Microscopy of Functional Oxides

Wednesday 3 July, 1000 – 1200, Charter 3

Session Chair: Ana Sanchez (University of Warwick, UK)

Invited Speakers: Elizabeth Dickey (North Carolina State University, USA)

### EMAG: In Situ Microscopy Techniques

Wednesday 3 July, 1000 – 1200, Charter 1

Session Chair: Jun Yuan (University of York, UK)

Invited Speakers: Grace Burke (University of Manchester, UK)

### EMAG: Electron Crystallography and Diffraction

Wednesday 3 July, 1400 – 1600, Charter 3

Session Chair: Andy Brown (University of Leeds, UK)

Invited Speakers: Richard Beanland (University of Warwick, UK)

### EMAG: Structural Materials and Metallurgy

Wednesday 3 July, 1400 – 1600, Charter 1

Session Chair: Larry Stoter

Invited Speakers: Randi Holmestad (NTNU, Norway) & Laurence Marks (Northwestern University, USA)

### EMAG: Phase Sensitive Techniques

Thursday 4 July, 0930 – 1130, Charter 3

Session Chair: Ana Sanchez (University of Warwick, UK) & Richard Beanland (University of Warwick, UK)

Invited Speakers: Rafal Dunin-Borkowski (Forschungszentrum Juelich GmbH, Germany)

### EMAG: Low Dimensional Materials (2D and 1D)

Thursday 4 July, 0930 – 1130, Charter 1

Session Chair: Sarah Haigh (The University of Manchester, UK)

Invited Speakers: Ute Kaiser (Ulm University, Germany)

### EMAG: Spectroscopy

Thursday 4 July, 1330 – 1530, Charter 3

Session Chair: Thomas Slater (Diamond Light Source Ltd. UK)

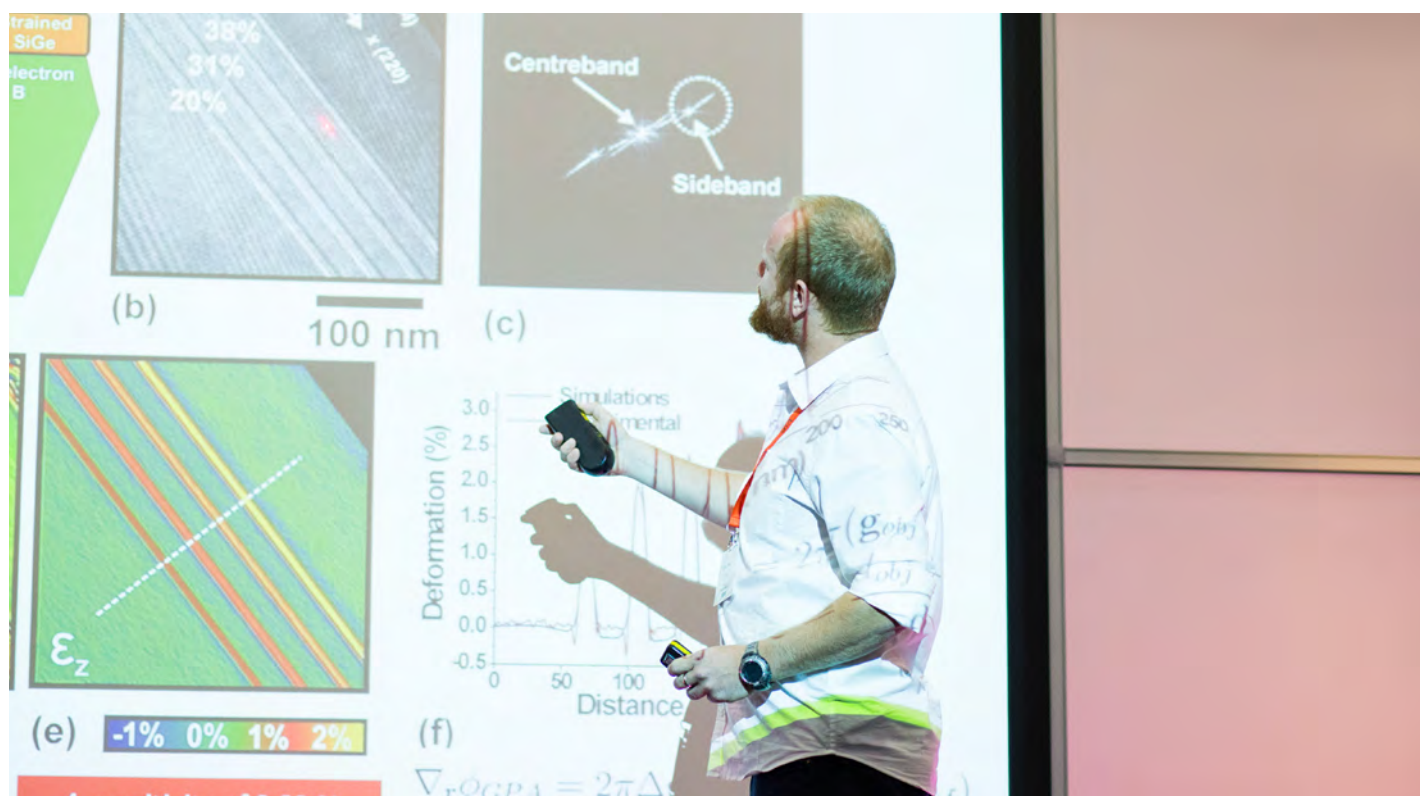
Invited Speakers: Raynald Gauvin (McGill University, Canada)

### EMAG: Electron Microscopy of Nanomaterials

Thursday 4 July, 1330 – 1530, Charter 1

Session Chair: Andy Brown (University of Leeds, UK)

Invited Speakers: Caterina Ducati (University of Cambridge, UK)



# Plenary Speakers

Confirmed Plenary Speakers at mmc2019:



**Professor Dr Wolfgang Baumeister, Max Planck Institute of Biochemistry**

*Cryo-Electron Tomography: The Promise and the Challenges of Doing*

*Structural Biology in situ*

*Monday 1 July, 1700 – 1745, Charter 1*

Wolfgang Baumeister studied biology, chemistry and physics at the Universities of Muenster and Bonn, Germany, and he obtained his Ph.D. from the University of Düsseldorf in 1973. From 1973-1980 he was Research Associate in the Department of Biophysics at the University of Duesseldorf. He held a Heisenberg Fellowship spending time at the Cavendish Laboratory in Cambridge, England. In 1982 he became a Group Leader at the Max-Planck-Institute of Biochemistry in Martinsried, Germany and in 1988 Director and Head of the Department of Structural Biology. He is also an Honorary Professor on the Physics Faculty at the Technical University in Munich. In 2000 he spent time at the California Institute of Technology as a Moore Distinguished Scholar.

Wolfgang Baumeister made seminal contributions to our understanding of the structure and function of the cellular machinery of protein degradation, in particular the proteasome. Moreover, he pioneered the development of cryo-electron tomography. His contributions to science were recognised by numerous awards including the Otto Warburg Medal, the Schleiden Medal, the John M. Cowley Medal, the Louis-Jeantet Prize for Medicine, the Stein and Moore Award, the Harvey Prize in Science and Technology and the Ernst Schering Prize. He is a member of several academies including the US National Academy of Sciences and the American Academy of Arts and Sciences.

Wolfgang is the recipient of an RMS Honorary Fellowship, this will be presented at mmc2019.



**Professor Jody Rosenblatt, King's College London**

*Epithelial Cell Extrusion and its Misregulation in Disease*

*Monday 1745 – 1830, Charter 1*

Jody Rosenblatt is

Professor of Cell Biology in the Faculty of Life Sciences & Medicine, School of Basic & Medical Biosciences and School of Cancer & Pharmaceutical Sciences who has recently moved her lab from the Huntsman Cancer Institute at the University of Utah. During her Ph.D. at the University of California, San Francisco with Dr. Timothy Mitchison, she studied actin filament turnover and as a post-doc at the MRC-LMCB at University College London, she discovered epithelial cell extrusion, a process that eliminates dying cells without forming any gaps. Her lab studies how epithelia maintain constant cell numbers through cell death and cell division and have found that mechanical forces control each process; when cells become too crowded, they extrude some cells that later die and when cells are too sparse stretch activates cells to rapidly divide. Surprisingly, both opposing processes require the same stretch-activated calcium channel, Piezo1, depending on the force encountered. Extrusion is critical for regulating epithelial cell number; as they find that aggressive metastatic cancers and asthma can result from defective extrusion signalling. Understanding the basic cell biology of cell death is now revealing new aetiologies for diseases that currently lack treatments. We believe that understanding the roots of a disease will better pave the way to finding its cure, rather than merely managing its symptoms.



**Professor Helen Saibil, Birkbeck, University of London**

*Malaria Parasites Breaking out of Red Blood Cells*

*Tuesday 2 July, 0845 – 0930, Charter 1*

Helen Saibil established the cryo electron microscopy lab at Birkbeck College, in the prehistoric era when electron micrographs were recorded on photographic film. Her research focuses on macromolecular

machines, both in vitro and in their cellular context. A major area of interest is the action of molecular chaperones in assisting protein folding, unfolding and disaggregation. In addition, her group studies membrane pore formation by bacterial toxins and immune system pore-forming proteins, and the actions of intracellular pathogens on host membranes. The main approach is three-dimensional reconstruction of protein complexes in solution or interacting with liposomes, or of cellular samples, by single particle analysis, electron tomography and correlative light and electron microscopy. She has also been involved in the establishment of the national facility for biological cryo electron microscopy at the Diamond synchrotron.



**Dr Sergei Kalinin, Oak Ridge National Laboratory**

*The Lab On A Beam: Learning Physics And Assembling Atomic Structures Via Deep Learning In Scanning*

*Transmission Electron Microscopy*

*Wednesday 3 July, 0845 – 0930, Charter 1*

Sergei Kalinin is the director of the Institute for Functional Imaging of Materials (IFIM) and distinguished staff member at the Center for Nanophase Materials Sciences at Oak Ridge National Laboratory. He received his MS degree from Moscow State University in 1998 and Ph.D. from the University of Pennsylvania (with Dawn Bonnell) in 2002.

His research presently focuses on the applications of big data and artificial intelligence methods in atomically resolved imaging by scanning transmission electron microscopy and scanning probes, as well as mesoscopic studies of electromechanical and transport phenomena via scanning probe microscopy.

Sergei has co-authored >600 publications, with a total citation of >25,000 and an h-index of >78. He is a fellow of MRS, APS, IoP, IEEE, Foresight Institute, and AVS; a recipient of the RMS medal for Scanning Probe Microscopy (2015); Blavatnik Award for Physical Sciences (2018), Presidential Early Career Award for Scientists and Engineers (PECASE) (2009); Burton medal of Microscopy Society of America (2010); 3 R&D100 Awards (2008, 2010, and 2016); and a number of other distinctions.





**Professor Keith Riles, University of Michigan**

*Entering the Era of Gravitational Wave Astronomy via Attometry*

*Thursday 4 July, 1545 – 1630, Charter 1*

Keith Riles is the

H. Richard Crane Professor of Physics at the University of Michigan and a founding member of the LIGO Scientific Collaboration. Originally a high energy experimentalist working at electron-positron colliders, Riles was drawn to the then-nascent field of gravitational waves in 1997 by the intriguing science and by the precision technology needed to carry out that science. He initially led the LIGO detector characterization group and more recently has led searches for continuous gravitational waves from galactic neutron stars. The LIGO discovery in September 2015 of gravitational waves from

the collision and merger of two massive black holes 1.3 billion years ago and the detection in August 2017 of colliding neutron stars have created a new scientific realm of gravitational wave astronomy, one which Riles looks forward to exploring for years to come.



**Professor Klaus Hahn, University of North Carolina - Chapel Hill**

*Molecules To Peek And Poke At Living Circuits*

*Thursday 4 July, 1640 – 1725, Charter 1*

Klaus Hahn obtained

his B.S in biochemistry from the University of Pennsylvania, a doctorate in Chemistry from the University of Virginia, and was a postdoctoral fellow at the Center for Fluorescence Research at Carnegie Mellon University. In his lab at Scripps Research Institute, and now at UNC-Chapel Hill

Medical School, he develops molecular approaches to visualize and control signaling in living cells. Using these tools, he and his colleagues ask how the rapid spatio-temporal dynamics of signaling control immune cell interactions, platelet production, and adhesion dynamics/structure. They strive to produce broadly applicable new approaches, including biosensors based on minimally perturbing designs, engineering allosteric networks in proteins to confer control by light or small molecules, and probing conformational changes of individual molecules in living cells. Klaus Hahn is the Thurman Distinguished Professor of Pharmacology at UNC and a fellow of the AAAS. He is a recipient of the NIH's James Shannon Director's Award and an NIH Transformative Grant. His lab's work on biosensors was named one of the "10 Breakthroughs of the Decade" by Nature Reviews Molecular Cell Biology.

Klaus is the recipient of the 2019 Pearse Prize, this will be presented at mmc2019.



# Programme Overview

Monday 1 July						
1330 - 1630	SPM Workshop, Cobden Rm 4	EMAG Workshop - Deep Learning, Cobden Rm 2	ImageJ Workshop, Cobden Rm 3	Biolumaging UK Meeting, Central 3, 4	Early Career Pre-Congress Symposium, Central 5, 6, 7 (*1400 - 1630)	
1655	Welcome to mmc2019 by Professor Rik Brydson and Professor Maddy Parsons					
1700	Plenary Speaker - Professor Dr Wolfgang Baumeister					
1745	Plenary Speaker - Professor Jody Rosenblatt					
1830	Welcome Drinks					
Tuesday 2 July						
	Charter 1	Charter 3	Charter 2	Charter 4	Central 5, 6, 7	Central 3, 4
0845	Plenary Speaker - Professor Helen Saibil					
1000 - 1200	EMAG: Electron Microscopy of Functional Materials Donald Maclaren	In Situ Electron Microscopy Applied to Soft Matter and Biological Systems Chris Parmenter	Frontiers in Biolumaging: Label-free Quantitative Optical Microscopy Paola Barri	Using Cryo-electron Microscopy to Investigate Macromolecular Structure Rebecca Thompson	SMG & MSI: Applications of Super-resolution From the Nano to the Atomic Scale Charlotte Buckley	SPM: Advancing Materials Science via Scanning Probes Oleg Kolosov
1200 - 1400	Exhibition and Lunch					
1400 - 1600	EMAG: Advanced Scanning Electron Microscopy Cornelia Rodenburg	In situ Electron Microscopy Applied to Soft Matter and Biological Systems Chris Parmenter	Frontiers in Biolumaging: Biological Applications of Fluorescence Microscopy Beyond the Diffraction Limit Dylan Owen	Correlative Microscopy Leandro Lemgruber	SMG & MSI: Trials and Tribulations of Electron and Light Beam Induced Radiation Effects Ursel Bangert	SPM of Soft and Biological Matter Jamie Hobbs
1600 - 1800	Exhibition, Posters and Drinks - Poster Session 1					
1600 - 1800	Quality Control Focussed Interest Group Meeting Alex Laude, Workshop 3					
1615						RMS SPM Section AGM
1730	RMS Life Sciences Section AGM, RMS LM Section AGM, RMS Flow Cytometry AGM, Workshop 1			RMS EM Section AGM, RMS EPS Section AGM, Workshop 2		
1930	SPM Dinner - Don Giovannis		Frontiers in Biolumaging Dinner - Midland Hotel		EMAG Dinner - Bem Brasil	
Wednesday 3 July						
	Charter 1	Charter 3	Charter 2	Charter 4	Central 5, 6, 7	Central 3, 4
0845	Plenary Speaker - Dr Sergei Kalinin					
1000 - 1200	EMAG: In Situ Microscopy Techniques Jun Yuan	EMAG: Electron Microscopy of Functional Oxides Ana Sanchez	Frontiers in Biolumaging: Developments in Super-resolution Microscopy Seamus Holden	Imaging in the Big Data era: Large Data Sets Rich in Information Tobias Starborg & Martin Jones	FIB Microscopy and Sample Preparation Xiang li Zhong	SPM: A tool for Pharmaceutical and Applied Biological/Biomedical Research Stephanie Allen
1200 - 1230	EMAG AGM					
1200 - 1400	Exhibition, Lunch and RMS Scientific Imaging Competition Awards					
1400 - 1600	EMAG: Structural Materials and Metallurgy Larry Stoter	EMAG: Electron Crystallography and Diffraction Andy Brown	Frontiers in Biolumaging: Light Sheet Microscopy: Imaging Complex Biological Samples in Time and Space Steve Thomas	Believing is More than Seeing: Learning and Models in Quantitative Imaging Jason Swedlow	Multimode Ion Beam Microscopy: Hybrid-techniques and Spectroscopy Trevor Almeida	SPM: Nanomechanics for Biology and Biomedicine Nuria Gavara
1600 - 1800	Exhibition, Posters and Drinks - Poster Session 2					
1600					RMS AGM, RMS Outreach & Education Committee AGM	
1800	Pre-Dinner Talk - Marty Jopson					
1900	Congress Dinner - Pre-Banquet Drinks and Congress Banquet at The Principal Manchester Hotel					
Thursday 4 July						
	Charter 1	Charter 3	Charter 2	Charter 4	Central 5, 6, 7	Central 3, 4
0930 - 1130	EMAG: Low dimensional Materials (2D and 1D) Sarah Haigh	EMAG: Phase Sensitive Techniques Ana Sanchez & Richard Beanland	Bio Applications: Imaging in Disease Claire Wells	UK Applied Image Analysis (NEUBIAS UK and IAFIG-RMS) Dominic Waithe	Quantitative Microscopy in Earth, Planetary and Archaeological Sciences Duncan Muir	Microscopy of Materials for Health Care Roland Kröger
1130 - 1330	Exhibition and Lunch					
1200 - 1315	Poster Session 3					
1330 - 1530	EMAG: Electron Microscopy of Nanomaterials Andy Brown	EMAG: Spectroscopy Thomas Slater	Imaging the Immune System Theresa Ward	Tissue Cytometry Derek Davies	X-ray Microscopy: Beyond Attenuation Contrast Tomography Michael Doube	
1500	Exhibition Closes					
1545	Plenary Speaker - Professor Keith Riles					
1630	Presentation of Poster Prizes					
1640	Plenary Speaker - Professor Klaus Hahn					
1725	Closing Drinks Reception, End of Congress					

