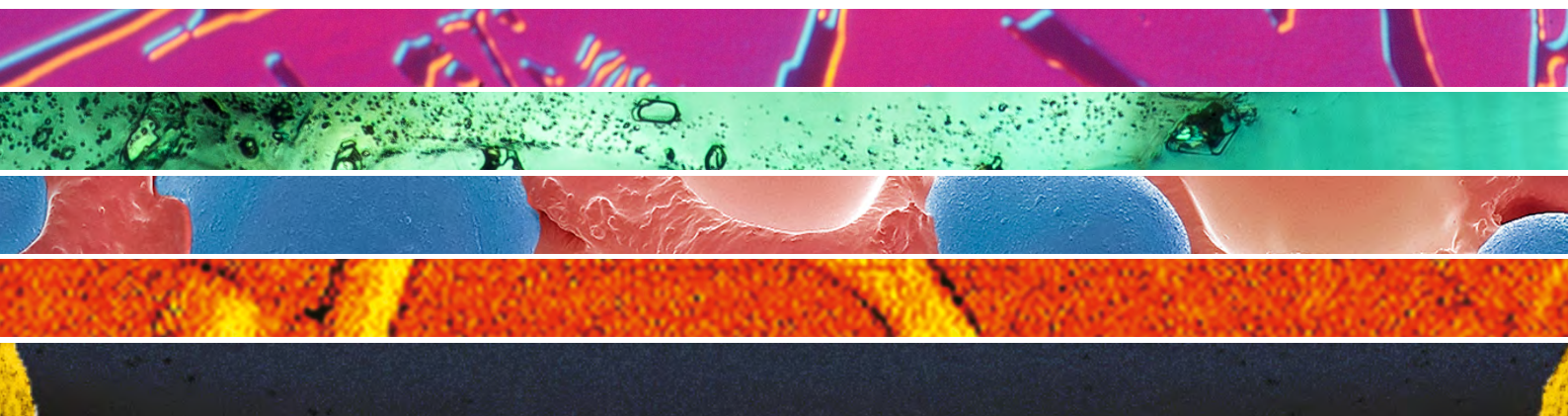




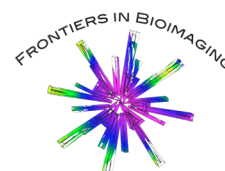
Microscience Microscopy Congress

incorporating **EMAG 2021**



5 - 9 July 2021 | Online

Conference Programme



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Meetings & Workshops

Monday 5 July 2021, Workshops

Two mmc2021 workshops will take place on Monday 5 July. They are a great way to learn the most up-to-date tips and techniques to help with your research.

ImageJ Workshop

1330 - 1630

Scientific Organiser: Dr Kees Straatman

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 will give a brief introduction on the use of ImageJ/Fiji. Please have Fiji installed on your laptop.

EMAG Workshop - Using Hyperspy for spectroscopy data cubes

1330 - 1630,

Scientific Organisers: Dr Laura Clark & Dr Jo Sharp

This workshop will introduce participants to the analysis of spectrum image data using the open-source python HyperSpy library. By the end of this workshop, you will be able to use Hyperspy to analyse EDS and EELS data, including visualising spectra and elemental maps, in addition to extracting quantitative information on composition and bonding state. No previous knowledge of Python is necessary.

Monday 5 July 2021, 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 mmc2021 these will include:

BiolmagingUK Meeting - Monday 5 July

1330 - 1630

This meeting taking place on Monday afternoon, will provide 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 and industrial/institute collaboration partners 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

1330 - 1700

Scientific Organiser: Dr Liam Rooney, Heriot-Watt University, with the assistance of the ECC

The RMS Early Career Pre-Conference Symposium is an event for early career microscopists (students and post docs) to network and present their work ahead of the main mmc conference. We will accept abstracts from early career researchers to present their research, with a focus on introducing the microscopy techniques used in their work.

The meeting will include two keynote lectures, one being the first Early Career Award winner Dr Kevin Whitley (Newcastle University), a panel discussion and the first RMS Early Career Committee Annual General Meeting.

Overall this will be a fantastic opportunity to meet fellow microscopists ahead of mmc2021, and we hope to see you there.

Friday 9 July, Satellite Meetings

Virtual Super-Resolution Workshop

12:30 - 17:00

Scientific Organisers: Professor Michelle Peckham and Dr Hari Shroff

Designed to talk about the current challenges in developing and using super-resolution microscopy with short talks and lots of time for discussion, this year the workshop will be split into 2 sessions, focussing on the topics of 'using machine learning and AI in super-resolution imaging' and the other will be 'expansion microscopy'. Thoughts and ideas are encouraged to help define what is good/best practice around these challenges, and give an insight into future potential developments.

Phototoxicity Workshop

14:00 - 17:00

Scientific Organisers: Dr Philippe Laissue, Dr Claire Brown and Professor Maddy Parsons

In fluorescence microscopy, phototoxicity describes the phenomenon by which the light used for fluorescence excitation leads to physiological changes in the observed living sample. These changes may go unnoticed or may damage the sample - and can lead to erroneous conclusions drawn from the experiment. In this workshop, we give participants an overview of the problem of phototoxicity. We aim to first give you the basics to better understand phototoxicity - from useful definitions (phototoxicity, intensity, exposure etc.) to key concepts. We then discuss some concrete approaches for assessing, minimising and reporting phototoxicity in different live imaging experiments. As this is a very broad area - with a challenging diversity of different biological model systems (e.g. cells, small organisms, plants...), fluorescent probes and microscope modalities - we include many references to relevant literature. We end with a summary of key considerations - and hope to have ample time for engaging discussions!

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 mmc2021 are:



Frontiers in Bioimaging 2021

The annual meeting in the successful Frontiers in Bioimaging series will be held during mmc2021.

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 6 & 7 July, they are:

- Development and Applications in Super Resolution Microscopy
- Lightsheet Microscopy: Development and Application
- Correlative imaging of Organelle Organization and Architecture
- Quantifying Dynamic Movement in Living Cells



RMS AFM & SPM Meeting

The Annual RMS Atomic Force Microscopy & Scanning Probe Microscopy Meeting will be held during mmc2021. This meeting is unmissable for anyone using AFM or SPM in their work or studies and will cover a wide range of topics associated with AFM or SPM including main techniques such as atomic force microscopy and scanning tunnelling microscopy as well as more specialised versions.

The AFM & SPM conference sessions at mmc2021 are taking place on 6 & 7 July, they are:

- SPM Techniques on Energy Materials and Processes
- New Frontiers in Quantum Matter Visualization
- Functional Scanning Probe Microscopy for Advanced Material Science
- Quantitative SPM for Biology, Biomedicine, and Bioinspired Technologies

IOP | Institute of Physics Electron Microscopy and Analysis Group

EMAG 2021

Organised by the Institute of Physics' Electron Microscopy and Analysis Group (EMAG), the 2021 EMAG conference will be part of mmc2021.

In keeping with the established EMAG traditions, EMAG 2021 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.

The EMAG 2021 conference sessions at mmc2021 are taking place throughout the three days and are as follows:

- 2D Materials
- Spectroscopy & Advanced SEM
- Energy and Energy Storage Materials
- Automated Control, Advanced Data Processing
- Soft and Hybrid Materials
- Electron Crystallography and Diffraction
- Functional Materials
- Instrumentation Development (incl Detector Technology) 4D-STEM
- *in-situ* microscopy

Conference Sessions

The conference at mmc2021 will consist of six parallel streams comprising 36 sessions, with excellent speakers and vibrant supporting poster sessions.

The conference sessions are as follows:

AFM & Scanning Probe Microscopies Sessions

AFM/SPM: SPM Techniques on Energy Materials and Processes

Session Chair: Professor Ulrich Stimming (Newcastle University, UK)

This session will bring together researchers from the Scanning Probe Microscopy community that are engaged in studying problems relating to energy. All researchers applying techniques, such as AFM, STM, scanning Kelvin probes, SECPM and more to energy related aspects are invited to submit their contributions. It is the goal of the session to demonstrate how the various SPM techniques are able to study materials as used in energy conversion and storage devices. SPM techniques can often be used under in-situ conditions, i.e. under control of the potential in electrochemical systems; this carries clear advantages compared to any vacuum-based characterisation techniques. It would be an important goal of the session to demonstrate the advantages of the in-situ approach.

Invited Speakers: Dr Wing Chung Tsoi (Swansea University, UK), Professor Dr Andreas Bund (Technische Universität Ilmenau, Germany)

AFM/SPM: New Frontiers in Quantum Matter Visualization

Session Chair: Professor Séamus Davis (University of Oxford, UK)

This session will focus on newly developing and highly advanced techniques for atomic-scale visualization of electronic quantum matter. These include scanned Josephson tunneling microscopy, scanned shot-noise microscopy, scanned Fano spectroscopy and quantum-phase resolved quasiparticle interference imaging. Areas of application for these techniques include studies of strongly-correlated electron fluids, strongly-correlated superconductors with complex order parameters, and strongly-correlated electronic liquid crystals or electron-pair crystals.

Invited Speakers: Dr Freek Massee (Cnrs, France), Dr Hermann Suderow (Universidad Autónoma De Madrid, Spain)

AFM/SPM: Functional Scanning Probe Microscopy for Advanced Material Science

Session Chair: Dr Olga Kazakova (National Physical Laboratory, UK)

This session will bring together researchers in physics, material science, instrumentation, machine learning, computing and beyond, linked by a common interest in the role of SPM to elucidate new physical phenomena. Researchers from industry, academia and research institutions will present their latest developments to foster new ideas and collaborations across multiple disciplines. Submissions covering all forms of SPM techniques, instrumentation and application are welcome, including (but not limited to) SPM for Quantum (incl. magnetic) systems and 2D materials beyond graphene, novel instrumentation and techniques, functional imaging and spectroscopy, advanced data processing, big data, Machine learning, AI in SPM, theory and simulations.

Invited Speakers: Dr Laura Fumagalli (University of Manchester, UK), Professor Frank Köppens (ICFO Institute Of Photonic Sciences, Spain)

AFM/SPM: Quantitative SPM for Biology, Biomedicine, and Bioinspired Technologies

Session Chair: Professor Brian Rodriguez (University College Dublin, Ireland)

Scanning probe microscopy (SPM) has found wide application in basic and applied biology-related research owing to its capacity for quantitative imaging and spectroscopy of a diverse set of functional properties at the micro- and nanoscale. The high resolution and high force sensitivity of SPM modes and the ability of SPM to operate in physiological conditions, at high speeds, and in conjunction with optical microscopy have made it an indispensable tool, suited to the wide ranging needs of biological research from single proteins to complex heterogeneous materials and biological systems including living cells, tissues, tumours, viruses, bacteria, plants, fungi, etc. The use of SPM for biological research has long been a driving force for application and technique development, and advances in correlative microscopy and multiparametric modes provide opportunities for further contributions in methodology, instrumentation, and analysis. Speakers in this

session will showcase how they are using SPM, including structural, nanomechanical, and electrical imaging and spectroscopy modes as well as ion conductance microscopy, to address challenges in biological, biomedical, and bioinspired research.

Invited Speakers: Dr Laia Pasquina-Lemonche (University Of Sheffield, UK), Dr Pedro J De Pablo (Universidad Autónoma De Madrid, Spain)

Frontiers in Bioimaging Sessions

Frontiers in Bioimaging: Development and Applications in Super Resolution Microscopy

Session Chair: Dr Jessica Valli (Heriot-Watt University, UK)

The emergence of super resolution light microscopy techniques in the last quarter-century has allowed researchers to probe further into the hitherto unseen depths of biology and 'resolve' many previously-unanswered questions. While there are now several commercially-available super resolution systems, these techniques are still anything but mundane, and new developments continue to push the limits of resolution closer to those achievable by electron microscopy. This session will focus on both the most recent developments in super resolution microscopy and the applications of these techniques to biological frontiers.

Invited Speakers: Professor Dr Markus Sauer (University Of Würzburg, Germany), Dr Katrin Willig (Max Planck Institute, Germany)

Frontiers in Bioimaging: Lightsheet Microscopy: Development and Application

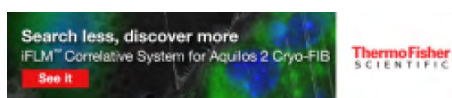
Session Chair: Dr Mike MacDonald (University of Dundee, UK)

Lightsheet microscopy has been with us for over a century, but it is the recent advances in camera technology and computational power that have allowed it to flourish. Initially driven largely by the demand for live, widefield, volumetric imaging in developmental biology, lightsheet imaging is now a tool which is used in a wide variety of applications. In fact, it has even been recently used for histopathological studies of COVID-19. This more established status has not stopped lightsheet imaging from evolving technologically and this session will focus on, and welcome submissions covering,

the development through to the application of lightsheet imaging, and especially those doing both.

Invited Speakers: Dr Caren Norden (Instituto Gulbenkian De Ciência, Portugal), Professor Dr Alexander Rohrbach (Imtek, University of Freiburg, Germany)

This session is kindly sponsored by Thermo Fisher Scientific



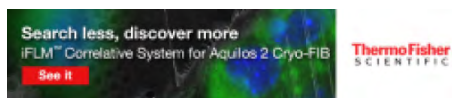
Frontiers in Bioimaging: Correlative imaging of Organelle Organization and Architecture

Session Chair: Dr Sebastian Munck (VIB Bio Imaging Core KU Leuven, Belgium)

In this session, we bring together the latest news on correlative imaging. We will be exploring the interface of cell and structural biology by combining the power of different approaches. Talks will be highlighting different approaches to study cellular organization, including the architecture of the membranes, compartmentalization, and how organelle architecture directs molecular function. In addition, we will emphasize the correlative aspects of the techniques employed and how to combine them efficiently. Among the methods, we will be discussing is cryo-electron tomography to visualize macromolecules directly and *in situ* and how to leverage this information in combination with, for example, the selectivity of fluorescence approaches to analyze molecular organization within the cell at the scale of single molecules.

Invited Speakers: Dr Kristina Micheva (Stanford University, USA), Dr Benjamin Engel (Helmholtz Zentrum München, Germany)

This session is kindly sponsored by Thermo Fisher Scientific



Frontiers in Bioimaging: Quantifying Dynamic Movement in Living Cells

Session Chair: Dr Steve Briddon (University of Nottingham, UK)

The precise co-ordination of molecular interactions in cell compartments fundamentally defines cell behaviour. These movements and interactions between proteins, peptides, lipids and DNA in live cells can be quantified and described using a range of advanced imaging methods, such as Resonance Energy Transfer (RET) techniques (FRET/FLIM), fluorescence fluctuation approaches (FCS etc.) and single particle tracking (SPT). The huge expansion in the availability of these techniques have transformed quantitative biology and allowed robust means to characterise spatiotemporal changes in molecular interactions. This session welcomes studies using advanced or novel techniques in this area, particularly those targeted to living cells.

Invited Speakers: Professor Philipp Kukura (University Of Oxford, UK), Dr Vladana Vukojevic (Karolinska Institute, Sweden)

Life/Physical Sessions

Imaging in Development and Disease

Session Chair: Dr Brian Stramer (King's College London, UK)

Our ability to image cells in fixed and living tissues is transforming our view of embryogenesis and disease progression. This session aims to highlight the latest developments of high-resolution tissue imaging, which examines either live or fixed samples across a range of spatial and temporal scales. Contributions to this session are encouraged from any area of research where imaging techniques are being applied to the study of animal development and normal or pathological physiology.

Invited Speakers: Dr Yanlan Mao (University College London, UK), Dr Colinda Scheele (VIB-KU Leuven Center for Cancer Biology, Belgium)

Up Close with the Enemy: Imaging Pathogen-host Dynamics

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

The continuous technology development in both light and electron microscopy and the use of correlative microscopy (combining

different types of microscopy) have provided exciting opportunities to address novel and important questions relating to the cellular structure of human pathogens and their relationship with the host, both *in vitro* and *in vivo*. This session aims to bring the recent works in pathogen imaging and analysis and show how advanced microscopic techniques are continuing to provide far-reaching insights into the biology of pathogens.

Invited Speakers: Dr Maximiliano Gutierrez (The Francis Crick Institute, UK), Professor Torsten Ochseneiter (University of Bern, Switzerland)

This session is kindly sponsored by FocalPlane



Seeing is Believing – Multiplexed Imaging Flow Cytometry

Session Chair: Dr Ziv Porat (Weizmann Institute of Science, Israel)

Imaging Flow Cytometry (IFC) combines the information-rich imagery of microscopy with the high-throughput, statistically robust strength of Flow Cytometry. IFC can simultaneously image up to 10 fluorescent channels as well as bright field and dark field images, at a rate of up to 5000 cells/sec. In addition to rapid, uniform high-resolution and multi-parametric acquisition, IFC has special advantages in identification of rare populations and hard-to image cells. This session will showcase state-of the art, novel applications demonstrating the unique abilities and advantages of IFC across a broad base of biological fields.

Invited Speakers: Dr Orla Maguire (Roswell Park Cancer Institute, USA), Dr Yoav Shechtman (Israel Institute of Technology, Israel)

This session is kindly sponsored by Luminex



High-plex Cytometry

Session Chair: Dr Karen Hogg (University of York, UK)

High-plex imaging cytometry enables the scrutiny of cells using a high number of quantitative characteristics whilst maintaining their spatial locations. Probes specific for molecular and protein targets provide information of cellular interactions in complex biological systems such as cancer, immunology, cell development, infection and disease. Recent advances in imaging technologies have led to the deep profiling of the tissue microenvironment, the identification of new biomarkers and previously unknown cellular interactions that would have been previously lost in dissociated tissue. Speakers shall provide an expert insight into this application-rich form of imaging and how it has been of benefit to their research.

Invited Speakers: Dr Nidhi Sharma Dey (University of York, UK), Dr Jan Roger (Glaxosmithkline, UK)

Volume Microscopy in Physical and Life Sciences

Session Chair: Xiangli Zhong (University of Manchester, UK) & Dr Saskia Lippens (VIB Ghent, Belgium)

Volumetric microscopy has become one of the most prominent subjects in both the Physical, as well as the Life Sciences, enabled by the rapid development of innovative tools for 3D imaging and spectroscopy such as analytical focused ion beam (FIB) systems for serial sectioning. Three dimensional visualisation significantly enhances our understanding from the macroscopic to the sub-nanometer level in a wide range of systems from metals via ceramics to biocomposites, biominerals and soft biological tissues. The close interaction between Physical and Life Sciences has been an important driver for this progress irrespective of length scale or resolution of the technique. Besides FIB-based methods, relevant examples of emerging techniques include serial-section SEM and TEM, electron Tomography, X-ray micro- and nano-CT, array tomography and gridTAPE TEM. This session containing both contributed and invited talks and posters discusses recent advances in volumetric characterisation techniques using ion beams, X-rays and electrons and focuses on recent novel applications. This session is linked to a separate specific FIB & Sample Preparation workshop which discusses

approaches and problems associated with FIB applications and sample preparation methods which enable volume microscopy.

