AMAS XIII, 9-13 Feb 2015

University of Tasmania, Hobart

Scientific Program, 11-13 Feb 2015

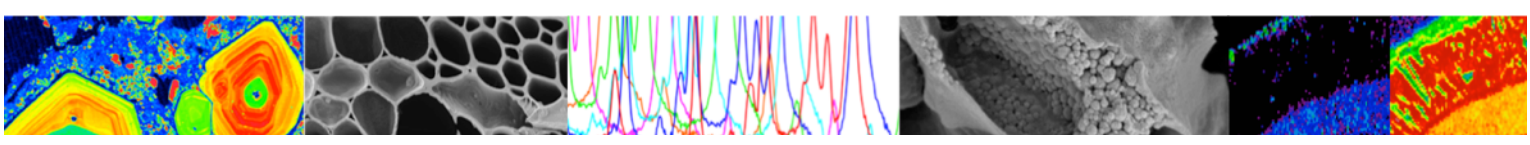
Location Map

The Symposium and Workshops will take place in the Earth Sciences Building at the University of Tasmania Sandy Bay Campus, main entrance from Clark Road (see green arrow in map).

The registration desk will be located near the main entrance to the building.

All Symposium talks will be held in the main Earth Sciences Lecture Theatre, Room 211, Level 2, which is located on the same level as the main entrance, towards the left in the foyer.

Morning tea, afternoon tea, and lunches are included in the Symposium registration and will be served in the foyer outside of the Lecture Theatre.



Wednesday, 11 Feb 2015

8:00 Reception/registration opens, Foyer Earth Sciences Building

8:45 Welcome address and opening, Earth Sciences Lecture Theatre (Room 211)

Wednesday Session 1, 9:00-10:30 **Chair: Brendan Griffin**

9:00 **The twin paradox: A study of preservation and disfigurement of Southworth and Hawes daguerreotype photographs**

Edward P. Vicenzi[1] and Mike Robinson[2]

1. Smithsonian Institution, Museum Conservation Institute, Suitland, MD 20746 USA
2. Century Darkroom, Toronto, Ontario, Canada

9:30 **Imaging and quantitative x-ray microanalysis at the nanoscale with a cold-field emission scanning electron microscope**

Raynald Gauvin[1], Nicolas Brodusch[1], Hendrix Demers[1] and Patrick Woo[2]

1. Department of Mining and Materials Engineering, McGill University, Montreal, Quebec, Canada
2. Hitachi High-Technologies Canada Inc., Toronto, Canada

10:00 **A dedicated x-ray mapping instrument (XRMEM)**

R. Wuhrer[1], L. Moran[2], and K. Moran[2]

1. Advanced Materials Characterisation Facility, University of Western Sydney, NSW 2751, Australia
2. Moran Scientific Pty Ltd, Goulburn, NSW, Australia

10:15 **Characterising drill core mineralogy by micro-XRF mapping**

A. Torpy[1], N.C. Wilson[1], C.M. MacRae[1], S. Barnes[2], and M. Verrall[2]

1. CSIRO Mineral Resources Flagship, Private Bag 10, Clayton South, VIC, 3169
2. CSIRO Mineral Resources Flagship, PO Box 1130 Bentley, WA, 6102

10:30 Morning tea, Foyer Earth Sciences Building

Wednesday Session 2, 11:00-12:30 **Chair: Ric Wuhrer**

11:00 **Some further aspects of secondary electron and backscattered electron imaging in the SEM and VPSEM**

B.J. Griffin[1,2], D.C. Joy[3] , J.R. Michael[4] and R. Gauvin[5]

1. Centre for Forensic Science, The University of Western Australia, Crawley, WA Australia 6009
2. Centre for Microscopy, Characterization and Analysis, The University of Western Australia, Crawley, WA Australia 6009
3. Center for NanoPhase Materials Science, Oak Ridge National Laboratory, Oak Ridge, TN 37831, USA
4. Sandia National Laboratories, PO Box 5800, Albuquerque, NM 87185-0886, USA
5. Dept of Materials Engineering, McGill University, Montreal, Canada

