

UIM²⁰₂₄

User Meeting
27–29 November



PROGRAM

The future is bright

Program

Day 1 | Wednesday, 27 November 2024

10:15	Registrations open					
11:00	Opening & Welcome - NCSS Auditorium					
11:10	Plenary Lecture 1: Giuliana Tromba & Christian Dullin: <i>Synchrotron phase contrast CT multi-scale imaging in human sized lungs at Elettra</i>					
12:00	Lunch Break					
	NCSS Auditorium		NCSS Seminar Room		AS Mezzanine	
	Session 1 Soft Matter, Foods & Nanomedicines Chair: Andy Clulow		Session 2 Advanced Materials Chair: Qinfen Gu		Session 3 Biological Systems & Life Science Chair: Julian Vivian	
13:00	97	Keynote: Developing cryo-capabilities at the SAXS/WAXS beamline. The case study of water nanoconfinement in lipidic mesophases	Livia Salvati Manni & Patrick Zueblin	164	Keynote: Using Synchrotron Techniques to Study the Structural Evolution and Redox Mechanisms in Cathode Materials for Rechargeable Batteries	Yameng Fan
13:30	80	Coupling Surface Interactions with Colloidal Transport to Understand Antibiotic Delivery with Self-Assembled Lipid Nanocarriers	Brendan Dyett	136	Precision Measurement of Absolute Absorption and Phase Fine Structure Spectra of the Copper K-edge Using Holographic Spectroscopy	Paul Di Pasquale
13:50	101	High-throughput Lipid Nanoparticle Development in Biomedical Applications	Sampa Sarkar	157	Facile dissociation of molecular nitrogen on crystalline lanthanide surfaces	Kiersten Kneisel
14:10	133	Prospective Subunit Nanovaccine against Mycobacterium tuberculosis Infection - Cubosome Lipid Nanocarriers of Cord Factor, Trehalose 6,6' Dimycolate	Sampa Sarkar	119	Characterisation of trace Sr distribution in hypoeutectic Al-Ni alloy using the XFM beamline	Vigneshwar Hari
14:30	Afternoon Tea					
	NCSS Auditorium		NCSS Seminar Room		AS Mezzanine	
	Session 4 Chemistry, Crystallography & Biologics Chair: Tam Greaves		Session 5 Manufacturing, Engineering & Industry Chair: David Jenkins		Session 6 Instruments & Techniques Chair: Ingrid Ukstins	
15:00	100	Keynote: Inverse cubic structure evolution within ionizable lipid nanoparticles correlates with mRNA transfection in macrophages	Jiali (Maggie) Zhai	75	Keynote: Real-time grain-scale rotational bursts via Laue X-ray diffraction in Mg-Zn: impact of crystal orientation and autocatalytically coordinated plasticity among neighbouring grains	Jun Wang
15:30	155	Ion binding and interactions of ionic liquids with proteins	Qi (Hank) Han	30	Impact of iron ore and binder addition on microstructure of ferro-coke for low-carbon blast furnace ironmaking	Guanghua Lu
15:50	149	Lipidic drug delivery systems can be responsive to the human microbiome	Livia Salvati Manni	166	Nano Positioning Engineering for Synchrotron Instruments	Brad Mountford/Callan Morey
16:10	51	Structural Evolution of liquid metals and alloys	Vaishnavi Krishnamurthi	90	Engineering Catalyst and Process Design for Carbon-neutral Methane Pyrolysis Hydrogen Production	Kang Hui Lim
16:30	Transit					
16:40	Plenary Lecture 2: Early-Mid Career Award - NCSS Auditorium					
17:20	Poster Slam - NCSS Auditorium					
18:00	Poster Session with canapes and drinks - NCSS Exhibition space					
19:30	Close					