Invited Speakers: Professor Roland Kröger (University of York, UK), Professor Philip Withers (Henry Royce Institute, University of Manchester, UK)

X-ray Microscopy: A Powerful Tool to aid the Understanding of Structures in Life and Physical Sciences

Session Chair: Dr Liz Duke (EMBL Hamburg, Germany)

Thanks to Roentgen's work in 1895 the use of X-rays as a research tool in the life and physical sciences is not new. However in recent years their use has increased, particularly but not exclusively in the area of X-ray imaging, aided by developments in many areas including sample preparation, detector technology and availability of commercial laboratory based microscopes. In this session we aim to explore the use of X-ray microscopy in life and physical sciences. We look forward to hearing from those who have used X-rays in their work either as a single technique or in conjunction with other microscopy techniques. The session will be bookended by invited talks. A further three talks will be selected from submitted abstracts and three posters will be chosen for flash talks.

Invited Speakers: Dr Julia Parker (Diamond Light Source, UK), Dr Alexandra Pacureanu (ESRF The European Synchrotron, France)

This session is kindly sponsored by Norcada.



Machine Learning for Image Analysis

Session Chair: Dr Martin Jones (The Francis Crick Institute, UK)

Artificial intelligence based methods, such as machine learning and deep learning, have revolutionised many aspects of image analysis in a broad range of subject areas. As the different communities get to grips with the technical implementation of these methods, there has been a shift in focus to getting

cutting-edge tools into the hands of domain experts, who are often not computational experts, with improvements in workflows and accessibility. This session will focus on state-of-the-art AI based image analysis methods and efforts to ensure these tools are made accessible to the wider communities in both life and physical sciences.

Invited Speakers: Dr Kwasi Kwakwa (European Molecular Biology Laboratory -EBL UK), Deborah Schmidt (MPI of Molecular Cell Biology and Genetics, Germany)

This session is kindly sponsored by Thermo Fisher Scientific



Chemical Imaging of Biological Samples using Electron, Ion and X-ray based Techniques

Session Chair: Dr Errin Johnson (University of Oxford, UK)

Microanalysis methods, such as Energy Dispersive X-ray spectrometry (EDS), Electron Energy Loss Spectroscopy (EELS) and Nano-Secondary Ions Mass Spectroscopy (NanoSIMs) are more traditionally associated with physical science than biological applications. However, this is starting to change, with these techniques and others, such as Synchrotron Radiation X-ray Fluorescence (SRXRF), increasingly being used to link chemical composition with ultrastructure in biological samples. For instance, EDS has recently been used to identify secretory cells in pancreatic islets by the elemental makeup of their granules, while NanoSIMs can pinpoint the cellular locations of isotope-labelled metabolites, hormones, drugs and lipids. This interdisciplinary session will include talks from physical scientists and biologists who are applying these techniques to a variety of biological and biomedical samples. It will cover biological sample preparation requirements for chemical imaging, potential challenges, opportunities for multimodal imaging and application examples.

Invited Speakers: Dr Ben Giepmans (University Medical Center Groningen, Netherlands), Dr Katie Moore (University of Manchester, UK)

Label Free Imaging

Session Chair: Dr Natalie Belsey (National Physical Laboratory, UK)

Label-free approaches have provided valuable new tools for structural and chemical visualisation of systems where labelling is not possible or desirable, for example medical imaging and other *in situ* applications. These powerful techniques have also enabled the study of systems where the presence of a tag would cause excessive perturbation to the sample, for example small molecule pharmacokinetics. This session welcomes a broad range of label-free optical microscopy techniques, such as vibrational spectroscopic imaging, multiphoton imaging, Brillouin scattering, interference and phase-contrast microscopies and holotomography. Particular consideration will be given to the elucidation of quantitative information using these methods.

Invited Speakers: Professor Minbiao Ji (Fudan University, China), Professor Malgorzata Kujawinska (Warsaw University of Technology, Poland)

3D+ Image Analysis

Session Chair: Dr Chas Nelson (gliff.ai, UK)

Imaging and microscopy in both the life and physical sciences spans dimensions including 3D imaging or the inclusion of temporal or spectral information and often all three. Analysing data in these higher dimensions comes with its own challenges and often requires bespoke mathematical and algorithmic solutions. This session will focus on state-of-the-art image analysis that enables scientists from both life and physical sciences to answer scientific questions in a quantitative fashion from multidimensional imaging.

Invited Speakers: Dr Perrine Paul-Gilloteaux (Université De Nantes, France), Dr Daniel Baum (Zuse Institute Berlin, Germany)

This session is kindly sponsored by Thermo Fisher Scientific

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S C I E N T I F I C

Software and Smart Microscopy

Session Chair: Dr Siân Culley (University College London, UK)

The modern bioimaging pipeline requires analysis throughout the process - from integrating image analysis into acquisition, e.g. smart microscopy, through to software solutions for the range of quantification pipelines necessary to glean new scientific insights from imaging. This session will focus on state-of-the-art software solutions for automated microscopy and quantitative imaging and post-acquisition analysis.

Invited Speakers: Dr Leila Muresan (Cambridge Advanced Imaging Centre, UK), Dr Martin Weigert (EPFL, Switzerland)

This session is kindly sponsored by Thermo Fisher Scientific

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S C I E N T I F I C

Operando Microscopy

Session Chair: Dr Hannah Nerl (Fritz-Haber Institute of the Max Planck Society, Germany)

Functional materials cannot be studied reliably when removing materials from their reaction environment. Recent operando studies aim to address this by correlating structure and function of materials under working conditions. Significant technical advances in instrumentation have led to the development and improvement of a range of operando techniques with great impact across scientific fields. These operando approaches have already been shown to allow for the visualization and analysis of materials during synthesis, degradation or function in well-defined environments. Aside from electron microscopy, relevant examples of emerging and improved operando techniques include X-ray microscopy, scanning probe microscopy, light microscopy and atomic force microscopy. This session will contain contributed and invited talks and posters that aim to highlight recent technical advances in operando approaches and the resulting science while

studying a range of materials including 2D materials, nanoparticles and catalysts.

Invited Speakers: Dr Irene Groot (Leiden University, Netherlands), Dr Thomas W Hansen (DTU Nanolab, Technical University of Denmark, Denmark)

This session is kindly sponsored by Norcada

NORCADA

Advanced Atom Probe Tomography

Session Chair: Professor Michael Moody (University of Oxford, UK)

Underpinned by advances in instrumentation, experimental protocols and increasingly sophisticated data analysis, Atom Probe Tomography (APT) is now an indispensable characterisation tool in laboratories around the world. The improved capabilities have broadened the scope of investigations and increased the depth of achievable atomic-scale insights. This has nucleated entirely new lines of research, including application to a wider range of material systems (biological, ceramics, functional materials) and the study of degradation of material microstructure subject to extreme conditions (irradiation, corrosion, hydrogen ingress). This session welcomes submissions pertaining to advanced applications of APT and in particular studies incorporating novel uses of complementary microscopy techniques to enable and enhance APT characterisation.

Invited Speakers: Dr Baptiste Gault (Max-Planck-Institut Für Eisenforschung in Düsseldorf, Germany), Professor Rachel Oliver (University of Cambridge, UK)

Diamond Light Source Sessions

Session Chairs: Professor Angus Kirkland (University of Oxford, UK) and Dr Peijun Zhang (University of Oxford, UK)

Diamond Light Source is the UK's national synchrotron user facility with 32 beamlines along with two state-of-the-art electron microscopy laboratories (eBIC for cryo-EM and ePSIC for aberrationcorrected transmission electron microscopy). Users at Diamond have access to a wide range of cutting edge experimental techniques in

microscopy and spectroscopy across multiple length scales, including X-ray imaging, hard and soft X-ray microscopy, XANES and XRD mapping, tomography, and phase-retrieval techniques such as ptychography and coherent diffraction imaging. These have wide ranging applications in fields from biology, environmental, earth and planetary sciences, to materials science and engineering. As for cryo-EM, eBIC provides cryoEM single particle analysis, cryo-electron tomography, electron crystallography, and cryoFIB/SEM. Through this session we aim to showcase a selection of user studies conducted at Diamond, with an introductory staff presentation briefly discussing some of the capabilities and access routes.

Invited Speakers: Dr Sean Collins (University of Leeds, UK), Professor James Naismith (University of Oxford, UK), Professor Mary Ryan (Imperial College London, UK)

Late Breaking

Session Chair: Professor Gail McConnell (University of Strathclyde, UK)

Late breaking submissions are invited to report the very latest results in microscopy. This abstract deadline is not intended to be merely an extension of the general submission deadline: instead this session provides an opportunity for researchers to present the most exciting recent developments in the field.

EMAG 2021 Sessions

2D Materials

Session Organisers: Sarah Haigh and Andy Brown

Spectroscopy & Advanced SEM

Session Organisers: Miryam Arredondo and Cornelia Rodenburg

Energy and Energy Storage Materials

Session Organisers: Joanne Sharp and Donald Maclaren

Automated Control, Advanced Data Processing

Session Organisers: Sarah Harper and Jun Yuan

Soft and Hybrid Materials

Session Organisers: Laura Clark and Andy Brown

Electron Crystallography and Diffraction

Session Organisers: Richard Beanland and Joanne Sharp

Functional Materials

Session Organisers: Ana Sanchez and Miryam Arredondo

Instrumentation Development (incl Detector Technology)

Session Organisers: John Rodenburgh and Laura Clark

4D-STEM

Session Organisers: Donald Maclaren and Ana Sanchez

This session is kindly sponsored by Quantum Design UK and Ireland



in-situ microscopy

Session Organisers: Cornelia Rodenburg and Jun Yuan

EMAG Invited Speakers

Professor Sarah Haigh (University of Manchester, UK)

Professor Ido Kaminer (Technion - Israel Institute of Technology, Israel)

Dr Demie Kepaptsoglou (SuperSTEM Laboratory In Daresbury, UK)

Dr Emanuela Liberti (The Rosalind Franklin Institute, UK)

Dr Donald Maclaren (University of Glasgow, UK)

Dr Eliška Materna Mikmeková (Institute of Scientific Instruments of The Czech Academy Of Sciences, Czech Republic)

Dr Lukáš Palatinus (FZU, Institute of Physics Of The Czech Academy of Sciences, Czech Republic)

Professor John Rodenburg (University of Sheffield, UK)

Dr Lorena Ruiz-Perez (University College London, UK)

Dr Steven R Spurgeon (Pacific Northwest National Laboratory, USA)

Dr Andy Stewart (Department of Physics and Bernal Institute, University of Limerick, Ireland)

Dr Toma Susi (Faculty of Physics, University of Vienna, Austria)

Plenary Speakers

Confirmed plenary speakers at mmc2021:



Professor Buzz Baum

MRC-LMB, UK

Buzz studied Biochemistry at St Catherine's College, Oxford. He worked on the yeast cell division cycle during his PhD (1993-1997)

with Paul Nurse at Cancer Research UK, then on fly cell shape with Norbert Perrimon at Harvard Medical School for his post-doc. In 2001 he was awarded a Royal Society URF to return to the UK as a group leader. In 2007 his team moved to UCL's MRC Laboratory for Molecular Cell Biology, where he also served as Director of UCL's Institute for the Physics of Living Systems. Most recently, in 2020, he moved to the LMB in Cambridge where he now has his lab.

Presentation Title - Imaging hell: studying the cell biology of micron-sized archaea that grow at 75°C to shed light on the evolution of cell division
09:00 - 09:45 BST, Wednesday 7 July, 2021



Professor Joanne Etheridge

Monash University, Australia

Joanne Etheridge is the Director of the Monash Centre for Electron Microscopy and Professor in the Department of

Materials Science and Engineering at Monash University. She obtained a degree and PhD in physics from the University of Melbourne and RMIT University, respectively, before appointments at the University of Cambridge in the Department of Materials Science and Metallurgy and Newnham College, including a Rosalind Franklin Research Fellowship and a Royal Society University Research

Fellowship. She returned to Melbourne to join Monash University where she established the Monash Centre for Electron Microscopy. She conducts research in the theory and development of new electron scattering methods for determining the atomic and electronic structure of condensed matter. She also applies these methods to the study of structure-property relationships in functional materials, including including ion-conducting, photoactive, plasmonic and semiconductor systems. She is a Fellow of the Australian Academy of Science.

Professor Joanne Etheridge is the EMAG Plenary Speaker at mmc2021

Presentation Title - Finding the atoms that matter in functional materials - adventures with 4D-STEM

09:00 - 09:45 BST, Thursday 8 July, 2021



Professor Janet Iwasa

University of Utah, USA

Janet Iwasa is an Assistant Professor in the Biochemistry Department at the University of Utah. Her group, the Animation Lab,

is broadly interested in creating accurate and compelling molecular visualizations that will support research, learning and scientific communication. After receiving a Ph.D. from the University of California, San Francisco for studies of the actin cytoskeleton in Dyche Mullins' lab, she completed a postdoc with Jack Szostak (Massachusetts General Hospital and Harvard Medical School) where she focused on visualizations of the origins of life. Before moving to Utah, she worked on molecular visualizations as a faculty member in the Cell Biology department in Harvard Medical School.

Presentation Title - Animating Molecular Machines

17:00 - 17:45 BST Thursday 8 July, 2021



Dr Olga Ovchinnikova

Oak Ridge National Laboratory, USA

Dr Olga Ovchinnikova graduated from the University of Tennessee, Knoxville (UTK) with a B.S and M.S. degrees

in physics. She received her PhD from the University of Tennessee, Knoxville in Chemical Physics where her research focused on developing chemical imaging approaches supported by a Chemical Physics Fellowship. Following her postdoc at ORNL, she worked as R&D Scientist and Chemical Imaging Team Lead at the Center for Nanophase Materials Sciences (CNMS) at ORNL. Her team focused on investigating relationships between physical structure and chemical functionality at the nanoscale through the unique merger of advanced scanning probe and ion microscopy with chemical imaging techniques rooted in innovative data processing, machine learning and control algorithms. Currently she is a Senior R&D scientist and the Group Leader of the Multimodal Data Analytics group in the Computational Sciences and Engineering Division where her research focuses on incorporating high performance computing (HPC) and edge computing directly into streaming data pipelines for multimodal chemical imaging and microscopy. Her work has generated multiple patents, and commercial licenses to industry and has been recognized by the Fowler-Marion Dissertation Award, UT-Battelle Early Career Award, AVS Rising Stars Award, UTK Research Foundation Patent Award, and the Rapid Communications in Mass Spectrometry Beynon Prize.

Presentation Title - Unravelling the Origins of Functionality through Correlative Multimodal Chemical Imaging

16:45 - 17:30 BST, Tuesday 6 July, 2021



Dr Aydogan Ozcan

*University of California,
Los Angeles, USA*

Dr Ozcan is the Chancellor's Professor and the Volgenau Chair for Engineering Innovation at UCLA and an

HHMI Professor with the Howard Hughes Medical Institute, leading the Bio- and Nano-Photonics Laboratory at UCLA and is also the Associate Director of the California NanoSystems Institute. Dr Ozcan is elected Fellow of the National Academy of Inventors (NAI) and holds 41 issued patents and >20 pending patent applications and is also the author of one book and the co-author of

>700 peer-reviewed publications in major scientific journals and conferences. Dr Ozcan is the founder and a member of the Board of Directors of Lucendi Inc., Pictor Labs and Holomic/Cellmic LLC, which was named a Technology Pioneer by The World Economic Forum in 2015. Dr Ozcan is also a Fellow of the American Association for the Advancement of Science (AAAS), the International Photonics Society (SPIE), the Optical Society of America (OSA), the American Institute for Medical and Biological Engineering (AIMBE), the Institute of Electrical and Electronics Engineers (IEEE), the Royal Society of Chemistry (RSC), the American Physical Society (APS) and the Guggenheim Foundation, and has received major awards including the Presidential Early Career Award for Scientists and Engineers, International Commission for Optics Prize, Biophotonics

Technology Innovator Award, Rahmi M. Koc Science Medal, International Photonics Society Early Career Achievement Award, Army Young Investigator Award, NSF CAREER Award, NIH Director's New Innovator Award, Navy Young Investigator Award, IEEE Photonics Society Young Investigator Award and Distinguished Lecturer Award, National Geographic Emerging Explorer Award, National Academy of Engineering The Grainger Foundation Frontiers of Engineering Award and MIT's TR35 Award for his seminal contributions to computational imaging, sensing and diagnostics.