Session Title	EMAG: Electron Microscopy of Functional Materials	In Situ Electron Microscopy Applied to Inorganic Materials	Frontiers in BioImaging: Label-free Quantitative Optical Microscopy
Session Chair(s)	<b>Donald MacLaren</b> University of Glasgow, UK	<b>Chris Parmenter</b> University of Nottingham, UK	<b>Paola Borri</b> Cardiff University, UK
Room	Charter 1	Charter 3	Charter 2
1000 - 1030	Invited: Development of a High Brightness Ultrafast Transmission Electron Microscope based on a Laser-driven Cold Field Emission Source <b>Arnaud Arbouet</b> CEMES-CNRS, France	Invited: Quantitative Observation of Interface Dynamics in Next Generation Batteries <b>B.Layla Mehdi</b> University of Liverpool, UK	Invited: Brillouin-Raman Micro-spectroscopy for Bioimaging of Cells and Tissues <b>Daniele Fioretto</b> University of Perugia, Italy
1030 - 1045	Advanced Transmission Electron Microscopy for the Characterisation of Au Nanoparticles after Ultrashort Laser Pulses Illumination <b>Thais Milagres de Oliveira</b> University of Antwerp, Belgium	Application of a Liquid TEM Cell to Study a 455S Bioactive Glass Dissolution <b>Elkin Lopez-Fontal</b> University of Cambridge, UK	Label-free Volumetric Quantitative Imaging of the Human Somatic Cell Division by Hyperspectral Coherent Anti-Stokes Raman Scattering <b>Wolfgang Langbein</b> Cardiff University, UK
1045 - 1100	Structure-function Relations in Perovskite-supported Ni Catalysts Revealed by Electron Microscopy <b>Aaron Naden</b> University of St Andrews, UK	Hot Stage Microscopy of Sn-Ag-Cu Solder, what we can Learn by Zooming out <b>Stuart Robertson</b> Loughborough University, UK	Progress in Vectorial Ptychography: Towards Quantitative Structural Imaging of Biominerals <b>Patrick Ferrand</b> Aix Marseille Universite, France
1100 - 1115	In Situ Studies for Understanding Intragranular Nanopore Evolution in Ni-rich Layered Oxide Cathode Material <b>Anuj Pokle</b> Philipps University Marburg, Germany	Flash: In Situ $\alpha$ -Iron Cuboidal Nanoparticles Formation and Interaction with O <sub>2</sub> Gas in an Open Cell Environmental TEM/STEM <b>Leonardo Lari</b> University of York, UK Flash: Observing Phase Transformations of the Phase Change Material Sb <sub>2</sub> Te <sub>3</sub> in Carbon Nanotube Bundles: Electron Diffraction, Imaging and Theory <b>Jeremy Sloan</b> University of Warwick, UK Flash: Real-Time Observation of Dynamics of Nanoscale Pattern Collapse <b>Tanmay Ghosh</b> National University of Singapore	Wide-field Label-free Imaging of Pathological Tissues using Optical Diffraction Tomography <b>Herve Hugonnet</b> KAIST, BMOL Korea, Republic of
1115 - 1130	Local Optical Properties Resolved in Organic and Metal-organic Materials by Electron Energy Loss Spectroscopy <b>Sean Collins</b> University of Cambridge, UK	Flash: Studying Cobalt-based Catalysts Promoted with Manganese using In Situ Gas Cell Scanning Transmission Electron Microscopy <b>Matt Lindley</b> The University of Manchester, UK Flash: Cryogenic and Static Liquid Cell Approaches to Enable Native State Electron Microscopy of Nanoparticle Dispersions <b>Elliot Hawkins-Farrow</b> University of Leeds, UK Flash: Feasibility Test of In Situ Gas Injection Observation in 300 KV Corrected TEM/STEM <b>Takeo Sasaki</b> JEOL (U.K.) LTD.	Flash: Enhanced Raman-Based Cancer Diagnosis using Hyperspectral Tissue Pre-Characterisation and Optimised Segmentation Techniques <b>Anneliese Jarman</b> King's College London, UK Flash: Measuring Sub-nanometre Thickness Changes in Supported Lipid Bilayers with Quantitative Differential Interference Microscopy <b>David Regan</b> Cardiff University, UK Flash: New Approach to Increase Information Content in Polarised Light Microscopy of Skeletal and Dental Tissues <b>Alan Boyde</b> Queen Mary University of London, UK
1130 - 1145	Atomic-scale Mapping of Plasmon Modes in Nanopatterned Ultraviolet Plasmonic Nanocavities <b>Kenan Elibol</b> Trinity College Dublin, Ireland	Invited: Spatio-temporal Dynamics of Oscillatory Heterogeneous Reactions Studied by Multi-scale In Situ Electron Microscopy <b>Marc Willinger</b> ETH Zürich, Switzerland	Invited: Dynamics of Cellular Systems Studied by Quantitative Phase Imaging (QPI) <b>Gabriel Popescu</b> University of Illinois, USA
1145 - 1200	Flash: Influence of GaAsSb Capping Layers on the Vertical-alignment in Closely Stacked InAs/GaAs Multi Quantum Dots <b>Nazaret Ruiz Marin</b> Universidad de Cádiz, Spain Flash: Mapping Plasmon Excitations in Near Field Transducers using Electron Energy Loss Spectroscopy <b>Liam Wright</b> University of Glasgow, UK Flash: Secondary Electron Hyper Spectral Surface Imaging for Beam Sensitive Biomaterial Characterisation <b>Nicholas Farr</b> University of Sheffield, UK		



Using Cryo-electron Microscopy to Investigate Macromolecular Structure	SMG & MSI: Applications of Super-resolution from the Nano to the Atomic Scale	SPM: Advancing Materials Science via Scanning Probes
<b>Rebecca Thompson</b> University of Leeds, UK	<b>Charlotte Buckley</b> University of Strathclyde, UK	<b>Oleg Kolosov</b> Lancaster University, UK
<b>Charter 4</b>	<b>Central 5, 6, 7</b>	<b>Central 3, 4</b>
Invited: <i>Mechanistic Insights from High-resolution CryoEM Structures of ATP Synthases</i> <b>Werner Kühlbrandt</b> Max Planck Institute of Biophysics, Germany	Invited: <i>Faster and Gentler Optical Nanoscopy for Brain Cell Imaging</i> <b>Ilaria Testa</b> KTH Royal Institute of Technology, Sweden	Invited: <i>Accessing and Controlling the Interaction of Individual Magnetic Atoms and Molecules with Surfaces</i> <b>Cyrus Hirjibehedin</b> MIT Lincoln Laboratory, USA
<i>Measuring the Energy Dependence of Contrast and Damage for Cryo-EM</i> <b>Mathew Peet</b> MRC Laboratory of Molecular Biology, UK	<i>Super-resolution Microscopy and Adaptive Optics for Deep Tissue Microscopy using Nanodiamonds</i> <b>Graeme Johnstone</b> University of Strathclyde, UK	Invited: <i>Scanning Probe Microscopy: Probing Materials beyond the Surface</i> <b>Franco Dinelli</b> CNR - INO, Italy
<i>Calicivirus VP2 Forms a Portal-like assembly following Receptor Engagement</i> <b>Michaela Conley</b> MRC - University of Glasgow Centre for Virus Research, UK	<i>SandSTORM Enables Accelerated and Unlimited Super-resolution Imaging in Quasi-physiological Buffers</i> <b>Kaarjel Narayanasamy</b> University of Leeds, UK	
<i>Revealing a Hidden Antigen: Cryo-EM of a Novel Architecture Protease Complex Conserved across Roundworm Parasites</i> <b>Charlotte Scarff</b> University of Leeds, UK	<i>Super-resolution Microscopy of Platinum Deposits in Volcanic Stone</i> <b>Sébastien Vilain</b> LIG Nanowise, UK	Flash: <i>Recognising Multiple Scanning Probe Tip States in Real Time with Convolutional Neural Network Ensembles</i> <b>Oliver Gordon</b> University of Nottingham, UK Flash: <i>Probing Dielectric Constant on the Nanoscale using Scanning Dielectric Microscopy: from Thin Films to Two-dimensionally Confined Water</i> <b>Laura Fumagalli</b> The University of Manchester, UK Flash: <i>Multiphysics 3D Study of Compound Semiconductor Nanostructures via Scanning Probes</i> <b>Marta Mucientes</b> Lancaster University, UK
Flash: <i>Single Particle Analysis Workflow Productivity Enhancements</i> <b>Fanis Grollios</b> Thermo Fisher Scientific, Netherlands Flash: <i>3D Structure And Functionality Of Coccolith Baseplates Revealed By Cryo-Electron Tomography And Super-Resolution Microscopy</i> <b>Fabio Nudelman</b> University of Edinburgh, UK Flash: <i>The Electron Bio-Imaging Centre (eBIC) at Diamond Light Source</i> <b>Alistair Siebert</b> eBIC at Diamond Light Source, UK	<i>Contact Mode High Speed-atomic Force Microscopy in a Microalgae-virus System</i> <b>Christopher Evans</b> Plymouth Marine Laboratory / University of Bristol, UK	Flash: <i>Latest Advances in Nanoscale IR Spectroscopy and Imaging</i> <b>Miriam Unger</b> Bruker Nano Surfaces, Germany Flash: <i>Revealing the Complexity of Stacking Order in Graphite Films</i> <b>Yaping Yang</b> The University of Manchester, UK Flash: <i>Mapping Nanoscale Flow Charts at Solid-liquid Interfaces</i> <b>Kislon Voitchovsky</b> Durham University, UK
Invited: <i>High-resolution Structure Determination of Dynamic Macromolecular Complexes by Cryo-EM</i> <b>Holger Stark</b> Max Planck Institute for Biophysical Chemistry, Germany	Invited: <i>Using Atomic Force Microscopy to Measure the Nanomechanical Properties of Clathrin</i> <b>Michael Lherbette</b> Heriot Watt University, UK	Invited: <i>Local Functional Studies of 2D Materials and Heterostructures</i> <b>Olga Kazakova</b> National Physical Laboratory, UK

Tuesday 2 July, Morning

Session Title	EMAG:Advanced Scanning Electron Microscopy	In Situ Electron Microscopy Applied to Soft Matter and Biological Systems	Frontiers in BioImaging: Biological Applications of Fluorescence Microscopy Beyond the Diffraction Limit
Session Chair(s)	<b>Cornelia Rodenburg</b> University of Sheffield, UK	<b>Chris Parmenter</b> University of Nottingham, UK	<b>Dylan Owen</b> King's College London, UK
Room	<b>Charter 1</b>	<b>Charter 3</b>	<b>Charter 2</b>
1400 - 1430	Invited: <i>Nanooptics in the Electron Microscope</i> <b>Mathieu Kociak</b> CNRS, France	Invited: <i>Translating Insights from Liquid Phase Electron Microscopy into Theory and Design</i> <b>Joe Patterson</b> University of California, Irvine, USA	Invited: <i>Exploring Cell Biology on a Molecular Level: Live-cell and Quantitative Localisation Microscopy</i> <b>Ulrike Endesfelder</b> MPI Marburg, Germany
1430 - 1445	<i>Next-generation Secondary Electron Detector with Energy Analysis Capability for Scanning Electron Microscopes</i> <b>Ashish Suri</b> University of York, UK	<i>A New Class of Molecular Probes for In Situ Cellular Imaging</i> <b>Cesare De Pace</b> University College London, UK	<i>Single-molecule Millisecond Super-resolution Light Microscopy to Pinpoint, Count and Track: Revealing the Secrets of How Barriers to DNA Replication are Resolved in Living Cells, one Molecule at a Time</i> <b>Mark Leake</b> University of York, UK
1445 - 1500	<i>Transmission Imaging of Thin Samples with a Dedicated Multi-Beam SEM</i> <b>Wilco Zuidema</b> Delft University of Technology, Netherlands	<i>A Mechanistic Insight into Bone: Micro-to Nano-scale Characterisation</i> <b>Nouf Aldegaither</b> Imperial College London, UK	<i>Imaging Dynamic Processes beyond the Diffraction Limit: a Centriole Test Case</i> <b>Alan Wainman</b> University of Oxford, UK
1500 - 1515	<i>Electron Tomography in the SEM via Scanning-transmission Imaging and Conical Tilting</i> <b>Matteo Ferroni</b> University of Brescia-DII & CNR-IMM, Italy	<i>The Environmental Liquid Cell Technique for Imaging Biological Structures</i> <b>Sana Azim</b> Max Planck Institute for the Structure and Dynamics of Matter, Germany	<i>Applying Expansion Microscopy (ExM) to Visualise Spatial Organisation of Repair Proteins and Chromatin During Repair of Double Strand Breaks (DSBs)</i> <b>Emma Faulkner</b> University of Birmingham, UK
1515 - 1530	Invited: <i>Electron Backscatter Diffraction - Exploring the Structural Properties of Materials in the Scanning Electron Microscope</i> <b>Carol Trager-Cowan</b> University of Strathclyde, UK	<i>Brownian Tomography in Liquid of Soft Polymer Assemblies and Biological Materials</i> <b>Lorena Ruiz-Perez</b> University College London, UK	<i>Improving DNA-PAINT for the Visualisation of Nuclear Structures</i> <b>Hylkje Geertsema</b> FU Berlin, Germany
1530 - 1545		Invited: <i>Revealing Molecular Adversaries of Human Health using In Situ Imaging Technology</i> <b>Deb Kelly</b> Pennsylvania State University, USA	Invited: <i>Using Super-resolution Microscopy to Watch Immune Cells Kill</i> <b>Daniel Davis</b> The University of Manchester, UK
1545 - 1600			
	Flash: <i>Automated Three Dimensional Broad Ion Beam Milling Acquisition and Analysis</i> <b>Ali Gholinia</b> The University of Manchester, UK Flash: <i>(R)evolution of EBSD Pattern Detection</i> <b>Rene de Kloet</b> EDAX, Netherlands Flash: <i>Recent Developments in the Analysis of Microstructures by 3D-EBSD</i> <b>Peter Konijnenberg</b> Max-Planck-Institute for Iron Research / Bruker Nano GmbH, Germany		

