

## ACMM-20 & IUMAS-IV CONFERENCE PROGRAM

### Monday 11<sup>th</sup> February

#### Opening Ceremony *Riverside Theatre*

##### 9.00 am Welcome

##### Opening Plenaries

9.15 am	David	Cockayne	Exploring the Nanoworld [1]
9.40 am	Lyn	Beazley	Microscopy and Science in Australia [2]
10.05 am	David	Scharf	SEM Photography – that's my Job: 35 years of making cool images – & still working [3]

##### Exhibition opening

10.30 am	Morning tea	Exhibition Pavilion 1
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#### Meeting Room 1

##### S-32 Microscopy, viruses & diseases [Alex Hyatt & Mah-Lee Ng]

11.00 am	Mark	Ellisman <i>Invited</i>	Multi-scale Imaging of the Nervous System [4] Part A: "New molecular labelling methods for imaging by light and electron microscopy."
11.30 am	Sandra	Crameri	Melaka virus, a new human respiratory virus, identified using electron microscopy. [5]
11.45 am	Alex	Hyatt	The Australian Biosecurity Microscopy Laboratory : a facility for identification of new pathogens. [6]
12.00	Mah-Lee	Ng <i>Invited</i>	Microscopic Characterisation of West Nile prM mutant viruses using Immunofluorescence and Transmission Electron Microscopy [7]

12.30 pm	Lunch	Exhibition Pavilion 1
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12.45 pm	Special Lunch Box	JEOL Seminar	Meeting Room 1	ASPMS General Meeting	Meeting Room 2
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##### S-03 Visualising & Modelling Biological Complexity in 3D across Scales and Resolutions – I [Brad Marsh]

1.45 pm	Mark	Ellisman <i>Invited</i>	Multi-scale Imaging of the Nervous System [4] Part B: "Building the Electronic Whole Brain Catalogue."
2.15 pm	Peter	Hunter <i>Invited</i>	Computational physiology, microscopy & the IUPS Physiome Project [9]
2.45 pm	Johanna	Hoog <i>Invited</i>	Tomographic Investigation of Interphase Microtubules in Fission Yeast (Schizosaccharomyces pombe) [10]
3.15 pm	Afternoon tea	Exhibition Pavilion 1	

##### S-03 Visualising & Modelling Biological Complexity in 3D across Scales and Resolutions – II [Filip Braet]

3.45 pm	S H	Lau	Rapid non-invasive tomography of biological samples across length scales using a novel lab-based CT with resolution from mm to 30 nm [11]
4.00 pm	Edd	Stockdale	Conventional and EFTEM Tomography in Biological Microscopy [12]
4.15 pm	Dane	Gerneke	Obtaining optimal Optical Sections in Surface Imaging Microscopy [13]
4.30 pm	Willie	Geerts	3D Insight into Melanogenesis [14]
4.45 pm	Poster Session & Happy Hour sponsored by JEOL in Exhibition Pavilion 1		

#### Meeting Room 2

##### S-13 Microscopy, self-assembly & surface chemistry [Pali Thordarson & Colin Raston]

11.00 am	Eric	Bakker <i>Invited</i>	Lab on a Bead for Sensing and Imaging [15]
11.30 am	Sabrina	Dehn	Using lanthanides to enhance the stability and possible applications of anion-sensitive self-assembled gels [16]
11.45 am	Adrian	Murdock	AFM Characterisation of Pr[Co(CN) <sub>6</sub> ].xH <sub>2</sub> O (x=5,4) Metal-Organic Frameworks [17]
12.00	Scott	Jones	Understanding Cell-gel interactions for better cancer treatment methods [18]
12.15 am	Pall	Thordarson	Hierarchical microscopy analysis of self-assembled gels [19]

12.30 pm	Lunch	Exhibition Pavilion 1
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12.45 pm	Special Lunch Box	JEOL Seminar	Meeting Room 1	ASPMS General Meeting	Meeting Room 2
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## Monday 11<sup>th</sup> February (continued)

### Meeting Room 2 (cont.)

#### S-08 Micro-CT & x-ray microscopy [Allan Jones & Peter Austin]

1.45 pm	<b>Naomi Tsafnat</b>	MicroCT and Finite Element Modelling in the Study of Materials with Complex Microstructures [20]
2.00 pm	<b>Stephen Barnes</b>	Micro-CT investigation of three-dimensional morphology of magmatic sulfides in low-grade nickel ores [21]
2.15 pm	<b>S H Lau</b>	Imaging biological, polymer and low Z materials in 3D to submicron spatial resolution, with a novel MicroCT [22]
2.30 pm	<b>Allan Jones</b>	Preparing Specimens for X-ray Microtomography [23]
2.45 pm	<b>Munish Kumar</b>	Creating a Digital Materials Repository using micro-CT and Other Complimentary Techniques [24]
3.00 pm	<b>Anthony Jones</b>	3D Imaging and Computational Techniques to Estimate Mechanical Properties of the Human Proximal Femur. Influence of Connectivity, Age and Heterogeneity on Bone Strength. [25]

3.15 pm Afternoon tea Exhibition Pavilion 1

#### S-24 Forensic & Optical Microscopy [Ian Dadour]

3.45 pm	<b>Graeme Auchterlonie</b>	Microscopy and Microanalysis of Ancient Roman Bronze Coins: I. Image Analysis, II. Energy Dispersive Spectroscopy [26]
4.00 pm	<b>Melissa Wakefield</b>	In-situ SEM/EDS-Raman Characterisation of Gunshot Residues [27]
4.15 pm	<b>Ivan Sarvas</b>	A needle in a haystack-to detect and identify gunshot residue particles amongst environmental particles [28]
4.30 pm	<b>Sarah Walker</b>	High throughput generation of histological volumes using the Olympus .slide platform [29]
4.45 pm	<b>Poster Session &amp; Happy Hour sponsored by JEOL in Exhibition Pavilion 1</b>	

### Meeting Room 3

#### S-17 Developments in x-ray detection [Colin MacRae]

11.00 am	<b>Paul Kotula</b> <i>Invited</i>	Results from two four-channel Si-drift detectors on an SEM: Conventional and annular geometries [30]
11.30 am	<b>Dale Newbury</b>	Predicting Visibility in Elemental Maps Derived from X-ray Spectrum Images [31]
12.00	<b>Aaron Torpy</b>	Hyperspectral Mapping in a FEG-EPMA [32]
12.15 pm	<b>Peter Statham</b>	Correction for Electronic Artefacts in High Rate X-Ray Spectra [33]