11:30 **In situ micro tensile testing of He^+ ion irradiated single crystal nickel film**

Dhriti Bhattacharyya[1], Ashley Reichardt[2], Mihail Ionescu[1], Joel Davis[1], Peter Hosemann[2], Robert Harrison[1] and Lyndon Edwards[1]

1. Institute of Materials Engineering, ANSTO, Lucas Heights, Australia
2. Department of Nuclear Engineering, University of California, Berkeley, USA

11:45 **A comparison of 3D microscopy techniques**

Colin Veitch[1], Christophe Comte[2], Malisja de Vries[3], Mark Greaves[3], Chi Huynh[3] and Lynne Waddington[4]

1. CSIRO Manufacturing Flagship, Waurn Ponds Laboratory, Waurn Ponds, Victoria, Australia
2. CSIRO Manufacturing Flagship, Lindfield Laboratory, Lindfield , New South Wales, Australia
3. CSIRO Manufacturing Flagship, Clayton Laboratory, Clayton, Victoria, Australia
4. CSIRO Manufacturing Flagship, Parkville Laboratory, Parkville, Victoria, Australia

12:00 **Colour SEM and 3D imaging techniques used for evaluating paper properties**

Mark Greaves[1], Malisja de Vries[1], Chi Huynh[1] and Colin Veitch[2]

1. CSIRO Manufacturing Flagship, Clayton Laboratory, Clayton, Victoria, Australia.
2. CSIRO Manufacturing Flagship, Waurn Ponds Laboratory, Waurn Ponds, Victoria, Australia

12:15 **Lung biopsies from symptomatic military deployers have variable mineral particle types and higher abundances of silicon, aluminum, cadmium and vanadium compared to controls**

H. Lowers[1], T. Todorov[1], M. Strand[2], G. Breit[1], G.P. Meeker[1], G.S. Plumlee[1], M. Robinson[2], R. Miller[3], S. Krefft[2], R. Meehan[2], S. Groshong[2] and C. Rose[2]

1. U.S. Geological Survey, Denver, CO/US
2. National Jewish Health – Denver, CO/US/University of Colorado Anschutz Medical Campus – Aurora, CO/US
3. Vanderbilt University – Nashville, TN

12:30 Lunch, Foyer Earth Sciences Building

Wednesday Session 3, 13:30-15:00	**Chair: Leonid Danyushevsky**

13:30 **The emergence of laser ablation ICPMS as an imaging tool**

Jon Woodhead and Bence Paul

School of Earth Sciences, The University of Melbourne, Melbourne, Australia

14:00 **Laser ablation ICPMS imaging of minerals from hydrothermal ore deposits**

Sebastien Meffre, Sarah E. Gilbert, Alexandr Stepanov and Leonid V. Danyushevsky

CODES ARC Centre of Excellence, University of Tasmania, Hobart, Tasmania 7005, Australia

14:15 **Matrix dependency for the quantification of sulphur in sulphide minerals by LA-ICP-MS**

Sarah Gilbert[1], Leonid Danyushevsky[1] and Karsten Goemann[2]

1. CODES, University of Tasmania, Hobart, Australia
2. Central Science Laboratory, University of Tasmania, Hobart, Australia

14:30 **Using LA-ICPMS for bulk analyses of pulverized-pressed samples: grasses from a world-wide data base**

Karine Harumi Moromizato[1], Charlotte M. Allen[1] and Jennifer Firn[2]

1. Queensland University of Technology, Central Analytical Research Facility/Institute of Future Environments, Brisbane, Australia.
2. Queensland University of Technology, School of Earth, Environmental and Biological Science, Brisbane, Australia

14:45 **Some sources of error in Pb/U dating of zircon by LA-ICP-MS**

Jay Thompson, Sebastien Meffre and Leonid Danyushevsky

Centre of Excellence in Ore Deposits, University of Tasmania, Hobart, Tasmania 7001