*Presentation Title - Deep Learning-enabled
Computational Microscopy*

09:00 - 09:45 BST, Tuesday 6 July, 2021

Programme Overview

Monday 5 July							
1330 - 1630		EMAG Workshop - Using Hyperspy for spectroscopy data cubes	ImageJ Workshop	Biolmaging UK Meeting	Early Career Pre-Congress Symposium (*1300 - 1700)		
Tuesday 6 July							
0900 - 0945	Plenary Talk: Dr Aydogan Ozcan - Deep Learning-enabled Computational Microscopy						
1000 - 1200	EMAG - 2D Materials <i>Andy Brown & Sarah Haigh</i>	Machine Learning for Image Analysis <i>Martin Jones</i>	Chemical Imaging of Biological Samples using Electron, Ion and X-ray Based Techniques <i>Erin Johnson</i>	(AFM): Quantitative SPM for Biology, Biomedicine, and Bioinspired Technologies <i>Brian Rodriguez</i>	Up Close with the Enemy: Imaging Pathogen-host Dynamics <i>Leandro Lemgruber</i>	(Frontiers): Lightsheet Microscopy: Development and Application <i>Mike MacDonald</i>	Commercial Workshops
1215 - 1245	Poster Session 1						
1215 - 1430	Lunch Break, Exhibition & Commercial Workshops						
1430 - 1630	EMAG - Spectroscopy & Advanced SEM <i>Miryam Arredondo & Cornelia Rodenburg</i>	Software and Smart Microscopy <i>Siân Culley</i>	X-ray Microscopy: A Powerful Tool to Aid the Understanding of Structures in the Life and Physical Sciences <i>Liz Duke</i>	(AFM): Functional Scanning Probe Microscopy for Advanced Material Science <i>Olga Kazakova</i>	Imaging in Development and Disease <i>Brian Stramer</i>	(Frontiers): Quantifying Dynamic Movement in Living Cells <i>Steve Briddon</i>	Commercial Workshops
							Airborne - Professor Rob Kessler
1645 - 1730	Plenary Talk: Dr Olga Ovchinnikova - Unravelling the Origins of Functionality through Correlative Multimodal Chemical Imaging						
1730 - 1800	Poster Session 2						
Wednesday 7 July							
0900 - 0945	Plenary Professor Buzz Baum - Imaging hell: studying the cell biology of micron-sized archaea that grow at 75°C to shed light on the evolution of cell division						
1000 - 1130	EMAG - Energy and Energy Storage Materials <i>Joanne Sharp & Donald Maclaren</i>	EMAG - Automated Control, Advanced Data Processing <i>Sarah Harper & Jun Yuan</i>	Volume Microscopy in Physical and Life Sciences <i>Saskia Lippens & Xiangli Zhong</i>	(AFM): SPM Techniques on Energy Materials and Processes <i>Ulrich Stimming</i>	High-plex Cytometry <i>Karen Hogg</i>	(Frontiers): Correlative Imaging of Organelle Organization and Architecture <i>Sebastian Munck</i>	Commercial Workshops
1130 - 1200	EMAG AGM						
1215 - 1415	Lunch Break, Exhibition & Commercial Workshops						
1415 - 1615	EMAG - Soft and Hybrid Materials <i>Laura Clark & Andy Brown</i>	EMAG - Electron Crystallography and Diffraction <i>Richard Beanland & Joanne Sharp</i>	3D+ Image Analysis <i>Chas Nelson</i>	(AFM): New Frontiers in Quantum Matter Visualization <i>Séamus Davis</i>	Label Free Imaging <i>Natalie Belsey</i>	(Frontiers): Development and Applications in Super Resolution Microscopy <i>Jessica Valli</i>	Commercial Workshops
1615 - 1645	RMS Scientific Imaging Competition Prize Giving						
1645 - 1745	Poster Session 3						
Thursday 8 July							
0900 - 0945	EMAG Plenary Talk: Professor Joanne Etheridge - Finding the atoms that matter in functional materials - adventures with 4D-STEM						
1000 - 1200	EMAG - Functional Materials <i>Ana Sanchez & Miryam Arredondo</i>	EMAG - Instrumentation Development (incl Detector technology) <i>Laura Clark</i>	Operando Microscopy <i>Hannah Nerl</i>	Diamond Light Source Session 1 <i>Angus Kirkland</i>	Late Breaking <i>Gail McConnell</i>	Commercial Workshops	
1215 - 1345	Lunch Break, Exhibition & Commercial Workshops						
1345 - 1445	Poster Session 4						
1445 - 1645	EMAG - 4D-STEM <i>Donald Maclaren & Ana Sanchez</i>	EMAG - In-situ microscopy <i>Cornelia Rodenburg & Jun Yuan</i>	Advanced Atom Probe Tomography <i>Michael Moody</i>	Diamond Light Source Session 2 <i>Peijun Zhang</i>	Seeing is Believing – Multiplexed Imaging Flow Cytometry <i>Ziv Porat</i>	Commercial Workshops	
1700 - 1745	Plenary Talk: Professor Janet Iwasa - Animating Molecular Machines						

Tuesday 6 July, Morning

EMAG - 2D Materials <i>Session Organisers: Andy Brown & Sarah Haigh</i>	Machine Learning for Image Analysis <i>Session Organiser: Martin Jones</i>	Chemical Imaging of Biological Samples using Electron, Ion and X-ray Based Techniques <i>Session Organiser: Erin Johnson</i>
<p>10:00 - 10:30 <i>Invited Atomic Imaging in 2D Material Heterostructures :Twist, Defects and Particle Synthesis</i> Sarah Haigh University of Manchester, UK</p> <p>10:30 - 10:42 <i>Monitoring dynamics of defects and single metal atoms in functionalized graphene by temperature programmed in situ transmission electron microscopy</i> Manfred Erwin Schuster Johnson Matthey, UK</p> <p>10:42 - 10:54 <i>Matching algorithm for elemental quantification and few tilt tomography in 2D materials</i> Christoph Hofer University of Antwerp, Belgium</p> <p>10:54 - 11:06 <i>Highly aligned crystallography of 1-1.5 nm SbTe₃ nanowires embedded in single walled carbon nanotube bundles leading to reversible in situ Phase Change Behaviour at the 1 nm scale</i> Jeremy Sloan University of Warwick, Coventry, UK</p> <p>11:11 - 11:14 <i>Flash Mapping optical near-field hotspots with multiphoton microscopy in nano/meta- and 2D materials</i> Ventsislav Valev University of Bath, UK</p> <p>11:14 - 11:17 <i>Flash One-Dimensional structures and heterostructures from atomic chains to co-axially stacking of crystals</i> Reza Kashtiban University of Warwick, Coventry, UK</p> <p>11:17 - 11:20 <i>Flash Identification and analysis of ion-implanted chromium dopants in monolayer MoS₂</i> Michael Hennessy University of Limerick, Ireland</p> <p>11:25 - 11:55 <i>Invited Electron-beam manipulation of lattice impurities</i> Toma Susi University of Vienna, Austria</p>	<p>10:00 - 10:30 <i>Invited The Integration of Machine Learning Tools into Spatial Transcriptomics Image Acquisition and Analysis</i> Kwasi Kwakwa EMBL-EBI, Hinxton, UK</p> <p>10:30 - 10:42 <i>Deep learning assisted Fourier transform imaging spectroscopy</i> Cory Juntunen University of Wisconsin Milwaukee, USA</p> <p>10:47 - 10:59 <i>SpinX: Time-resolved 3D Analysis of Spindle Dynamics using Deep Learning Techniques</i> David Dang Queen Mary University of London, UK & King's College London, UK</p> <p>10:59 - 11:11 <i>Label2Label: Training a Neural Network as Image Content Filter in Immunofluorescence Microscopy</i> Lisa Sophie Kölln University of Strathclyde, Glasgow, UK & University of Edinburgh, UK.</p> <p>11:11 - 11:23 <i>Applying Deep Learning to EBSD data for the discrimination of phase transformation products in Steels</i> Tomas Martinez OSTIM, Université de Lorraine, Metz, France</p> <p>11:23 - 11:53 <i>Invited User friendly integration of Deep Learning into scientific applications</i> Deborah Schmidt Max Delbrück Center for Molecular Medicine in the Helmholtz Association, Dresden, Germany</p>	<p>10:00 - 10:30 <i>Invited Visualising trace element and isotopic distributions in plants using high-resolution secondary ion mass spectrometry imaging (NanoSIMS)</i> Katie Moore The University of Manchester, Manchester, UK</p> <p>10:30 - 10:42 <i>Combined synchrotron- and electron microscopy-based imaging to decipher silver nanoparticle fate in hepatic models</i> Aurélien Deniaud Laboratory of Chemistry and Biology of Metals, Grenoble, France</p> <p>10:42 - 10:47 <i>Technical Showcase UA-Zero: non-radioactive, uranium free staining</i> Tim Ecclestone Agar Scientific</p> <p>10:47 - 10:59 <i>Intracellular iron composition of magnetotactic bacteria at the single-cell level via Fe K-edge nano-XANES</i> Daniel Chevrier Biosciences and Biotechnologies Institute of Aix-Marseille, St Paul lez Durance, France</p> <p>10:59 - 11:11 <i>Correlative EDS and AFM reveals compositional changes in tooth dentine and enamel exposed to acid solutions compared with alterations in topography and material properties.</i> Louise Hughes Oxford Instruments NanoAnalysis, High Wycombe, UK</p> <p>11:11 - 11:23 <i>Nanoscope Quantitative X-ray Fluorescence Imaging of Cells with a High Energy X-ray Cryo Nano-probe and cryo-correlative microscopy</i> Sylvain Bohic Inserm UA7 Strobe, Grenoble, France</p> <p>11:28 - 11:58 <i>Invited ColorEM & Nanotome: Multimodal microscopy to identify molecules and structures in large-scale tissue EM maps</i> Ben Giepmans UMC Groningen, Groningen, Netherlands</p>

(AFM): Quantitative SPM for Biology, Biomedicine, and Bioinspired Technologies <i>Session Organiser: Brian Rodriguez</i>	Up Close with the Enemy: Imaging Pathogen-host Dynamics <i>Session Organiser: Leandro Lemgruber</i>	(Frontiers): Lightsheet Microscopy: Development and Application <i>Session Organiser: Mike MacDonald</i>
<p>10:00 - 10:30 <i>Invited</i> The Gram-positive bacterial cell wall: an evolving heterogeneous hydrogel characterised by AFM Laia Pasquina Lemonche, University of Sheffield, UK</p> <p>10:30 - 10:42 Biophysical characterization of the interactions between human papillomavirus and cell surface glycosaminoglycans at the single particle level Fouzia Bano Department of Clinical Microbiology and Wallenberg Centre for Molecular Medicine, Umeå University, Umeå, Sweden</p> <p>10:47 - 10:50 Flash High-resolution AFM reveals the nanoscale architecture of MRSA cell wall Abimbola Feyisara Adedeji Olulana University of Sheffield, UK</p> <p>10:50 - 10:53 Flash Detection of extracellular vesicles in non-Newtonian fluids using vibrating microcantilevers Kislon Voitchovsky Durham University, UK</p> <p>10:53 - 10:56 Flash Characterizing nanomechanical properties of comedones after treatment with sodium salicylate Zeinab Al-Rekabi National Physical Laboratory, Teddington, UK</p> <p>10:56 - 11:08 Mechanical Architecture in the Context of Intact Complex Tissue — A Case Study of the Breast Cancer Metastasis to Bone Xinyue Chen Department of Physics and Astronomy, University of Sheffield, UK</p> <p>11:08 - 11:20 Direct measurements of shear-induced nanoscale lipid dynamics and restructuring William Trewby Durham University, UK</p> <p>11:25 - 11:55 <i>Invited</i> Physical Virology with Atomic Force Microscopy Pedro J. de Pablo Universidad Autónoma de Madrid, Madrid, Spain</p>	<p>10:00 - 10:30 <i>Invited</i> Mycobacterium tuberculosis interactions with host macrophages in space and time Maximiliano Gutierrez The Francis Crick Institute, London, UK</p> <p>10:30 - 10:42 Introducing the M⁴ (MultiModal Modular Microscopy) 3D Printed Microscope System for Imaging Macrophage-Pathogen Interactions Gemma Cairns University of Strathclyde, Glasgow, UK & University of Edinburgh, Edinburgh, UK</p> <p>10:47 - 10:59 Tracking ultrastructure remodelling of host cells following HSV-1 infection using X-ray tomography combined with fluorescence imaging Kamal Nahas University of Cambridge, UK & Diamond Light Source, Didcot, UK</p> <p>10:59 - 11:11 An investigation of SARS-CoV-2 assembly at subcellular resolution by the use of fluorescence microscopy Katharina Scherer University of Cambridge, UK</p> <p>11:11 - 11:23 Mesoscopic imaging of excised pediatric palatine tonsils confirm the presence of bacterial infection beyond the surface Megan Clapperton University of Strathclyde, Glasgow, UK</p> <p>11:28 - 11:58 <i>Invited</i> Elucidating the structure of the mitochondrial genome segregation machinery in trypanosomes by ultrastructure expansion microscopy and cryo-electron tomography Torsten Ochsenreiter Institute of Cell Biology, University of Bern, Switzerland</p>	<p>10:00 - 10:30 <i>Invited</i> Retinal Lamination: Generating order out of (pseudo)chaos Caren Norden Instituto Gulbenkian de Ciência, Oeiras, Portugal</p> <p>10:30 - 10:42 Artefact-free timelapse light sheet microscopy in, on and around the beating heart Jonathan Taylor University of Glasgow, UK</p> <p>10:42 - 10:47 Technical Showcase Multi-line lasers for light sheet microscopy Elena Vasileva HUBNER Photonics - Cobolt Lasers</p> <p>10:47 - 10:50 Flash Improving the resolution of light sheet microscopy without additional photons James Manton MRC Laboratory of Molecular Biology, Cambridge, UK</p> <p>10:50 - 10:53 Flash Lightsheet microscopy for studies of plant-environment interactions Yangminghao Liu University of Dundee, UK</p> <p>10:53 - 11:05 The Flamingo project makes custom microscopy more accessible Michael Weber Morgridge Institute for Research, Madison, USA.</p> <p>11:05 - 11:17 Tracking 3D cell shape using an OPM plater reader Nathan Curry Imperial College London, UK</p> <p>11:17 - 11:22 Technical Showcase Five new ways to automate your research Simon Bush Prior Scientific</p> <p>11:22 - 11:52 <i>Invited</i> Pushing the limits: guiding of light through biological material in light-sheet microscopy Alexander Rohrbach University of Freiburg, Germany</p>

Tuesday 6 July, Afternoon

EMAG - Spectroscopy & Advanced SEM <i>Session Organisers: Miryam Arredondo, Cornelia Rodenburg</i>	Software and Smart Microscopy <i>Session Organiser: Siân Culley</i>	X-ray Microscopy: A Powerful Tool to Aid the Understanding of Structures in the Life and Physical Sciences <i>Session Organiser: Liz Duke</i>
<p>14:30 - 15:00 <i>Invited</i> Study of 2D materials by advanced SEM techniques Eliška Materna Mikmeková Institute of Scientific Instruments of the CAS, v.v.i., Brno, Czech Republic</p> <p>15:00 - 15:12 Secondary Electron Hyper Spectral surface imaging for beam sensitive biomaterial characterisation Nicholas Farr University of Sheffield, UK</p> <p>15:12 - 15:24 InGaN Pyramids and Micro-LEDs Characterized by Hyperspectral Cathodoluminescence Imaging Anders Gustafsson Solid state physics and NanoLund, Lund University, Sweden</p> <p>15:24 - 15:36 Perfect Pixel Correlative Capture of Energy Dispersive and Cathodoluminescence Spectroscopy Data from a Chondritic Meteorite Jonathan Lee Gatan, Inc., Pleasanton, USA</p> <p>15:36 - 15:41 <i>Technical Showcase</i> Mitigate FIB-induced curtaining artifacts caused by the preferential milling rates with the new TESCAN Rocking stage Lukáš Hladík TESCAN</p> <p>15:41 - 15:44 <i>Flash</i> Use of FIB-DIC to measure the residual stress of a SnO₂:F based coating on glass Jauffrey Lescoffit University of Surrey, Guildford, UK. NSG Pilkington, Lathom, UK</p> <p>15:44 - 15:47 <i>Flash</i> Noble Gas Bubbles in Thin Films Rebecca B. Cummings University of Glasgow, UK</p> <p>15:47 - 15:50 <i>Flash</i> Unscrambling mixed elements atom-by-atom by combining HAADF STEM and EDX Annick De Backer EMAT, University of Antwerp, Belgium. NANOLab Center of Excellence, Antwerp, Belgium</p> <p>15:50 - 15:55 <i>Technical Showcase</i> AZtecLive chemical imaging: revolutionising sample navigation and analysis Anthony Hyde Oxford Instruments</p> <p>15:55 - 16:07 Environmental degradation of SiC fibre/BN/SiC matrix ceramic matrix composites studied by TEM and EELS Lisa Toller-Nordström Department of Materials, University of Oxford, UK</p> <p>16:07 - 16:19 Fast generation of calculated ADF-EDX scattering cross-sections under channelling conditions Zezhong Zhang EMAT & NANOLab Center of Excellence University of Antwerp, Belgium. Department of Materials, University of Oxford, UK</p> <p>16:19 - 16:22 <i>Flash</i> The use of through the length scale chemical analysis in steels used in hostile environments Geoff West WMG, University of Warwick, Coventry, UK</p> <p>16:22 - 16:25 <i>Flash</i> Using XANES and EELS to analyse space weathered Apollo lunar samples: Preparation for Hayabusa² Samples Leon Hicks University of Leicester, UK</p>	<p>14:30 - 15:00 <i>Invited</i> Computational enhancement of lightsheet microscopy imaging Leila Muresan University of Cambridge, UK</p> <p>15:00 - 15:12 Getting the most from the data behind your beautiful NanoSImages Greg McMahon National Physical Laboratory, Teddington, UK</p> <p>15:12 - 15:17 <i>Technical Showcase</i> Lightning fast fluorescence with 8-channel LED Illumination Chris Deeks CoolLED</p> <p>15:17 - 15:20 <i>Flash</i> Development of a deep neural network based fully automated centrosome analysis workflow Gabor Pajor Deutsches Krebsforschungszentrum, Heidelberg, Germany. University of Pecs Medical School, Pecs, Hungary</p> <p>15:20 - 15:23 <i>Flash</i> ContactJ: Lipid Droplets-Mitochondria Contacts measurement by Fluorescence Microscopy and Image Analysis Gemma Martin Advanced Optical Microscopy Facility. Scientific and Technological Centers. University of Barcelona, Spain</p> <p>15:23 - 15:26 <i>Flash</i> Automating Correlative Microscopy with Python: Removing the Frustrations Thomas Fish Diamond Light Source, Didcot, UK</p> <p>15:26 - 15:38 ShapoGraphy: a novel web-based tool for representing microscopy data and accelerating knowledge discovery Heba Sailem University of Oxford, UK</p> <p>15:38 - 15:50 High precision autofocus on a low cost microscope: automating blood sample imaging on the OpenFlexure Microscope Joe Knapper University of Bath, UK</p> <p>15:50 - 15:55 <i>Technical Showcase</i> AI For Microscopists - Nikon NIS.ai Giulia Vargiu Nikon UK Ltd</p> <p>15:55 - 16:25 <i>Invited</i> Learned shape representations for segmentation of cells and organelles in light and electron microscopy images Martin Weigert EPFL, Lausanne, Switzerland</p>	<p>14:30 - 15:00 <i>Invited</i> X-ray microscopy for deep and precise bioimaging Alexandra Pacureanu ESRF, the European Synchrotron, Grenoble, France</p> <p>15:00 - 15:12 Label-free Analysis of Neuromelanin and Associated Iron Deposits in Parkinson's Disease Brain Tissue by Synchrotron X-ray Spectromicroscopy Jake Brooks School of Engineering, University of Warwick, Coventry, UK</p> <p>15:17 - 15:20 <i>Flash</i> X-ray Ptychography Imaging of Human Chromosomes After Low-dose Irradiation Archana Bhartiya London Centre for Nanotechnology, University, Department of Chemistry, University College London, UK. Research Complex at Harwell, Didcot, UK</p> <p>15:20 - 15:23 <i>Flash</i> XRnanotech: Nanostructured Diffractive X-Ray Optics Florian Döring XRnanotech, Untersiggenthal, Switzerland. Paul Scherrer Institut, Villigen-PSI, Switzerland</p> <p>15:23 - 15:26 <i>Flash</i> Capturing the intracellular universe at near-native states and in 4D: the many uses of cryo-soft X-ray tomography for in-depth investigations of biological systems Ilias Kounatidis Diamond Light Source, Didcot, UK</p> <p>15:26 - 15:29 <i>Flash</i> Investigating the biochemistry of Alzheimer's disease using synchrotron x-ray microscopy and spectroscopy James Everett School of Pharmacy & Bioengineering, Keele University, Stoke-on-Trent, UK. School of Engineering, University of Warwick, Coventry, UK</p> <p>15:29 - 15:41 Characterisation of 'Hot' Particles using Nano- and Micro-focus Synchrotron X-ray Techniques Joyce W. L. Ang University of Helsinki, Finland</p> <p>15:41 - 15:44 <i>Flash</i> Cryo Soft X-ray Microscopy for Whole Cell Imaging: Progress in the Development of a Commercial Laboratory Scale Device Kenneth Fahy SiriusXT, Dublin, Ireland</p> <p>15:44 - 15:47 <i>Flash</i> Investigation of life science samples using an annular silicon drift detector at low beam currents Max Patzschke Bruker Nano, Berlin, Germany</p> <p>15:47 - 15:50 <i>Flash</i> Nanoscale chemical imaging and spectro-microscopy of engineered nanomaterials after interaction with aquatic environmental media and microorganisms Miguel Gomez-Gonzalez Diamond Light Source Ltd., Didcot, UK</p> <p>15:50 - 15:53 <i>Flash</i> 3D multi-modal imaging of demineralised dentine using combined scanning transmission X-ray microscopy (STXM-CT) and micro-X-ray diffraction (μ-XRD-CT) tomography techniques Nathanael Leung University of Surrey, Guildford, UK</p> <p>15:58 - 16:28 <i>Invited</i> Using Multimodal X-Ray Microscopy for Structural and Chemical Nanoscale Imaging Julia Parker Diamond Light Source, Didcot, UK</p>