12.30 pm Lunch Exhibition Pavilion 1

12.45 pm **Special Lunch Box JEOL Seminar Meeting Room 1 ASPMS General Meeting Meeting Room 2**

#### S-05 IUMAS Presidential Symposium on Microanalysis - I [Clive Walker]

1.45 pm	<b>Raynald Gauvin</b> <i>Invited</i>	X-Ray Microanalysis and Imaging in the Field Emission Scanning Electron Microscope [34]
2.15 pm	<b>Xavier Llovet</b>	Measurements and calculations of characteristic X-ray yields in electron probe microanalysis [35]
2.30 pm	<b>Claude Merlet</b>	Calculation of Reference X-ray Intensities for Quantitative Analysis by WDS-EPMA [36]
2.45 pm	<b>Silvia Richter</b> <i>Invited</i>	Depth Profile Analysis on the Nanometre Scale by a Combination of Electron Probe Microanalysis [EMPA] and Focussed Ion Beam Specimen Preparation (FIB) (FIB) [37]

3.15 pm Afternoon tea Exhibition Pavilion 1

#### S-05 IUMAS Presidential Symposium on Microanalysis - II [Raynald Gauvin]

3.45 pm	<b>Ryuichi Shimizu</b> <i>Invited</i>	Toward Higher Resolution X-ray Microscopy - theoretical and experimental approaches [38]
4.15 pm	<b>Richard Wuhrer</b>	Correction Factor Images Generated from X-ray Maps [39]
4.30 pm	<b>Masashi Watanabe</b>	Improvements of X-ray Analysis of Thin-Films in Aberration-Corrected Scanning Transmission Electron Microscopes [40]

4.45 pm **Poster Session & Happy Hour sponsored by JEOL in Exhibition Pavilion 1**

**Monday 11<sup>th</sup> February** *(continued)*

**4.45 pm Poster viewing & JEOL sponsored Happy Hour**

### **Exhibition – Pavilion 1**

#### **Biological Posters**

B-01	<b>Sandra Fok</b>	Cancer Cell Migration in Three-Dimensional High Density Collagen Matrix Compared to Low Density [41]
B-02	<b>Ray Gilbert</b>	Techniques for Microscopic Imaging of Human Brain Tissue [42]
B-03	<b>Midori Jones</b>	Immunolabelling of cell wall polymers in softening <i>Actinidia arguta</i> [43]
B-04	<b>Emma Kettle</b>	Tropomyosin 4 Defines a Novel Filament System Associated with the Terminal Sarcoplasmic Reticulum in Skeletal Muscle [44]
B-05	<b>Katie Levick</b>	An AFM study of tomato hairy roots embedded in epoxy resin [45]
B-06	<b>Edd Stockdale</b>	Building a Structural map; Volume Rendering Confocal Data [46]
B-07	<b>Lisa Tee</b>	Assessment of Captopril for the Treatment of Retinal Neurovascularisation [47]
B-08	<b>Lisa Tee</b>	rAAV.sFLT-1-mediated Gene Therapy improves Vasculature Outcome in Retinal Neurovascularisation [48]
B-09	<b>Sing Wong</b>	Biological element mapping: How to get good results from energy-filtered TEM [49]

#### **SEM & Other techniques/applications Posters**

S-01	<b>Mao-Nan Chang</b>	Approach to Nondestructive Characterization of Dielectric Breakdown Strength by Conductive Atomic Force Microscopy [50]
S-02	<b>Thor Bostrom</b>	ESEM and EDX Mapping Correlated with Raman Spectroscopy and FT-IR Spectral Imaging Spectroscopy in the Study of Archaeological Paint and Plaster Samples [51]
S-03	<b>Daniel Goldstein</b>	Monitoring Charge Transfer in Carbon Nanotube-Fluorescein Dye Conjugates using Near Field Scanning Optical Microscopy (NSOM) [52]
S-04	<b>Eleanor Kable</b>	Implementation & Integration of Light/laser Optical Imaging Facilities within an Electron Microscope Unit: Considerations about Infrastructure, Instrumentation, Scientific Drivers, Staff Recruitment and Training. [53]
S-05	<b>Claude Merlet</b>	Characterization of a plutonium-doped ceramic material (zirconolite) by WDS-EPMA. Results of an interlaboratory round-robin test. [54]
S-06	<b>Sue Ramm-Anderson</b>	Under the Electron Microscope - what is Compliance with ISO 15189 (AS 4633-2004) in a Diagnostic Pathology Unit? [55]
S-07	<b>Dwi Panduwinata</b>	Surface Modification on the Nanoscale with an Atomic Force Microscope [56]
S-08	<b>Grahame Rosolen</b>	A Modified Scanning Electron Microscope for Fabricating Terahertz Coupling Structures [57]
S-09	<b>Ross Williams</b>	Microstructural characterisation of fly ash and fly ash geopolymers [58]
S-10	<b>Estrolita Green</b>	Laser excited fluorescence imaging of latent fingerprints [59]

**6.15 pm CLOSE - Exhibition & Poster Viewing**

**6.30 pm AMMRF Public Lecture** *Riverside Theatre*

## Tuesday 12<sup>th</sup> February

### Meeting Room 1

#### S-07 High resolution biological TEM - I [Ben Hankamer]

9.00 am	<b>Steven Ludtke</b>	<i>Invited</i>	Cryo-EM Single Particle Reconstruction of GroEL at 4 Å Resolution [60]
9.30 am	<b>Alok Mitra</b>	<i>Invited</i>	Structural analysis of proteins involved in viral morphogenesis by transmission electron microscopy [61]
10.00 am	<b>Brad Marsh</b>	<i>Invited</i>	Multi-resolution spatio-temporal analysis of mammalian cells reconstructed in toto in 3D by electron tomography (ET) [62]
10.30 am	Morning tea	Exhibition Pavilion 1	