15:00 Afternoon tea, Foyer Earth Sciences Building

Wednesday Session 3, 15:30-17:00 **Chair: Angus Netting**

15:30 **$\Delta^{34}S$ analyses of single human red blood cells and hair**

Charles W. Magee, Jr.[1,2], Melanie Rug[1], Graeme Allbon[3], Chris Gore[3]

1. Australian National University; Acton ACT 2600 Australia
2. Australian Scientific Instruments 111/113 Gladstone St. Fyshwick ACT 2609 Australia
3. Australian Institute of Sport Leverrier St. Bruce ACT 2617 Australia

16:00 **Advanced focused ion beam techniques for the observation, characterization and nanoscale modification and manipulation of advanced materials**

John F. Mansfield

North Campus Electron Microbeam Analysis Laboratory, Building 22, Room G010, University of Michigan, 2800 Plymouth Road, Ann Arbor, MI 48109-2800 USA

16:30 **Optimizing FIB application for three dimensional quantification**

Charlie Kong

EMU, Mark Wainwright Analytical Centre, The University of New South Wales, Sydney, NSW 2052, Australia

16:45 **Micromechanical properties of different microstructures in weld metal**

Walter L. Costin[1], A. K. Basak[2]

1. School of Mechanical Engineering, The University of Adelaide, South Australia, 5005
2. Adelaide Microscopy, The University of Adelaide, Adelaide, South Australia, 5005

17:00 AMAS Annual General Meeting, Earth Sciences Lecture Theatre (Room 211)

17:30 Bruker Happy Hour, Foyer Earth Sciences Building

Thursday, 12 Feb 2015

8:15 Reception/registration opens, Foyer Earth Sciences Building

Thursday Session 1, 8:45-10:30 **Chair: Thomas Rodemann**

8:45 **New directions and applications for optical diagnosis using Raman spectroscopy**

Kishan Dholakia

SUPA, School of Physics and Astronomy, University of St Andrews, North Haugh, Fife, Scotland KY16 9SS

9:15 **Analysis of DNA conformation and the ultrafine structure of nuclear material in functional and fixed avian erythrocytes with synchrotron FTIR and Soft X-ray Tomography**

Bayden R. Wood[1], Donna Whelan[1], Don McNaughton[1], Phil Heraud[1], Jason Zhang[2] and Dilworth Y. Parkinson[2]

1. Centre for Biospectroscopy, School of Chemistry, Monash University, 3800, Victoria, Australia
2. Advanced Light Source, Lawrence Berkeley National Laboratory, 1 Cyclotron Road, Berkeley, California, 94720, United States

9:30 **Multi-dimensional lipid analysis to elucidate the action of a novel anti-leukaemic drug therapy in acute myeloid leukaemia cells**

Joanna Denbigh[1], Andrew Southam[2], Farhat Khanim[2], Roy Goodacre[1] and Nick Lockyer[1]

1. Manchester Institute of Biotechnology, University of Manchester, UK
2. School of Biosciences, University of Birmingham, UK

9:45 **The morphology of subsurface laser induced modifications in Si**

L.A. Smillie[1], P.C. Verburg[2], J.S. Williams[1] and J.E. Bradby[1]

1. Research School of Physics and Engineering, The Australian National University, Acton, Australia
2. Faculty of Engineering Technology, University of Twente, P.O. Box 217, 7500 AE Enschede, The Netherlands

10:00 **Characterization of reduced hematite by Raman and microprobe analysis**

Tegan Simmonds[1], Peter Hayes[1], Ying Yu[2] and Ron Rasch[2]

1. School of Chemical Engineering, The University of Queensland, St. Lucia, Brisbane, Australia
2. Centre for Microscopy and Microanalysis, The University of Queensland, St. Lucia, Brisbane, Australia

10:15 **A new approach to achieving ultra-high spatial resolution FTIR imaging – synchrotron FTIR imaging like performance with a benchtop FTIR**

Mustafa Kansiz[1], David Haines[1], Carol Hirschmugl[2], Benedict Albenisi[3], Catherine Liao[4] and Kathleen Gough[4]