(AFM): Functional Scanning Probe Microscopy for Advanced Material Science <i>Session Organiser: Olga Kazakova</i>	Imaging in Development and Disease <i>Session Organiser Brian Stramer</i>	(Frontiers): Quantifying Dynamic Movement in Living Cells <i>Session Organiser Steve Briddon</i>
<p>14:30 - 15:00 Invited Probing electric polarization on the atomic scale: van der Waals heterostructures and water confined inside Laura Fumagalli University of Manchester, UK</p> <p>15:00 - 15:12 Real time dynamics of metal ions domains- a high speed AFM study Clodomiro Cafolla Physics Department, Durham, UK</p> <p>15:17 - 15:20 Flash High-Speed AFM as a Quality Control Tool: Measuring the Roughness Variability of SiC Monofilaments for Metal Matrix Composites Dhilan Devadasan University of Surrey, Guildford, UK</p> <p>15:20 - 15:23 Flash STGM studies of charge symmetry in the geometrically modulated Seebeck coefficient in encapsulated graphene nanoconstrictions Eli Castanon National Physical Laboratory, London, UK. Lancaster University, UK</p> <p>15:23 - 15:26 Flash Probing electric polarization at solid-liquid and solid-solid interfaces in van der Waals heterostructures Harriet Nevison-Andrews University of Manchester, UK</p> <p>15:26 - 15:38 Local Mapping of Thermoelectric Properties of 2D Structures via Scanning Thermal Gate Microscopy Pascal Gehring UCLouvain, Louvain-la-Neuve, Belgium</p> <p>15:38 - 15:41 Flash Scanning thermal microscopy of 2D materials in various environments Khushboo Agarwal Lancaster University, UK</p> <p>15:41 - 15:44 Flash Characterizations of Responsive Photonic Liquid Crystal Network Coatings on Flexible Plastic Substrates by Atomic Force Microscopy Lanti Yang Technology & Innovation, SABIC, Bergen op Zoom, Netherlands</p> <p>15:44 - 15:47 Flash Chemical Decoration of Graphene And 2D-Materials: An AFM Outlook Vladimir Korolkov Park Systeme Ltd, Nottingham, UK</p> <p>15:52 - 16:22 Invited Near-field optical characterization techniques of twisted and indirectly nanostructured 2D material heterostructures Frank Koppens ICFO, Barcelona (Castelldefels), Spain</p>	<p>14:30 - 15:00 Invited Coping with mechanical stress: tissue dynamics during homeostasis and repair Yanlan Mao University College London, UK</p> <p>15:00 - 15:12 FLASH-based epithelial epitope recovery to examine cleared carcinomas in 3D Jorge Almagro The Francis Crick Institute, London, UK</p> <p>15:12 - 15:17 Technical Showcase LED illumination for fluorescence from Fura-2 to Cy7.5 and beyond – a true lamp replacement Kavita Aswani Excelitas</p> <p>15:20 - 15:23 Flash Using the Mesolens to observe structural changes in E. coli mature colony biofilm under different nutrient availability Beatrice Bottura University of Strathclyde, Glasgow, UK</p> <p>15:23 - 15:26 Flash Rapid (FLASH-FLIM) imaging of protoporphyrin IX in a tumour mimic in real time using a CMOS based widefield fluorescence lifetime imaging camera Graham Hungerford Horiba, Glasgow, UK</p> <p>15:26 - 15:38 Integration of multimodal imaging for insight into the BTBR obob model of diabetic nephropathy Stephanie Ling AstraZeneca, Cambridge, UK</p> <p>15:38 - 15:41 Flash The combined application of optical tweezers and advanced microscopy for examination of mutual interaction of red blood cells influenced by nano-materials Igor Meglinski Aston University, Birmingham, UK</p> <p>15:41 - 15:44 Flash Skin Image Analysis in Contact Capacitive Imaging and High Resolution Ultrasound Imaging Perry Xiao London South Bank University, UK</p> <p>15:44 - 15:47 Flash FLIMbow: a multicolor multi-lifetime labeling method for individual cells and cell lineages Vasilisa Polinovskaya Skolkovo Institute of Science and Technology, Moscow, Russian Federation</p> <p>15:47 - 15:52 Technical Showcase Near IR Solutions for Expanded Multiplexed Confocal Imaging Christopher Storey Olympus</p> <p>15:52 - 16:22 Invited Unmasking in vivo cell dynamics in mammary tissue and mammary tumours Colinda Scheele VIB-KU Leuven Center for Cancer Biology, Belgium</p>	<p>14:30 - 15:00 Invited Mass photometry: weighing molecules with light Philipp Kukura University of Oxford, UK</p> <p>15:00 - 15:12 Parallax microscopy for 3D single-molecule tracking in bacteria Helen Miller University of Oxford, UK</p> <p>15:12 - 15:17 Technical Showcase Exploring Live Cell Dynamics with ZEISS Lattice Lightsheet 7 Jon Shewring ZEISS</p> <p>15:17 - 15:29 Live projection imaging of sub-cellular dynamics at high speed via shear warp angled projection microscopy James Manton MRC Laboratory of Molecular Biology, Cambridge, UK</p> <p>15:29 - 15:41 Genetically encoded probe for calcium imaging in lifetime domain Tatiana Simonyan Center of Life Sciences, Skolkovo Institute of Science and Technology, Moscow, Russian Federation</p> <p>15:41 - 15:53 Novel experimentation chambers for improved and integrated live-cell imaging approaches Alexander Lichius University of Innsbruck, Innsbruck, Austria. innccells GmbH, Patsch, Austria</p> <p>15:53 - 15:58 Technical Showcase Putting the Objective first - introducing the openFrame, a sustainable, modular platform for application-based microscopy Jeremy Graham Cairn Research</p> <p>15:58 - 16:28 Invited Quantitative scanning-free confocal fluorescence microscopy for the characterization of fast dynamic processes in live cells Vladana Vukojevic Department of Clinical Neuroscience (CNS), Center for Molecular Medicine (CMM), Karolinska Institutet, Stockholm, Sweden</p>

Wednesday 7 July, Morning

EMAG - Energy and Energy Storage Materials Session Organisers: Joanne Sharp, Donald Maclaren	EMAG - Automated Control, Advanced Data Processing Session Organisers: Sarah Harper, Jun Yuan	Volume Microscopy in Physical and Life Sciences Session Organisers: Saskia Lippens, Xiangli Zhong
<p>10:00 - 10:12 Exploring tailored electrolytes to regulate lithium-ion battery performance by operando transmission electron microscopy Alex Robertson University of Oxford, UK</p> <p>10:12 - 10:24 Direct Imaging of Oxygen Sub-lattice Deformation in Li-rich Cathode Material Using Electron Ptychography Weixin Song Department of Materials, University of Oxford, UK</p> <p>10:24 - 10:36 In situ EIS-TEM characterization of electrospun nanofibers for solid oxide electrolysis cells Waynah Lou Dacayan DTU Energy, Fysikvej, Kgs. Lyngby, Denmark</p> <p>10:36 - 10:39 Flash Nanoscale origins of degradation of Ni-rich NMC Li-ion battery cathodes Jedrzej Morzy Dept. of Materials Science and Metallurgy & Institute for Manufacturing, University of Cambridge, UK</p> <p>10:39 - 10:42 Flash High energy resolution STEM-EELS as a powerful tool for the characterisation of battery materials Angelica Laurita Université de Nantes, CNRS, Institut des Matériaux Jean Rouxel, France</p> <p>10:42 - 10:45 Flash Electrochemical TEM experiments on solid oxide electrolysis cells Zhongtao Ma Department of Energy Conversion and Storage, Technical University of Denmark</p> <p>10:45 - 10:50 Technical Showcase Combining EM and broad ion beam milling to better understand LiB materials Mike Dixon Hitachi High Tech Europe</p> <p>10:50 - 11:02 The atomic-scale microstructure of metal halide perovskites elucidated via low-dose scanning transmission electron microscopy Mathias Uller Rothmann Department of Physics & Department of Materials, University of Oxford, UK</p> <p>11:02 - 11:14 Understanding Cu-Alumina interactions in redox conditions for Chemical Looping Combustion (CLC) application – A multi-scale correlative electron and X-ray microscopy study Sharmin Sharna IFP Energies nouvelles, Lyon, France. Institut de Physique et de Chimie des Matériaux de Strasbourg, France</p> <p>11:14 - 11:17 Flash Structure-property Correlation of Black ZnO Nanoparticles with High Absorbance for Photovoltaic Applications Praveen Kumar Centre for Nanostructured Media, School of Mathematics & Physics, Queen's University Belfast, UK</p> <p>11:17 - 11:20 Flash Understanding the degradation of Be tiles in the JET tokamak reactor using EELS and DFT Xinlei Liu University of Oxford, UK</p>	<p>10:00 - 10:30 Invited Three-dimensional electron crystallography (3DED) and the particle-crystal transition and implications for structure solution Andrew Stewart University of Limerick, Ireland</p> <p>10:30 - 10:42 Using Bayesian inference to improve three-dimensional atomic reconstructions from a single projection using Z-contrast imaging Annick De Backer EMAT, University of Antwerp, Belgium. NANOLab Center of Excellence, University of Antwerp, Belgium</p> <p>10:42 - 10:54 Automating 3D Imaging of Heterogeneous Inorganic Nanoparticles Tom Slater Diamond Light Source, Didcot, UK</p> <p>10:54 - 11:06 Machine learning analysis of complex mineral microstructures through machine learning on combined EDS and EBSD data Kho Zhiquan University of Manchester, UK</p> <p>11:11 - 11:14 Flash Understanding Trainable Segmentation for Inorganic Nanoparticle Images Cameron Bell Diamond Light Source, Didcot, UK. University of Edinburgh, UK</p> <p>11:14 - 11:17 Flash Quantification of dynamic structural changes of nanomaterials via atom-counting from sequential ADF STEM images Annelies De wael EMAT, University of Antwerp, Belgium. NANOLab Center of Excellence, University of Antwerp, Belgium.</p> <p>11:17 - 11:20 Flash The correlation between ptychographic phase and ADF intensity: A new approach for quantitative STEM Ali Mostaed Department of Materials, University of Oxford, UK</p>	<p>10:00 - 10:30 Invited Large volume three dimensional correlative microscopy Philip Withers Henry Royce Institute, Department of Materials, University of Manchester, UK</p> <p>10:30 - 10:42 Imaging intracellular calcium-rich deposits using X-ray ptychographic tomography to reveal pathways of calcium transport in coccolithophore <i>Emiliania huxleyi</i> Alexander Triccas University of Edinburgh, UK</p> <p>10:47 - 10:50 Flash Resin comparison for Serial Block Face Scanning Electron Microscopy Anna Kremer VIB Bioimaging Core, Ghent, Belgium. VIB Center for Inflammation Research, Ghent, Belgium. Department of Biomedical Molecular Biology, Ghent University, Belgium</p> <p>10:50 - 10:53 Flash Speckle based Phase Contrast X-ray Microscopy, an investigation into possible clinical and research applications Matthew Donoghue Galway Clinic, Ireland</p> <p>10:53 - 10:56 Flash 3D visualisation of dentine tubule occlusion by dual beam FIB SEM/EDS Xiaohui Chen Division of Dentistry, School of Medical Sciences, The University of Manchester, UK</p> <p>10:56 - 11:08 Mechanical Adaptation of Brachiopod Shells Via Hydration-Induced Structural Changes Fabio Nudelman University of Edinburgh, UK</p> <p>11:08 - 11:20 Structural 3D analysis of a Ga-Pd SCALcatalyst using correlative laboratory Nano-CT, Electron Tomography and analytical TEM Janis Wirth Institute for Micro- and Nanostructure Research (IMN), Erlangen, Germany</p> <p>11:25 - 11:55 Invited Three-dimensional analysis of hierarchical biocomposites: Preparation and structure evaluation across the length scales Roland Kröger University of York, UK</p>

(AFM): SPM Techniques on Energy Materials and Processes Session Organiser: Ulrich Stimming	High-plex Cytometry Session Organiser: Karen Hogg	(Frontiers): Correlative Imaging of Organelle Organization and Architecture Session Organiser: Sebastian Munck
<p>10:00 - 10:30 <i>Invited</i> Multi-functional and in-situ mapping techniques for optoelectronic devices Wing Chung Tsoi Swansea University, UK</p> <p>10:30 - 10:42 <i>Sequencing functional conjugated polymers by high resolution SPM imaging</i> Giovanni Costantini University of Warwick, Coventry, UK</p> <p>10:47 - 10:59 <i>ReactorSTM study of Hydrodesulfurization over a Co-promoted MoS₂ catalyst</i> Mahesh Krishna Prabhu Leiden University, Netherlands</p> <p>10:59 - 11:11 <i>Investigation of SEI layer formation on HOPG using SPM</i> Saisameera Mitta Newcastle University, UK. The Faraday Institution, Didcot, UK</p> <p>11:11 - 11:23 <i>Revealing the nanoscale fundamentals of batteries performance via x-sectional in-situ/operando Electrochemical SPM</i> Yue Chen Department of Physics, Lancaster University, UK. The Faraday Institution, Harwell Science and Innovation Campus, UK</p> <p>11:28 - 11:58 <i>Invited</i> Characterization of active materials for lithium ion batteries using scanning probe techniques Andreas Bund TU Ilmenau, Electrochemistry and Electroplating Group, Ilmenau, Germany</p>	<p>10:00 - 10:30 <i>Invited</i> Immunopathology pipeline to study potential host directed therapy targets in cutaneous leishmaniasis Nidhi Dey York Biomedical Research Institute, University of York, UK</p> <p>10:30 - 10:42 <i>Tools for spatial analysis to understand the immunopathology associated with infectious disease</i> Helen Ashwin York Biomedical Research Institute, Hull York Medical School, University of York, UK</p> <p>10:42 - 10:47 <i>Technical Showcase</i> Imaging 100 markers and beyond with the MACSima Imaging Platform from Miltenyi Biotec Andrew Hill Miltenyi Biotec</p> <p>10:47 - 10:59 <i>Hypoxia organizes unique cellular niches in the tumor microenvironment in a mouse model of triple negative breast cancer</i> Abigail J. Walke Optical Microscopy and Analysis Laboratory, Frederick National Laboratory for Cancer Research, USA</p> <p>11:04 - 11:34 <i>Invited</i> A Pharma perspective on deployment of spatial multiplex technologies for drug discovery in tissue samples Jan Roger GSK, Stevenage, UK</p>	<p>10:00 - 10:30 <i>Invited</i> Correlative imaging of the brain with array tomography: understanding the logic of inhibitory synapses Kristina Micheva Stanford University School of Medicine, USA</p> <p>10:30 - 10:42 <i>Fluorescence-guided lamella fabrication for cryo-electron tomography with ENZEL, an integrated cryogenic CLEM solution</i> Caspar Jonker Delmic BV, Delft, Netherlands</p> <p>10:42 - 10:47 <i>Technical Showcase</i> An Integrated Fluorescence Light Microscope for the Thermo Scientific Aquilos 2 Cryo-FIB Alexander Rigort Thermo Fisher Scientific</p> <p>10:47 - 10:50 <i>Flash</i> Inverted microscope platform for cryo-CLEM and laser-free confocal cryo-fluorescence Michael Schwertner Linkam Scientific Instruments Ltd., Tadworth, UK</p> <p>10:50 - 10:53 <i>Flash</i> Quantum on a budget: Developing a 3d-printed microscope for Optically Detected Magnetic Resonance of nanodiamond Ryan Corbyn University of Strathclyde, Glasgow, UK. Diamond Science and Technology CDT, University of Warwick, Coventry, UK</p> <p>10:53 - 10:56 <i>Flash</i> Targeting intracellular bacteria with antimicrobial virus-like particles: a case study with a single-cell resolution Stephanie Rey National Physical Laboratory, London, UK</p> <p>10:56 - 10:59 <i>Flash</i> Establish a simple pre-embedding correlative light and electron microscopy to evaluate the structural impacts of the APEX2 reporter in PK15 cells Yi-Fan Jiang Graduate Institute of Molecular and Comparative Pathobiology, School of Veterinary Medicine, National Taiwan University, Taipei, Taiwan</p> <p>10:59 - 11:11 <i>High resolution correlative 3D imaging of the intracellular world under physiological conditions using the synergies of laser light and X-ray microscopes at cryogenic temperatures</i> Chidinma Okolo Diamond Light Source, Harwell, Didcot, UK</p> <p>11:11 - 11:23 <i>Next Generation Correlative Cryo-Light and Electron Microscopy</i> Chris Parmenter University of Nottingham, UK</p> <p>11:28 - 11:58 <i>Invited</i> Exploring molecular landscapes inside cells with in situ cryo-electron tomography Benjamin Engel Helmholtz Zentrum München, Munich, Germany</p>