#### S-07 High resolution biological TEM - II [Filip Braet]

11.00 am	<b>Ben Hankamer</b>	<i>Invited</i>	Towards high-resolution single particle analysis of membrane proteins, macromolecular assemblies and icosahedral viruses [63]
11.30 am	<b>Kristina Jahn</b>		Monitoring Membrane Rafts in Cancer Cells by Means of Correlative Fluorescence and Transmission Electron Microscopy [65]
11.45 am	<b>Arndt Meier</b>		Quantitative Analysis of Human Lung Computer Tomography Data: From basic Segmentation to Scintigraphy and Clinical Applications [66]
12.00	<b>Ian Hallett</b>		Differential Cell Wall Changes During Kiwifruit Softening [67]
12.15 pm			
12.30 pm	Lunch	Exhibition Pavilion 1 & <b>AMMS 2008 Calendar presentation</b>	
12.45 pm	<b>AMAS General Meeting</b>	<b>Meeting Room 1 (Lunch Boxes provided)</b>	

#### S-28 Plant & other biological microscopy [Rosemary White & John Kuo]

1.45 pm	<b>Robyn Overall</b>	<i>Invited</i>	Probing Plant Cell Function with Microscopy [68]
2.15 pm	<b>Helen Jolley</b>		Characterisation of the structure of the moss <i>Stonea oleaginosa</i> (Musci: Pottiaceae) using Environmental Scanning Electron Microscopy. [69]
2.30 pm	<b>Mark Talbot</b>		The role of the coleorhiza in barley seed germination [70]
2.45 pm	<b>Rosemary White</b>		Does transient expression of fluorescent fusion proteins always tell the truth about protein localisation? [71]
3.00 pm	<b>Jaroslav Blazek</b>		Amylolysis of Wheat Starches. Degradation Patterns of Starch Granules in Relation to Amylose Content [72]
3.15 pm	Afternoon tea	Exhibition Pavilion 1	

#### T-01 Invited Tutorials [Peta Clode & Alex Hyatt]

3.45 pm	<b>Peter Ingram</b>		Essentials of Biological Microanalysis [104]
4.45 pm	<b>Brad Marsh</b>		Basic tomography and image reconstruction in biomedicine [105]

**5.15 pm AMMS General Meeting Meeting Room 1**

**7.00 pm for 7.30 pm Conference Dinner BelleView Ballroom 1**  
sponsored by nanoTechnology Systems

## Tuesday 12<sup>th</sup> February (continued)

### Meeting Room 2

#### S-16/33 Applications and Techniques in STEM, TEM & EELS – I [Joanne Etheridge]

9.00am	<b>Christian Colliex</b>	Invited	Nanocarbon and the TEM: probing the object and/or testing the instrument [73]
9.30 am	<b>Michel Bosman</b>		Optimizing EELS acquisition [74]
9.45 am	<b>Matthew Field</b>		The Electron Energy Loss Near Edge Structure of Tungsten Oxide [75]
10.00 am	<b>Chris Witte</b>		Effects of Channelling on Core-Loss Fine Structure in TEM and STEM [76]
10.15 am	<b>Vicki Keast</b>		Measuring and understanding Surface Plasmons with Electron Energy-Loss Spectroscopy [77]
10.30 am	Morning tea		Exhibition Pavilion 1

#### S-16/33 Applications and Techniques in STEM, TEM & EELS – II [Vicki Keast]

11.00 am	<b>Mark Oxley</b>	Invited	Spectroscopic Imaging Using Aberration Corrected Scanning Transmission Electron Microscopy [78]
11.30 am	<b>Christian Dwyer</b>		Multislice Theory of Atomic Inner-Shell Ionization [79]
11.45 am	<b>Les Allen</b>		Theoretical Interpretation of Imaging Based on Core-Loss Spectra [80]
12.00	<b>Philip Nakashima</b>		Can Absorption be Quantitatively Negated in Experimental CBED Data? [81]
12.15 pm	<b>Joanne Etheridge</b>		A Method to Measure the Size of an Angstrom-Scale Electron Probe [82]
12.30 pm	Lunch	Exhibition Pavilion 1	& <b>AMMS 2008 Calendar presentation</b>
12.45 pm	<b>AMAS General Meeting</b>		<b>Meeting Room 1 (Lunch Boxes provided)</b>

#### S-18/34 Remote Microscopy, Teaching & Training [Jane Hunter, Luc Harmsen & John Mansfield]

1.45 pm	<b>Luc Harmsen</b>	Invited	Mind the Training Gap [83]
2.15 pm	<b>Kim Sewell</b>		A pedagogical approach to a flexible training program for university-based clients structured to facilitate effective independent scanning electron microscope based research. [84]
2.30 pm	<b>John Mansfield</b>	Invited	Remote Instrument Control for Technique Teaching [85]
3.00 pm	<b>Jane Hunter</b>		Building a Data Grid for the Australian Nanostructural Analysis Network [86]
3.15 pm	<b>Nestor Zaluzec</b>		The ANL Tele-Presence Collaboratory Suite [87]
3.30 pm	Afternoon tea		Exhibition Pavilion 1

#### T-02 Invited Tutorials [Paul Rigby & Bill Richmond]

3.45 pm	<b>Bob Price</b>	<b>Jay Jerome</b>	Confocal Microscopy: Selection of Operating Parameters for Optimum Resolution, Quantitation and 3D Imaging [106]
4.30 pm	<b>John Thomas</b>		Tutorial [107]

**5.15 pm AMMS General Meeting Meeting Room 1**

**7.00 pm for 7.30 pm Conference Dinner Belle View Ballroom 1**  
sponsored by nanoTechnology Systems

**Tuesday 12<sup>th</sup> February** (continued)

### Meeting Room 3

**S-11 Scanning Ion Microscopy, High Resolution SEM & VPSEM - I [Brendan Griffin & David Joy]**

**Sponsored by Carl Zeiss SMT**

9.30 am	<b>Scott</b>	<b>Wight</b>	A Comparison of Imaging Modes: Secondary Electron, Ion Induced, STEM. [88]
9.30 am	<b>Brendan</b>	<b>Griffin</b>	Measurement of Relative Variations in Rutherford Backscattered Ion Intensity and Atomic Number in the "Orion" Scanning Helium Ion Microscope [89]
9.45 am	<b>David</b>	<b>Joy</b>	IONISE - Modelling Image Formation in the He Ion SIM [90]
10.15 am	<b>Heiner</b>	<b>Jaksch</b>	Strain related Contrast mechanisms in crystalline materials imaged with AsB detection [91]
10.30 am	Morning tea	Exhibition Pavilion 1	