Correlative Microscopy	SMG & MSI: Trials and Tribulations of Electron and Light Beam Induced Radiation Effects	SPM of Soft and Biological Matter
<b>Leandro Lemgruber</b> University of Glasgow, UK	<b>Ursel Bangert</b> University of Limerick, Ireland	<b>Jamie Hobbs</b> University of Sheffield, UK
<b>Charter 4</b>	<b>Central 5, 6, 7</b>	<b>Central 3, 4</b>
<p>Invited: <i>A Correlative Microscopy Toolbox to Study Native Membrane Architectures</i>  <b>Wanda Kukulski</b> MRC Laboratory of Molecular Biology, UK</p>	<p>Invited: <i>Imaging and Spectroscopy of Radiation-induced Physical and Chemical Processes in the Electron Microscope: from the Study of Molecular Excited States to the In Situ Degradation/growth of Nanostructures</i>  <b>Patricia Abellan</b> SuperSTEM, UK</p>	<p>Invited: <i>Molecular To Cellular Mechanics Using High-speed Atomic Force Microscopy</i>  <b>Felix Rico</b> Aix-Marseille University, France</p>
<p><i>Correlating the Overlays: Overlaying LM and EM Data for 3D-CLEM</i>  <b>Anna Kremer</b> VIB, Belgium</p>	<p><i>Controlling Dose/Rate using Compressive Sensing Methods in Scanning Transmission Electron Microscopy</i>  <b>Daniel Nicholls</b> University of Liverpool, UK</p>	<p><i>Direct Observations of the Transpeptidation Activity of Sortase in a DNA Nanostructure</i>  <b>Andrew Lee</b> University of Leeds, UK</p>
<p><i>Putting Molecules in Context with Correlated Fluorescence and Soft X-ray Tomography</i>  <b>Carolyn Larabell</b> University of California, San Francisco, USA</p>	<p><i>Exploiting Electron-beam Induced Damage to obtain Fluorescence Super-resolution</i>  <b>Aditi Srinivasa Raja</b> Delft University of Technology, Netherlands</p>	<p><i>Understanding the Sequence of Events Leading to MAC Induced Killing of Gram-negative Bacteria</i>  <b>Georgina Benn</b> University College London, UK</p>
<p><i>Correlative AFM and STORM/PALM: Imaging the Structure and Mechanics of Cell Adhesions</i>  <b>Liisa Hirvonen</b> King's College London, UK</p>	<p><i>Exploiting the Electron Beam Effects: a Study of Radiation and Electric Field Applications</i>  <b>Michele Conroy</b> University of Limerick, Ireland</p>	<p><i>Molecular Resolution Effect of Antibiotics on Gram Positive Bacteria Cell Wall using AFM</i>  <b>Laia Pasquina Lemonche</b> University of Sheffield, UK</p>
<p><i>Correlative Microscopy - The New System RISE Combined with EDXS Applied on Complex Materials</i>  <b>Ruth Schmidt</b> Technical University Graz, Austria</p>	<p><i>Visualising Electron-molecule Interactions using In Situ Fluorescence in Few-eV SEM</i>  <b>Yoram Vos</b> Delft University of Technology, Netherlands</p>	<p><i>Studying Phase Separation in Lipid Bilayers Mixture and Detection of Femtomolar Graphene Solution in Bilayers using Tip Enhanced Raman Spectroscopy TERS</i>  <b>Pierre Burgos</b> Horiba UK</p>
<p>Invited: <i>Towards a Mechanistic Understanding of cellular Processes by Cryo-EM</i>  <b>Gaia Pigino</b> Max Planck Institute CBG, Germany</p>	<p>Invited: <i>Mitigating Electron Dose for 3D and In Situ Imaging</i>  <b>Ilke Arslan</b> Argonne National Laboratory, USA</p>	<p>Invited: <i>Untangling DNA, one Molecule at a Time</i>  <b>Alice L B Pyne</b> University College London, UK</p>

Tuesday 2 July, Afternoon



Session Title	EMAG: <i>In Situ</i> Microscopy Techniques	EMAG: Electron Microscopy of Functional Oxides	Frontiers in BioImaging: Developments in Super-resolution Microscopy
Session Chair(s)	<b>Jun Yuan</b> University of York, UK	<b>Ana Sanchez</b> University of Warwick, UK	<b>Seamus Holden</b> Newcastle University, UK
Room	Charter 1	Charter 3	Charter 2
1000 - 1030	Invited: <i>Challenges and Opportunities in Corrosion Research: In Situ Analytical TEM of Metals</i> <b>M. Grace Burke</b> The University of Manchester, UK	Invited: <i>Local Structure and Disorder in Relaxor Ferroelectrics</i> <b>Elizabeth Dickey</b> North Carolina State University, USA	Invited: <i>Structure and Dynamics, Crossing Scales with Super-resolution Microscopy</i> <b>Suliana Manley</b> Ecole Polytechnique Federale de Lausanne (EPFL), Switzerland
1030 - 1045	<i>Focused Electron-beam Induced Deposition, In Situ TEM and Off-axis Electron Holography Investigation of Bi-magnetic Core-shell Nanostructures</i> <b>Trevor Almeida</b> University of Glasgow, UK	<i>The use of Scanning Precession Electron Diffraction for Characterisation of Bismuth Ferrite-Barium Titanate Ceramics</i> <b>Shane McCartan</b> University of Glasgow, UK	<i>Artefact free High Density Localisation Microscopy Analysis</i> <b>Richard Marsh</b> King's College London, UK
1045 - 1100	<i>Investigating Ferroelectric Charged Domain Wall Dynamics of <math>\text{Cu}_3\text{B}_2\text{O}_{13}\text{Cl}</math> at the Atomic Scale</i> <b>Michele Conroy</b> University of Limerick, Ireland	<i>Analytical Electron Microscopy Characterisation of a Temperature-Stable Relaxor Ferroelectric Ceramic</i> <b>Teresa Roncal-Herrero</b> University of Leeds, UK	<i>Pushing the Boundaries of 3D-Structured Illumination Microscopy (3D-SIM)</i> <b>Ian Dobbie</b> University of Oxford, UK
1100 - 1115	<i>In Situ SEM Observation of Abnormal Grain Growth in the Austenitic Region of Carbon Steel</i> <b>Rhiannon Heard</b> University of Oxford, UK	<i>Fourier Masked Imaging to Reveal Charged Domain Wall Junctions in Lead Titanate</i> <b>Kalani Moore</b> University of Limerick, Ireland	<i>NanoJ: High-performance Open-source Super-resolution Microscopy Analysis in ImageJ</i> <b>Romain Laine</b> MRC Laboratory for Molecular Cell Biology, University College London, UK
1115 - 1130	<i>Correlative Nanoanalytical Electron Microscopy of Spontaneously Nanostructured Thermoelectric Half-Heusler Alloys</i> <b>Robert Webster</b> University of Glasgow, UK	<i>Reliable Atomic-Resolution Observations of the Nanoscopic Properties of Hybrid Perovskite Thin Films</i> <b>Mathias Rothmann</b> University of Oxford, UK	<i>SIMFLUX: Localisation Microscopy at Doubled Precision using Patterned Illumination</i> <b>Sjoerd Stallinga</b> Delft University of Technology, Netherlands
1130 - 1145	<i>Liquid Cell Electron Microscopy (LCEM) of Organic Crystal Nucleation, Growth and Dynamics</i> <b>Jennifer Cookman</b> University of Limerick, Ireland	<i>Visualising the Lithiation Mechanisms of <math>\text{LiCoPO}_4</math></i> <b>Laura Wheatcroft</b> University of Sheffield, UK	Invited: <i>Three-Dimensional Super-resolution Imaging of Membrane Receptors</i> <b>Sebastian van de Linde</b> University of Strathclyde, UK
1145 - 1200	Flash: <i>Quantitative STEM-EDS for Liquid-phase Transmission Electron Microscopy</i> <b>Daniel Kelly</b> The University of Manchester, UK Flash: <i>Imaging and Characterisation of Nanoparticle Coatings and Dispersion</i> <b>Martha Ilett</b> University of Leeds, UK Flash: <i>Activation of Co Fischer-Tropsch Catalyst: Exploring Co Valence State under Different Reduction Conditions using STEM-EELS</i> <b>Ofentse Makgae</b> University of Oxford, UK	Flash: <i>Switching Mechanism in HfO<sub>2</sub>-based Oxide Resistive Memories using HAADF and EELS-STEM</i> <b>Sylvie Schamm-Chardon</b> CEMES-CNRS, France Flash: <i>Resolving Oxygen Columns in ADF-STEM Images of Pyrochlore and Perovskite Oxides</i> <b>Ali Mostaed</b> University of Sheffield, UK Flash: <i>Irradiation Effects on the Oxidation First Stages of a 316L Austenitic Stainless Steel in Simulated Primary Environment</i> <b>Lydia Laffont</b> CIRIMAT/ENSIACET, France	

Imaging in the Big Data era: Large Data Sets Rich in Information	FIB Microscopy and Sample Preparation	SPM: A tool for Pharmaceutical and Applied Biological/Biomedical Research
<b>Tobias Starborg</b> The University of Manchester, UK & <b>Martin Jones</b> The Francis Crick Institute, UK	<b>Xiang li Zhong</b> The University of Manchester, UK	<b>Stephanie Allen</b> University of Nottingham, UK
<b>Charter 4</b>	<b>Central 5, 6, 7</b>	<b>Central 3, 4</b>
Invited: Large Volume Serial Sectioning: Adding Multiple Layers of Analytical Information in 3D <b>Tim Burnett</b> The University of Manchester, UK	Invited: Odd Artifacts Induced by Ga and Xe Ion Exposures <b>Joseph Michael</b> Sandia National Laboratories, USA	Invited: Nanomechanical and Surface Properties of Cells Post Exposure to Wear Particles <b>Polina Prokopovich</b> Cardiff University, UK
Invited: SBFSEM and Array Tomography: Tips and Tricks for Optimising Specimen Preparation and Data Collection <b>Louise Hughes</b> Oxford Instruments Nanoanalysis, UK	Avoiding Amorphisation Related Shape Changes of Nano-structures During Medium Fluence Ion Beam Irradiation of Semiconductor Materials <b>Gregor Hlawacek</b> Helmholtz Zentrum Dresden Rossendorf, Germany	The Interfacial Interactions Between Faceted Crystals: an In-silico and Atomic Force Microscopy Study <b>Alexandru Moldovan</b> University of Leeds, UK
	Optimised Protocol for the Three-dimensional Visualisation and Reconstruction of Intercellular Junctions in Cardiac Muscle using SBF-SEM and FIB-SEM <b>Bieke Vanslembrouck</b> University Ghent, Belgium	Targeting Twist: Single Molecule Insights into Supercoiled DNA-Topoisomerase Interactions <b>Kavit Main</b> University College London, UK
Invited: Leveraging Machine Learning to do More with Less <b>Minh Doan</b> Broad Institute of MIT and Harvard, USA	Multimodal 3D Imaging of Butterfly Defects in Bearing Steels <b>Matthew Curd</b> The University of Manchester, UK	Single Molecular Imaging of DNA-Protein Interactions Between Flap Endonuclease Domain of DNA Polymerase I and Flap DNA using Atomic Force Microscopy <b>Vinny Verma</b> University of Sheffield, UK
	Flash: Sample Preparation, Transfer and Coregistration: From Micro CT to TEM <b>Bartlomiej Winiarski</b> Thermo Fisher Scientific / The University of Manchester, Czech Republic / UK Flash: The Development of Cryo-FIB Lift-out for Soft Matter and Biological Imaging - Making the Practically Impossible 'Less Difficult' <b>Chris Parmenter</b> University of Nottingham, UK Low Damage Ultra-thin Lamella Preparation of Metals and Nanostructured Materials with a Novel Ga+/Ar+/e- TripleBeam™ Technique <b>Michael Dixon</b> Hitachi High-Technologies Europe, UK	A Broad Frequency Chirp-based Nanoindentation Technique for Viscoelastic Measurements in Tissue Engineering <b>Alba Piacenti</b> University of Oxford, UK
Invited: Large-scale Image Segmentation with Machine Learning <b>Anna Kreshuk</b> EMBL, Germany	Invited: Sample Preparation, Ion-Sample Interactions and Image Processing Considerations in Plasma Focused Ion Beam - Scanning Electron Microscopy Workflows <b>Nabil Bassim</b> McMaster University, Canada	Invited: Metrology in Pharmaceutical Formulation and Manufacturing <b>Dimitrios Lamprou</b> Queen's University Belfast, UK

Wednesday 3 July, Morning

Session Title	EMAG: Structural Materials and Metallurgy	EMAG: Electron Crystallography and Diffraction	Frontiers in BioImaging: Light Sheet Microscopy: Imaging Complex Biological Samples in Time and Space
Session Chair(s)	<b>Larry Stoter</b>	<b>Andy Brown</b> University of Leeds, UK	<b>Steve Thomas</b> University of Birmingham, UK
Room	<b>Charter 1</b>	<b>Charter 3</b>	<b>Charter 2</b>
1400 - 1430	Invited: <i>Precipitates in Aluminium Alloys - Studied by Advanced (S)TEM Techniques</i> <b>Randi Holmestad</b> Norwegian University of Science and Technology, Norway	Invited: <i>Measuring Crystals with Digital Electron Diffraction</i> <b>Richard Beanland</b> University of Warwick, UK	Invited: <i>Lessons from the Glassy Bone: Spatial Regulation of Thrombopoiesis in the Bone Marrow</i> <b>Katrin Heinze</b> Rudolf Virchow Center, Germany
1430 - 1445	<i>Scanning Electron Diffraction as a Versatile Tool for Studying the Microstructure of Al Alloys</i> <b>Jonas Sunde</b> Norwegian University of Science and Technology, Norway	<i>Mapping Deformation in Nanoindented C-BN with Scanning Precession Electron Diffraction</i> <b>Phillip Crout</b> University of Cambridge, UK	<i>Single- and Multi-photon Shaped Illumination for Light-sheet Fluorescence Microscopy</i> <b>Jonathan Nytk</b> University of St Andrews, UK
1445 - 1500	<i>Multi-lengthscale Analysis of TiNiSn Half-Heusler Thermoelectrics: Assessing Structure, Function and Chemistry using Electron Microscopies and Spectroscopies and Atom Probe Tomography</i> <b>Donald MacLaren</b> University of Glasgow, UK	<i>Mechanical Driven Grain Boundary Formation in Bent Penta-twinned Ag NWs and their Structure Analyse</i> <b>Hu Zhao</b> The University of Manchester, UK	<i>Lorentzian Light Sheets: Longer, Thinner, more Efficient Illumination Profiles for Macroscopic Samples</i> <b>James Manton</b> MRC Laboratory of Molecular Biology, UK
1500 - 1515	<i>TEM Image Simulations of Overlapping Phases - a Case Study of Sheared <math>\beta''</math> Precipitates in Al-Mg-Si Alloys</i> <b>Emil Christiansen</b> Norwegian University of Science and Technology, Norway	<i>Electron Ptychography using Fast Binary 4D STEM Data</i> <b>Colum O'Leary</b> University of Oxford, UK	<i>Facile Single-molecule Light-sheet Microscopy using an AFM Cantilever: Observing G-quadruplex Formation in Living Cells</i> <b>Aleks Ponjavic</b> University of Cambridge, UK
1515 - 1530	Flash: <i>Identification of Internal Oxidation in a 20% Cold-worked 316SS at 340°C Through Advanced Characterisation</i> <b>Zhao Shen</b> University of Oxford, UK Flash: <i>Examination of Damage Mechanisms of Wc/Co Hardmetals by EBSD and ECCI</i> <b>Mark Gee</b> National Physical Laboratory, UK Flash: <i>High Resolution Imaging of Neutron Radiation Induced Nano Features in Zr-Nb Alloys</i> <b>Guanze He</b> University of Oxford, UK	<i>Low Dose Scanning Transmission Electron Microscopy of Organic Crystals by Scanning Moiré Fringes</i> <b>Mark S'ari</b> University of Leeds, UK	<i>A Curvature-enhanced Random Walker Segmentation Method for Detailed Capture of 3D Cell Surface Membrane Features</i> <b>Josiah Lutton</b> University of Warwick, UK
1530 - 1545	Invited: <i>Nonequilibrium Solute Capture in Oxidation and Corrosion</i> <b>Laurence Marks</b> Northwestern University, USA	<i>Utilising High Spatial Resolution in TEM to Determine the Structure of Bismuth Manganite</i> <b>Ercin Duran</b> The University of Manchester, UK	Invited: <i>Advanced Multiphoton Microscopy and Image Analysis to Investigate Fast Biological Processes in Living Embryos</i> <b>Willy Supatto</b> Ecole polytechnique - CNRS - INSERM, France
1545 - 1600		Flash: <i>Direct Electron Detection in Scanning Precession Electron Diffraction</i> <b>Ian MacLaren</b> University of Glasgow, UK Flash: <i>Quantitative High Dynamic Range Electron Diffraction of Polar Nanodomains in <math>Pb_{0.5}ScTaO_6</math></i> <b>Jonathan Peters</b> University of Warwick, UK Flash: <i>Microstructure of Magnetic Junctions in Fe-based Nanowires Encapsulated by Carbon Nanotube Radial Structures</i> <b>Muhammad Ibrar</b> Islamia College Peshawar, Pakistan	