1. Agilent Technologies Australia Pty Ltd, 679 Springvale Rd, Mulgrave, VIC., 3179, AUSTRALIA;
2. Department of Physics, University of Wisconsin, Milwaukee, Wisconsin 53211, USA;
3. Division of Neurodegenerative Disorders, St. Boniface Hospital Research Centre R4050-351 Tache Avenue, Winnipeg, MB R2H 2A6, CANADA
4. Department of Chemistry, University of Manitoba, Winnipeg, Manitoba, R3E 0W3, CANADA

10:30 Morning tea

Thursday Session 2, 11:00-12:30 **Chair: Mark Blackford**

11:00 **X-ray microanalysis of nanoscale materials in liquids and gases in the analytical scanning/transmission electron microscope**

Nestor J. Zaluzec

Electron Microscopy Center, NanoScience and Technology Division, Argonne National Laboratory, Argonne, Illinois USA 60440

11:30 **Characterization of layered NMC cathode materials by transmission electron microscopy**

Aaron C. Johnston-Peck, Igor Levin, Leonid A. Bendersky and Andrew A. Herzing

Material Measurement Laboratory, National Institute of Standards and Technology, Gaithersburg, MD, 20899, USA

11:45 **Atomic-scale study of polarization in ferroelectric $PbZr_xTi_{1-x}O_3$ thin-filmed heterostructures**

Hsin-Hui Huang[1], Huolin Xin[2], Dong Su[2], Esther Huang[1], Guanzhong Huang[2, 3], Nagarajan Valanoor[1] and Paul Munroe[1]

1. School of Materials Science and Engineering University of New South Wales, Sydney NSW 2052, Australia
2. The Center for Functional Nanomaterials, Brookhaven National Laboratory, Upton, New York, 11973-5000, United States
3. Department of Materials Science and Engineering, Stony Brook University, Stony Brook, New York, 11794, United States

12:00 **Density functional theoretical study of graphene compounds**

Graeme John Auchterlonie

Centre for Microscopy & Microanalysis, The University of Queensland, Brisbane, Qld, Australia

12:15 **The response of complex ceramic oxides exposed to ion-irradiation, compared using two TEM characterisation techniques; bulk, *ex-situ*, and thin crystal, *in-situ***

R.D. Aughterson[1,2], J. Cairney[2], M. Ridgway[3], N.J. Zaluzec[4] and G.R. Lumpkin[1]

1. Institute of Materials Engineering, ANSTO, Locked Bag 2001, Kirrawee DC, NSW, 2232, Australia
2. Australian Key Centre for Microscopy and Microanalysis, The University of Sydney, Sydney, NSW, 2006, Australia
3. Research School of Physical Sciences and Engineering, Australian National University, Canberra, ACT, 0200, Australia
4. Materials Science Division, Argonne National Laboratory, 9700 South Cass Avenue, Argonne, IL, USA

12:30 Lunch

12:30 AMMS Annual General Meeting, Earth Sciences Lecture Theatre (Room 211)

Thursday Session 3, 13:30-15:00 **Chair: Nestor Zaluzec**

13:30 **Contamination mitigation strategies for aberration corrected Scanning Transmission Electron Microscopy.**

David R. G. Mitchell

Electron Microscopy Centre, AIIM, Innovation Campus, University of Wollongong, North Wollongong, NSW 2500, Australia

13:45 **Signal enhancement by electron channelling in atomic resolution energy dispersive x-ray analysis**

Zhen Chen[1], Adrian J. D'Alfonso[2], Matthew Weyland[3,4], Scott D. Findlay[1] and Leslie J. Allen[2]

1. School of Physics, Monash University, Victoria 3800, Australia
2. School of Physics, University of Melbourne, Victoria 3010, Australia
3. Monash Centre for Electron Microscopy, Monash University, Victoria 3800, Australia
4. Department of Materials Engineering, Monash University, Victoria 3800, Australia

14:00 **Evaluation of rare-earth mixed oxides as oxygen absorbents**

Anita M. D'Angelo and Alan L. Chaffee

CRC for Greenhouse Gas Technologies (CO2CRC), School of Chemistry, Monash University, Clayton, VIC, 3800 Australia.