**S-11/14 Scanning Ion Microscopy, High Resolution SEM & VPSEM - II [Brendan Griffin & David Joy]**

**Sponsored by Carl Zeiss SMT**

11.00 am	<b>David</b>	<b>Joy</b>	Lattice Fringe Imaging in an SEM [92]
11.15 am	<b>Debbie</b>	<b>Stokes</b>	Ultra-high resolution SEM of materials: hard or soft, conductive or insulating [93]
11.30 am	<b>Colin</b>	<b>Veitch</b>	Imaging Biomaterials and Advanced Materials in the VP-SEM [94]
11.45 am	<b>Heiner</b>	<b>Jaksch</b>	The New GEMINI ULTRA plus & its Low Voltage, Low Pressure Detection Capabilities [95]
12.00	<b>Kelvin</b>	<b>Poon</b>	In Situ Chemical Analysis of Tattooing Inks & Pigments in Ancient Mummified Remains [96]
12.15 pm	<b>Brendan</b>	<b>Griffin</b> <i>Invited</i>	The Application of Moire Fringe Interferometry to Measurement of Defocus in High Resolution SEM Images [97]
12.30 pm	Lunch	Exhibition Pavilion 1 &	<b>AMMS 2008 Calendar presentation</b>
12.45 pm	<b>AMAS General Meeting</b>	<b>Meeting Room 1</b>	<b>(Lunch Boxes provided)</b>

**S-11/14 – III & S-20 In situ CL Spectroscopy & Imaging [Matthew Phillips & Colin Veitch]**

1.45 pm	<b>Niels</b>	<b>de Jonge</b> <i>Invited</i>	Electron Microscopy of whole Cells in Liquid with Nanometer Resolution [99]
2.15 pm	<b>Matthew</b>	<b>Glenn</b>	A Comparison between On-Axis and Off-Axis Large Field Gaseous Secondary Electron Detectors in an ESEM [100]
2.30 pm	<b>Colin</b>	<b>MacRae</b>	Hyperspectral Cathodoluminescence microanalysis – mapping at the part per million level [101]
2.45 pm	<b>Dom</b>	<b>Drouin</b> <i>Invited</i>	Characterization of semiconductor materials using Cathodoluminescence and Monte Carlo simulation [102]
3.15 pm	<b>Matthew</b>	<b>Phillips</b>	Low voltage CL study of exciton transport in ZnO single crystals [103]
3.30 pm	Afternoon tea	Exhibition Pavilion 1	

**T-03 Invited Tutorials [Michael Moody & Colin MacRae]**

3.45 pm	<b>Tom</b>	<b>Kelly</b>	A Review of Local Electrode Atom Probes and Future Developments [108]
4.30 pm	<b>John</b>	<b>Small (Newbury)</b>	Problems Encountered in EDS X-ray Microanalysis in the SEM [109]

**5.15 pm AMMS General Meeting Meeting Room 1**

**7.00 pm for 7.30 pm Conference Dinner** *BelleView Ballroom 1*  
**sponsored by nanoTechnology Systems**

## Wednesday 13<sup>th</sup> February

### Meeting Room 1

#### S-26 Analytical microscopy in biology/biomedicine – I [Alan Marshall & Peta Clode]

9.00 am	<b>Peter Ingram</b> <i>Invited</i>	Event Streamed Spectrum Imaging using Programmed Beam Acquisition in Biological Microprobe Analysis [113]
9.30 am	<b>Alan Marshall</b> <i>Invited</i>	X-ray microanalysis of frozen-hydrated and freeze-dried biological samples in the SEM [114]
10.00 am	<b>Jeremy Shaw</b> <i>Keynote</i>	Rock Biting Invertebrates: Elemental Mapping of the Iron Mineralised Teeth of Chitons (Mollusca) [115]
10.30 am	Morning tea	Exhibition Pavilion 1

#### S-26 Analytical microscopy in biology/biomedicine – II [Alan Marshall & Peta Clode]

11.00 am	<b>Peter Smith</b>	Is Osteoarthritis more than a disease of the articular cartilage? [116]
11.15 am	<b>Richard Webb</b>	Uptake and Localisation of Lead in the Root Systems of Indian Mustard ( <i>Brassica juncea</i> ) and Signal Grass ( <i>Brachiaria decumbens</i> ) [117]
11.30 am	<b>Ann LeFurgey</b>	Osmotic and Metal Ion Homeostasis in the Pathogen <i>Leishmania</i> [118]
12.00	<b>Luis Filgueira</b>	Low-Energy-Loss Electron Microscopy of Doxorubicin in MCF-7 Breast Cancer Cell Lines [119]
12.15 pm	<b>Hans Griesser</b>	Microscopy and Microanalysis Characterization of Protein Microarray Surfaces [120]
12.30 pm	<b>Short Lunch</b>	Exhibition Pavilion 1

#### S-23 Specimen Preparation & Imaging in the Biological Sciences [Rick Webb & Sue Lindsay]

1.00 pm	<b>Kent McDonald</b> <i>Invited</i>	New specimen cups and loading strategies for high pressure freezing of biological samples [121]
1.30 pm	<b>Josef Schroeder</b>	Impact of Microwave-Assisted Sample Preparation in Diagnostic Electron Microscopy Today [122]
1.45 pm	<b>Jeremy Shaw</b>	Microwave Assisted Fixation and High Pressure Freezing for TEM Studies of Tooth Biomineralisation in Chitons (Mollusca) [123]
2.00 pm	<b>Tak Kee</b>	Elimination of Non-Resonant Background in CARS Imaging using Interferometry [124]
2.15 pm	<b>Unstructured networking afternoon for delegates</b>	
2.15 – 4.15 pm	<b>Inaugural AMMS SCIENTIFIC COMMITTEE EVENT</b>	Meeting Room 1
	<b>"Careers in microscopy - what you need to know but no one ever tells you"</b>	

### Meeting Room 2

#### S-9/10 David Cockayne Symposium on Advances in Materials Microscopy – I [Simon Ringer]

9.00 am	<b>David Cockayne</b> <i>Invited</i>	Studies of amorphous materials using electron RDF analysis and model refinement [125]
9.30 am	<b>Dmitri Golberg</b>	Recent Advances in in-situ TEM: Electrical and Mechanical Property Studies of Individual Low-Dimensional Inorganic Nanostructures [126]
9.45 am	<b>Judy Kim</b>	Nanosecond Imaging in the Dynamic TEM Reveals Unquenchable Transient Microstructure [127]
10.00 am	<b>Xiaozhou Liao</b>	Plastic Deformation Mechanisms of Nanostructured Metals [128]
10.15 am	<b>Jennifer Wong-Leung</b>	TEM analysis of defects created by ion implantation in silicon carbide [129]
10.30 am	Morning tea	Exhibition Pavilion 1