Believing is More than Seeing: Learning and Models in Quantitative Imaging	Multimode Ion Beam Microscopy: Hybrid-techniques and Spectroscopy	SPM: Nanomechanics for Biology and Biomedicine
<b>Jason Swedlow</b> University of Dundee, UK	<b>Trevor Almeida</b> University of Glasgow, UK	<b>Nuria Gavara</b> Queen Mary University of London, UK
<b>Charter 4</b>	<b>Central 5, 6, 7</b>	<b>Central 3, 4</b>
<p>Invited: Content-Aware Image Restoration for Light and Electron Microscopy Facilitates Quantitative Data Analysis <b>Florian Jug</b> Centre for Systems Biology Dresden, Germany</p>	<p>Invited: 3D Printing at the Nanoscale in an Electron Microscope <b>Amalio Fernandez-Pacheco</b> University of Glasgow, UK</p>	<p>Invited: Atomic Force Microscopy for Measuring the Local Mechanical Properties of Complex and Soft Tissue <b>Jamie Hobbs</b> University of Sheffield, UK</p>
<p>3DScript: Animating 3D/4D Microscopy Data using a Natural Language Based Syntax <b>Ralf Palmisano</b> Optical Imaging Centre Erlangen (OICE), Germany</p>	<p>An Investigation of the Effect of XeF<sub>4</sub> Assisted Ion Beam Imaging on the Surface of High Alloy Steels and Ni Alloy <b>Sabrina Yan</b> University of Warwick, UK</p>	<p>The Role of Humidity and Crosslinking on Collagen Piezoelectricity <b>Brian Rodriguez</b> University College Dublin, Ireland</p>
<p>Generative Adversarial Networks for Augmenting Training Data of Microscopic Cell Images <b>Till Bretschneider</b> University of Warwick, UK</p>	<p>Latest Developments in Multiple Ion Species Plasma FIB Technology <b>Mikhail Dutka</b> Thermo Fisher Scientific, Netherlands</p>	<p>Strain-induced Stiffening and Charging of Collagen Fibrils on the Nanoscale <b>Emilie Gachon</b> King's College London, UK</p>
<p>Label-free Characterisation of Neutrophils using Optical Diffraction Tomography and Machine Learning <b>Young Seo Kim</b> Korea Advanced Institute of Science and Technology (KAIST), Korea, Republic of</p>	<p>Rapid Fabrication of Sub-5nm Nanopores in MoS<sub>2</sub> Membrane over a Large Area using a Helium Ion Microscope <b>Yunsheng Deng</b> Southern University of Science and Technology, China, Peoples Republic</p>	<p>AM-FM AFM Nanomechanical Mapping of the Effects of Ion Concentration, Growth Factors and Collagen V Knockdown on the Extracellular Matrix Secreted by Fibroblasts In Vitro <b>Casey Adam</b> University of Oxford, UK</p>
<p>Predictive Drug Release Modeling From Micro-Structural Imaging Of Long-Acting Pharmaceutical Devices <b>Daniel Skomski</b> Merck &amp; Co. Inc. USA</p>	<p>3D Characterisation of Non-conductive Polymeric Coating using Multi-modal Plasma FIB-SEM <b>Xun Zhang</b> University of Oxford, UK</p>	<p>Method of Direct Stiffness Measurement for AFM Cantilevers <b>Lukas Avilovas</b> University of Glasgow, UK</p>
<p>Invited: Continuous Models for Bioimage Analysis <b>Virginie Uhlmann</b> EMBL-EBI, UK</p>	<p>Invited: Focused Ion Beams in Biology: How the Helium Ion Microscope and FIB/SEMs help Reveal Nature's Tiniest Structures <b>Annalena Wolff</b> CARF/IFE/QUT, Australia</p>	<p>Invited: The Mechanical Stability of Proteins Regulates their Translocation Rate into the Cell Nucleus <b>Sergi Garcia-Manyes</b> King's College London, UK</p>

Wednesday 3 July, Afternoon

Session Title	EMAG: Low Dimensional Materials (2D and 1D)	EMAG: Phase Sensitive Techniques	Bio Applications: Imaging in Disease
Session Chair(s)	<b>Sarah Haigh</b> The University of Manchester; UK	<b>Ana Sanchez</b> University of Warwick, UK & <b>Richard Beanland</b> University of Warwick, UK	<b>Claire Wells</b> King's College London, UK
Room	Charter 1	Charter 3	Charter 2
0930 - 1000	Invited: <i>Functionalising Low-dimensional Materials by Low-Voltage High-Resolution Transmission Electron Microscopy</i> <b>Ute Kaiser</b> Ulm University, Germany	Invited: <i>Model-based Characterisation of Magnetic Moments and Charge Densities in the Transmission Electron Microscope</i> <b>Rafal Dunin-Borkowski</b> Forschungszentrum Juelich GmbH, Germany	Invited: <i>Investigating Tumor Cell Dissemination and Metastasis with Single Cell Resolution Intravital Imaging</i> <b>David Entenberg</b> Einstein College of Medicine, USA
1000 - 1015	<i>Different Folding Structures from Graphene to Graphite</i> <b>Aidan Rooney</b> Université Grenoble Alpes, France	<i>Electron Ptychography with an Ultrafast Detector</i> <b>Peng Wang</b> Nanjing University, China, Peoples Republic	<i>Applying SEM-based Volume and Microanalysis Techniques to the Study of Congenital Dyserythropoietic Anaemia Type-I (CDA-I)</i> <b>Errin Johnson</b> University of Oxford, UK
1015 - 1030	<i>Atomic Ordering in Two-dimensional Transition Metal Dichalcogenide Alloys</i> <b>Xue Xia</b> University of Warwick, UK	<i>Phase Reconstruction of Structured Electron Beams by Ptychograph</i> <b>Zhiyuan Ding</b> Nanjing University, China, Peoples Republic	<i>The OpenFlexure Microscope: a Motorised, Automated 3D Printed Microscope for Research and Healthcare Laboratories</i> <b>Richard Bowman</b> University of Bath, UK
1030 - 1045	<i>Modelling the Lattice of Ion-Implanted Impurities in Two-dimensional Materials via Atomic Resolution Electron Microscopy</i> <b>Eoghan O'Connell</b> University of Limerick, Ireland	<i>A Semi-quantitative Predictive Model for SnO<sub>2</sub> Adatom Diffusion and its Application to Exit Wave Reconstruction</i> <b>Arthur Moya</b> University of Oxford, UK	<i>Quantitative Morphometry of Murine Colons with Progressive Stages of Colorectal Cancer using Synchrotron-based X-ray Phase Contrast Computed Tomography and Colonic Cycloramas</i> <b>Charalambos Rossides</b> University of Southampton, UK
1045 - 1100	<i>AR-TEM and STEM Studies of Encapsulated PCMs in Narrow to Medium Diameter SWCNTs</i> <b>Charlotte Slade</b> University of Warwick, UK	<i>A Lorentz TEM Study of Hybrid Domain Walls in Skyrmionic Materials</i> <b>Stephen McVitie</b> University of Glasgow, UK	<i>Imaging the Effects of Immunosuppressant Modulators of Endothelial Function</i> <b>Charlotte Buckley</b> University of Strathclyde, UK
1100 - 1115	<i>Characterisation of Plasmons in 2D TMDCs: Moving Towards Custom Plasmon Tailoring</i> <b>Eoin Moynihan</b> University of Limerick, Ireland	<i>Three-dimensional Electron Ptychography of Catalyst Nanoparticles using Combined HAADF STEM and Atom Counting</i> <b>Emanuela Liberti</b> University of Oxford, UK	Invited: <i>Visualising Neutrophil Decision-making at Sites of Tissue Damage</i> <b>Milka Sarris</b> University of Cambridge, UK
1115 - 1130	Flash: <i>Confocal Raman Microscope integrated in SEM for Correlative Microscopy of 2D Materials</i> <b>Fang Zhou</b> Carl Zeiss Microscopy GmbH, Germany Flash: <i>Optoelectronic Tailoring of 2D Materials by Ultra Low Energy Ion Implantation</i> <b>Michael Hennessy</b> University of Limerick, Ireland Flash: <i>Metal and 2D-material Interaction Investigated via HAADF STEM</i> <b>Eileen Courtney</b> University of Limerick, Ireland	Flash: <i>Exploring the Performance of Hybrid Pixel Detectors for Electron Microscopy with Alternative Sensor Materials</i> <b>Kirsty Paton</b> University of Glasgow, UK Flash: <i>Integrated Differential Phase Contrast (iDPC) STEM for Low Z Detection and for High Contrast Low Dose Imaging Applications</i> <b>Anil Yalcin</b> Thermo Fisher Scientific, Netherlands Flash: <i>Visualisation and Quantification of Sub-Å Image Contrast Shifts to Reveal Character and Constellations of Individual Atoms</i> <b>Ursel Bangert</b> University of Limerick, Ireland	

UK Applied Image Analysis (NEUBIAS UK and IAFIG-RMS)	Quantitative Microscopy in Earth, Planetary and Archaeological Sciences	Microscopy of Materials for Health Care
<b>Dominic Waithe</b> University of Oxford, UK	<b>Duncan Muir</b> Cardiff University, UK	<b>Roland Kröger</b> University of York, UK
<b>Charter 4</b>	<b>Central 5, 6, 7</b>	<b>Central 3, 4</b>
Invited: Better Software, Better Practices, Better Research <b>Shoaib Sufi</b> Software Sustainability Institute, UK	Invited: What Quantitative Petrography Revealed about Ancient Roman Builders in Ostia <b>Jennifer Murgatroyd</b> RSK Environment Ltd, UK	Invited: Bone Hierarchical Structure and Mechanics Through 3D X-ray Imaging Techniques <b>Henrik Birkedal</b> Aarhus University, Denmark
Analysis of Relative Positions in 3D PALM and DSTORM Provides High-resolution Information on Organised Biological Complexes <b>Alistair Curd</b> University of Leeds, UK	The use of High Speed, High Resolution EBSD and EDS to Understand Fayalite Formation in the Allende Meteorite <b>Pat Trimby</b> Oxford Instruments Nanoanalysis, UK	3D Characterisation of Inhaled Powder Blends using X-ray Computed Tomography <b>Parmesh Gajjar</b> The University of Manchester, UK
Automated Segmentation And Quantification Of Isolated Mitochondria In Electron Microscopy Images Using Ilastik <b>Marie-Charlotte Domart</b> Francis Crick Institute, UK	Flash: Ancient Egyptian Gold Jewellery: Technologies and Corrosion Study <b>Lore Troalen</b> National Museums Scotland, UK Flash: Through Time and Space using X-ray Computed Tomography <b>Alice Macente</b> University of Glasgow, UK Flash: Characterisation of Hydrothermally Altered Inclusions in the Mineral Caldasite by SEM and TEM Analysis <b>Michael Lee</b> Nelson Mandela University, South Africa	Reference Standards for High Resolution Microscopy and Differential Diagnostics <b>Ibolya Kepiro</b> National Physical Laboratory, UK
Harnessing the Power of the Crowd for Bioimage Analysis <b>Martin Jones</b> Francis Crick Institute, UK	Flash: Quantitative Analysis of Dislocations in Bulk Earth Materials using Bend Contour Contrast <b>Shirin Kaboli</b> Hydro-Québec's Center of Excellence in Transportation Electrification and Energy Storage, Canada Flash: A Study of Chirality and Optical Response of 2D Chiral Metamaterials with Stokes Polarimetric Light Microscope <b>Huda Alzahrani</b> University of Salford, UK Flash: Creating Context for Geochemical Analysis: Microanalytical Studies of Lewisian Zircons using the Xe-FIB - SEM Microscope <b>Joshua Einsle</b> Imperial College London, UK	Imaging and Spectroscopy of Medical Devices <b>Paul Gunning Smith &amp; Nephew</b> , UK
Discussion: IAFIG-RMS and Neubias Community update	Understanding Biologically-induced Soil Weathering: Applying a Novel Multi-modal and Multi-scale Method via Correlative Imaging <b>Ria Mitchell</b> Swansea University, UK	The Widow's Kiss: the Effects of Venom of the Noble False Widow Spider <i>Steatoda Nobilis</i> on Keratinocytes in Culture <b>John Dunbar</b> NUI Galway, Ireland
Invited: Building Bioinformatics Training Capacity across Europe <b>Gabriella Rustici</b> University of Cambridge, UK	Invited: Application of Secondary Ion Mass Spectrometry (SIMS) to the Study of Earth and Planetary Processes <b>Cees-Jan De Hoog</b> University of Edinburgh, UK	Invited: Not-too-stiff and Not-too-compliant, just Right: how the Goldilocks Principle Applies to Bone Tissue Engineering <b>Natalie Reznikov</b> Object Research Systems Inc. Canada

Thursday 4 July, Morning

Session Title	EMAG: Electron Microscopy of Nanomaterials	EMAG: Spectroscopy	Imaging the Immune System
Session Chair(s)	<b>Andy Brown</b> University of Leeds, UK	<b>Thomas Slater</b> Diamond Light Source Ltd. UK	<b>Theresa Ward</b> London School of Hygiene & Tropical Medicine, UK
Room	<b>Charter 1</b>	<b>Charter 3</b>	<b>Charter 2</b>
1330 - 1400	Invited: Transmission Electron Microscopy Studies of Photoactive Hybrid Perovskite-based Nanomaterials <b>Caterina Ducati</b> University of Cambridge, UK	Invited: Analytical STEM at 30 KeV <b>Raynald Gauvin</b> McGill University, Canada	Invited: Healthy and Malignant Haematopoiesis in the Bone Marrow: Dynamic Cells in an Evolving Environment <b>Cristina Lo Celso</b> Imperial College London, UK
1400 - 1415	In Situ Observation of $\Sigma 3 \{112\}$ Twin Boundary Motion at Atomic Resolution in III-V Nanowires <b>James Gott</b> University of Warwick, UK	The Impact of Corrosion and Chemical Modification of Silver Nanoparticle Assemblies on their Plasmonic Functionality Studied by Electron Energy Loss Spectroscopy <b>Jack Brennan</b> University of Glasgow, UK	Defining the Tumor Microenvironment Niche in the 4T1 Tumor Model: Treatment Resistance, Metastasis, and Immunosuppression <b>David Scheiblin Frederick</b> National Laboratory for Cancer Research / Leidos Biomedical Research Inc. / National Institute of Health / National Cancer Institute, USA
1415 - 1430	Electron Microscopy Studies of $\text{Nb}_2\text{O}_5(\text{OH})$ Nanostructured Cubes - Insights in the Growth Mechanism <b>Thomas Günsler</b> Max Planck Institut for Iron Research, Germany	Intracellular Elemental Mapping of Na, K and Ca using EELS and EDX: a Combined Approach for Quantification <b>Alexandra Sheader</b> University of Oxford, UK	Elucidating the Pathway of Staphylococcus Aureus Internalisation by Primary Macrophages <b>Ilias Kounatidis</b> Diamond Light Source, UK
1430 - 1445	Progress on Cryogenic Analytical STEM of Nanomaterials <b>Nicole Hondow</b> University of Leeds, UK	Three-Dimensional Imaging of Nanoparticle Chemistry using Spectroscopic Single Particle Reconstruction <b>Yi-Chi Wang</b> The University of Manchester, UK	Characterising Interactions of Food-grade Titanium Dioxide Particles with Intestinal Immune Cells In Vivo <b>John Wills</b> University of Cambridge, UK
1445 - 1500	Exchange Energies of Bismuth Segregation in the InAsBi/InAs System <b>Sara Flores</b> Universidad de Cádiz, Spain	Electron Compton Scattering and the Measurement of Electron Momentum Distributions in Solids <b>Alina Talmantaite</b> Durham University, UK	Single-molecule Light-sheet Imaging of T-cell Membrane Proteins above the Coverslip to Avoid Adhesion-induced Artefacts <b>Aleks Ponjavic</b> University of Cambridge, UK
1500 - 1515	Preparative and Analytical Challenges in Electron Microscopic Investigation of Nanostructured CuInS <sub>2</sub> Thin Films for Energy Applications <b>Anna Frank</b> Max Planck Institut for Iron Research, Germany	Extending the Energy Loss Range for EELS - Practicalities and Applications <b>Ian MacLaren</b> University of Glasgow, UK	Invited: Mechanics in Leukocyte Recruitment <b>Olivier Theodoly</b> Laboratoire Adhèsion et Inflammation, France
1515 - 1530	Flash: Self-assembled Quantum Wires and Dots in GaAsP-GaAsP Core-shell Nanowires <b>Aruni Fonseka</b> University of Warwick, UK Flash: Investigation of Co Oxidation States in PtCo Nanoparticles using STEM-EELS <b>James Sode</b> University of Oxford, UK Flash: Dose Limited STEM Characterisation of Calcium Carbonate Based Nanomaterials <b>Rob Hooley</b> University of Leeds, UK	Flash: Using STEM EDX Mapping and Mono-EELS to Understand the Reaction Kinetics of Environmentally Relevant Iron Oxide Minerals for Water Remediation <b>Helen Freeman</b> University of Leeds, UK Flash: Electron Energy Loss Phonon Spectroscopy of Carbon Nitride <b>Rebecca Nicholls</b> University of Oxford, UK Flash: Application of Electron and X-ray Scanning Transmission Microscopy (STM) to the Investigation of Structural Evolution in Biomass-Derived Hydrothermal Carbon <b>Luke Higgins</b> University of Leeds, UK	