14:15 **Low angle annular dark field scanning transmission electron microscopy as a proxy for changes to oxidation state in CeO_2 nanoparticles**

Aaron C. Johnston-Peck[1], Jonathan P. Winterstein[2], Alan D. Roberts[4], Joseph S. DuChene[4], Kun Qian[4], Brendan C. Sweeny[4], Wei David Wei[4], Renu Sharma[2], Eric A. Stach[3], Andrew A. Herzing[1]

1. Material Measurement Laboratory, National Institute of Standards and Technology, Gaithersburg, MD, 20899, USA
2. Center for Nanoscale Science and Technology, National Institute of Standards Technology, Gaithersburg, MD 20899 USA
3. Center for Functional Nanomaterials, Brookhaven National Laboratory, Upton, NY 11793 USA
4. Department of Chemistry and Center for Nanostructured Electronic Materials, University of Florida, Gainesville, FL 32611 USA

14:30 **Aberration-corrected HR-TEM and Analytical STEM with 300 kV cold-FEG**

Tetsuo Oikawa[1] and Yuji Kohno[2]

1. JEOL Asia Pte Ltd., #01-12 Corporation Place, 2 Corporation Road, 618494Singapore
2. JEOL ltd., 1-2 Musashino 3-chome, Akishima, Tokyo 196-8558, Japan

14:45 **Improved 3D electron tomography image reconstruction using sparse coding based adaptive dictionaries**

Ala' Al-Afeef[1,2], Paul Cockshott[1], Ian MacLaren[2] and Stephen McVitie[2]

1. School of Computing Science, University of Glasgow, Glasgow, G12 8QQ, United Kingdom.
2. School of Physics and Astronomy, University of Glasgow, Glasgow G12 8QQ, United Kingdom

15:00 Afternoon tea

Thursday Session 4, 15:30-17:15 **Chair: Colin MacRae**

15:30 **ANSTO electron microscopy building**

Mark Blackford

Institute of Materials Engineering, Australian Nuclear Science and Technology Organisation, Lucas Heights, Australia

15:45 **Design trends for vibration, EMF and noise in new laboratories**

Matthew Stead

Director, Resonate Systems, Australia

16:00 **Probing the optical, structural and electrical properties of III-nitride devices using multimode SEM**

Paul R. Edwards, Michael J. Wallace, Gunnar Kusch, Christopher G. Bryce, Gunasekar Naresh-Kumar, Jochen Bruckbauer, Carol Trager-Cowan and Robert W. Martin

Department of Physics, SUPA, University of Strathclyde, Glasgow, Scotland, United Kingdom

16:30 **A micro- and nanoscale cathodoluminescence study of semiconductor nanowires**

David J. Stowe[1], Robert E.A. Williams[2], Santino D. Carnevale[3], Thomas. F. Kent[2], Roberto C. Myers[2,3] and David W. McComb[2]

1. Gatan Inc., 5794 W Las Positas Blvd, Pleasanton, CA, 94588, USA
2. Dept. of Materials Science and Engineering, The Ohio State University, Columbus, 43210
3. Dept. of Electrical and Computer Engineering, The Ohio State University, Columbus, 43210

16:45 **Toward atomic-scale tomography**

Thomas F. Kelly

CAMECA Instruments, Inc. 5500 Nobel Dr., Madison, WI 53711 USA

19:00 **FEI Symposium Dinner, Hobart Function & Conference Centre**
Elizabeth Street Pier, Hobart CBD

Friday, 13 Feb 2015

8:15 Reception/registration opens, Foyer Earth Sciences Building

Friday Session 1, 8:45-10:30 **Chair: John Mansfield**

8:45 **Quantitative microstructural analysis of geological materials: The mechano-chemical behaviour of zircon – the "prime geological time capsule"**