## Wednesday 13<sup>th</sup> February *(continued)*

### S-9/10 David Cockayne Symposium on Advances in Materials Microscopy – II [John Drennan]

11.00 am	<b>Masashi Watanabe</b> <i>Invited</i>	Atomic-Column Electron Energy-Loss Spectrum Imaging in Aberration-Corrected Scanning Transmission Electron Microscopes [130]
11.30 am	<b>Peter Hines</b>	SEM/EDS + Raman - a lab in a column [131]
11.45 am	<b>Bianca Haberl</b>	Characterization of Nanoindentation-Induced Amorphous Silicon [132]
12.00	<b>Michael O'Keefe</b> <i>Invited</i>	Seeing Atom Positions at Sub-Ångström Resolution with HRTEM [133]
12.30 pm	<b>Short Lunch</b>	Exhibition Pavilion 1

### S-21 Scanned Probe Technologies [Bill Richmond]

1.00 pm	<b>Hadi Zareie</b> <i>Invited</i>	Scanning Probe Microscopy of Organic, Biological and Polymeric Materials [134]
1.30 pm	<b>Thomas Becker</b>	Barium Sulfate Precipitation: The Effect of Cations [135]
1.45 pm	<b>Michael Higgins</b>	Atomic and Molecular Resolution AFM in Liquid [136]
2.00 pm	<b>Xiu-Qiang Tong</b>	The AFM Tip as a Complex Sensor for Biomolecular Processes [137]

2.15 pm **Unstructured networking afternoon for delegates**

2.15 – 4.15 pm **Inaugural AMMS SCIENTIFIC COMMITTEE EVENT** Meeting Room 1  
*"Careers in microscopy - what you need to know but no one ever tells you"*

## Meeting Room 3

### S-19 3-D Atom Probe Tomography - I [Michael Moody]

9.00 am	<b>François Vurpillot</b> <i>Invited</i>	Intrinsic performances and limitations of the Atom probe Tomography [138]
9.30 am	<b>Baptiste Gault</b>	Advanced calibration technique for Atom Probe Tomography [139]
9.45 am	<b>Ross Marceau</b>	Quantitative Atom Probe Tomography Analysis of Solute Clusters Formed During Early Rapid Hardening in Al-Cu-Mg Alloys [140]
10.00 am	<b>Michael Miller</b>	Atom Probe Tomography of Neutron Irradiated Pressure Vessel Steels [141]
10.15 am	<b>Xiang Xiong</b>	Study of the Homogeneity of Composition in Sm(CoCu) <sub>5</sub> Alloy by 3-Dimensional Atom Probe Analysis [142]
10.30 am	Morning tea	Exhibition Pavilion 1

### S-19 3-D Atom Probe Tomography - II [Xiang Xiong]

11.00 am	<b>Leigh Stephenson</b>	Cluster analysis for Atom Probe Tomography [143]
11.15 am	<b>Michael Moody</b>	Spatial Distribution Map Applications to 3D Atom Probe Data [144]
11.30 am	<b>Michael Miller</b> <i>Invited</i>	Probing the Early Stages of Phase Separation with the Local Electrode Atom Probe [145]
12.00	<b>Anna Ceguerra</b>	Analysis Techniques For Nanoscale Solute Clustering In Atom Probe Tomography [146]
12.15 am	<b>Peter Liddicoat</b>	Solute Cluster and Precipitate Evolution During Ageing of Al-Zn-Mg Alloys [147]
12.30 am	<b>Daniel Haley</b>	Radial Structure of Mg <sub>65</sub> Cu <sub>25</sub> Y <sub>10</sub> From Complementary APT and Energy Filtered Electron Diffraction [148]
12.30 pm	<b>Short Lunch</b>	Exhibition Pavilion 1

### S-15 Spectral Imaging and Multivariate Analysis [Nic Wilson & Martin Saunders]

1.00 pm	<b>Paul Kotula</b> <i>Invited</i>	Computed tomographic spectral imaging: 3D STEM-EDS Spectral Imaging [149]
1.30 pm	<b>Thomas Dieing</b>	High Resolution, High Speed Confocal Raman Imaging [150]
1.45 pm	<b>Nick Wilson</b>	Analysis of hyperspectral datasets using clustering algorithms and visualisation tools [151]

2.00 pm **Unstructured networking afternoon for delegates**

2.15 – 4.15 pm **Inaugural AMMS SCIENTIFIC COMMITTEE EVENT** Meeting Room 1  
*"Careers in microscopy - what you need to know but no one ever tells you"*

## Thursday 14<sup>th</sup> February

### Meeting Room 1

#### S-12 Fluorescence Quantification & Sensing Techniques & their Biological Applications [Ian Harper]

##### *Sponsored by Leica Microsystems*

9.00 am	<b>Jay Jerome</b> <i>Invited</i>	The Effect of Sterol Accumulation on Lysosome Function: A Study Combining Quantitative Structural and Biochemical Information [152]
9.30 am	<b>Bob Price</b> <i>Invited</i>	Applications of Confocal Microscopy in the Study of Gastrointestinal Diseases [153]
10.00 am	<b>Sam Wallace</b>	Quantification of Cell Volume of Cardiomyocytes using Second Harmonic Generation and Two Photon Excitation Fluorescence Microscopy [154]
10.15 am	<b>Lisa Tee</b>	Retinal and Choroidal Vascular changes in a Model of Diabetic Retinopathy [155]
10.30 am	Morning tea	Exhibition Pavilion 1

#### S-06 Advances in SIMS Technologies and Applications - I [Michael McWilliams]

##### *Sponsored by the CUT John de Laeter Centre of Mass Spectrometry*

11.00 am	<b>Hans Griesser</b> <i>Invited</i>	ToF-SIMS with PCA : Unique Capability for the Characterization of Biomaterials Surfaces [156]
11.30 am	<b>Ed Vicenzi</b> <i>Keynote</i>	Understanding Surface Processes on Mars via Time-of-Flight SIMS Microanalysis of Meteorites [157]
12.00 am	<b>Ian Fletcher</b>	SHRIMPing in the Sea of Tranquillity [158]
12.15 am	<b>Clive Walker</b>	SIMS Analysis of Irradiated Nuclear Fuel: Completing the Picture Provided by EPMA [159]