Tissue Cytometry	X-ray Microscopy: Beyond Attenuation Contrast Tomography
<b>Derek Davies</b> The Francis Crick Institute, UK	<b>Michael Doube</b> City University of Hong Kong's College of Veterinary Medicine and Life Science
<b>Charter 4</b>	<b>Central 5, 6, 7</b>
<p>Invited: <i>Imaging Mass Cytometry of Kras Mutated Lung Cancers to Study Effects of Drug Treatments on the Tumour Microenvironment</i>  <b>Febe van Maldegem</b> Francis Crick Institute, UK</p>	<p>Invited: <i>Bragg Ptychography: an X-ray 3D Crystalline Microscopy to Shed New Light on Biomineral Structure and Biomineralisation Mechanisms</i>  <b>Virginie Chamard</b> Institut Fresnel, France</p>
<p>From 'Pretty' Pictures to Dots on Plots!  <b>Karen Hogg</b> University of York, UK</p>	<p><i>X-ray Grating Talbot Interferometer for Fast Imaging and Tomography Applications at I13-2 Diamond Manchester Beamline</i>  <b>Shashi Marathe</b> Diamond Light Source Ltd, UK</p>
<p><i>Imaging Mass Cytometry: Adoption of New Technologies</i>  <b>Philip Hobson</b> Francis Crick Institute, UK</p>	<p><i>Time-lapse 3D Imaging during the Compression of Freeze Cast Aerogel by Phase Contrast Synchrotron X-ray Micro-CT</i>  <b>Shelley Rawson</b> The University of Manchester, UK</p>
<p><i>Dynamic Analysis of NF-Kappa-B P105 Processing using Photo-switchable FRET and Live Cell Imaging</i>  <b>David Spiller</b> The University of Manchester, UK</p>	<p><i>Non-destructive Mapping of Crystallographic Microstructure Evolution in 3D by Laboratory X-ray Diffraction Contrast Tomography</i>  <b>Samuel McDonald</b> The University of Manchester, UK</p>
<p><i>Using FRAP as Technique to Quantitate Local Reactive Oxygen Species (ROS) Production</i>  <b>Josh Hughes</b> LightOx Ltd, UK</p>	<p>Flash: <i>Synchrotron Microtomography of Native Intervertebral Disc for Structural Characterisation and Strain Analysis</i> <b>Catherine Disney</b> The University of Manchester, UK  Flash: <i>Time-lapse Synchrotron X-ray Computed Tomography Imaging Of Damage Evolution In Composite Tubes</i> <b>Yuan Chai</b> The University of Manchester, UK  Flash: <i>3D Magnetic Reconstruction of Non-trivial Spin Textures from Simulated Dichroic Soft X-ray Transmission Tomography</i>  <b>Aurelio Hierro-Rodriguez</b> University of Glasgow, UK</p>
<p>Invited: <i>Building and Exploring Molecularly Annotated 3D-tissue Atlases to Understand Tumour Heterogeneity and Micro-environment</i>  <b>Dario Bressan</b> CRUK Cambridge Institute, UK</p>	<p>Invited: <i>Multi-modal and Multi-length Scale Correlative Imaging of Hierarchical Biological Materials</i>  <b>Richard Johnston</b> Swansea University, UK</p>

# Poster List

Posters with 1000 and 2000 numbers relate to mmc2019 sessions. Posters with 3000, 4000 and 5000 numbers relate to EMAG sessions.

**Poster Session 1, Tuesday 2 July, 1600 - 1800.** Posters with 1000 and 3000 numbers.

**Poster Session 2, Wednesday 3 July, 1600 - 1800.** Posters with 2000 and 4000 numbers.

**Poster Session 3, Thursday 4 July, 1200 - 1315.** Posters with 5000 numbers.

## Poster Session 1

### Physical Sciences

1000 *In Situ Transmission Electron Microscopy Double-Tilt Sample Heating Platform* **Daan Hein Alsem** Hummingbird Scientific, USA

1001 *Real-Time Observation of Dynamics of Nanoscale Pattern Collapse* **Tanmay Ghosh** National University of Singapore

1002 *Cryogenic and Static Liquid Cell Approaches to Enable Native State Electron Microscopy of Nanoparticle Dispersions* **Elliot Hawkins-Farrow** University of Leeds, UK

1003 *In Situ Observation of Crystallised Grain Boundaries in Environmental Scanning Electron Microscopy after Different Freezing Conditions* **Kamila Imrichova** Institute of Scientific Instruments of the CAS, Czech Republic

1004 *Multi-Modal Electroanalytical Liquid Microscopy for Energy Applications* **Khim Karki** Hummingbird Scientific, USA

1005 *In Situ  $\alpha$ -Iron Cuboidal Nanoparticles Formation and Interaction with O<sub>2</sub> Gas in an Open Cell Environmental TEM/STEM* **Leonardo Lari** University of York, UK

1006 *Studying Cobalt-based Catalysts Promoted with Manganese using In Situ Gas Cell Scanning Transmission Electron Microscopy* **Matt Lindley** The University of Manchester, UK

1007 *Chemical Reactions and Growth of New Phases in The Ceria-water System by Liquid-cell TEM* **Guenter Moebus** University of Sheffield, UK

1008 *Feasibility Test of In Situ Gas Injection Observation in 300 KV Corrected TEM/STEM* **Takeo Sasaki** JEOL (U.K.) LTD. UK

1009 *Transmission Electron Microscopy Study of TiO<sub>2</sub> Thin Films for Solar Cell Applications* **Zhengyuan Shan** University of York, UK

1010 *Observing Phase Transformations of the Phase Change Material Sb<sub>2</sub>Te<sub>3</sub> in Carbon*

*Nanotube Bundles: Electron Diffraction, Imaging and Theory* **Jeremy Sloan** University of Warwick, UK

1011 *Complex Study of Thermally Induced Microstructure Evolution in Cu-Au Thin Films* **Alla Sologubenko** ScopeM ETH Zürich, Switzerland

### Life Sciences

1012 *Getting Trained as well as Training others in a Shared Imaging Facility* **Jennifer Adcott** University of Liverpool, UK

1013 *In-resin Fluorescence Preservation and Imaging Conditions for High-resolution Imaging with Integrated Light and Electron Microscope* **Pieter Baatsen** vib@kuleuven, Belgium

1014 *Tracking Wireworm Burrowing Behaviour in Soil over time using 3D X-ray CT* **Samuel Booth** University of Nottingham, UK

1015 *Use of Focal Charge Compensation to Avoid Charging Artefacts during Serial Block-face Scanning Electron Microscopy* **Peter Borghgraef** VIB Bioimaging Core Ghent, Belgium

1016 *New Approach to Increase Information Content in Polarised Light Microscopy of Skeletal and Dental Tissues* **Alan Boyde** Queen Mary University of London, UK

1017 *A New Class of Molecular Probes for Biological Imaging* **Cesare De Pace** University College London, UK

1018 *Progress in the Development of a Laboratory-scale Soft X-ray Microscope for Whole Cell Imaging* **Kenneth Fahy** SiriusXT, Ireland

1019 *Single Particle Analysis Workflow Productivity Enhancements* **Fanis Grollios** Thermo Fisher Scientific, Netherlands

1020 *Streamlining Microscope Quality Control using Open Source Resources* **Nadia Halidi** University of Oxford, UK

1021 *Correlative Imaging for the Life Sciences at Diamond Light Source Beamline B24* **Maria Harkiolaki** Diamond Light Source Ltd, UK

1022 *Heterodyne Dual-polarisation Epi-detected CARS Microscopy for Chemically Specific and Topographic Imaging of Interfaces* **Dafydd Harlow** Cardiff University, UK

1023 *Investigating Dynamic Biological Processes with High-speed, High-resolution Correlative AFM-light Microscopy* **Heiko Haschke** JPK BioAFM, Bruker Nano Surfaces, Germany

1024 *Combining Optical Tweezers with IRM, TIRF, Widefield and STED: a Platform for Dynamic Single Molecule Analysis* **Maurice Hendriks** Lumicks, Netherlands

1025 *Enhanced Raman-Based Cancer Diagnosis using Hyperspectral Tissue Pre-Characterisation and Optimised Segmentation Techniques* **Anneliese Jarman** King's College London, UK

1026 *Quantitative Three-dimensional Analysis of Wound Healing Model using Optical Diffraction Tomography* **Ariel Lee** KAIST, Korea, Republic of

1027 *What Lies Beneath: 3D Vs 2D Correlative Imaging Challenges and how to Overcome them* **Ria Mitchell** Swansea University, UK

1028 *3D Structure And Functionality Of Coccolith Baseplates Revealed By Cryo-Electron Tomography And Super-Resolution Microscopy* **Fabio Nudelman** University of Edinburgh, UK

1029 *Correlative Cryo-light and EM: Context and Application* **Chris Parmenter** University of Nottingham, UK

1030 *Measuring Spatio-temporal Electrical Activity in Neural Networks using Widefield Diamond Based Quantum Magnetometry: Towards next Generation Nanoscale Electrophysiology* **Joshua Price** University of Nottingham, UK

1031 *Measuring Sub-nanometre Thickness Changes in Supported Lipid Bilayers with Quantitative Differential Interference Microscopy* **David Regan** Cardiff University, UK

1032 *Polarised Light Microscopy Method (PLM) and Correlative Imaging for Mapping Crystal Orientation in Titanium Alloys* **Hamed Safaie** Swansea University, UK

1033 *Stokes Polarimetric Microscopy and Label-free Quantitative Imaging* **Tiehan Shen** University of Salford, UK

1034 *The Electron Bio-Imaging Centre (eBIC) at Diamond Light Source* **Alistair Siebert** eBIC at Diamond Light Source, UK

1035 *Developments towards Laboratory-Scale Correlative Cryo-Light 3D Soft X-Ray Tomography* **Dunja Skoko** SiriusXT, Ireland

1036 *Scanning Electron Microscopy of Subgingival Biofilm and its Endotoxin Activity in Patients with Chronic Periodontitis* **Alex Strachan** Plymouth Electron Microscopy Centre, UK

1037 *The Effect of Environmentally Sensitive Dyes on Lipid Bilayers* **Adam Suhaj** King's College London, UK

1038 Development of a Quantitative Model for the Ordered Process of Chromatin Rearrangements at DNA Double-strand Breaks **Prithvikumar Tidke** National University of Ireland Galway, Ireland

1039 Energy Transfer in Artificial Light-harvesting Assemblies Studied by Fluorescence Life-time Imaging **Cvetelin Vasilev** University of Sheffield, UK

## SPM

1040 High Resolution Imaging and Nanomechanical Properties of the Gram-Positive Bacterial Cell Wall using Atomic Force Microscopy **Anaam Alomari** University of Sheffield, UK

1041 Investigating Potato Plant Cell Mechanics using Atomic Force Microscopy **Zeinab Al-Rekabi** National Physical Laboratory, UK

1042 High Electrical Conductivity of Metal-organic Chains at the Single-molecule Level **Pablo Ares** The University of Manchester, UK

1043 Lubricated Friction at Surface Nano-defects **Clodomiro Cafolla** Durham University, UK

1044 Characterisation of Metallic Coated Atomic Force Microscopy Probes for Conductive AFM and Scanning Kelvin Probe Microscopy Applications **Charles Clifford** National Physical Laboratory, UK

1045 Probing the Dielectric Constant of Two-dimensionally Confined Water using Scanning Dielectric Microscopy **James Dougherty** The University of Manchester, UK

1046 NanoMechanics with Atomic Force Microscopy : Overview from Force Spectroscopy to NanoDMA Capabilities **Mickael Febvre** Bruker, France

1047 Tracking the Molecular Organisation of Water and Alcohol Mixtures at Hydrophobic Solid Interfaces **William Foster** Durham University, UK

1048 Probing Dielectric Constant on the Nanoscale using Scanning Dielectric Microscopy: from Thin Films to Two-dimensionally Confined Water **Laura Fumagalli** The University of Manchester, UK

1049 Strain-induced Stiffening and Charging of Collagen Fibrils on the Nanoscale **Emilie Gachon** King's College London, UK

1050 Recognising Multiple Scanning Probe Tip States in Real Time with Convolutional Neural Network Ensembles **Oliver Gordon** University of Nottingham, UK

1051 Nanoscale Visible-IR Optical Properties of 2D Materials via AFM Optical Microscope **Ian Holton** Acutance Scientific Ltd, UK

1052 Cross-sectional Nanoscale Resolution Mapping of Potential And Current Distribution in 3D Structure of Vertical Cavity Surface Emitting Laser III-V Nanostructures **Oleg Kolosov** Lancaster University, UK

1053 Thermo-mechanical Behaviour of Atomic Force Microscopy Cantilevers in Thermal Drift Utilising Scanning Thermal Microscopy Probes **Christopher Mordue** University of Glasgow, UK

1054 Visualisation of Subsurface Defects in Van-der-Waals Heterostructures via 3D SPM Mapping **Marta Mucientes** Lancaster University, UK

1055 Multiphysics 3D Study of Compound Semiconductor Nano-structures via Scanning Probes **Marta Mucientes** Lancaster University, UK

1056 Molecular Resolution Effect of Antibiotics on Gram Positive Bacteria Cell Wall using AFM **Laia Pasquina Lemonche** University of Sheffield, UK

1057 Bilayer Lithography in Atomic Force Microscope **Yu Shu** University of Oxford, UK

1058 Reconfigured Filamentary High Resolution Electrical Probes **Eugene Soh** University of Oxford, UK

1059 Latest Advances in Nanoscale IR Spectroscopy and Imaging **Miriam Unger** Bruker Nano Surfaces, Germany

1060 Mapping Nanoscale Flow Charts at Solid-liquid Interfaces **Kislon Voitchovsky** Durham University, UK

1061 Revealing the Complexity of Stacking Order in Graphite Films **Yaping Yang** The University of Manchester, UK

## EMAG

3000 In Situ Electrochemical Study of Solid-State Energy Storage Materials using a Probe-Based Transmission Electron Microscope Sample Holder **Daan Hein Alsem** Hummingbird Scientific, USA

3001 (R)evolution of EBSD Pattern Detection **Rene de Kloe** EDAX, Netherlands

3002 The Reliability of Silicon Drift Detectors (SDD) for Quantitative Chemical Analysis in Analytical Electron Microscopy **Rik Drummond-Brydson** University of Leeds, UK

3003 Secondary Electron Hyper Spectral Surface Imaging for Beam Sensitive Biomaterial Characterisation **Nicholas Farr** University of Sheffield, UK

3004 Automated Three Dimensional Broad Ion Beam Milling Acquisition and Analysis **Ali Gholinia** The University of Manchester, UK

3005 Advanced Material Characterisation: Scanning Atomic Force and Electron Microscopy **Colin Grant** Hitachi High-Technologies Corporation, UK

3006 Fabrication of Sub-micron Apertures by Plasma Focused Ion Beam Milling for Atom-optical Microscopy **John Halpin** University of Glasgow, UK

3007 Simulation of Electron Trajectories in Scanning Electron Microscope Specimen Chamber **Yuka Ito** Osaka Institute of Technology, Japan

3008 Smart Approach to Combining Compositional and Topographical Information into a Single Image **Jakub Kolář** TESCAN Brno s.r.o. Czech Republic