Sandra Piazolo[1], Alexandre La Fontaine[2], Patrick Trimby[2], Limei Yang[2], Julie Cairney[2], Håkon Austrheim[3], and Martin Whitehouse[4]

1. Australian Research Council Centre of Excellence for Core to Crust Fluid Systems/GEMOC, Department of Earth and Planetary Sciences, Macquarie University, Australia
2. Australian Centre for Microscopy & Microanalysis, University of Sydney, Australia
3. Physics of Geological Processes, University of Oslo, Norway
4. Swedish Museum of Natural History, Stockholm, Sweden

9:15 **The nanostructure of Australia's gold deposits**

Mark A. Pearce[1], Michael F. Gazley[1], Louise A. Fisher[1], Martin J. Saunders[2], Robert M. Hough[1] and Charlie Kong[3]

1. CSIRO Mineral Resources Flagship, Australian Resources Research Centre, 26 Dick Perry Avenue, Kensington, WA 6151, Australia
2. Centre for Microscopy, Characterisation and Analysis (CMCA), University of Western Australia, Perth, WA 6009, Australia
3. Electron Microscopy Unit, University of New South Wales, Sydney, NSW 2052, Australia

9:30 **Nanoscale characterisation of meteorites using the SEM and TEM**

Pat Trimby[1], Luke Daly[2], Phil Bland[2], Hongwei Liu[1], Steve Moody[1], Limei Yang[1] and Simon Ringer[1,3]

1. The Australian Centre for Microscopy & Microanalysis, The University of Sydney, NSW 2006, Australia
2. Department of Applied Geology, Curtin University of Technology, Perth, WA 6845, Australia
3. School of Aerospace, Mechanical & Mechatronic Engineering, The University of Sydney, NSW 2006, Australia

9:45 **Three dimensional EBSD characterisations of grain boundary fragments in rolling microstructures of a microalloyed steel**

Md Zakaria Quadir

Electron Microscope Unit, University of New South Wales, Sydney, Australia

10:00 **Characterization of complex carbide-silicide precipitates in a Ni-Cr-Mo-Fe-Si alloy modified by welding**

Dhriti Bhattacharyya, J. Davis, M. Drew, R. P. Harrison, L. Edwards

Institute of Materials Engineering, ANSTO, Lucas Heights, NSW, 2234, Australia

10:15 **Titanium characterisation by EBSD and EPMA**

A. M. Glenn[1], C. M. MacRae[1], S. Lathabai[2] and D. Fraser[2]

1. CSIRO, Minerals Resources Flagship, Private Bag 33, Clayton, VIC, 3168, Australia
2. CSIRO Manufacturing Flagship, Private Bag 33, Clayton, VIC, 3168, Australia

10:30 Morning tea

Friday Session 2, 11:00-12:30	Chair: Paul Carpenter

11:00 **High speed matrix and secondary fluorescence boundary corrections based on Monte-Carlo derived k-ratio intensities**

John Donovan[1], Philippe Pinard[2] and Silvia Richter[2]

1. University of Oregon, CAMCOR, Eugene, Oregon, USA, 97403
2. RWTH Aachen University, Ahornstr. 55, Aachen, Germany, 52074

11:30 **Methodology for automated quantitative measurements using a constant overvoltage ratio with a field emission microprobe**

Philippe T. Pinard and Silvia Richter

Central Facility for Electron Microscopy, RWTH Aachen University, Aachen, Germany

11:45 **Soft x-ray emission spectroscopy with higher energy resolution and detectability from lithium to uranium**

H. Takahashi[1], T. Murano[1], M. Takakura[1], M. Terauchi[2], C. Dickinson[3], V. Lozbin[4]

1. JEOL Ltd., 1-2 Musashino, 3-chome, Akishima, Tokyo 196-8558, Japan
2. Institute for Multidisciplinary Research for Advanced Materials, Tohoku University, Sendai 980-8577, Japan
3. JEOL UK Ltd. JEOL House, Silver Court, Watchmead, Welwyn Garden City, Hearts AL7 1LT, U.K.
4. JEOL AustraliaAsia, Suite,1, L2 18 Aquatic Drive Freches Forest NSW 2086 Australia