12.30 pm Lunch Exhibition Pavilion 1

**12.45 pm Lunch-box Seminar Paul Hlava: "Color in Gems" [Peter Downes] [112] Meeting Room 1**

#### S-06 Advances in SIMS Technologies and Applications - I [Matt Kilburn]

##### *Sponsored by the CUT John de Laeter Centre of Mass Spectrometry*

1.45 pm	<b>Claude Lechene</b> <i>Invited</i>	High-resolution quantitative imaging of mammalian and bacterial cells using MIMS [160]
2.15 pm	<b>John Moreau</b>	Extracellular Proteins in a Sulfate-Reducing Biofilm Limit the Dispersal of Metal-Sulfide Nanoparticles from an Abandoned Mine [161]
2.30 pm	<b>Smail Mostefaoui</b>	NanoSIMS study of cometary materials [162]
2.45 pm	<b>François Hillion</b> <i>Invited</i>	Recent and future developments of the NanoSIMS 50 [163]
3.15 pm	Afternoon tea	Exhibition Pavilion 1

#### T-04 Invited Tutorial [Raynald Gauvin]

3.45 pm **David Joy** Monte Carlo Modelling [110]

4.30 pm **Poster Session & the University of Sydney's EMU Golden Jubilee Happy Hour** in Exhibition Pavilion 1

6.00 pm **Exhibition Close**

6.30 pm **UWA Foreshore BBQ sponsored by Oxford Instruments**

## Thursday 14<sup>th</sup> February (continued)

### Meeting Room 2

#### S-38 50 Years of the Cowley-Moodie Multislice Theory [Andrew Johnson]

9.00 am	<b>David Cockayne</b> <i>Invited</i>	Reflections on the Multi-slice [164]
9.30 am	<b>Alex Moodie</b> <i>Invited</i>	Foundations of Multislice. [165]
10.00 am	<b>Philip Nakashima</b>	Solving the "Phase Problem" and Determining Structure Amplitudes by Inspecting 3-Beam CBED Patterns [166]
10.15 am	<b>Ray Withers</b>	Structured Diffuse Scattering and Polar Nano Regions in BaTiO <sub>3</sub> -based Relaxor Ferroelectrics [167]
10.30 am	Morning tea	Exhibition Pavilion 1

#### S-16/33 Applications and Techniques in STEM, TEM & EELS – III [Les Allen]

11.00 am	<b>Nigel Browning</b> <i>Invited</i>	Applications of Aberration Corrected and Monochromated STEM [168]
11.30 am	<b>Stephen Pennycook</b> <i>Keynote</i>	Distinguishing Surface Atoms from Bulk by Aberration-Corrected STEM [169]
12.00	<b>Eiji Okunishi</b>	Simultaneous Acquisition of HAADF image and Elemental Maps by EELS and EDS in Atomic Resolution with a Cs Corrected STEM [170]
12.15 pm	<b>Maria Varela</b>	Atomic Resolution Spectroscopic Imaging of Oxide Interfaces in the Aberration Corrected Scanning Transmission Electron Microscope [171]

12.30 pm Lunch Exhibition Pavilion 1

**12.45 pm Lunch-box Seminar Paul Hlava: "Color in Gems" [Peter Downes] [112] Meeting Room 1**

#### S-16/33 Applications and Techniques in STEM, TEM & EELS – IV [Ray Withers]

1.45 pm	<b>Hamish Fraser</b> <i>Invited</i>	Elemental Intermixing in Metallic Multilayers Studied using STEM/HAADF Imaging, with EDS and EELS, and the Comparative Technique of Tomographical Atom Probe [172]
2.15 pm	<b>Matthew Weyland</b>	Two and Three Dimensional STEM of Plate like Precipitates in Aluminium-Copper-Lithium Alloys [173]
2.30 pm	<b>Ilke Arslan</b>	The 3-D Morphology and Electronic Structure of Nanowires using STEM Tomography and Monochromated EELS [174]
2.45 pm	<b>Tim Petersen</b>	Experimental Investigation of Phase Retrieval using a Transmission Electron Microscope and the Transport of Intensity Equation [175]
3.00 pm	<b>Andrew Martin</b>	Thermal Scattering with Correlated Atomic Vibrations [176]
3.15 pm	Afternoon tea	Exhibition Pavilion 1

#### T-01 Invited Tutorial [Mansfield]

3.45 pm **Joe Michael** FIB methods and applications i.e., FIB-EPMA/ FIB-SIMS [111]

4.30 pm **Poster Session & the University of Sydney's EMU Golden Jubilee Happy Hour** in Exhibition Pavilion 1

6.00 pm **Exhibition Close**

6.30 pm **UWA Foreshore BBQ sponsored by Oxford Instruments**

## Thursday 14<sup>th</sup> February (continued)

### Meeting Room 3

#### S-30 Microscopy assisting Industry - I [Samantha Matthews]

##### Sponsored by Alcoa World Alumina

9.00 am	<b>Gerald</b>	<b>Roach</b>	<i>Invited</i>	Use of Electron Microscopy and Microprobe Analysis in Industry [177]
9.30 am	<b>Benjamin</b>	<b>Withy</b>		The Role of Microscopy in Materials Failure Investigations [178]
9.45 am	<b>Takeshi</b>	<b>Soeda</b>		Multiple Observations and Analyses of Semiconductor Devices Using Confocal TEM/STEM technique [179]
10.00 am	<b>Mark</b>	<b>Annett-Stuart</b>		Particle Search Analysis - the way of the future? [180]
10.15 am	<b>Mahesh</b>	<b>Chaturvedi</b>		Microstructural Characterization of a Transient Liquid Phase Bonded Nickel Based Superalloy [181]
10.30 am	Morning tea	Exhibition Pavilion 1		