Wednesday 7 July, Afternoon

EMAG - Soft and Hybrid Materials Session Organisers: Laura Clark, Andy Brown	EMAG - Electron Crystallography and Diffraction Session Organisers: Richard Beanland, Joanne Sharp	3D+ Image Analysis Session Organiser: Chas Nelson
<p>14:15 - 14:45 <i>Invited</i> Nanoscale functional chemistry and opto-electronic response of organic materials Demie Kepaptsoglou SuperSTEM, Daresbury, UK. University of York, UK</p> <p>14:45 - 14:57 <i>Investigating nanoscale chemical heterogeneity in polyamide polymer membranes using STEM-EELS – a beam damage study</i> Catriona McGilvery Imperial College London, UK</p> <p>14:57 - 15:09 <i>Study of beam damage effect on CPO-27-Ni Metal Organic Framework by Cs-corrected STEM imaging and EELS</i> Trung Tran Johnson Matthey Technology Centre, Reading, UK</p> <p>15:09 - 15:21 <i>Using transmission electron microscopy to monitor hydration of theophylline</i> Natalia Koniuch University of Leeds, UK</p> <p>15:21 - 15:26 <i>Technical Showcase</i> Temperature and Environmental Controlled Experiments for Microscopy and Spectroscopy Shrey Sharma Linkam Scientific Instruments</p> <p>15:26 - 15:29 <i>Flash</i> Next generation vitrification robot Maarten Kuijper Thermo Fisher Scientific, Eindhoven, Netherlands</p> <p>15:29 - 15:32 <i>Flash</i> Expanding Performance and Usability of High-speed / Low-dose STEM Scanning Tiarnan Mullarkey Centre For Doctoral Training in the Advanced Characterisation of Materials, Dublin, Ireland. School of Physics, Trinity College Dublin, Ireland</p> <p>15:32 - 15:35 <i>Flash</i> Routine Sample Optimization for Single Particle Cryo-EM with chameleon Michele Darrow SPT Labtech LTD, Melbourn, UK</p> <p>15:40 - 15:52 <i>To Monochromate or not to Monochromate: Balancing Electron Dose and Energy Spread Requirements</i> Frances Quigley School of Physics & Centre for Research on Adaptive Nanostructures and Nanodevices (CRANN), Trinity College Dublin, Ireland</p> <p>15:52 - 16:04 <i>Low Voltage Three-dimensional Electron Ptychographic Phase Imaging for Organic-inorganic Hybrid Nanostructures</i> Peng Wang Nanjing University, Nanjing, China</p> <p>16:04 - 16:07 <i>Flash</i> Imaging Zeolites Implanted with Single Metal Sites for Catalysis Ping-Luen Baron Ho Wolfson Catalysis Centre, Department of Chemistry & Department of Materials, University of Oxford, UK</p> <p>16:07 - 16:10 <i>Flash</i> Assessment of Quantification Errors and Fidelity of Compressed Sensing based Electron Tomography Reconstructions using material-realistic 3D Phantoms Ainouna Bouziane Department of Materials Science and Metallurgical Engineering and Inorganic Chemistry, University of Cádiz, Spain</p>	<p>14:15 - 14:45 <i>Invited</i> Democratisation of dynamical 3D ED: structure analysis using dynamical diffraction applied to all types of 3D electron diffraction data Lukas Palatinus Institute of Physics of the CAS, Prague, Czech Republic</p> <p>14:45 - 14:57 <i>Large area (2D) and volume (3D) EBSD mapping and the associated distortion corrections</i> Ali Gholinia University of Manchester, UK</p> <p>14:57 - 15:09 <i>Measuring distortions in tetragonal tungsten bronze oxides using electron diffraction</i> Richard Beanland University of Warwick, Coventry, UK</p> <p>15:09 - 15:21 <i>A new sample preparation workflow in the FIB-SEM for rapid, in-situ TKD analyses</i> Pat Trimby Oxford Instruments Nanoanalysis, High Wycombe, UK</p> <p>15:26 - 15:29 <i>Flash</i> Electron diffraction studies of commensurately modulated structures in bismuth transition metal oxide Satyam Choudhury Department of Metallurgical Engineering, Indian Institute of Technology (BHU), Varanasi, India</p> <p>15:29 - 15:32 <i>Flash</i> Comparative analysis of continuous rotation electron diffraction (cRED) data using Bloch-wave simulations Anton Cleverley University of Warwick, Coventry, UK</p> <p>15:32 - 15:35 <i>Flash</i> Unravelling dynamical behaviour of intergranular glassy film Si₃N₄ ceramics during in-situ heating: exit wave reconstruction insights Chiranjit Roy Department of Metallurgical and Materials Engineering, Indian Institute of Technology Madras, Chennai, India</p> <p>15:40 - 16:10 <i>Invited</i> Designing Novel Functional Materials Through Data-Infused Microscopy Steven Spurgeon Pacific Northwest National Laboratory, Richland, USA</p>	<p>14:15 - 14:45 <i>Invited</i> Correlative microscopies: quantitatively fusing information from 3D+ to 6D+ images Perrine Paul-Gilloteaux Université de Nantes, France</p> <p>14:45 - 14:57 <i>A deep learning-based workflow for high-throughput and high-quality widefield fluorescent imaging of 3D samples</i> Edvin Forsgren Umeå University - Department of Chemistry, Sweden</p> <p>15:02 - 15:05 <i>Flash</i> PyCalibrate: Fully automated PSF analysis Alexander Corbett University of Exeter, UK</p> <p>15:05 - 15:08 <i>Flash</i> A Machine-Learning-Based Approach for Rapid 3D-Segmentation of cryo-Soft X-Ray Tomographic Datasets of Mammalian Cells Michael Dyhr Membrane Biochemistry Group, Department of Biology, Chemistry and Pharmacy, Free University of Berlin, Germany</p> <p>15:08 - 15:11 <i>Flash</i> Depth Resolution in Ptychography Shengbo You The University of Sheffield, UK</p> <p>15:11 - 15:14 <i>Flash</i> Phase Object Reconstruction of 4D-STEM datasets using Deep Learning Thomas Friedrich Electron Microscopy for Materials Science (EMAT) & NANOLab Center of Excellence, University of Antwerp, Belgium</p> <p>15:14 - 15:26 <i>Transverse-tubule remodelling in remote and border regions following myocardial infarction</i> Tharushi Perera University of Manchester, UK</p> <p>15:26 - 15:38 <i>The impact of strain on Z-contrast imaging of iron oxide nanoparticles</i> Shuayl Alotaibi Department of Physics, University of York, UK</p> <p>15:43 - 16:13 <i>Invited</i> Visual Data Analysis: Bringing the Human into the Loop Daniel Baum Zuse Institute Berlin, Germany</p>

(AFM): New Frontiers in Quantum Matter Visualization <i>Session Organiser: Séamus Davis</i>	Label Free Imaging <i>Session Organiser: Natalie Belsey</i>	(Frontiers): Development and Applications in Super Resolution Microscopy <i>Session Organiser: Jessica Valli</i>
<p>14:15 - 14:45 <i>Invited</i> Imaging dynamics using atomic scale shot noise Freek Massee Laboratoire de Physique des Solides / CNRS, Orsay, France</p> <p>14:45 - 14:57 <i>Head-on skyrmion collisions using Magnetic Force microscopy</i> Héctor Corte-León National Physical Laboratory, Teddington, UK</p> <p>15:02 - 15:05 <i>Flash</i> Quantitative imaging of antiferromagnetic spin cycloidal textures on strain engineered BiFeO₃ thin film with a scanning nitrogen-vacancy magnetometer Hai Zhong Qnami AG, Muttentz, Switzerland</p> <p>15:05 - 15:08 <i>Flash</i> Scanned Josephson Tunneling Microscopy Studies of Copper-Oxide High Temperature Superconductivity Shane O'Mahony University College Cork, Ireland</p> <p>15:11 - 15:23 <i>Scattering Interference Signature of a Pair Density Wave State in the Cuprate Pseudogap Phase</i> Shuqiu Wang Clarendon Laboratory, University of Oxford, UK</p> <p>15:23 - 15:26 <i>Flash</i> Revealing the nanoscale infrared properties of graphene-hBN bubbles Tom Vincent National Physical Laboratory, London, UK. Royal Holloway, University of London, UK</p> <p>15:26 - 15:29 <i>Flash</i> Quasiparticle Interference Imaging of Hidden Orbital Order Weijiong Chen Clarendon Laboratory, University of Oxford, UK</p> <p>15:34 - 16:04 <i>Invited</i> AC Josephson scanning tunneling microscopy Hermann Suderow Universidad Autonoma de Madrid, Spain</p>	<p>14:15 - 14:45 <i>Invited</i> Optical diffraction tomography: present solutions and future trends in biomedical applications Malgorzata Kujawska Warsaw University of Technology, Poland</p> <p>14:45 - 14:57 <i>Spin Angular Momentum in Digital Histo-Biophotonics</i> Igor Meglinski Aston University, Birmingham, UK</p> <p>14:57 - 15:02 <i>Technical Showcase</i> If a picture is worth a thousand words, a Liveocyte graph can speak volumes Martin Humphry Phasefocus & Lablogic</p> <p>15:02 - 15:05 <i>Flash</i> Potential application of confocal reflection microscopy with Airyscan detector arrays for quantitative label-free live myelin imaging Daryan Chitsaz Montreal Neurological Institute, Canada</p> <p>15:05 - 15:08 <i>Flash</i> Phasing Out Fluorescence: Quantifying Mitosis Label-free Meetal Solanki Phasefocus, Sheffield, UK</p> <p>15:08 - 15:11 <i>Flash</i> Robust morphology-based classification of cells following label-free cell-by-cell segmentation using convolutional neural networks Timothy Jackson Sartorius, BioAnalytics, Royston, UK</p> <p>15:11 - 15:14 <i>Flash</i> Building a rotational near field ptychography Yiqian Zhang University of Sheffield, UK</p> <p>15:14 - 15:26 <i>Label-free imaging of collagen and myosin, using excitation polarization resolved second harmonic generation imaging through a 125 µm fiber probe</i> Johanna Trägårdh Institute of Scientific Instruments of the CAS, Brno, Czech Republic</p> <p>15:26 - 15:38 <i>Multi-Modal Optical Microscopy with a Fully Integrated Coherent Raman Scattering - Confocal Microscopy Platform: Applications from Cells to Tissues to Model Organisms</i> Volker Schweikhard Leica MicrosysteCGmbH, Mannheim, Germany</p> <p>15:38 - 16:08 <i>Invited</i> Deep-learning based stimulated Raman scattering histology Minbiao Ji Fudan University, Shanghai, China</p>	<p>14:15 - 14:45 <i>Invited</i> Long-term and multi-colour STED microscopy of the living mouse brain Katrin Willig Max Planck Institut of Experimental Medicine, Göttingen, Germany</p> <p>14:45 - 14:57 <i>Automated studies of the structure of multimer complexes of the EGFR on cells at ~4 nm resolution: Elucidating structure-function relationships in cancer</i> Marisa Martin-Fernandez Central Laser Facility, STFC Rutherford Appleton Laboratory, Didcot, UK</p> <p>14:57 - 15:02 <i>Technical Showcase</i> Recent Developments in Super-Resolution Microscopy Ruediger Bader Photon Lines Ltd</p> <p>15:02 - 15:05 <i>Flash</i> MINFLUX, a game-changer? Kirti Prakash National Physical Laboratory, London, UK</p> <p>15:05 - 15:08 <i>Flash</i> High resolution reflection microscopy via absorbance modulation Parul Jain Institut für Nanophotonik, Göttingen, Germany</p> <p>15:08 - 15:11 <i>Flash</i> Modular, sustainable, low-cost, open microscopy and high content analysis Sunil Kumar Imperial College London, UK. Francis Crick Institute, London, UK</p> <p>15:11 - 15:23 <i>Correction of multiple-blinking artefacts in photoactivated localisation microscopy</i> Tjun Yee Hoh Institute for Statistical Science, School of Mathematics, University of Bristol, UK</p> <p>15:23 - 15:35 <i>A correlative super-resolution protocol to map the local single-channel underpinnings of fast second-messenger signals in primary cell types</i> Miriam Hurley The University of Leeds, UK</p> <p>15:35 - 15:40 <i>Technical Showcase</i> Nanoscopy meets lifetime Paul McCormick Leica Microsyste(UK) Ltd</p> <p>15:40 - 16:10 <i>Invited</i> Present, future and past of super-resolution microscopy by dSTORM Markus Sauer University of Wuerzburg, Germany</p>

Thursday 8 July, Morning

EMAG - Functional Materials Session Organisers: Ana Sanchez, Miryam Arredondo	EMAG - Instrumentation Development (incl Detector technology) Session Organiser: Laura Clark	Operando Microscopy Session Organiser: Hannah Nerl
<p>10:00 - 10:30 <i>Invited</i> Improved thermoelectric design through multi-lengthscale structural analysis Donald MacLaren University of Glasgow, UK</p> <p>10:30 - 10:42 Utilising correlated EDS and 4DSTEM to investigate the structural ordering of Full-Heusler Co₂FeSi alloy Ercin Duran University of Manchester, UK</p> <p>10:42 - 10:54 3D EBSD of CdTe/CdSeTe Thin Film Solar Cell Using Xenon-FIB Milling Vladislav Kornienko Loughborough University, UK</p> <p>10:54 - 11:06 Incommensurate domain topologies in ferroelectrics Dorin Rusu University of Warwick, Coventry, UK</p> <p>11:06 - 11:11 <i>Technical Showcase</i> Advanced Materials Analysis Michaela Schleifer EDAX</p> <p>11:11 - 11:14 <i>Flash</i> Inclined twins related non-radiative defects in vertical III-V nanowires grown in unconventional directions H.Aruni Fonseka Department of Physics, University of Warwick, Coventry, UK</p> <p>11:14 - 11:17 <i>Flash</i> Quantitative STEM for Bimetallic Catalyst Nanoparticles Xiaonan Luo University of Oxford, UK</p> <p>11:17 - 11:20 <i>Flash</i> Ferroelectric polarisation control in thin filia growth conditions Aaron Naden University of St Andrews, UK</p> <p>11:20 - 11:25 <i>Technical Showcase</i> The latest, high-throughput entry level floor standing Thermo Colour SEM from Blue Scientific Tom Warwick Blue Scientific Ltd</p> <p>11:25 - 11:37 Study of Novel Mesopores in Ceria Nanorods Using Electron Tomography Carlos Brambila Department of Chemical and Biological Engineering, The University of Sheffield, UK</p> <p>11:37 - 11:49 Correlative Tomography for micro- and nano- scale porosity reduction analysis in Additive Manufactured healable aluminium alloy Grzegorz Pyka Universite Catholique de Louvain, Louvain-la-Neuve, Belgium</p> <p>11:52 - 11:55 <i>Flash</i> Exploring metastable domain configurations in BaTiO₃: an in-situ study Tamsin O'Reilly Queen's University, Belfast, UK. University of Glasgow, UK</p>	<p>10:00 - 10:30 <i>Invited</i> Extreme Light-Matter Interactions in the Ultrafast Transmission Electron Microscope Ido Kaminer Technion, Haifa, Israel</p> <p>10:30 - 10:42 Towards a 100,000 frames per second direct detector for 4D STEM Barnaby Levin Direct Electron LP, San Diego, California, USA</p> <p>10:42 - 10:54 On the Dependence of the Sensitivity of EELS vs XEDS in the AEM with Thickness and Beam Energy Nestor J. Zaluzec Dept. of Physics, Chalmers University of Technology, Gothenburg, Sweden. Photon Sciences Directorate, Argonne National Laboratory, Argonne, Illinois, USA</p> <p>10:54 - 11:06 Increasing the Usable Frame-rate of your Existing STEM Jonathan Peters School of Physics, Trinity College Dublin, Ireland. Advanced Microscopy Laboratory, CRANN, Dublin, Ireland</p> <p>11:06 - 11:11 <i>Technical Showcase</i> Nanoprobng and EBAC analysis with minimum electron beam exposure Marco Nordmann SmarAct GmbH</p> <p>11:11 - 11:14 <i>Flash</i> Atomic scale 3D reconstruction of nanostructures using inline 3D holography Pritam Banerjee Department of Metallurgical and Materials Engineering, Indian Institute of Technology Madras, Chennai, India</p> <p>11:17 - 11:20 <i>Flash</i> An efficient solution for correlative microscopy and co-localized observations based on multiscale multimodal machine-readable nanoGPS tags Sebastien Legendre HORIBA FRANCE SAS, Loos, France</p> <p>11:25 - 11:37 Three-dimensional imaging of a single impurity atom inside a thick crystal using multislice electron ptychography David Muller Cornell University, Ithaca, USA</p> <p>11:37 - 11:49 Time correlation spectroscopy using event-driven data acquisition Daen Jannis EMAT, Antwerp, Belgium. NANOLab Center of Excellence, Antwerp, Belgium</p> <p>11:49 - 11:52 <i>Flash</i> Ultrafast nanoimaging of the order parameter in a structural phase transition Till Domröse 4th Physical Institute – Solids and Nanostructures, University of Göttingen, Germany</p> <p>11:52 - 11:55 <i>Flash</i> Strain mapping using scanning precession electron diffraction - a round robin test of different methods for calculation from the raw datasets Ian MacLaren University of Glasgow, UK</p>	<p>10:00 - 10:30 <i>Invited</i> Seeing is believing: atomic-scale imaging of catalysts under reaction conditions Irene Groot Leiden Institute of Chemistry, Leiden University, Netherlands</p> <p>10:30 - 10:42 In-situ hydration of calcium sulfate and the phase transformation pathways of bassanite to gypsum Martha Ilett University of Leeds, UK</p> <p>10:47 - 10:59 Direct observation of the chemical dynamics of Pt nanoparticles in CO oxidation reaction by operando TEM Milivoj Plodinec ETH Zurich, ScopeM, Zurich, Switzerland. Fritz-Haber Institute of the Max-Planck Society, Department of Inorganic Chemistry, Berlin, Germany</p> <p>10:59 - 11:11 Gold Oxide Formation on TiO₂/Au(111) Model Catalysts Sabine Wenzel Leiden Institute of Chemistry, Netherlands</p> <p>11:16 - 11:46 <i>Invited</i> Dynamics of nanostructure surfaces and ways to approach them Thomas Willum Hansen Technical University of Denmark, Kgs. Lyngby, Denmark</p>