3009 Recent Developments in the Analysis of Microstructures by 3D-EBSD **Peter Konijnenberg** Max-Planck-Institute for Iron Research / Bruker Nano GmbH, Germany

3010 Visualisation and Elemental Analysis of Perovskite Damage in Laser Scribing of Perovskite Solar Modules **Felix Kosasih** University of Cambridge, UK

3011 Calibration of Secondary Electron Energy Filters with in-column Detectors in Latest Generation FEGSEMs **James McGladdery** Loughborough University, UK

3012 Detection and Quantification of Secondary Phases in 12%Cr Steels using in-column Secondary Electron Detectors **James McGladdery** Loughborough University, UK

3013 Application of Cryo-FIB-SEM to Volume Analysis of Liquid Dispersed Nanoparticle based Samples **Stuart Micklethwaite** University of Leeds, UK

3014 Measurement of Scattered Electron Current Distribution in Scanning Electron Microscope **Kentaro Morimoto** Osaka Institute of Technology, Japan

3015 Understanding Li-ion Battery Cathode Degradation using Analytical Electron Microscopy **Jedrzej Morzy** University of Cambridge, UK

3016 Growth and Structural Analysis of NiO Thin Films for Solar Cells Applications **Sam Orchard** University of York, UK



3017 *STEM Electron Beam Induced Current in GaN* **Aidan Rooney** Univ. Grenoble Alpes, LETI, France

3018 *Influence of GaAsSb Capping Layers on the Vertical-alignment in Closely Stacked InAs/GaAs Multi Quantum Dots* **Nazaret Ruiz Marín** Universidad de Cádiz, Spain

3019 *Low Damage Lamella Preparation of Metallic Materials using Triple Beam<sup>TM</sup> System* **Takahiro Sato** Hitachi High-Technologies Corporation, Japan

3020 *Development of a Lanthanum Hexaboride based High-current Cold Field Emitter to Generate Microsecond Pulses for Capturing Molecular Dynamics* **Gopal Singh** Max Planck Institute for Structure and Dynamics of Matter, Germany

3021 *Improving the Photo-catalytic Performance of Self-cleaning Glasses, a Comparative Benchmark* **Alex Starling** University of Leeds, UK

3022 *Improvements in XHR Imaging: Pushing Extreme Low Voltage SEM Imaging Performance* **Brandon Van Leer** Thermo Fisher Scientific, USA

3023 *3D Tomography of Zebrafish Embryos Examined with Xe Plasma FIB* **Rostislav Vana** TESCAN-Orsay Holding, Czech Republic

3024 *Colour SEM* **Ernst Jan Vesseur** Thermo Fisher Scientific, Netherlands

3025 *Ultra-thin Metal Coatings as a Solution for Successful SEM Imaging of Nano-electrospinning Fibres Influence Of Coating Quality On SEM Imaging Of Nano-electrospinning Fibres* **Anna Walkiewicz** Quorum Technologies, UK

3026 *Studying Degradation Mechanisms of High Voltage Li-Ion Batteries using He-ion Microscopy and Ne Secondary Ion Mass Spectrometry* **Laura Wheatcroft** University of Sheffield, UK

3027 *Multi-beam and Multi-ion FIB-SEM for 3D Correlative Microscopy* **Bartłomiej Winiarski** Thermo Fisher Scientific / The University of Manchester, Czech Republic / UK

3028 *Accessing Large Volumes by Plasma FIB Serial Spin Milling Tomography* **Bartłomiej Winiarski** Thermo Fisher Scientific / The University of Manchester, Czech Republic / UK

3029 *Mapping Plasmon Excitations in Near Field Transducers using Electron Energy Loss Spectroscopy* **Liam Wright** University of Glasgow, UK

## Poster Session 2

### Physical Sciences

2000 *A Study of Chirality and Optical Response of 2D Chiral Metamaterials with Stokes Polarimetric Light Microscope* **Huda Alzahrani** University of Salford, UK

2001 *Quantitative and Qualitative Analysis of Hydrocarbon Contamination and Removal in FIB/ SEMs* **Barbara Armbruster** XEI Scientific, USA

2002 *Focused Ion Beam In Situ Lamella Fabrication Technique For In Situ TEM* **Megan Canavan** Trinity College Dublin, Ireland

2003 *Time-lapse Synchrotron X-ray Computed Tomography Imaging Of Damage Evolution In Composite Tubes* **Yuan Chai** The University of Manchester, UK

2004 *Synchrotron Microtomography of Native Intervertebral Disc for Structural Characterisation and Strain Analysis* **Catherine Disney** The University of Manchester, UK

2005 *Low Damage Ultra-thin Lamella Preparation of Metals and Nanostructured Materials with a Novel Ga+/Ar+/e- TripleBeam<sup>TM</sup> Technique* **Michael Dixon** Hitachi High-Technologies Europe, UK

2006 *Creating Context for Geochemical Analysis: Microanalytical Studies of Lewisian Zircons using the Xe-FIB - SEM Microscope* **Joshua Einsle** Imperial College London, UK

2007 *Evaluation of Abraded WC/Co Surfaces by FIB Tomography* **Mark Gee** National Physical Laboratory, UK

2008 *3D Magnetic Reconstruction of Non-trivial Spin Textures from Simulated Dichroic Soft X-ray Transmission Tomography* **Aurelio Hierro-Rodriguez** University of Glasgow, UK

2009 *Quantitative Analysis of Dislocations in Bulk Earth Materials using Bend Contour Contrast* **Shirin Kaboli** Hydro-Québec's Center of Excellence in Transportation Electrification and Energy Storage, Canada

2010 *Quantitative Characterisation of the Nanostructure of Bone using Electron Tomography* **Roland Kröger** University of York, UK

2011 *Characterisation of Hydrothermally Altered Inclusions in the Mineral Caldasite by SEM and TEM Analysis* **Michael Lee** Nelson Mandela University, South Africa

2012 *Through Time and Space using X-ray Computed Tomography* **Alice Macente** University of Glasgow, UK

2013 *Improved FIB Preparation of Samples for MEMS-based In Situ Simultaneous Heating and Biasing in the TEM/STEM* **Tom Macgregor** University of Glasgow, UK

2014 *The Development of Cryo-FIB Lift-out for Soft Matter and Biological Imaging - Making the Practically Impossible 'Less Difficult'* **Chris Parmenter** University of Nottingham, UK

2015 *AutoTEM 5 - Fully Automated TEM Sample Preparation for Everyone* **Anna Prokhodtseva** Thermo Fisher Scientific, Netherlands

2016 *Focused Ion Beam Preparation of Microbeams for In Situ Mechanical Analysis of Electroplated Nanotwinned Copper with Probe Type Indenters* **Stuart Robertson** Loughborough University, UK

2017 *A Tool for Generating Smooth Cross Sections with Focussed Ion Beams: A Highly-precise Eucentric Tilting Substage* **Andrew Smith** Kleindiek Nanotechnik, Germany

2019 *Sculpting at the Nanoscale: a Route to Electron Transparency* **Evan Tillotson** The University of Manchester, UK

2020 *Observing Biomimetic Bone Formation: Studying Collagen Mineralisation via Precursor Phases In Situ and Ex Situ using Raman Spectroscopy and Electron Microscopy* **Emma Tong** University of York, UK

2021 *Ancient Egyptian Gold Jewellery: Technologies and Corrosion Study* **Lore Troalen** National Museums Scotland, UK

2022 *Focused Ion Beam Fabrication of Thin Samples for Cryo-electron Tomography* **Rostislav Vana** TESCAN-Orsay Holding, Czech Republic

2023 *Microstructural Defects in Antimony Selenide Solar Cells* **Rhys Williams** Durham University, UK

2024 *Sample Preparation, Transfer and Coregistration: From Micro CT to TEM* **Bartłomiej Winiarski** Thermo Fisher Scientific / The University of Manchester, Czech Republic / UK

2025 *Magnesium Alloy TEM Sample Preparation using Ultramicrotome* **Xiangli Zhong** The University of Manchester, UK

### Life Sciences

2026 *Pilocarpine Rat Model of Epilepsy Elicits Upregulation of Hippocampal Synaptophysin and GFAP* **Oluwale Alese** University of Kwazulu-Natal, South Africa



2027 Multiphoton Excitation of Biological Samples with 10 Femtosecond Laser Pulses **Kurt Anderson** Francis Crick Institute, UK

2028 Deep Learning Enables 3D Reconstructions from 2D Projections in Localisation Microscopy **Benjamin Blundell** King's College London, UK

2029 Haar Wavelet Kernel Analysis of Three-dimensional Localisation Microscopy Data **Ishan Costello** King's College London, UK

2030 3D Visualisation of Bone Quality in Osteoporosis **Alexander Cresswell-Boyes** Queen Mary University of London, UK

2031 Tracking the Fate of Individual Disseminated Tumor Cells in Target Organs to Determine the Role of Premetastatic Conditioning **David Entenberg** Einstein College of Medicine, USA

2032 DeepSIM: Adaptive Optics Enhancing Deep Super-resolution Imaging in Difficult Samples **Nicholas Hall** Micron Advanced Bioimaging Unit, UK

2033 Selective Single Cell Isolation of Adherent Cells using a Novel Shake Method **Bob Hartley** Molecular Machines & Industries AG, Switzerland

2034 The Role of the Electron Microscope in the Study of the Immune Escape Mechanism of Malignant Cells **Amira Helmy** Theodor Bilharz Research Institute, Egypt

2035 Gene Circuits and Multi-dimensional Optical Microscopy: Characterisation of Cellular Stress **Sarah Lecinski** University of York, UK

2036 A Flexible, Adaptable Design for Sub-cellular Light Sheet Microscopy **James Manton** MRC Laboratory of Molecular Biology, UK

2037 SandSTORM Enables Accelerated and Unlimited Super-resolution Imaging in Quasi-physiological Buffers **Kaarjel Narayanasamy** University of Leeds, UK

2038 Wide-field Paramagnetic Spatial Mapping using Nitrogen Vacancies **Valentin Radu** University of Nottingham, UK

2039 Axial Localisation of Single Particles using Machine Learning **Craig Russell** National Physical Laboratory, UK

2040 High-Stability Design for Super-Resolution, Life-cell Imaging and Single Molecule Experiments at Reduced Cost **Michael Schwertner** Linkam Scientific Instruments Ltd. UK

2041 Microscopy on Drugs: Characterisation and Quantification of Pt-based Pharmaceuticals using the STEM **Alexandra Sheader** University of Oxford, UK

2042 Sub-15 Nm 3D Fluorescence Nanoscopy Based on Single Molecule Localisation and Photometry **Sabrina Simoncelli** King's College London, UK

2043 Imaging Mitochondrial Viscosity using Fluorescent Molecular Rotors and Fluorescence Lifetime Imaging Microscopy **Ida Emilie Steinmark** King's College London, UK

2044 Developing Microscope Software with Python **David Miguel Susano Pinto** University of Oxford, UK

2045 A Custom MSPIM for Long Time Course Imaging of Live Samples **Ben Sutcliffe** MRC Laboratory of Molecular Biology, UK

2046 Re-engineered Enzymes as Tools in DSTORM Microscopy - The New Field of Enzymostaining? **Beatriz Vale** Heriot Watt University, UK

2047 Microsphere Super-resolution Imaging of Bio-samples **Sébastien Vilain** LIG Nanowise, UK

2048 Morphological and Histological Features of the Greenland Shark Coronary Circulation **Sana Yaar** The University of Manchester, UK

## Physical / Life Sciences

2049 Nineteenth Century Sharks: 3D Segmentations of the Organelles from the Greenland Shark (*Somniosus Microcephalus*) Cardiac Myocytes Provide Insights on Extreme Longevity **Pierre Delaroche** The University of Manchester, UK

2050 Multiscale Correlative Characterisation of Environmentally Induced Crack Initiation, Propagation and Failure in a High Strength Aluminium Alloy **Visweswara Gudla** The University of Manchester, UK

2051 Chromosomal Studies on the Egyptian Fresh Water Snail *Biomphalaria Alexandrina* by using Transmission and Scanning Electron Microscope **Amira Helmy** Theodor Bilharz Research Institute, Egypt

2052 4D Image Analysis Technique in Liquid TEM for Soft Matter Systems **Gabriele Marchello** University College London, UK

2053 Set-theoretical Foundation of Imaging in Microscopy **Volodymyr Nechyporuk-Zloy** The University of Oxford, UK

2054 Unambiguous Characterisation of Nanosized Particles in 14%Cr Oxide Dispersion Strengthened (ODS) Steel using Classical and Frontier Microscopy Methods **Yael Templeman** Ben Gurion University of the Negev, Israel

2055 Serial Block Face Scanning Electron Microscopy - Big Data Results for Life Sciences and Materials Science. An Issue for Measurement and Analysis **Armin Zankel** Technical University Graz, Austria

## EMAG

4000 In Situ 4D Characterisation of Indentation Damage in Mineralised Biological Materials **Rachel Board** Swansea University, UK

4001 Microstructure Studies on Combination of Work Hardening and Precipitation Strengthening in 2024 Aluminum Alloy by a Complex Thermo-mechanical Treatment **Witold Chrominski** Warsaw University of Technology, Poland

4002 In Situ Gas and Heating TEM/STEM Study at Atmospheric Pressure of Multi-shaped Pd and NiPd Nano-particles **Michele Conroy** University of Limerick, Ireland

4003 Applications of CMOS-based Imaging Sensors for High-Speed EBSD Mapping **Rene de Kloe** EDAX, Netherlands

4004 Examination of Damage Mechanisms of W/cr Hardmetals by EBSD and ECCI **Mark Gee** National Physical Laboratory, UK

4005 Femtosecond Laser-Enabled TriBeam for In Situ Laser Ablation of Charge Sensitive Materials **Remco Geurts** ThermoFisher Scientific, Netherlands

4006 Electron Counting Mode with Fibre-optically Coupled Camera System **Reza Ghadimi** TVIPS GmbH, Germany

4007 Electron Diffraction for the Ab Initio Structure Solution of Microcrystals of a Common Pharmaceutical Grown by Destructive Eutectic Solvents **Victoria Hamilton** University of Bristol, UK

4008 Using EBSD to Visualise the Grain Structure of Electroplated Tin and its Intermetallic Compounds, Relating to Tin Whisker Growth **Dan Haspel** University of Plymouth, UK

4009 High Resolution Imaging of Neutron Radiation Induced Nano Features in Zr-Nb Alloys **Guanze He** University of Oxford, UK

4010 A New In Situ Heating Stage for SEM Imaging at Elevated Temperature **Rhiannon Heard** University of Oxford, UK

4011 Microstructure of Magnetic Junctions in Fe-based Nanowires Encapsulated by Carbon Nanotube Radial Structures **Muhammad Ibrar Islamia** College Peshawar, Pakistan

4012 Imaging and Characterisation of Nanoparticle Coatings and Dispersion **Martha Ilett** University of Leeds, UK

4013 Quantitative STEM-EDS for Liquid-phase Transmission Electron Microscopy **Daniel Kelly** The University of Manchester, UK

4014 Irradiation Effects on the Oxidation First Stages of a 316L Austenitic Stainless Steel in Simulated Primary Environment **Lydia Laffont** CIRIMAT/ENSIACET, France

4015 Direct Electron Detection in Scanning Precession Electron Diffraction **Ian MacLaren** University of Glasgow, UK

4016 Activation of Co Fischer-Tropsch Catalyst: Exploring Co Valence State under Different Reduction Conditions using STEM-EELS **Ofentse Makgae** University of Oxford, UK

4017 Next Generation Liquid Inspection using SEM **David Manby** DGM Limited, UK

4018 Application of Low-flux Electron Diffraction Tomography to Solve Nano-sized Crystals Grown in Magnetic Fields **Gearóid Mangan** University of Limerick, Ireland

4019 The Evaluation Of EBSD Grain Reconstruction Algorithms As Applied To Grain Sizing **Andrew Marshall** University of Surrey, UK

4020 Resolving Oxygen Columns in ADF-STEM Images of Pyrochlore and Perovskite Oxides **Ali Mostaed** University of Sheffield, UK

4021 Bowing of Silicon Nitride Windows under Solvent Conditions in Liquid Cell Electron Microscopy **Eoin Moynihan** University of Limerick, Ireland

4022 Interface Coupling and Atypical Polarisation in Ferroelectric Multilayers **Jonathan Peters** University of Warwick, UK