#### S-31 Microscopy assisting Industry - II [John Terlet]

##### Sponsored by Alcoa World Alumina

11.00 am	<b>Brendan</b>	<b>Baker</b>		Characterisation of nanoparticles formed from concentrated acid addition to Bayer liquors [182]
11.15 am	<b>Lyn</b>	<b>Waterhouse</b>		A Technique For The Characterisation Of Foreign Material In Thin Film Coatings [183]
11.30 am	<b>Abid</b>	<b>Ghous</b>		FIB-Tomography meets X-ray micro-Tomography: A 3D approach to aid enhanced oil recovery [184]
11.45 am	<b>Hideyuki</b>	<b>Takahashi</b>		Two Types of Corrosion Layers of Sulfur Compounds on Gold Plated Copper Pins of Electric Devices [185]
12.00	<b>Flame</b>	<b>Burgmann</b>		Optimisation of Nanostructure in Microalloyed Strip Cast Steels: A Study on Heat Treatment Behaviour [186]
12.15 pm	<b>Ryna</b>	<b>Marinenko</b>		A WD-EPMA Heterogeneity Testing Comparison of Mapping with a Random Point Analysis Procedure [187]
12.30 pm	<b>Peter</b>	<b>Statham</b>		Progress towards X-Ray Analysis for Structures below 100nm in dimension [188]
12.45 pm	Lunch	Exhibition Pavilion 1		
<b>12.45 pm</b>	<b>Lunch-box Seminar</b>	<b>Paul Hlava: "Color in Gems"</b>	<b>[Peter Downes] [113]</b>	<b>Meeting Room 1</b>

#### S-25 Mineral chronology & trace element microanalysis - I [Janet Muhling]

##### Sponsored by the UWA Centre for Microscopy, Characterisation and Analysis

1.45 pm	<b>Paul</b>	<b>Carpenter</b>	<i>Invited</i>	A Comparison of WDS and SD-EDS Performance and Quantitative Analysis of Major and Trace Elements in Geological Materials [189]
2.15 pm	<b>Steven</b>	<b>Reddy</b>		Chronology and Trace Element Microanalysis of Deformed Zircon [190]
2.30 pm	<b>Brent</b>	<b>McInnes</b>		Application of X-Ray Micro-Computed Tomography in (U-Th)/He ThermoChronology [191]
2.45 pm	<b>John</b>	<b>Fitz Gerald</b>		Palaeoclimatology, Microanalysis and Microscopy of the Foraminifera <i>Orbulina universa</i> [192]
3.00 pm	<b>Nicholas</b>	<b>Timms</b>		Localised intragrain Ti and REE mobility along crystal-plastic deformation microstructures in a mantle zircon. [193]
3.15 pm	Afternoon tea	Exhibition Pavilion 1		

**Thursday 14<sup>th</sup> February** (continued)

**S-25 Mineral chronology & trace element microanalysis - I [John Fitz Gerald]**

**Sponsored by the UWA Centre for Microscopy, Characterisation and Analysis**

- 3.45 pm      **David Steele**      Trace element microanalysis using electron and ion microprobes: data for zircons 91500 and SL3, and temperature constraints on Antarctic rocks [194]  
*Invited*
- 4.15 pm      **Peter Downes**      Magmatic evolution of the alkaline rocks of the Chhota Udaipur subprovince, Deccan Igneous Province, Gujarat, India: Evidence from zoned pyroxene phenocrysts [195]
- 4.30 pm      **Janet Muhling**      The occurrence and geochronology of low-temperature metamorphic monazite from the basal Earraheedy Group, Western Australia [196]

4.45 pm      in Exhibition Pavilion 1      **Physical Sciences Poster Session & the University of Sydney's EMU Golden Jubilee Happy Hour**

- P-01      **Laure Bourgeois**      HRTEM, CBED, LACBED and <sup>31</sup>P NMR of Alkaline Earth Diphosphates and Apatites [197]
- P-02      **Shaun Bulcock**      Ultrastructure and Growth Kinetics of Inorganic Phase of the Caries-Induced Intratubular Dentine [198]
- P-03      **Julie Cairney**      Grain Boundary Segregation of B, P and C in IN718 Superalloy [199]
- P-04      **Annette Dowd**      Optimised Presentation of Nanoparticle Size Analysis Data Using Bayesian Methods [200]
- P-05      **Peter Duncan**      Investigation of Indium Doped Ultra-Thin Chemical Bath Deposited CdS Films [201]
- P-06      **John Fitz Gerald**      Dislocation Annealing in Fine-Grained Synthetic Olivine [202]
- P-07      **Amy Gelmi**      A study of SnO<sub>2</sub> Nanoparticle Morphology [203]
- P-08      **Yanan Guo**      Structural characteristics of GaSb/GaAs heterostructured nanowires [204]
- P-09      **Dulani Heenetigala**      Local Atomic Structure of La<sub>2-x</sub>Ba<sub>x</sub>CuO<sub>4</sub> [205]
- P-10      **Kazuo Ishizuka**      Optimum Noise Filters To Observe Nanomaterials [206]
- P11      **Hadas Katz**      TEM Characterisation of Highly Luminescent CdS Nanocrystals [207]
- P-12      **Matt Kilburn**      NanoSIMS analysis of Archean fossils and biomarkers [208]
- P-13      **Amelia Liu**      Medium-range order in melt-spun Zr<sub>70</sub>Pd<sub>30</sub> metallic glass probed using fluctuation electron microscopy. [209]
- P-14      **Steven Reddy**      Quantitative Characterization of Plastic Deformation in Zircon [210]
- P-15      **Steven Reddy**      Zircon Deforms in a Magma Chamber! [211]
- P-16      **Mark Ryan**      Carbon nanotube coated textiles for use as "Smart Fabrics" [212]
- P-17      **Martin Saunders**      Continuous flow synthesis of ZnO nanoparticles via process intensification technology [213]
- P-18      **Lily Shen**      Transmission Electron Microscopy of Ultramicrotome Samples of porous InSb formed by Ion Implantation [214]
- P-19      **Adam Sikorski**      A new FIB-based TEM sample preparation method for ultra-high quality site-specific specimens [215]
- P-20      **Alexandra Suvorova**      Analytical electron microscopy of implanted silicon carbide [216]
- P-21      **Tim Williams**      Characterisation of Ultra Fine Grained Super-plastic Magnesium Alloy AZ31 by Scanning Electron Microscopy [217]
- P-22      **Richard Wuhrer**      Sample Preparation and EBSD studies of High-Chromium Cast Irons [218]
- P-23      **Nikolai Zakharov**      Precipitates Formation in MBE Grown Si Layers Highly Doped with Er [219]