Diamond Light Source Session I Session Organiser: Angus Kirkland	Late Breaking Session Organiser: Gail McConnell
<p>10:00 - 10:15 Introduction <i>Imaging and Microscopy at Diamond</i> Paul Quinn Diamond Light Source</p> <p>10:15 - 10:45 Invited <i>Understanding the Evolution of Nanoporosity in Alloy Systems using X-ray and Electron Techniques</i> Mary Ryan Imperial College London, UK</p> <p>10:45 - 10:57 <i>Application of unsupervised machine learning methods to scanning electron nanobeam diffraction (SEND) data: case study for domain mapping in P2 and O3-type Sodium-Ion Battery cathode material</i> Andy Bridger University of Oxford, UK. STFC, Swindon, UK. Diamond Light Source, Didcot, UK</p> <p>10:57 - 11:09 <i>Wigner Distribution Deconvolution for ptychography: blind solution of the illumination function</i> Wenjie Mei University of Sheffield, UK</p> <p>11:09 - 11:24 <i>Technical Showcas Advanced electron imaging techniques at the electron Physical Science Imaging Centre (ePSIC)</i> Chris Allen Diamond Light Source</p> <p>11:24 - 11:54 Invited <i>Local diffraction at low dose: Nanoscale structural variation in molecular materials</i> Sean Collins University of Leeds, UK</p>	<p>10:00 - 10:12 <i>Polarization Mapping in Single Crystal Bulk Perovskite Oxides by Atomic Resolution STEM</i> Wanbing Ge University of Warwick, Coventry, UK</p> <p>10:12 - 10:24 <i>SPM nanomapping of subsurface electronic and electro-mechanical properties of compound semiconductor devices - modelling vs experiment</i> Oleg Kolosov Physics Department, Lancaster University, UK</p> <p>10:24 - 10:36 <i>Synthetic Graphite and xGnP composites for EMIS; relative to their platelet axis and platelet behaviour</i> Lina Jfai University of Manchester, UK</p> <p>10:41 - 10:53 <i>Architecture of the mitochondrial genome segregation machinery in Trypanosoma brucei</i> Irina Bregy Institute of Anatomy & Institute of Cell Biology, University of Bern, Switzerland. Graduate School for Cellular and Biomedical Sciences, Bern, Switzerland</p> <p>10:53 - 11:05 <i>Using advanced microscopy to study evolutionary processes involved in the emergence of AMR</i> Raveen Tank The University of Manchester, UK</p> <p>11:05 - 11:17 <i>A Modular 100 keV Vacuum Sealed FEG for High-resolution Microscopy</i> Mohamed El-Gomati York Probe Sources Ltd, UK.</p> <p>11:17 - 11:29 <i>Measuring coefficient of thermal expansion of materials of micrometre size using SEM/FIB microscope with in-situ ME heating stage</i> Stuart Robertson Loughborough Materials Characterisation Centre/Department of Materials, Loughborough University, UK.</p> <p>11:34 - 11:37 Flash <i>Xfold slides for cell and virus imaging at a single-particle resolution</i> Nagarajan Subramaniam Xfold Imaging Oy, Espoo, Finland</p> <p>11:37 - 11:40 Flash <i>Cross-sectional STEM imaging to investigate deformation in van der Waals materials</i> Evan Tillotson University of Manchester, UK. National Graphene Institute, Manchester, UK</p> <p>11:40 - 11:43 Flash <i>Magnetic field dependence of the tunneling density of states in the type II Weyl semimetal WTe₂</i> Raquel Sánchez-Barquilla Universidad Autónoma de Madrid, Spain. Unidad asociada (UAM/CSIC), Madrid, Spain</p> <p>11:43 - 11:46 Flash <i>A new Scanning Tunneling Microscope at magnetic fields of 22 T</i> Beilun Wu Instituto de ciencia de Materiales Nicolás Cabrera, Condensed Matter Physics Center (IFIMAC), Universidad Autónoma de Madrid, Spain</p> <p>11:46 - 11:49 Flash <i>Development of a dose control technique for damage-less SEM observation of polymers</i> Yoichiro Hashimoto Hitachi High-Tech Corporation, Kawasaki, Japan</p>

Thursday 8 July, Afternoon

EMAG - 4D-STEM Session Organisers: Donald Maclaren, Ana Sanchez	EMAG - In-situ microscopy Session Organiser: Cornelia Rodenburg, Jun Yuan	Advanced Atom Probe Tomography Session Organiser: Michael Moody
<p>14:45 - 15:15 Invited Uses of multimodal ptychography John Rodenburg University of Sheffield, UK</p> <p>15:15 - 15:27 In-situ biasing and temperature influence on the electric fields across GaAs based p-n junction via 4D STEM Anuj Pokle Philipps University Marburg, Germany</p> <p>15:27 - 15:39 Ptychography on dynamically scattering samples Laura Clark University of Leeds, UK</p> <p>15:39 - 15:51 Improved magnetic field mapping of Fe₆₀Al₄₀ embedded nanomagnets by precession-corrected STEM-DPC Gregory Nordahl Department of Physics, Norwegian University of Science and Technology, Trondheim, Norway</p> <p>15:51 - 15:56 Technical Showcase Precession Electron Diffraction in TEM for nm-scale materials analysis. Applications and Examples Thanos Galanis Quantum Design UK and Ireland / NanoMEGAS SPRL</p> <p>15:56 - 15:59 Flash Optimal experiment design for characterising structures containing multiple types of elements using 4D scanning transmission electron microscopy Duygu Gizem Sentürk EMAT & NANOLab Center of Excellence, University of Antwerp, Belgium</p> <p>15:59 - 16:02 Flash In-STEM Transmission Kikuchi Diffraction of nanoscale crystalline defects in zirconium alloys Jack Haley University of Oxford, UK</p> <p>16:02 - 16:05 Flash Design of electron ptychography experiments through simulations Mohsen Danaie Diamond Light Source Ltd., electron Physical Science Imaging Centre (ePSIC), Didcot, UK</p> <p>16:05 - 16:10 Technical Showcase Electrostatic Dose Modulation applications for STEM EDS Dan Masiel JEOL (UK) Ltd</p> <p>16:10 - 16:40 Invited Quantification of light elements in ABF and 4D STEM electron ptychography Emanuela Liberti The Rosalind Franklin Institute, Harwell Campus, Didcot, UK. University of Oxford, Department of Materials, UK. electron Physical Science Imaging Centre (ePSIC), Diamond Light Source, Didcot, UK</p>	<p>14:45 - 15:15 Invited Assessing structure and dynamics of biological systems via Liquid Phase Electron Microscopy Lorena Ruiz-Perez University College London, Department of Chemistry, UK</p> <p>15:15 - 15:27 Understanding Electron Beam Effects on Liquid-phase Specimens using Low Dose Electron Energy-Loss Spectroscopy Liam Spillane Gatan Inc., USA</p> <p>15:27 - 15:39 Multiple Object Tracking of Supported Nanoparticles during in situ Environmental TEM Studies of Nanocatalysts Thierry Epicier IRCÉLYON, Univ Lyon-UCBL-CNRS & MATEIS, Univ Lyon-INSa de Lyon-UCBL-CNRS, Villeurbanne, France</p> <p>15:39 - 15:51 Mapping Crystalline Regions During In-Situ Heating-Comparing TEM and 4D STEM Benjamin Miller Gatan, Inc., USA</p> <p>15:51 - 15:56 Technical Showcase Continuum-IS: Advanced direct detection for in-situ chemical analysis Liam Spillane GATAN</p> <p>15:56 - 15:59 Flash An off-axis electron holography investigation of the perpendicular shape anisotropy and thermal stability of STT-MRAM nano-pillars Trevor Almeida Univ. Grenoble Alpes, CEA, LETI, France</p> <p>15:59 - 16:02 Flash Observing Changes in Polar Domain Structures in Ferroelectric Oxide Thin Film Using Atomic Resolution In-Situ Electron Microscopy James Gott University of Warwick, Coventry, UK</p> <p>16:02 - 16:05 Flash Brownian Tomography of Mesoporous Silica Nanoparticles Cesare De Pace University College London, UK</p> <p>16:05 - 16:10 Technical Showcase Development of In-Situ Observation TEM-Holder Takashi Gondo Mel-Build</p> <p>16:22 - 16:34 Heat Treatment of Steel: A Novel High Temperature In Situ SEM Imaging Approach Rhiannon Heard University of Oxford, UK. Natural History Museum, London, UK</p> <p>16:34 - 16:37 Flash Introducing the term “probe high tension” and extreme x-ray collection efficiency on Spectra Ultra S/TEM Anil Yalcin Thermo Fisher Scientific, Eindhoven, Netherlands</p> <p>16:37 - 16:40 Flash Caught in transition: Nanoscale analysis and molecular level characterisation of collagen mineralisation by complementary use of electron microscopy and in situ Raman microspectroscopy Emma Tong University of York, UK</p>	<p>14:45 - 15:15 Invited Using microscopy to understand and improve green light emitting diodes Rachel Oliver University of Cambridge, UK</p> <p>15:15 - 15:27 High-Resolution Characterisation of Neutron-Irradiated Zirconium Alloys Benjamin Jenkins University of Oxford, UK</p> <p>15:32 - 15:44 Understanding the role of oxygen in titanium alloys for use in jet engines Hazel Gardner Department of Materials, University of Oxford, UK</p> <p>15:44 - 15:56 A liquid metal encapsulation for analyzing complex nanomaterials by atom probe tomography Se-Ho Kim Max Planck Institut für Eisenforschung, Dusseldorf, Germany</p> <p>15:56 - 16:08 Developing Atom Probe Tomography to Characterise Sr-Loaded Bioactive Glass for Bone Scaffolding Yanru Ren Department of Materials, University of Oxford, UK</p> <p>16:08 - 16:38 Invited Pushing the analytical limits of atom probe tomography via cryo-enabled workflows Baptiste Gault Max-Planck-Institut für Eisenforschung, Düsseldorf, Germany</p>

Diamond Light Source Session 2 <i>Session Organiser: Peijun Zhang</i>	Seeing is Believing – Multiplexed Imaging Flow Cytometry <i>Session Organiser: Ziv Porat</i>
<p>14:45 - 15:00 Introduction The electron Bio-imaging centre (eBIC) at Diamond Light Source Alistair Siebert Diamond Light Source</p> <p>15:00 - 15:30 Invited Looking inside the cell; molecular pathology using electron tomography James Naismith Rosalind Franklin Institute, Harwell Campus, UK. Oxford University, UK</p> <p>15:30 - 15:42 Cryo-EM and single-particle analysis reveals pore dynamics and asymmetric cargo loading in an encapsulin nanocompartment Zak McIver Newcastle University, UK</p> <p>15:42 - 15:54 Multi-modal chemical imaging of catalysts – from micro to nano scale resolution Dorota Matras Diamond Light Source, Didcot, UK. The Faraday Institution, Didcot, UK</p> <p>15:54 - 16:06 Demineralisation of human dental enamel observed by operando X-ray tomography Alexander M. Korsunsky University of Oxford, UK</p> <p>16:06 - 16:09 Flash Engineering illumination modes in X-ray ptychography Yangyang Mu The University of Sheffield, UK</p> <p>16:09 - 16:12 Flash Instance segmentation of crystalline cones from x-ray microCT of insect eye Tunhe Zhou Stockholm University, Sweden</p> <p>16:12 - 16:15 Flash Nanostructural Analysis of Human Dentine using 3D Small Angle X-ray Scattering Tensor Tomography Tayyaba Rabnawaz University of Surrey, Guildford, UK, Diamond Light Source, Didcot, UK</p> <p>16:15 - 16:18 Flash In situ Crack Growth in Irradiated and Virgin Nuclear Graphite by 4D X-ray Tomography Paul Mummery University of Manchester, UK</p> <p>16:18 - 16:21 Flash Structural and spectroscopic insights on elemental distribution in bimetallic nanoparticles through combined atomic resolution electron microscopy and nano X-ray fluorescence imaging Panashe Mhembe University of Southampton, UK</p> <p>16:21 - 16:24 Flash A synchrotron X-ray Computed Tomography investigation of solute transport under unsaturated conditions Nikolaos Karadimitriou Institute of Applied Mechanics (CE), University of Stuttgart, Germany</p> <p>16:24 - 16:27 Flash Phase-contrast 3D tomography of cells grown in polymer electrospun scaffolds using synchrotron X-rays at Diamond Light Source (I13-2) Mohammed Yusuf University College London, UK, Research Complex at Harwell, Didcot, UK Aga Khan University, Karachi, Pakistan</p> <p>16:27 - 16:30 Flash 4D in-situ microtomography and image analysis of aerosol filtration Matthew Jones University of Manchester at Harwell, Oxford, UK</p> <p>16:30 - 16:33 Flash Tracking Reactions of Asymmetric Organo-Osmium Transfer Hydrogenation Catalysts in Cancer Cells by ICP-and nanofocussed x-ray fluorescence Elizabeth Bolitho University of Warwick, Coventry, UK. Diamond Light Source, Oxford, UK</p> <p>16:33 - 16:36 Flash Correlative Soft Tissue Synchrotron Microtomography: Sample Preparation, Imaging, Reconstruction and Segmentation Methods Andrew J Bodey Diamond Light Source, Didcot, UK</p> <p>16:36 - 16:39 Flash Revealing the 3D local atomic structure in an undercooled binary Al alloy melt Shi Huang University of Hull, UK</p>	<p>14:45 - 15:15 Invited Monitoring immune responses by imaging flow cytometry Orla Maguire Roswell Park Comprehensive Cancer Center, Buffalo, USA</p> <p>15:15 - 15:20 Technical Showcase New Developments from Amnis to Enable Deeper Biological Insights Owen Hughes Luminox</p> <p>15:20 - 15:25 Technical Showcase More than microscopy: microdissection - micromanipulation - imaging Bob Hartley MMI GmbH</p> <p>15:25 - 15:55 Invited Nanoscale 3D co-Localization in Imaging Flow Cytometry via Point-Spread-Function Engineering Yoav Shechtman Technion - Israel Institute of Technology, Haifa, Israel</p>

Poster List

Poster Session 1

12:15 - 12:45 Tuesday 6 July, 2021

16 Characterisation and Defect Analysis of 2D Layered Ternary Chalcogenides

Tigran Simonian, *Advanced Microscopy Lab, Trinity College Dublin, Dublin, Ireland. CRANN/ AMBER, Trinity College Dublin, Dublin, Ireland. School of Chemistry, Trinity College Dublin, Dublin, Ireland.*

51 Probing the dielectric polarization properties of biological molecules on the molecular scale

Harriet Read *Department of Physics and Astronomy, University of Manchester, Manchester, UK.*

94 Characterizing nanomechanical properties of comedones after treatment with sodium salicylate

Zeinab Al-Rekabi *National Physical Laboratory, Teddington, UK*

100 A comparison of convolutional neural network-based approaches for label-free cell cycle prediction

Elsa Sörman Paulsson *Sartorius Corporate Research, Umeå, Sweden*

114 Fabrication of functionalized cotton adorned with ZnO nanoflowers for antibacterial activity

Ambreen Ashar *Department of Chemistry, Government College Women University, Faisalabad, Pakistan*

133 Robotic microscopy for everyone with the Web of Things: the OpenFlexure Microscope

Richard Bowman *University of Bath, UK*

175 Lightsheet microscopy for studies of plant-environment interactions

Yangminghao Liu *University of Dundee, UK.*

194 Automating Correlative Microscopy with Python: Removing the Frustrations

Thomas Fish *Diamond Light Source, Didcot, UK*

197 Efficient data annotation for large-scale machine learning-based segmentations with webKnossos

Norman Rzepka *scalable minds GmbH, Potsdam, Germany*

213 Development of a deep neural network based fully automated centrosome analysis workflow

Gabor Pajor *Deutsches Krebsforschungszentrum, Heidelberg, Germany. University of Pecs Medical School, Pecs, Hungary.*

215 Accuracy of mass measurements by AFM

Hans Gunstheimer *Nanosurf AG, Liestal, Switzerland. TU Ilmenau, Germany*

219 Automation of imaging and control of the OpenFlexure Delta Stage using the OpenFlexure MATLAB client.

Samuel McDermott *University of Cambridge, UK*

221 Improving the resolution of light sheet microscopy without additional photons

James Manton *MRC Laboratory of Molecular Biology, Cambridge, UK*

238 Mapping optical near-field hotspots with multiphoton microscopy in nano/meta- and 2D materials

Ventsislav Valev *University of Bath, UK*

244 SmartSamplingTM: a revolution in Raman imaging

Thibault Brulé *HORIBA France SAS, Palaiseau, France*

245 ContactJ: Lipid Droplets-Mitochondria Contacts measurement by Fluorescence Microscopy and Image Analysis

Gemma Martin *Advanced Optical Microscopy Facility. Scientific and Technological Centers. University of Barcelona, Spain*

275 Medical image registration and pixel classification for the study of protein co-localization and morphology heterogeneity in cancer biopsies

Laura Nicolas *Departamento de Bioingeniería e Ingeniería Aeroespacial, Universidad Carlos III de Madrid, Leganés, Spain. Instituto de Investigación Sanitaria Gregorio Marañón, Madrid, Spain*