4023 Quantitative High Dynamic Range Electron Diffraction of Polar Nanodomains in  $\text{Pb}_2\text{ScTaO}_6$  **Jonathan Peters** University of Warwick, UK

4024 Understanding the Effect of Hydrogen on SCC in Austenitic Alloys by Micromechanical Testing, Modelling and TEM **Edward Roberts** University of Oxford, UK

4025 Switching Mechanism in  $\text{HfO}_2$ -based Oxide Resistive Memories using HAADF and EELS-STEM **Sylvie Schamm-Chardon** CEMES-CNRS, France

4026 Identification of Internal Oxidation in a 20% Cold-worked 316SS at 340°C Through Advanced Characterisation **Zhao Shen** University of Oxford, UK

4027 Understanding Electron Beam-induced Structural Degradation of Metal-organic Frameworks using Electron Diffraction **Eu Pin Tien** The University of Manchester, UK

4028 Transmission Electron Microscopy Characterisation of YBCO Thin Films **Ecaterina Ware** Imperial College London, UK

4029 Investigation of Helium Bubble Behaviour in a Lattice-damaged FCC Metal as a Surrogate System for Self-irradiation within Plutonium **Kathryn Yates** Imperial College London, UK

### Poster Session 3

#### EMAG

5000 NTCDI Thin Films and NTCDI/PTCDI Heterostructures on Hexagonal Boron Nitride **Manal Alkhamisi** University of Nottingham, UK

5001 Differential Phase Contrast Imaging of the Magnetostructural Transition and Phase Boundary Motion in Uniform and Gradient-doped  $\text{FeRh}$ -based Thin Films **Trevor Almeida** University of Glasgow, UK

5002 Applying Scanning Electron Microscopy for the Development of Technology of Microplasma Spraying of Titanium Wire Biocompatible Coatings **Darya Alontseva** East Kazakhstan State Technical University, Kazakhstan

5003 Determination of Boron Concentration in Silicon by EELS and Multivariate Analysis **Kyoichiro Asayama** JEOL Ltd. Japan

5004 Morphology Based Comparison of Photocatalytic Activity of  $\text{Cazno}_2$  Nano Composite as Solar Photocatalyst **Ambreen Ashar** University of Agriculture, Faisalabad, Pakistan

5005 Comparative Efficacies of Nano Zinc Oxide and Nano Curcuma Longa against Third Degree Burn Wound **Ambreen Ashar** University of Agriculture, Faisalabad, Pakistan

5006 Sunlight Mediated Antibacterial Activity of (Zn-Aloe Vera) Nanomaterials **Ambreen Ashar** University of Agriculture, Faisalabad, Pakistan

5007 Solar-Photocatalytic Degradation of Humic Substances from Municipal Wastewater an Efficient  $\text{Fe/ZnO}$ /Ceramic Hybrid **Ambreen Ashar** University of Agriculture, Faisalabad, Pakistan

5008 Visualisation and Quantification of Sub-Å Image Contrast Shifts to Reveal Character and Constellations of Individual Atoms **Ursel Bangert** University of Limerick, Ireland

5009 Calcite Orientation Tuned in a Marine Shell to Support the Filter-feeding Organ **Peter Chung** University of Glasgow, UK

5010 Atomic Resolution STEM Imaging and Low Loss EELS Spectroscopy Study of the Growth Plane Effect on Band Gap Changes in GaN Based MQWs in Nanorods **Michele Conroy** University of Limerick, Ireland

5011 Metal and 2D-material Interaction Investigated via HAADF STEM **Eileen Courtney** University of Limerick, Ireland

5012 Self-assembled Quantum Wires and Dots in GaAsP-GaAsP Core-shell Nanowires **Aruni Fonseka** University of Warwick, UK

5013 Using STEM EDX Mapping and Mono-EELS to Understand the Reaction Kinetics of Environmentally Relevant Iron Oxide Minerals for Water Remediation **Helen Freeman** University of Leeds, UK

5014 Confinement Controlled Calcium Sulfate Polymorphism Revealed by Low Dose Electron Diffraction **Johanna Galloway** University of Leeds, UK

5015 Shining a Light on Hidden Nanophases: using EELS to Reveal Irradiation-induced Defects in Nuclear Alloys **Jack Haley** University of Oxford, UK

5016 Optoelectronic Tailoring of 2D Materials by Ultra Low Energy Ion Implantation **Michael Hennessy** University of Limerick, Ireland

5017 Application of STEM-EELS Provides Mechanistic Understanding of the Complexation of Aqueous Waste Gold Chloride to Pyrolysis Carbon from Biomass **Luke Higgins** University of Leeds, UK

5018 Application of Electron and X-ray Scanning Transmission Microscopy (STM) to the Investigation of Structural Evolution in Biomass-Derived Hydrothermal Carbon **Luke Higgins** University of Leeds, UK

5019 Microscopy and Microspectroscopy of 2D Material Liquid Crystal Nanocomposites: From Fundamental Properties to Application in Devices **Benjamin Hogan** University of Exeter, UK

5020 Dose Limited STEM Characterisation of Calcium Carbonate Based Nanomaterials **Rob Hooley** University of Leeds, UK

5021 Neuromorphic  $\text{MoS}_2$  Memtransistors Fabricated by Localised Helium Ion Beam Irradiation **Jakub Jadwiszczak** Trinity College Dublin, Ireland

5022 *Double Helices and One-dimensional Chains of Cesium Iodide in Ultra-Narrow Carbon Nanotubes* **Reza Kashtiban** University of Warwick, UK

5023 *Climb of the 90° Partial Dislocation in Brown Type IIa Natural Diamond* **Fraser Laidlaw** University of Warwick, UK

5024 *Ostwald Ripening Rates and Electron Beam Effect Analysis on Heated Au Nanoparticles by In Situ STEM* **Leonardo Lari** University of York, UK

5025 *Imaging Polymer Crystallinity with Transmission Electron Microscopy* **Hui Luo** University of Oxford, UK

5026 *Modelling a Capped Carbon Nanotube by Linear-scaling Density-functional Theory* **Sabrina Masur** University of Cambridge, UK

5027 *A Reliable Method to Count Number of Layers in Chemically Derived Two Dimensional Materials: Correlation Between Optical Transparency and Atomic Force Microscopy*

**Mohsen Moazzami Gudarzi** The University of Manchester, UK

5028 *Electron Energy Loss Phonon Spectroscopy of Carbon Nitride* **Rebecca Nicholls** University of Oxford, UK

5029 *Contrast Transfer and Noise Minimisation in Electron Ptychography* **Colum O'Leary** University of Oxford, UK

5030 *Exploring the Performance of Hybrid Pixel Detectors for Electron Microscopy with Alternative Sensor Materials* **Kirsty Paton** University of Glasgow, UK

5031 *Analytical Cryo Electron Microscopy for Characterisation of Pickering Emulsions* **Teresa Roncal-Herrero** University of Leeds, UK

5032 *Investigation of Co Oxidation States in PtCo Nanoparticles using STEM-EELS* **James Sode** University of Oxford, UK

5033 *High Resolution Electron Energy-Loss Spectroscopy with Low Point Spread Detector* **Liam Spillane** Gatan incorporated, USA

5034 *A Study of Tip-induced Moire Deformation of Strained MBE Grown Graphene on HBN* **James Thomas** University of Nottingham, UK

5035 *Understanding Catalyst Failure Mechanisms in Plant Operation* **Ewa Tocha** Dow Benelux B.V. Netherlands

5036 *Integrated Differential Phase Contrast (iDPC) STEM for Low Z Detection and for High Contrast Low Dose Imaging Applications* **Anil Yalcin** Thermo Fisher Scientific, Netherlands

5037 *Direct Synthesis of MoS<sub>2</sub> Or MoO<sub>3</sub> via Single Source Precursor* **Niting Zeng** The University of Manchester, UK

5038 *Confocal Raman Microscope integrated in SEM for Correlative Microscopy of 2D Materials* **Fang Zhou** Carl Zeiss Microscopy GmbH, Germany

to a scientist who has made a significant contribution to histochemistry and life sciences and is still active in their field. It will not be restricted to any particular age group.

It is typically awarded every four or five years (and not more frequently than every two years) and only then when it is felt there is a suitable candidate. It is generally regarded as one of the international honours in histochemistry and the life sciences, with an emphasis on microscopy.

Professor Klaus Hahn (University of North Carolina - Chapel Hill) is the recipient of the 2019 Pearse Prize, this will be presented during his plenary talk at mmc2019.

More information about the Pearse Prize can be found on the RMS website.

### **RMS Medal Series**

An RMS Medal for Life Sciences has been awarded since 2012, and since then additional new scientific section committee medals have also been established, some of which are going to be presented at mmc2019, they are:

#### ***Medal for Innovation in Applied Microscopy for Materials Science - Caterina Ducati (University of Cambridge, UK)***

The Presentation will take place before Caterina's invited talk in one of the EMAG sessions.

#### ***Medal for Life Sciences - Cristina Lo Celso (Imperial College London, UK)***

The Presentation will take place on Thursday 4 July at 1330, ahead of Cristina's invited talk in the Imaging the Immune System session.

#### ***Medal for Light Microscopy - Suliana Manley (EPFL, Switzerland)***

The Presentation will take place on Wednesday 3 July at 1000, ahead of Suliana's invited talk in the Frontiers in Biolmaging: Developments in Super-resolution Microscopy session.

#### ***Alan Agar Medal for Electron Microscopy - Wanda Kukulski (MRC Laboratory of Molecular Biology, UK)***

The presentation will take place on Tuesday 2 July at 1400, ahead of Wanda's invited talk in the Correlative Microscopy session.

#### ***Medal for Scanning Probe Microscopy - Cyrus Hirjibehedin (MIT, Lincoln Laboratory, USA)***

The presentation will take place on Tuesday 2 July at 1000, ahead of Cyrus' invited talk in the SPM: Advancing Materials Science via Scanning Probes session. Scanwel Ltd have provided Cyrus with a travel bursary to assist his attendance at mmc2019.



### **Poster Prizes**

There are a number of poster prizes up for grabs at mmc2019. The prizes will be in the following categories:

- Physical Sciences
- Life Sciences
- SPM
- EMAG

Poster prizes will be awarded on Thursday 4 July from 1630 prior to Professor Klaus Hahn's plenary talk in Charter 1.

The organisers would like to thank Microscopy & Analysis for their kind sponsorship of the poster prizes.



### **Award Presentations & Prizes**

A number of prestigious awards are being presented at mmc2019, these include:

#### **Honorary Fellowship of the Royal Microscopical Society**

Honorary Fellowships are bestowed by the Society for eminence in microscopy or related branches of science or for exceptional service to science.

An Honorary Fellowship is being presented to Professor Dr Wolfgang Baumeister (Max Planck Institute of Biochemistry) during his plenary talk at mmc2019.

More information about the Honorary Fellowships can be found on the RMS website.

#### **The Pearse Prize**

The Pearse Prize was established by the RMS Histochemistry and Cytochemistry Section (now Life Sciences) in 1982 to honour the contribution made to histochemistry by Professor AGE Pearse. The prize is awarded