12:00 **Soft x-ray measurement and simulation**

N.C. Wilson[1], C.M. MacRae[1], A. Torpy[1], H. Takahashi[2], T. Murano[2] and M. Takakura[2]

1. CSIRO Mineral Resources, Private Bag 10, Clayton South, VIC, 3169
2. JEOL Ltd., 3-1-2 Musashino, Akishima, Tokyo 196-8558, Japan

12:15 **Light element WDS: Synthetic multilayer crystals, d-spacing measurements, and related phenomena**

David A. Steele

Central Analytical Research Facility (CARF), Queensland University of Technology, Brisbane, Australia

12:30 Lunch

Friday Session 3, 13:30-15:00 **Chair: Mike Matthews**

13:30 **Improvements in EPMA: Spatial resolution and analytical accuracy**

P. K. Carpenter

Earth and Planetary Sciences, Washington University, St. Louis, MO 63130, USA

Quantitative electron-probe microanalysis and WDS background measurement

P. K. Carpenter[1], J. J. Donovan[2], and K. Goemann[3]

1. Dept. of Earth and Planetary Sciences, Washington University in St. Louis, Campus Box 1169, Saint Louis, MO, 63130, USA
2. CAMCOR, University of Oregon, Eugene, OR 97403, USA
3. Central Science Laboratory, University of Tasmania, Hobart, Tasmania, Australia

14:00 **How micro is my microanalysis?**

Les Moore

Materials Technology and Evaluation, BlueScope Steel, PKSW, Port Kembla, Australia

14:15 **Quantification of nano-inclusions by using a conventional EPMA**

Claude Merlet

GM, CNRS, Université de Montpellier II, Place E. Bataillon, 34095 Montpellier, France.

14:30 **The occurrence and composition of chevkinite-(Ce) and perrierite-(Ce) in mafic igneous rocks**

Janet R. Muhling[1,2], Alexandra A. Suvorova[1] and Birger Rasmussen[2]

1. Centre for Microscopy, Characterisation and Analysis, The University of Western Australia, Crawley WA 6009, Australia.
2. Department of Applied Geology, Curtin University, Bentley WA 6102, Australia.

14:45 **Challenges and limitations of focused beam analysis of carbonates**

Jason S. Herrin[1,2], Sylvain Rigaud[3]

1. Facility for Analysis, Characterization, Testing, & Simulation, Nanyang Technological University, Singapore 639798
2. Earth Observatory of Singapore,
3. Department of Earth Sciences, University of Geneva, Switzerland

15:00 Afternoon tea

Friday Session 4, 15:30-16:30 **Chair: Karsten Goemann**

15:30 **Chlorine microanalysis – Stand back and light the blue touch paper**

C.M. MacRae[1], N.C. Wilson[1], A. Torpy[1] and T.Rose[2]

1. Microbeam Laboratory, CSIRO Mineral Resources, Clayton South, VIC, 3169
2. Department of Mineral Sciences, Smithsonian Institution, Washington, DC 20560, United States

15:45 **Setting the standards for microbeam analysis: How international standards are created**

Mike Matthews

AWE, Reading, UK.

16:15 **Closing remarks, awarding of ASI Student Prizes**

16:30 **Close**

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FEI Australia Conference Dinner, Hobart Function and Conference Centre, Elizabeth St Pier, Hobart Waterfront

Thomson Scientific/ Gatan Welcome Reception, Staff Club, University of Tasmania, Sandy Bay Campus

Nanospec Cricket Match, Hutchins School Oval, Sandy Bay

Bruker Happy Hour, Earth Sciences Building Foyer, University of Tasmania, Sandy Bay Campus


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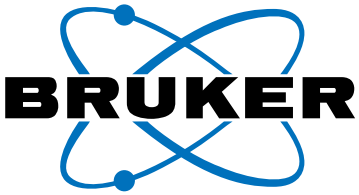
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