277 High Resolution Imaging and Nanomechanical Properties of Gram-Positive Bacterial Cell Wall Using Atomic Force Microscopy

Anaam Alomari *Sheffield University, UK*

294 Detection of extracellular vesicles in non-Newtonian fluids using vibrating microcantilevers

Kislon Voitchovsky *Durham University, UK*

313 High-resolution AFM reveals the nanoscale architecture of MRSA cell wall

Abimbola Feyisara Adedeji Olulana *Krebs Institute, University of Sheffield, UK. Department of Physics and Astronomy, University of Sheffield, UK*

314 Single Molecular Dynamic Imaging of DNA-Protein using Atomic Force Microscopy

Vinny Verma *University of Sheffield, UK*

319 Identification and analysis of ion-implanted chromium dopants in monolayer MoS₂

Michael Hennessy *University of Limerick, Ireland*

332 One-Dimensional structures and heterostructures from atomic chains to coaxially stacking of crystals

Reza Kashtiban *University of Warwick, Coventry, UK*

437 High Resolution Large Field of View Axial Swept Lightsheet Microscope at Low Cost

Ben Sutcliffe *Light Microscopy Facility, MRC Laboratory of Molecular Biology, Cambridge, UK*

Poster Session 2

17:30 - 18:00 Tuesday 6 July, 2021

9 Skin Image Analysis in Contact Capacitive Imaging and High Resolution Ultrasound Imaging

Perry Xiao *London South Bank University, UK*

15 Unscrambling mixed elements atom-by-atom by combining HAADF STEM and EDX

Annick De Backer *EMAT, University of Antwerp, Belgium. NANOLab Center of Excellence, Antwerp, Belgium.*

42 Imaging across biological length scales with laser free confocal microscopy

Phillipa Timmins *Aurox Ltd, Culham Science Centre, Abingdon, UK*

44 Characterizations of Responsive Photonic Liquid Crystal Network Coatings on Flexible Plastic Substrates by Atomic Force Microscopy

Lanti Yang *Technology & Innovation, SABIC, Bergen op Zoom, Netherlands*

59 METEOR: an integrated top down cryo-CLEM imaging system

Marit Smeets *Delmic B.V., Delft, Netherlands*

65 Rapid (FLASH-FLIM) imaging of protoporphyrin IX in a tumour mimic in real time using a CMOS based widefield fluorescence lifetime imaging camera

Graham Hungerford *Horiba, Glasgow, UK*

96 Beam-dose controlled atomic resolution EELS mapping of beam sensitive catalyst supports.

Trung Tran *Johnson Matthey Technology Centre, Reading, UK*

136 Probing electric polarization at solid-liquid and solid-solid interfaces in van der Waals heterostructures

Harriet Nevison-Andrews *University of Manchester, UK*

156 High-Speed AFM as a Quality Control Tool: Measuring the Roughness Variability of SiC Monofilaments for Metal Matrix Composites

Dhilan Devadasan *University of Surrey, Guildford, UK*

158 Using the Mesolens to observe structural changes in E. coli mature colony biofilm under different nutrient availability

Beatrice Bottura *University of Strathclyde, Glasgow, UK*

164 Using XANES and EELS to analyse space weathered Apollo lunar samples: Preparation for Hayabusa2 Samples

Leon Hicks *University of Leicester, UK*

171 Nanoscale chemical imaging and spectro-microscopy of engineered nanomaterials after interaction with aquatic environmental media and microorganisms

Miguel Gomez-Gonzalez *Diamond Light Source Ltd., Didcot, UK*

176 Investigating the biochemistry of Alzheimer's disease using synchrotron x-ray microscopy and spectroscopy

James Everett *School of Pharmacy and Bioengineering, Keele University, Stoke-on-Trent, UK. School of Engineering, University of Warwick, Coventry, UK*

188 Cryo Soft X-ray Microscopy for Whole Cell Imaging: Progress in the Development of a Commercial Laboratory Scale Device

Kenneth Fahy *SiriusXT, Dublin, Ireland*

191 XRnanotech: Nanostructured Diffractive X-Ray Optics

Florian Döring *XRnanotech, Untertsggental, Switzerland. Paul Scherrer Institut, Villigen-PSI, Switzerland*

201 Investigation of life science samples using an annular silicon drift detector at low beam currents

Max Patzschke *Bruker Nano, Berlin, Germany*

208 Capturing the intracellular universe at near-native states and in 4D: the many uses of cryo-soft X-ray tomography for in-depth investigations of biological systems

Ilias Kounatidis *Diamond Light Source, Didcot, UK*

229 The use of through the length scale chemical analysis in steels used in hostile environments

Geoff West *WMG, University of Warwick, Coventry, UK*

241 The combined application of optical tweezers and advanced microscopy for examination of mutual interaction of red blood cells influenced by nano-materials

Igor Meglinski *Aston University, Birmingham, UK*

246 Experimental Solid Angle of the X-ray Perimeter Array Detector (XPAD) on the Argonne PicoProbe Analytical Electron Microscope

Nestor J. Zaluzec *Photon Science Directorate, Argonne National Laboratory, Argonne, Illinois 60439, USA*

250 Chemical Decoration of Graphene and 2D-Materials: An AFM Outlook

Vladimir Korolkov *Park Systems Ltd, Nottingham, UK*

251 X-ray Ptychography Imaging of Human Chromosomes After Low-dose Irradiation

Archana Bhartiya *London Centre for Nanotechnology, University College London, London, UK. Department of Chemistry, University College London, London, UK. Research Complex at Harwell, Didcot, UK*

268 3D multi-modal imaging of demineralised dentine using combined scanning transmission X-ray microscopy (STXM-CT) and micro-X-ray diffraction (μ -XRD-CT) tomography techniques

Nathanael Leung *University of Surrey, Guildford, UK*

310 Use of FIB-DIC to measure the residual stress of a SnO_2/F based coating on glass

Jaufray Lescoffit *University of Surrey, Guildford, UK. NSG Pilkington, Lathom, UK*

318 Noble Gas Bubbles in Thin Films

Rebecca B. Cummings *University of Glasgow, UK*

322 FLIMbow: a multicolor multi-lifetime labeling method for individual cells and cell lineages

Vasilisa Polinovskaya *Skolkovo Institute of Science and Technology, Moscow, Russian Federation*

324 STGM studies of charge symmetry in the geometrically modulated Seebeck coefficient in encapsulated graphene nanoconstrictions

Eli Castanon *National Physical Laboratory, London, UK. Lancaster University, UK*

334 Scanning thermal microscopy of 2D materials in various environments

Khushboo Agarwal *Lancaster University, UK*

Poster Session 3

16:45 - 17:45 Wednesday 7 July, 2021

2 MINFLUX, a game-changer?

Kirti Prakash *National Physical Laboratory, London, UK*

7 Gaining meaningful statistical data on TEM specimens through automated nanoparticle workflow (APW)

Anil Yalcin *Thermo Fisher Scientific, Eindhoven, Netherlands*

8 Next generation vitrification robot

Maarten Kuijper *Thermo Fisher Scientific, Eindhoven, Netherlands*

13 Building a rotational near field ptychography

Yiqian Zhang *University of Sheffield, UK*

19 Expanding Performance and Usability of High-speed / Low-dose STEM Scanning

Tiarnan Mullarkey *Centre For Doctoral Training in the Advanced Characterisation of Materials, Dublin, Ireland. School of Physics, Trinity College Dublin, Ireland*

20 The correlation between ptychographic phase and ADF intensity: A new approach for quantitative STEM

Ali Mostaed *Department of Materials, University of Oxford, UK*

24 Laser-free super-resolution microscopy

Kirti Prakash *National Physical Laboratory, London, UK*

28 Plasma FIB Spinmill for Al alloy Sample Preparation

Changrun Cai *MSD, Thermo Fisher Scientific, Shanghai, China*

34 Phasing Out Fluorescence: Quantifying Mitosis Label-free

Meetal Solanki *Phasefocus, Sheffield, UK*

35 High resolution imaging and spectroscopy of interfaces in solid-state Li-ion batteries

Ruomu Zhang *University of Oxford, UK*

36 Quantifying Macrophage Phagocytosis of Bioparticles

Meetal Solanki *Phasefocus, Sheffield, UK*

41 Super-resolution microscopy of macrophage adhesion and migration

Liisa Hirvonen *The University of Western Australia, Perth, Australia*

47 The Applications of Fast Electron Detectors and 4D -STEM Imaging for Understanding Structural Changes in Li-ion Cathode Systems.

Emma Hedley *Department of Materials, University of Oxford, UK*

56 Establish a simple pre-embedding correlative light and electron microscopy to evaluate the structural impacts of the APEX2 reporter in PK15 cells.

Yi-Fan Jiang *Graduate Institute of Molecular and Comparative Pathobiology, School of Veterinary Medicine, National Taiwan University, Taipei, Taiwan*

57 Imaging Zeolites Implanted with Single Metal Sites for Catalysis

Ping-Luen Baron Ho *Wolfson Catalysis Centre, Department of Chemistry, University of Oxford, UK.*

66 High resolution reflection microscopy via absorbance modulation

Parul Jain *Institut für Nanophotonik, Göttingen, Germany*

70 Particle analysis of siliceous sand fillers in electrical insulating epoxy resin-based casting system using Environmental Scanning Electron Microscopy

Martin Olbert *Institute of Scientific Instruments of the Czech Academy of Science, Brno, Czech Republic*

75 Nanoscale origins of degradation of Ni-rich NMC Li-ion battery cathodes

Jedrzej Morzy *Dept. of Materials Science and Metallurgy, University of Cambridge, UK. Institute for Manufacturing, University of Cambridge, UK*

79 Electron diffraction studies of commensurately modulated structures in bismuth transition metal oxide

Satyam Choudhury *Department of Metallurgical Engineering, Indian Institute of Technology (BHU), Varanasi, India*

85 Depth Resolution in Ptychography

Shengbo You *The University of Sheffield, UK*

87 Hyperspectral 3D fluorescence imaging using Snapshot projection optical tomography

Yongjin Sung *University of Wisconsin-Milwaukee, USA*

107 Understanding the degradation of Be tiles in the JET tokamak reactor using EELS and DFT

Xinlei Liu *University of Oxford, UK*

108 Structure-property Correlation of Black ZnO Nanoparticles with High Absorbance for Photovoltaic Applications

Praveen Kumar *Centre for Nanostructured*

Media, School of Mathematics and Physics, Queen's University Belfast, UK

109 Potential application of confocal reflection microscopy with Airyscan detector arrays for quantitative label-free live myelin imaging

Daryan Chitsaz *Montreal Neurological Institute, Montreal, Canada*

117 Electrochemical TEM experiments on solid oxide electrolysis cells

Zhongtao Ma *Department of Energy Conversion and Storage, Technical University of Denmark*

128 PyCalibrate: Fully automated PSF analysis

Alexander Corbett *University of Exeter, UK*

132 Quasi-in situ SXM study of post-lithium ion battery materials

Professor Benedetto Bozzini *Politecnico di Milano, Milan, Italy. Elettra Sincrotrone Trieste, Italy*

134 Understanding Trainable Segmentation for Inorganic Nanoparticle Images

Cameron Bell *Diamond Light Source, Didcot, UK. University of Edinburgh, UK*

135 Quantification of dynamic structural changes of nanomaterials via atom-counting from sequential ADF STEM images

Annelies De wael *EMAT, University of Antwerp, Belgium. NANOLab Center of Excellence, University of Antwerp, Belgium*

137 Method to measure AFM probe tip lifetime and wear

Charles Clifford *National Physical Laboratory, Teddington, UK*

144 Unraveling dynamical behaviour of intergranular glassy filin Si₃N₄ ceramics during in-situ heating: exit wave reconstruction insights

Chiranjit Roy *Department of Metallurgical and Materials Engineering, Indian Institute of Technology Madras, Chennai, India*

157 High throughput electron imaging of biological samples with Delmic's FAST-EM

Job Fermie *DELMIC, Delft, Netherlands*

159 Robust morphology-based classification of cells following label-free cell-by-cell segmentation using convolutional neural networks

Timothy Jackson *Sartorius, BioAnalytics, Royston, UK*

165 A Machine-Learning-Based Approach for Rapid 3D-Segmentation of cryo-Soft X-Ray Tomographic Datasets of Mammalian Cells

Michael Dyhr *Membrane Biochemistry Group, Department of Biology, Chemistry and Pharmacy, Free University of Berlin, Berlin, Germany*

167 Multi-scale structural and mechanical characterisation in polyurethane based tissue model

Jingyi Mo *University of Surrey, Guilford, UK*

195 3D Electron Diffraction / Micro-ED for Structural Characterization of beam sensitive API using Pixelated detectors

Partha Pratim Das *NanoMEGAS SPRL, Brussels, Belgium*

196 Large area visualization of the Li distribution in lithium-ion battery electrodes using plasma FIB and SIMS

Yige Sun *Department of Materials, University of Oxford, UK. The Faraday Institution, Quad One, Harwell Science and Innovation Campus, Didcot, UK*

198 Resin comparison for Serial Block Face Scanning Electron Microscopy

Anna Kremer *VIB Bioimaging Core, Ghent, Belgium. VIB Center for Inflammation Research, Ghent, Belgium. Department of Biomedical Molecular Biology, Ghent University, Belgium*

200 Phase Object Reconstruction of 4D-STEM datasets using Deep Learning

Thomas Friedrich *Electron Microscopy for Materials Science (EMAT) and NANOLab Center of Excellence, University of Antwerp, Belgium*

203 LifeHack: An Open-Source, Modular Microscope for Live & Fixed Cell Single Molecule Imaging

Josh Edwards *Newcastle University, UK*

207 Targeting intracellular bacteria with antimicrobial virus-like particles: a case study with a single-cell resolution

Stephanie Rey *National Physical Laboratory, London, UK*

216 Atomic-Scale Investigation of the Reversible omega-Phase Lithium Ion Charge – Discharge Characteristics of Electrodeposited Vanadium Pentoxide (V₂O₅) Nanobelts

Haytham Hussein *Department of Chemistry, University of Southampton, UK*

222 Structured illumination microscopy vs image scanning microscopy

James Manton *MRC Laboratory of Molecular Biology, Cambridge, UK*

224 Automated In-Situ Spectrum Imaging with Synchronized Stimulus Control

Liam Spillane *Gatan Inc., Pleasanton, USA*

227 Eliminating charging issues when imaging non-conducting physical and biological samples by FIB tomography

James O'Sullivan *The University of Manchester, UK*

230 Inverted microscope platform for cryo-CLEM and laser-free confocal cryo-fluorescence

Michael Schwertner *Linkam Scientific Instruments Ltd., Tadworth, UK*

233 Improving data quality for 3D electron diffraction (3DED) by Gatan Image Filter

Taimin Yang *Stockholm University, Sweden*

234 Speckle based Phase Contrast X-ray Microscopy, an investigation into possible clinical and research applications.

Matthew Donoghue *Galway Clinic, Ireland*

236 Probing the structure-property relationship in natural and bioinspired dental materials aided by *in situ* advanced microscopy

Tan Sui *University of Surrey, Guildford, UK*

264 Quantitative imaging of antiferromagnetic spin cycloidal textures on strain engineered BiFeO₃ thin film with a scanning nitrogen-vacancy magnetometer

Hai Zhong *Qnami AG, Muttenz, Switzerland*

272 Routine Sample Optimization for Single Particle Cryo-EM with chameleon

Michele Darrow *SPT Labtech LTD, Melbourn, UK*

273 High energy resolution STEM-EELS as a powerful tool for the characterisation of battery materials

Angelica Laurita *Université de Nantes, CNRS, Institut des Matériaux Jean Rouxel, IMN, France*

276 Quantum on a budget: Developing a 3d-printed microscope for Optically Detected Magnetic Resonance of nanodiamond

Ryan Corby *University of Strathclyde, Glasgow, UK. Diamond Science and Technology CDT, University of Warwick, Coventry, UK*

285 Modular, sustainable, low-cost, open microscopy and high content analysis

Sunil Kumar *Imperial College London, UK. Francis Crick Institute, London, UK*

287 Revealing the nanoscale infrared properties of graphene-hBN bubbles

Tom Vincent *National Physical Laboratory, London, UK. Royal Holloway, University of London, UK*

290 Scanned Josephson Tunneling Microscopy Studies of Copper-Oxide High Temperature Superconductivity

Shane O'Mahony *University College Cork, Ireland*

295 Machine learning large-angle convergent-beam electron diffraction

Richard Beanland *University of Warwick, Coventry, UK*

297 Chemical Survey for Lithium-Ion Battery Electrode by ToF-SIAttached Xe Plasma FIB-SEM

Xuhui Yao *Advanced Technology Institute, University of Surrey, Guildford, UK*

305 Quasiparticle Interference Imaging of Hidden Orbital Order

Weijiong Chen *Clarendon Laboratory, University of Oxford, UK*

306 Bright monomeric red fluorescent protein for FLIM and nanoscopy

Dmitry Ruchkin *Shemyakin-Ovchinnikov Institute of Bioorganic Chemistry, Moscow, Russian Federation*

317 Accelerate your research with access to the best microscopy tools across all of Europe

Johanna Bischof *Euro-BiImaging ERIC, Heidelberg, Germany*

321 Microscopic analysis of new and historic cotton textiles pre- and post-bleaching

Rana Salem *Department of Applied ScienceGlasgow Caledonian University, Glasgow, UK*

326 Assessment of Quantification Errors and Fidelity of Compressed Sensing based Electron Tomography Reconstructions using material-realistic 3D Phantoms

Ainouna Bouziane *Department of Materials Science and Metallurgical Engineering and Inorganic Chemistry, University of Cádiz, Spain*

333 Engineered Point Spread Functions Enable Axial Super-Resolution in Single Molecule Imaging and Single Particle Tracking

Anurag Agarwal *Double Helix Optics, Boulder, USA*

336 Hot corrosion fatigue characterization of Ni-superalloy C-ring using CT-tomography crystallographic analysis with finite elemental analysis.