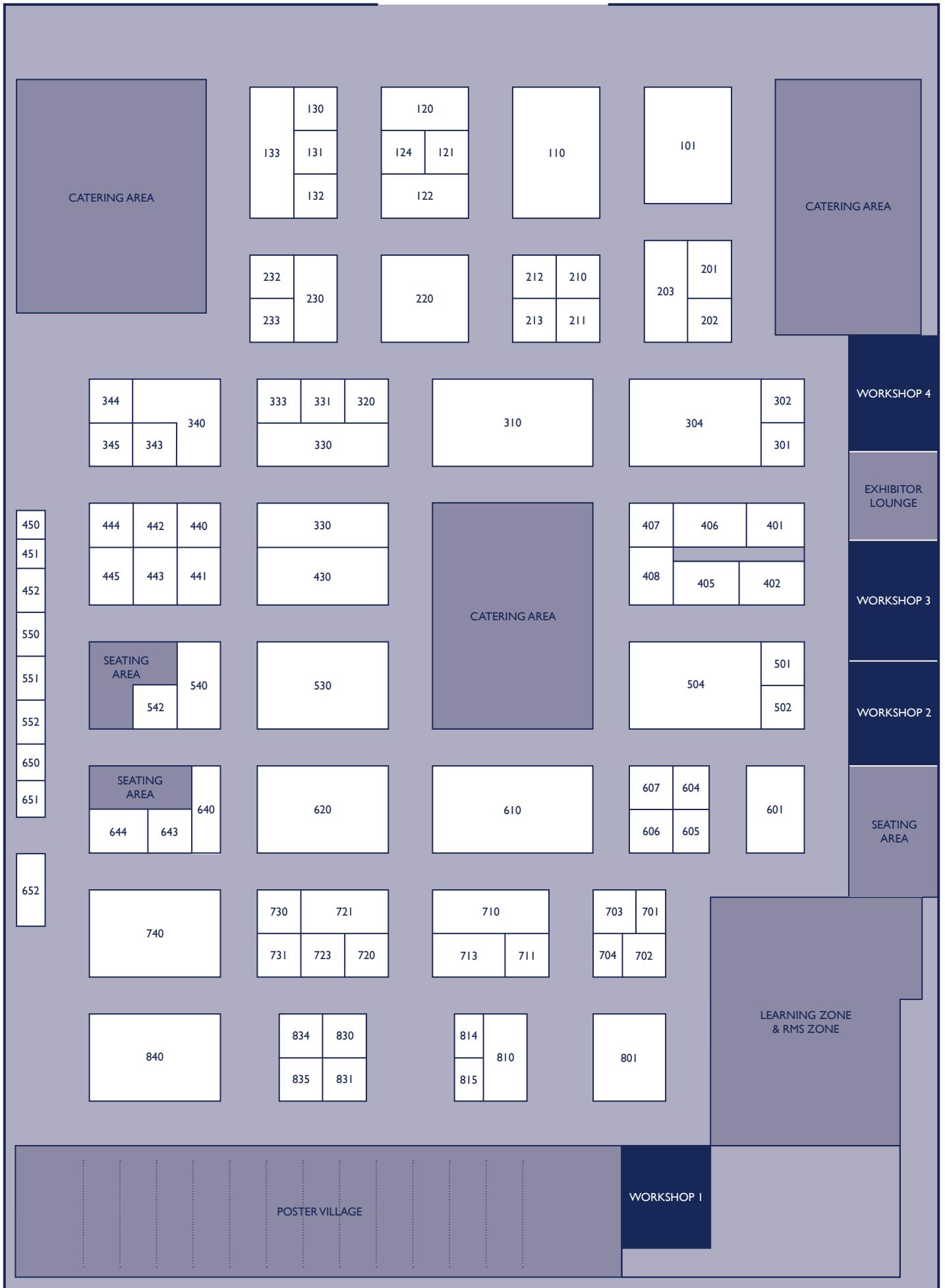
# Commercial Workshop Timetable

Tuesday 2 July					
		Workshop 1	Workshop 2	Workshop 3	Workshop 4
Lunchtime	1100 - 1130	<b>SCREEN</b> <i>Novel Optical Coherence Tomography (OCT) Technology for No-Invasive 3D Ex Vivo Imaging</i>		<b>Media Cybernetics</b> <i>Simplifying Your Advanced Imaging Solutions Using Image-Pro APPS</i>	
	1130 - 1200	<b>Agar Scientific Ltd</b> <i>Microwave Processing Using the BioWave Pro+</i>	<b>SVI Huygens</b> <i>Restoration of Light Sheet Multi-View Data with HUYGENS: The New INTER-ACTIVE LSFM Fusion and Deconvolution Interface</i>	<b>Park Systems &amp; CN Tech</b> <i>Advances in Atomic Force Microscopy: PinPoint Piezo Force Microscope – Frictionless Imaging Technique</i>	<b>Cairn Research Ltd</b> <i>Next Generation Confocal Imaging: A New Spinning Disk for Fast Imaging of Large Field Sizes</i>
	1200 - 1230	<b>Nanomegas</b> <i>Phase &amp; Orientation Imaging and Strain Analysis in TEM: Recent Advances</i>	<b>ZEISS</b> <i>Enabling Deeper Insights in Structural Biology Using Cryo-Correlative Workflows</i>	<b>Andor Technology, an Oxford Instruments Company</b> <i>Sona, a New Back Illuminated sCMOS Camera for the Highest-Sensitivity and Largest Field-Of-View Imaging; Protecting your Specimen from Photobleaching and Toxicity; Maximizing Sampling and Throughput</i>	<b>Bitplane, an Oxford Instruments Company</b> <i>3D Image Visualization and Analysis for Light, Electron and Correlative Microscopy</i>
	1230 - 1300	<b>Leica Microsystems</b> <i>THUNDER – Decode 3D Biology in Real Time</i>	<b>Bruker</b> <i>Point Analysis Quantification: Comparison of EPMA, SEM-EDS, SEM-WDS, Micro-XRF for SEM</i>	<b>Protochips</b> <i>in situ Electrical Characterization of FIB Prepared Semiconductor Devices Under Atomic Resolution Conditions</i>	<b>Olympus</b> <i>scanR AI: Self Learning Microscopy for Life Science</i>
	1300 - 1330	<b>Nikon UK Ltd</b> <i>High Content Imaging Solutions: Capturing High Resolution Images while Increasing Throughput of Experiments</i>	<b>Thermo Fisher Scientific</b> <i>A Revolution in SEM Imaging and Elemental Analysis</i>	<b>CoolLED</b> <i>Am I Using the Best Filter Sets for LED Fluorescence?</i>	<b>Teledyne Photometrics</b> <i>Back-illuminated sCMOS – Reducing Our Reliance on EMCCD</i>
	1330 - 1400	<b>Imagic</b> <i>Your Big Image Data in Experienced Hands: Image Management System - Secure, Versatile, Fast</i>	<b>TESCAN</b> <i>Multi-Modal 3D Microstructure Analysis Using New Generation Plasma FIB-SEM</i>	<b>TVIPS GmbH</b> <i>Electron Counting Mode with Fiber-Optically Coupled Camera System</i>	<b>LUMICKS</b> <i>Adding Function to your Structure with Dynamic Single-Molecule Technologies</i>
	1400 - 1430	<b>ZEISS</b> <i>New Methods for Fast and Gentle Live Cell Imaging in 3D</i>	<b>Thermo Fisher Scientific</b> <i>Cryo-electron Tomography: A Novel Imaging Technique for Cell Biology to Peer at the Inner Workings of Cells</i>	<b>Leica Microsystems</b> <i>Sample Processing for Array Tomography and Related Volume Imaging Techniques</i>	<b>Linkam Scientific Instruments</b> <i>Cryo-fluorescence, Cryo-CLEM and Plunge Freezing: How to Simplify and Improve your Cryo-workflow</i>
	1430 - 1500	<b>3i - Intelligent Imaging Innovations</b> <i>Cleared Tissue LightSheet: Presenting a New Microscope for High Speed, High Resolution Imaging of Cleared Tissue and Whole Organs</i>	<b>WITec GmbH</b> <i>RISE Microscopy – Combining the Advantages of 3D Chemical Raman and SEM Imaging</i>	<b>Stream Bio</b> <i>Conjugated Polymer Nanoparticles: Highly Fluorescent Imaging Agents for Fluorescent Microscopy, Flow Cytometry and Multiple other Cellular Applications</i>	<b>Bitplane, an Oxford Instruments Company</b> <i>3D and 4D Image Visualization and Analysis for Light Sheet Microscopy</i>
Poster Session	1500 - 1530	<b>Exprodo Software Ltd</b> <i>Calpendo, Our Core Facility Management System</i>	<b>Thermo Fisher Scientific</b> <i>Advances in Image Processing Automation in Thermo Scientific Amira Software for Life Sciences</i>	<b>arivis AG</b> <i>Integrated Imaging Platform for Image Analysis and Exploration Via Desktop, Web Based Collaboration and VR Based 4D Interaction</i>	<b>EDAX</b> <i>(R)evolution of EBSD Pattern Detection</i>
	1530 - 1600	<b>DENSsolutions</b> <i>Impulse - Next Generation In Situ Software 'Optimize Your Workflow'</i>			<b>Quorum</b> <i>Studying Nano-Structures by Electron Microscopy - Methods of Coating for Successful Imaging and Elemental Analysis</i>
	1600 - 1630	<b>Gatan</b> <i>GIF Continuum™: New Capabilities and Their Impact on Your EELS and EFTEM Experiments</i>			
	1630 - 1700	<b>Quekett Microscopical Club</b> <i>"New Lamps for Old" Updating Old Microscopes for Current Use and Digital Imaging</i>			

Wednesday 3 July					
		Workshop 1	Workshop 2	Workshop 3	Workshop 4
	1100 - 1130		<b>Thermo Fisher Scientific</b> <i>Advances in 3D Image Processing Automation in Avizo Software for Materials Science</i>	<b>Bitplane, an Oxford Instruments Company</b> <i>3D Image Visualization and Analysis for Light, Electron and Correlative Microscopy</i>	
	1130 - 1200	<b>Tomocube</b> <i>Holotomography: Three-Dimensional Label-Free Imaging of Live Cells and Tissues at High Resolution</i>	<b>Thermo Fisher Scientific</b> <i>Developments in Light Element EDS Analysis Using the Thermo Scientific Pathfinder Microanalysis Platform for Materials Science</i>	<b>Bruker</b> <i>An Alternative Method for Ultrafast EBSD Mapping</i>	<b>Andor Technology, an Oxford Instruments Company</b> <i>Dragonfly High-Speed Confocal for nm to mm Imaging; Latest Developments in this High-Productivity Multi-Modal Imaging Platform</i>
Lunchtime	1200 - 1230	<b>Gatan</b> <i>What's New in Gatan Microscopy Suite® (GMS)?</i>	<b>Exprodo Software Ltd</b> <i>Calpendo Activity Recorders (CAR) for Actual Usage Tracking</i>	<b>EDAX</b> <i>The APEX of EDS and EBSD Data Collection and Analysis</i>	<b>Asylum Research, an Oxford Instruments Company</b> <i>Increased Resolution, Speed and Productivity with the New Oxford Instruments Asylum Research Jupiter XR Large-Sample AFM</i>
	1230 - 1300	<b>Linkam Scientific Instruments</b> <i>Super-Stable Microscope Design for Super-Resolution Light Microscopy on Your Desktop Without an Optical Table</i>	<b>Agar Scientific Ltd</b> <i>Diamond Wire Saws for Microscopy Applications</i>	<b>Thermo Fisher Scientific</b> <i>A New Generation Multiple Ion Species Plasma FIB Technology</i>	<b>SciMed</b> <i>Launch of HIROX Mini SEM and High Resolution RIGAKU CT SCAN for Soft Materials</i>
	1300 - 1330	<b>SVI Huygens</b> <i>New Super-Resolution Advances in HUYGENS: Reliable SMLM, ZEISS Airyscan, and STED Image Processing</i>	<b>Cairn Research Ltd</b> <i>Tilt – A New Angle on Light Sheet Imaging</i>	<b>3i - Intelligent Imaging Innovations</b> <i>Cleared Tissue LightSheet: Presenting a New Microscope for High Speed, High Resolution Imaging of Cleared Tissue and Whole Organs</i>	<b>JEOL UK Ltd</b> <i>Pushing Performance with the Latest JEOL TEM's</i>
	1330 - 1400	<b>Nanomegas</b> <i>Precession Electron Diffraction Tomography and Amorphous Materials Analysis (e-PDF) in TEM</i>	<b>Oxford Instruments - NanoAnalysis</b> <i>Bringing EDS to Life: Using EDS to Analyse Biological Samples</i>	<b>OptoSigma</b> <i>Multipurpose Zoom Microscope</i>	<b>Quorum</b> <i>Studying Nano-Structures by Electron Microscopy - Methods of Coating for Successful Imaging and Elemental Analysis</i>
	1400 - 1430	<b>ZEISS</b> <i>Multimodal Microscopy for Very Large 2D &amp; 3D Imaging</i>	<b>Thermo Fisher Scientific</b> <i>Advances in Image Processing Automation in Thermo Scientific Amira Software for Life Sciences</i>	<b>Nikon UK Ltd</b> <i>High Content Imaging Software: Enhancing Ease and Flexibility of Image Capture</i>	<b>Leica Microsystems</b> <i>Leica Microsystems Digital Microscope Leica DVM6: Facilitating Precise, Repeatable Imaging, Measurement, and Analysis</i>
	1430 - 1500	<b>ZEISS</b> <i>From Nanoparticles to Neuron Segmentation: Accelerating Research Through Digital Technology</i>	<b>CoolLED</b> <i>Am I Using the Best Filter Sets for LED Fluorescence?</i>	<b>KLA-Tencor &amp; CN Tech</b> <i>in situ Nanomechanical Testing for Scanning Electron Microscopy: Critical Design Features and Results</i>	<b>Teledyne Photometrics</b> <i>Back-Illuminated sCMOS – Reducing Our Reliance on EMCCD</i>
	1500 - 1530	<b>Agar Scientific Ltd</b> <i>The Future of Sample Preparation</i>	<b>Leica Microsystems</b> <i>Inspirational Research with the Leica SP8 Platform</i>	<b>Media Cybernetics</b> <i>Image-Pro Solutions for Analyzing Electron Microscopy Images</i>	<b>Protochips</b> <i>Metal Organic Vapor Phase Epitaxy Inside the TEM</i>
	1530 - 1600	<b>Thermo Fisher Scientific</b> <i>UHR-STEM Imaging: How the Latest Developments are Coming Together</i>	<b>TESCAN</b> <i>Multi-Modal 3D Microstructure Analysis Using New Generation Plasma FIB-SEM</i>	<b>NEWTEC Scientific</b> <i>SEM Observation on a Sample Subject to Mechanical and/or Thermal Stress in an Oxidizing Environment or High Vacuum</i>	<b>Olympus</b> <i>X Line - Breaking Optical Barriers with the New Apochromat Objective Series from Olympus</i>
Poster Session	1600 - 1630	<b>Gatan</b> <i>Advances in Cathodoluminescence – Optical Characterization Below the Diffraction Limit</i>	<b>Gatan</b> <i>Advanced Imaging for all TEMs and All Applications: New Generation Cameras from Gatan</i>	<b>LUMICKS</b> <i>Step into the Unresolved: Versatile Tools Towards Real-time Single-molecule Biology</i>	<b>JEOL UK Ltd</b> <i>With Great Microscopy Comes Great Spectroscopy – Analytical Solutions from JEOL</i>
	1630 - 1700	<b>Quekett Microscopical Club</b> <i>"New Lamps for Old" Updating Old Microscopes for Current Use and Digital Imaging</i>			

Thursday 4 July					
		Workshop 1	Workshop 2	Workshop 3	Workshop 4
	1100 - 1130	<b>Linkam Scientific Instruments</b> <i>Solutions for Sample Characterisation, Make More of Your Microscope</i>	<b>Thermo Fisher Scientific</b> <i>Advances in 3D Image Processing Automation in Avizo Software for Materials Science</i>	<b>Fluidigm</b> <i>Simultaneously Detect up to 37 Protein Markers in a Single Tissue Scan with the Hyperion™ Imaging System, Powered by CyTOF® Technology</i>	
	1130 - 1200		<b>ZEISS</b> <i>Solutions for the Challenges of Advanced FIB-SEM Tomography Including Machine Learning Based Segmentation</i>	<b>Zaber Technologies</b> <i>Low-cost Automated Fluorescence Microscopy</i>	

# MAIN ENTRANCE



# Exhibitor List

2BScientific Ltd	450	Gatan	840	OptoSigma Co Exhibitor with Laser 2000 (UK)	445
3i - Intelligent Imaging Innovations	540	GATTAquant Co Exhibitor with Photon Lines Ltd	133	Oxford Instruments - NanoAnalysis Co Exhibitor with Asylum Research, an Oxford Instruments Company, Andor, an Oxford Instruments Company and Bitplane, an Oxford Instruments Company	310
Abberior Instruments Co Exhibitor with Photon Lines Ltd	133	Hamamatsu Photonics	406	Park Systems Co Exhibitor with CN Tech	441
Acutance Scientific Ltd	652	HHV Ltd	550	PCO Co Exhibitor with Photon Lines Ltd	133
Agar Scientific Ltd	710	Hitachi High Technologies Europe	304	Pfeiffer Vacuum Ltd	701
AHF analysentechnik AG	551	HORIBA	201	Photon Lines Ltd	133
Andor, an Oxford Instruments Company Co Exhibitor with Oxford Instruments - NanoAnalysis, Asylum Research, an Oxford Instruments Company and Bitplane, an Oxford Instruments Company	310	HÜBNER Photonics	643	Photonic Science Co Exhibitor with Scintacor	650
Apex Probes Ltd - NanoAndMore GmbH, Newcomers Area exhibiting on Tuesday and Wednesday	601	Hummingbird Scientific	132	Prior Scientific Instruments Ltd	830
Applied Thermal Control	730	Imagic	723	Protochips	210
arivis AG	720	Imagine Optic Co Exhibitor with Photon Lines Ltd	133	Quantum Design UK and Ireland	721
Asylum Research, an Oxford Instruments Company Co Exhibitor with Oxford Instruments - NanoAnalysis, Andor, an Oxford Instruments Company and Bitplane, an Oxford Instruments Company	310	Imaging & Microscopy Co Exhibitor with Microscopy & Analysis	801	Quekett Microscopical Club	702
Aurox Ltd	344	Instruct- ERIC, Newcomers Area exhibiting on Tuesday and Wednesday	601	Quorum	120
BioStatus Limited	651	Integrated Dynamics Engineering	703	Reading Scientific Services Limited (RSSL)	401
Bitplane, an Oxford Instruments Company Co Exhibitor with Oxford Instruments - NanoAnalysis, Asylum Research, an Oxford Instruments Company and Andor, an Oxford Instruments Company	310	Integrated Optics, UAB	542	Royal Microscopical Society	RMS Zone
Blue Scientific Limited	640	International Labmate Limited	814	Scanwel Ltd	202
Bragg Centre for Materials Research, University of Leeds	333	ISS Group Services Ltd	442	SciMed	834
Bruker	620	JAI A/S	501	Scintacor	650
Cairn Research Ltd	130	JEOL UK Ltd	110	SiriusXT Ltd	711
Cambridge University Press	124	KEYENCE UK Ltd	203	SmarAct GmbH	644
CN Tech	430; 441; 443	KLA-Tencor Co Exhibitor with CN Tech	443	SPI Supplies	211
ConnectomX Ltd	451	Klocke Nanotechnik GmbH Co Exhibitor with Acutance Scientific	652	Spicer Consulting Limited	405
CoolLED	212	Labtech International	330	Starlight Xpress Ltd	452
COXEM Co Exhibitor with CN Tech	430	Lambda Photometrics Ltd	810	Stream Bio Co Exhibitor with 2BScientific Ltd	450
CrestOptics	131	Laser 2000 (UK)	445	SVI Huygens	121
DEBEN UK Ltd	408	LaVision BioTec GmbH	607	Swift Instruments Co Exhibitor with CN Tech	430
Delong Instruments	302	Leica Microsystems	740	Systron EMV GmbH	233
DENSsolutions Co Exhibitor with Quantum Design UK and Ireland	721	Linkam Scientific Instruments	713	Teledyne Photometrics	320
Direct Electron	232	LUMICKS	831	TESCAN	101
EDAX	340	Märzhäuser Wetzlar GmbH & Co. KG	230	Thermo Fisher Scientific	504
Electron Microscopy Sciences & CN Tech	430	Media Cybernetics	402	Thistle Scientific, Newcomers Area exhibiting on Thursday	601
EM Analytical Ltd	213	Microscopy & Analysis Co Exhibitor with Imaging & Microscopy	801	Thorlabs Ltd	122
EM Systems Support Ltd	606	MMI, Newcomers Area exhibiting on Tuesday and Wednesday	601	TMC Vibration Control Co Exhibitor with EDAX	340
EMSIS GmbH	407	NanoMagnetics Instruments Ltd	502	Tokai Hit Co Exhibitor with Photon Lines Ltd	133
Evactron® by XEI Scientific Co Exhibitor with CN Tech	430	Nanomegas Co Exhibitor Quantum Design UK and Ireland	721	Tomocube Co Exhibitor Quantum Design UK and Ireland	721
Exprodo Software Ltd	704	Nanosurf	605	TVIPS GmbH	440
Fluidigm	731	NANOVISS, Newcomers Area exhibiting on Tuesday and Wednesday	601	Vac Coat	604
		NEWTEC Scientific	815	Vironova	301
		Nikon UK Ltd	530	WITec GmbH	331
		Nu Nano Ltd	835	Zaber Technologies Co Exhibitor with Laser 2000 (UK)	445
		Olympus	220	ZEISS	610
		Omicron Co Exhibitor with Photon Lines Ltd	133		