6.00 pm      **Exhibition Close**

6.30 pm      **UWA Foreshore BBQ sponsored by Oxford Instruments**  
at the Swan Foreshore in front of the University of Western Australia Club

## Friday 15<sup>th</sup> February

### Meeting Room 1

#### S-22 Nanomaterials & thin films - I [Dougal McCulloch]

9.00 am	<b>Matthew Taylor</b>	The Formation of Highly Oriented Graphitic Films Using Cathodic Arc deposition [220]
9.15 am	<b>Zongwen Liu</b>	Preparing Metallic Nanostructures in a Transmission Electron Microscope [221]
9.30 am	<b>Laure Bourgeois</b>	Void-like Objects Associated with Nano-Particles of Tin in Aluminium [222]
9.45 am	<b>Flame Burgmann</b>	Hardness Enhancement in Al/W Nanoscale Multilayers: The Role of Interfaces and Defects [223]
10.00 am	<b>Laurence Dyer</b>	Characterisation of Co-precipitated Ferrihydrite/Silica Particles Using Transmission Electron Microscopy [224]
10.15 am	<b>Alison Funston</b>	Morphological Studies of Gold Nanoparticles and Their Application to DDA Theory [225]
10.30 am	Morning tea	Exhibition Pavilion 1

#### S-22 Nanomaterials & thin films - II [Mark Blackford]

11.00 am	<b>Des Lau</b>	Stress Induced Transformation of Amorphous Carbon Thin Films [226]
11.15 am	<b>Jim Partridge</b>	Analysis of Metal Oxide Thin Films Deposited using a Filtered Cathodic Vacuum Arc [227]
11.30 am	<b>Robert Hough</b>	Natural Ultra-thin Supergene Gold Nanoplates And Nanoparticles [228]
11.45 am	<b>Julie Sheffield-Parker</b>	X-ray Analysis of Nano-particles and thin films using a large area sensor optimised for detection of low energy photons [229]
12.00	<b>Oleg Lourie</b>	In-situ nano-characterization using SPM-TEM systems. [230]
12.15 pm	<b>Closing Ceremony</b>	in River View Room 4

### Meeting Room 2

#### S-16/33 Applications and Techniques in STEM, TEM & EELS – V [Phillip Nakashima]

9.00 am	<b>Ian Anderson</b> <i>Invited</i>	EFTEM Spectral Imaging of FinFET Structure using LACSBI Method [231]
9.30 am	<b>Nestor Zaluzec</b>	Measurement of Ion Irradiation Induced Amorphization using High Resolution Electron Energy Loss Spectroscopy [232]
9.45 am	<b>Adrian D'Alfonso</b>	Three-dimensional Structure Retrieval using Core Loss Electron Energy Loss Spectroscopy in Scanning Confocal Electron Microscopy [233]
10.00 am	<b>Andrew Bleloch</b> <i>Invited</i>	Counting Atoms with Aberration Corrected Scanning Transmission Electron Microscopy and Electron Energy Loss Spectroscopy [234]
10.30 am	Morning tea	Exhibition Pavilion 1

#### S-39 Material Characterisation [Nestor Zaluzec]

11.00 am	<b>Goran Drazic</b>	Analytical Electron Microscopy of Ti-Zr-Ni based Quasi-crystals prepared with Melt-spinning and Pulsed Laser Deposition [235]
11.15 am	<b>Bill Richmond</b>	An electron microscopy study of the mechanism of schwertmannite growth in ferric sulfate solution [236]
11.30 am	<b>Se Song</b>	TEM investigation of the phase transition in Ge <sub>2</sub> Sb <sub>2</sub> Te <sub>5</sub> alloy [237]
11.45 am	<b>Jonathan Mak</b>	Characterization of Advance Titanium Metal Matrix Composites through Quantitative X-Ray Mapping [238]
12.00	<b>Carolina Novo</b>	Use of Scanning Electron Microscopy and Focused Ion Beam Lithography in Single Gold Nanoparticle Experiments [239]
12.15 pm	<b>Closing Ceremony</b>	in River View Room 4

## Friday 15<sup>th</sup> February *(continued)*

### Meeting Room 3

#### S-02 Quantitative Microstructural (EBSD) Analysis in Synthetic & Natural Materials

[Steve Reddy & Mark Nave]

9.00 am	<b>Joe Michael</b>	<i>Invited</i>	Improved EBSD Sample Preparation Via Low Energy Ga+ and Ar+ Ion Milling [240]
9.30 am	<b>Michael Ferry</b>		Development of FIB-EBSD Tomography for Generating 3-D Orientation Maps in Deformed and Annealed Alloys [241]
9.45 am	<b>Robert Hough</b>		Weathering Of Gold: An EBSD, FIB and TEM study [242]
10.00 am	<b>Steven Reddy</b>		A Systematic Assessment of Match Unit Characteristics and Pattern Indexing Optimisation: Examples from Zircon and Monazite [243]
10.15 am	<b>Jian Li</b>		Characterization of jarosite scaling formed during high pressure acid leaching process of nickel laterites: Some preliminary findings using electron backscatter diffraction [244]
10.30 am	Morning tea		Exhibition Pavilion 1

#### S-35 Characterisation of Implanted Materials and Structures [Suvorova]

11.00 am	<b>David Jamieson</b>	<i>Invited</i>	Microscopy and Microbeams in the Fabrication of Quantum Devices [245]
11.30 am	<b>Sergey Rubanov</b>		Ion Beam Engineering of Diamond Nanostructures: A TEM Study [246]
11.45 am	<b>Nicholas Stokes</b>		Electron Beam Lithography of Polymethyl Methacrylate Films on Indium-Tin Oxide Coated Glass [247]
12.00	<b>Matthew Phillips</b>		Cathodoluminescence properties of ZnO nano-particle surfaces. [248]

### 12.15 pm Closing Ceremony *River View Room 4*

IUMAS - IFSM - AMMS Forum on the Future of Microscopy [Walker]

12.15 pm	<b>Christian Colliex</b>		The Microscopy of the Future [249]
12.30 pm	<b>Alex Hyatt</b>		The Microscopy of the Future [250]

12.45 pm AMMS Student & Conference Best Micrograph Awards

### 1.00 pm Close of ACMM-20 & IUMAS-IV

1.30 pm Anticipated