Maadhav Kothari *Carl Zeiss Microscopy, Cambridge, UK*

340 Comparative analysis of continuous rotation electron diffraction (cRED) data using Bloch-wave simulations.

Anton Cleverley *University of Warwick, Coventry, UK*

342 3D visualisation of dentine tubule occlusion by dual beam FIB SEM/EDS

Xiaohui Chen *Division of Dentistry, School of Medical Sciences, The University of Manchester, UK.*

343 Intercellular Communication in a Poly-Extremophilic Exiguobacterium Strain Isolated From Modern Stromatolites

Virginia Albarracin *Center for Electron Microscopy (CIME)-CONICET-UNT, San Miguel de Tucuman, Argentina*

Poster Session 4

13:45 - 14:45 Thursday 8 July, 2021

5 Strain mapping using scanning precession electron diffraction - a round robin test of different methods for calculation from the raw datasets

Ian MacLaren *University of Glasgow, UK*

12 An off-axis electron holography investigation of the perpendicular shape anisotropy and thermal stability of STT-MRAM nano-pillars

Trevor Almeida *Univ. Grenoble Alpes, CEA, LETI, Grenoble, France*

14 Introducing the term "probe high tension" and extreme x-ray collection efficiency on Spectra Ultra S/TEM

Anil Yalcin *Thermo Fisher Scientific, Eindhoven, Netherlands*

17 Interface analysis for the next-generation of multi-materials additive manufacturing

Tien Thuy Quach *Advanced Materials and Healthcare Technologies, School of Pharmacy, University of Nottingham, UK. Centre for Additive Manufacturing, Faculty of Engineering, University of Nottingham, UK. Faculty of Pharmacy, Ho Chi Minh City University of Technology, Vietnam*

43 Instance segmentation of crystalline cones from x-ray microCT of insect eye

Tunhe Zhou *Stockholm University, Sweden*

48 A cold field emission gun optimized for cryo-EM applications.

Stan Konings *Thermo Fisher Scientific, Eindhoven, Netherlands*

- 49 Characterisation of InGaAs QW in metamorphic InP lasers
Nicholas Stephen *Queen's University Belfast, UK*
- 50 Exploring the Atomic Structure of Pyramidal Quantum Dots
Tamsin O'Reilly *Queen's University, Belfast, UK. University of Glasgow, UK*
- 58 ESEM as a Tool for Observations of Delicate Frozen Samples
Kamila Závacká *Institute of Scientific Instruments of the Czech Academy of Science, Brno, Czech Republic*
- 62 Influence of Thermal Diffuse Scattered Electrons in Electron Ptychography
Zhiyuan Ding *Department of Materials, University of Oxford, UK*
- 64 Tracking Reactions of Asymmetric Organo-Osmium Transfer Hydrogenation Catalysts in Cancer Cells by ICP-and nanofocussed x-ray fluorescence
Elizabeth Bolitho *University of Warwick, Coventry, UK. Diamond Light Source, Oxford, UK*
- 72 A synchrotron X-ray Computed Tomography investigation of solute transport under unsaturated conditions
Nikolaos Karadimitriou *Institute of Applied Mechanics (CE), University of Stuttgart, Germany*
- 81 Elucidation of short range order, defects and beam sensitivity in Ca_2MnO_4 Ruddlesden-Popper oxides through Transmission electron microscopy
Satyam Choudhury *Department of Metallurgical Engineering, Indian Institute of Technology (BHU), Varanasi, India*
- 88 Quantitative STEM for Bimetallic Catalyst Nanoparticles
Xiaonan Luo *University of Oxford, UK*
- 91 Ultrafast nanoimaging of the order parameter in a structural phase transition
Till Domröse *4th Physical Institute – Solids and Nanostructures, University of Göttingen, Germany*
- 99 Phase-contrast 3D tomography of cells grown in polymer electrospun scaffolds using synchrotron X-rays at Diamond Light Source (I13-2)
Mohammed Yusuf *Research Complex at Harwell, Didcot, UK. Aga Khan University, Karachi, Pakistan*
- 106 Hybrid Pixel Electron Detection for Observation of Material Structures at Low Energies
Anahita Pakzad *Gatan Inc., Pleasanton, USA*
- 112 Electron ptychographic imaging of polymer and macromolecular ordering
Botao Hao *University of Oxford, UK*
- 121 Engineering illumination modes in X-ray ptychography
Yangyang Mu *The University of Sheffield, UK*
- 123 Operando CO_2 Methanation Experiments over Fe Promoted $\text{Ni}/\text{Al}_2\text{O}_3$ Hydrotalcites by a combined TEM and Hard X-ray Nanoprobe approach
Manfred Erwin Schuster *Johnson Matthey, Sonning Common, UK*
- 143 Atomic scale 3D reconstruction of nanostructures using inline 3D holography
Pritam Banerjee *Department of Metallurgical and Materials Engineering, Indian Institute of Technology Madras, Chennai, India.*
- 145 Exploring metastable domain configurations in BaTiO_3 : an in-situ study
Tamsin O'Reilly *Queen's University, Belfast, UK. University of Glasgow, UK*
- 151 Optimal experiment design for characterising structures containing multiple types of elements using 4D scanning transmission electron microscopy
Duygu Gizem Sentürk *EMAT, University of Antwerp, Belgium. NANOLab Center of Excellence, University of Antwerp, Belgium*
- 161 A correlative through the length scale study combining XRM-FIB-TEM instrumentation with machine learning to understand autocatalysts.
Aakash Varambhia *Johnson Matthey, Reading, UK*
- 163 Advances in bio-TEM – Revolution or Evolution?
Christopher Edgcombe *Dept of Physics, University of Cambridge, UK*
- 172 *In situ* Crack Growth in Irradiated and Virgin Nuclear Graphite by 4D X-ray Tomography
Paul Mummery *University of Manchester, UK*
- 177 Correlative Soft Tissue Synchrotron Microtomography: Sample Preparation, Imaging, Reconstruction and Segmentation Methods
Andrew J Bodey *Diamond Light Source, Oxfordshire, UK*
- 179 Imaging on a large scale: Dealing with Expansion Microscopy, Spatially Resolved transcriptomics and other omics
Claudia Florindo *Andor Technologies, Belfast, UK*
- 180 Liquid-phase Electron Microscopy in Structural and Molecular Biology
Gabriel Ing *University College London, UK*
- 182 Ferroelectric polarisation control in thin filia growth conditions
Aaron Naden *University of St Andrews, UK*
- 210 4D in-situ microtomography and image analysis of aerosol filtration
Matthew Jones *University of Manchester at Harwell, Oxford, UK*
- 212 High-resolution cryo-EM at 200kV enabled by Selectris-X and Falcon 4
Adrian Koh *Thermo Fisher Scientific, Eindhoven, Netherlands*
- 225 In-STEM Transmission Kikuchi Diffraction of nanoscale crystalline defects in zirconium alloys
Jack Haley *University of Oxford, UK*
- 242 An efficient solution for correlative microscopy and co-localized observations based on multiscale multimodal machine-readable nanoGPS tags
Sebastien Legendre *HORIBA FRANCE SAS, Loos, France*
- 243 Understanding early stages of crystallization of calcium carbonate Using Electron Microscopy.
Maryam Afzali Haji Dela *Leeds University, UK*
- 258 Caught in transition: Nanoscale analysis and molecular level characterisation of collagen mineralisation by complementary use of electron microscopy and *in situ* Raman microspectroscopy
Emma Tong *University of York, UK*
- 261 Brownian Tomography of Mesoporous Silica Nanoparticles
Cesare De Pace *University College London, UK*
- 271 Design and *in situ* Environmental TEM characterization of a stable and robust self-assembled network of bi-metallic (Au-Pd) nanoparticles for CO oxidation
Thierry Epicier *IRCELYON, Univ Lyon-UCBL-CNRS, Villeurbanne, France*
- 281 Nanostructural Analysis of Human Dentine using 3D Small Angle X-ray Scattering Tensor Tomography
Tayyaba Rabnawaz *Department of Mechanical Engineering Sciences, University of Surrey, Guildford, UK. Diamond Light Source, Harwell Science and Innovation Campus, Didcot, UK*

299 Ferroelastic Domain Dynamics as a Function of Aspect Ratio

John Scott *Queen's University Belfast, UK*

300 Structural and spectroscopic insights on elemental distribution in bimetallic nanoparticles through combined atomic resolution electron microscopy and nano X-ray fluorescence imaging.

Panashe Mhembere *University of Southampton, UK*

316 Inclined twins related non-radiative defects in vertical III-V nanowires grown in unconventional directions

H.Aruni Fonseka *Department of Physics, University of Warwick, Coventry, UK*

323 Revealing the 3D local atomic structure in an undercooled binary Al alloy melt

Shi Huang *University of Hull, UK*

330 Observing Changes in Polar Domain Structures in Ferroelectric Oxide Thin Film Using Atomic Resolution In-Situ Electron Microscopy

James Gott *University of Warwick, Coventry, UK*

338 Design of electron ptychography experiments through simulations

Mohsen Danaie *Diamond Light Source Ltd., electron Physical Science Imaging Centre (ePSIC), Didcot, UK*

356 Development of a dose control technique for damage-less SEM observation of polymers

Yoichiro Hashimoto *Hitachi High-Tech Corporation, Kawasaki, Japan*

358 A new Scanning Tunneling Microscope at magnetic fields of 22 T

Beilun Wu *Laboratorio de Bajas Temperaturas, Departamento de Física de la Materia Condensada, Instituto de ciencia de Materiales*

Nicolás Cabrera, Condensed Matter Physics Center (IFIMAC), Universidad Autónoma de Madrid, Spain

361 Magnetic field dependence of the tunneling density of states in the type II Weyl semimetal WTe₂

Raquel Sánchez-Barquilla *Universidad Autónoma de Madrid, Spain. Unidad asociada (UAM/CSIC), Madrid, Spain*

365 Xfold slides for cell and virus imaging at a single-particle resolution

Nagarajan Subramaniam *Xfold Imaging Oy, Espoo, Finland*

Award Presentations & Prizes

A number of 2021 RMS Award-winners are due to give talks during the Virtual Conference.

Several winners of the Society's 'Medal Series', chosen biennially by each of the RMS Science Sections will be presenting their work and answering questions from colleagues.

They are as follows:

Alan Agar Medal for Electron Microscopy (sponsored by Agar Scientific) - Dr Alexandra Pacureanu, European Synchrotron Radiation Facility

Alexandra is talking at 11.11 on Tuesday 6 July in the Chemical Imaging of Biological Samples using Electron, Ion and X-ray Based Techniques session.

Medal for Light Microscopy - Professor Philipp Kukura, University of Oxford

Philipp is talking at 14.30 on Tuesday 6 July in the Quantifying Dynamic Movement in Living Cells session.

Medal for Innovation in Applied Microscopy for Engineering and Physical Sciences - Dr Wing Chung Tsoi, Swansea University

Wing Chung is talking at 10.00 on Wednesday 7 July in the SPM Techniques on Energy Materials and Processes session.

Medal for Life Sciences - Dr Yanlan Mao, University College London

Yanlan is talking at 14.30 on Tuesday 6 July in the Imaging in Development and Disease session.

AFM & SPM Medal - Dr Laura Fumagalli, University of Manchester

Laura is talking at 14.30 on Tuesday 6 July in the Functional Scanning Probe Microscopy for Advanced Material Science session.

RMS Early Career Award - Dr Kevin Whitley, Newcastle University

Kevin is talking at 16.00 on Monday 5 July as part of the Early Career Pre-Conference Symposium.

Poster Prizes

There are a number of poster prizes up for grabs at mmc2021. The prizes will be in the following categories:

- Physical Sciences
- Life Sciences
- Frontiers in Bioimaging
- AFM & SPM
- EMAG

Poster prizes will be awarded on Wednesday 7 July at the end of poster session 3 at 1730.

The organisers would like to thank The International Journal of Biochemistry & Cell Biology and The Journal of Microscopy for sponsoring the poster sessions and poster prizes at mmc2021.



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Commercial Workshop

Timetable Tuesday 6 July

1000 - 1030	Linkam Scientific Instruments <i>Cryo-fluorescence and Cryo-CLEM: sample handling, microscope integration and new workflow options with the Linkam CMS196V3</i>	Teledyne Photometrics <i>Overcoming The Challenges Of High Speed Voltage Imaging With New sCMOS Camera Technology</i>			
1100 - 1130	Delmic <i>Powerful workflows by Delmic – simplifying large scale EM and cryo-ET</i>	GATAN <i>Recent advances in cathodoluminescence microscopy</i>			
1245-1315			Leica Microsystems (UK) Ltd <i>Aivia, the future of AI microscopy</i>	Olympus <i>Unlocking simultaneous, multicolour super-resolution down to 15 nm in 3D</i>	Blue Scientific Ltd <i>Using microCT for fast scanning 5µ resolution in <5min and high performance, high resolution applications in energy storage</i>
1400-1430			Double Helix Optics <i>Multi-color, multi-modal, high precision 3D super-resolution imaging with Double Helix Optics PSF Engineering</i>	Park Systems <i>Graphene Under the Tip: Ultra-High Resolution Atomic Force Microscopy Of Chemically Decorated 2D-materials</i>	Thermo Fisher Scientific <i>An Integrated Fluorescence Light Microscope for the Thermo Scientific Aquilos 2 Cryo-FIB</i>
1500-1530	Excelitas Technologies Inc. <i>LED illumination for fluorescence from Fura-2 to Cy7.5 and beyond – a true lamp replacement</i>	TELIGHT <i>Q-Phase, a label-free multimodal holographic microscope for quantitative phase imaging</i>			

				1000 - 1030
				1100 - 1130
JEOL (UK) Ltd <i>Which SEM?</i>	Nikon (UK) Ltd <i>New Generation AI Confocal Microscope: Nikon AX</i>	ZEISS <i>How to tame a lattice lightsheet</i>	Oxford Instruments <i>Microscopy Applied to Battery Materials</i>	1215 - 1245
Oxford Instruments <i>Cypher VRS1250 Video- Rate AFM</i>	Quantum Design/ NanoMEGAS SPRL <i>Precession enhanced Electron Diffraction Applications in TEM</i>	EDAX <i>Highlighting the imaging workflow in the innovative APEX Software</i>	LUMICKS <i>A Dynamic Single- Molecule Approach to Directly Visualize the Molecular Mechanisms of DNA-Binding Proteins</i>	1345 - 1415
				1430 - 1500

Commercial Workshop

Timetable Wednesday 7 July

1000 - 1030	Thermo Fisher Scientific <i>Thermo Scientific Tundra: Cryo-EM for all</i>	JEOL (UK) Ltd <i>Interface upgrades provide high level control over JEOL TEM operation</i>			
1100 - 1130	TELIGHT <i>LiveCodim - super-resolution solution for every lab</i>	CoolLED <i>Transform Your Microscope into an Automated High-Speed Imaging System Without the Need for Complex Software</i>			
1215 - 1245			Agar Scientific <i>Microscopy: Preparing your sample for imaging and analysis</i>	Delmic <i>Delmic cryo-CLEM solutions for Cryo-ET and multibeam volume EM: Speed up your understanding of biological systems on a nanometer scale</i>	Miltenyi Biotec <i>Simplicity that defies complexity - the MACSima™ Platform for ultrahigh-content imaging</i>
1345 - 1415			Leica Microsystems (UK) Ltd <i>Capture life the moment it happens</i>	TESCAN <i>Dynamic micro-CT - Pushing the temporal and spatial boundaries for true in situ experimentation</i>	Miltenyi Biotec <i>Automated large-scale 3D fluorescence imaging - UltraMicroscope Blaze™ Light Sheet Imaging System</i>
1430 - 1500	GATAN <i>Electron detectors for counted EELS acquisition</i>	Hitachi <i>Combining SEM and broad ion beam milling to better understand battery materials</i>			
1530 - 1600	ZEISS <i>Addressing multi scale challenges in materials research</i>	Linkam Scientific Instruments <i>Characterising the Micro-Mechanical Properties of Your Samples Using the Linkam Modular Force Stage</i>			

					1000 - 1030
					1100 - 1130
Blue Scientific Ltd <i>Using SEM/EDS for rapid and accurate failure analysis</i>	JEOL (UK) Ltd <i>With open ARMs – JEOL Corrected Microscopy solutions for widening your capabilities</i>		CELLINK <i>Harnessing the power of live cell imaging with the CELLCYTE X</i>		1215 - 1245
Thermo Fisher Scientific <i>ChemiSEM – Real-time problem solving for SEM-EDS</i>	EDAX <i>Advanced EBSD data processing with OIM Analysis - data selection, validation, and quantification</i>	Oxford Instruments <i>Getting the most out of your EDS in the TEM: M2T quantification, EDS based sample thickness measurements and more</i>	Luminex <i>Automating DNA Damage Assays Using Multi-Spectral Imaging Flow Cytometry</i>	Mel-Build <i>Development of In-Situ Observation Holder and SEM Stage</i>	1345 - 1415
					1430 - 1500
					1530 - 1600

Commercial Workshop

Timetable Thursday 8 July

1000 - 1030	TESCAN <i>Take your multi-modal materials characterization further with the latest plasma FIB-SEM by TESCAN</i>	Nanosurf <i>DriveAFM: Approaches towards combining high-resolution and large-range AFM imaging for materials and life science samples</i>			
1100 - 1130	Leica Microsystems (UK) Ltd <i>Label-free, chemically specific imaging with Leica STELLARIS 8 CRS – a true multi-modal optical discovery platform</i>	EM Resolutions Ltd <i>Real-world examples of TEM, STEM & cryo-EM research conducted by University of Leeds using EM Resolutions products.</i>			
1215 - 1245			Leica Microsystems (UK) Ltd <i>Super-Resolution Re-Imagined with Stellaris Sted</i>	Thermo Fisher Scientific <i>Explore large multi-channel and time series data with Thermo Scientific Amira Software and the new Xplore5D extension</i>	Photon Lines Ltd <i>Nanometer-scale imaging and microsecond-range tracking with the Abberior MINFLUX</i>
1500 - 1530	Olympus <i>scanR: TruAI Assisted Quantitative Image-Based Cytometry</i>				
1530 - 1600	Lambda Photometrics <i>Advanced sample preparation</i>	Oxford Instruments <i>Jupiter-XR AFM: High Resolution, High Stability, and High Speed</i>			

			1000 - 1030
			1100 - 1130
Miltenyi Biotec Automated large-scale 3D fluorescence imaging - UltraMicroscope Blaze™ Light Sheet Imaging System	TESCAN From data to information with selective BSE contrast methods of TESCAN's CLARA Field- Free UHR-SEM	Thermo Fisher Scientific The new magic duo: Our state-of-the-art TEM workflow	1215 - 1245
			1500 - 1530
			1530 - 1600