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Program

Day 2 | Thursday, 28 November 2024

09:00 Plenary Lecture 3: Lifetime Contribution Medal

09:50 Morning Tea

	NCSS Auditorium		NCSS Seminar Room		AS Mezzanine	
	Session 7 Earth, Environment & Cultural Heritage Chair: Courtney Ennis		Session 8 Instruments & Techniques Chair: Michael Jones		Session 9 Manufacturing, Engineering & Industry and Solid State Physics Chair: Jun Wang	
10:20	81	Keynote: Gallium as a Potential Biosignature of Silica-Microbe Interactions in Hot Springs: Preparing for a Future Mars Sample Return Mission Michael Rowe	12	Keynote: X-ray speckle-based phase-contrast and dark-field imaging using UMPA at the Australian Synchrotron Marie Christine Zdora	63	Keynote: 3D micro-CT analysis of biochar in microstructure of metallurgical biocoke David Jenkins
10:50	85	Characterising the platy morphology of talc in copper ore flotation: insights from synchrotron micro-CT Shane Usher	45	Pushing canine radiotherapy towards clinical standards on IMBL Michael Lerch / James Cayley	17	Structural Expansion upon Cooling in the Skyrmion Hosting Material, Cu ₂ OSeO ₃ Marco Vas
11:10	73	Insights into U-REE-Cu-Au skarn occurrences in the eastern Mount Isa Inlier from garnet geochemistry and geochronology Christina Loidolt	67	In vivo 4D x-ray dark-field lung imaging in mice Ying Ying How	15	Superdurable High-Surface-Area Nitrogen-Rich Porous Carbon with Single-Atom Co-N ₄ Sites for Enhanced Bifunctional Oxygen Electrocatalysis in Zinc-Air Batteries Saeed Askari
11:30	112	Mapping nano-porosity in cm-sized samples of deep crustal rocks with scanning small-angle X-ray scattering Christoph Schrank	32	VHEE radiotherapy research at PEER James Cayley	40	Development of dynamic loading studies on the Micro-CT beamline Peter Lynch
11:50	25	Measurements of porosity in Martian mineral analogues using Small Angle Neutron Scattering Nicholas Florent	76	Reference-free single-exposure dark-field imaging at IMBL Jannis Ahlers	33	Influence of Acidity in Sulfate-Promoted Pd-Al-MCM-41 Catalysts on Furfural Production from Biomass Pyrolysis Jingwei Wang

12:10 Lunch

	NCSS Auditorium		NCSS Seminar Room		AS Mezzanine	
	Session 10 Advanced Materials Chair: Qi (Hank) Han		Session 11 Chemistry, Crystallography & Biologics Chair: Jiali (Maggie) Zhai		Session 12 Biological Systems & Life Science Chair: Michael Gardiner	
13:00	153	Keynote: In-situ Exploring Transition Metal Electrocatalysts for Energy Conversion Applications Porun Liu	61	Keynote: Synchrotron Insights: Observing microbially accelerated metal mobility and carbon capture in near-surface environments. Thomas Ray Jones	139	Keynote: XFM at the Australian Synchrotron provides fundamental insights into the life history and ecology of Australia's marsupials Alistair Evans
13:30	22	Intermarrying MOF glass and lead halide perovskite for photocatalysis Wengang Huang	108	Synthesis and XANES characterization of novel transition metal oxide clusters Mohammed Abdelbassit	107	Solvent effects of protic ionic liquids on proteins Tam Greaves
13:50	102	In Situ XAS Insights into Acid-Stable Mixed Silver-Bismuth Oxides for Water Oxidation Catalysis Brittany Kerr	117	Synergy in the s-Block: Alkali Metal Magnesiates for Small Molecule Activation Matthew Evans	116	Probing protein structure in the context of biomolecular condensation Andrew Marshall
14:10	29	Acoustic wave assisted synthesis of monolithic MOF superstructures with hierarchical porosity and tunable properties Javad Khosravi Farsani	165	Far-infrared and DFT investigations of host-guest interactions within porous materials Courtney Ennis	151	ASWEBRICK: a secured server of Auto-Rickshaw Santosh Panjkar
14:30	38	High-Entropy Oxides with Enhanced Functionality for Metal Air Batteries Xiaoran Zheng	53	Astrochemistry goes Chiral: Spectroscopic and powder diffraction studies of propylene oxide and vinyl oxirane Evan Robertson	21	Effect of X-ray FLASH synchrotron-based radiation and nanoparticles on the survival of cultured normal and their tumour derived cells Moshi Geso

14:50 Afternoon Tea

Program

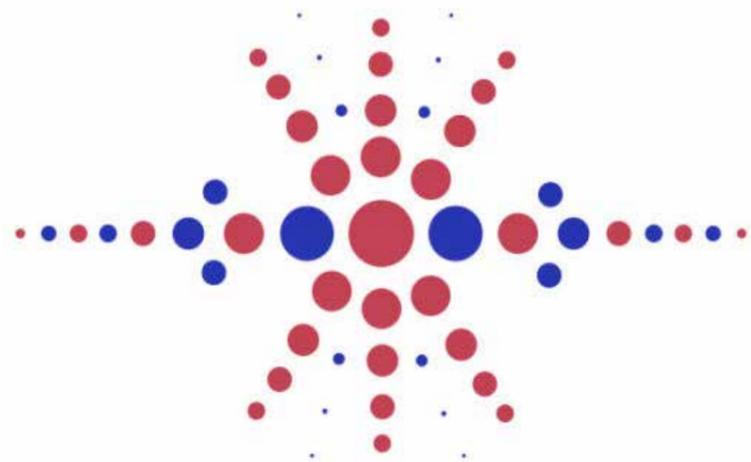
Day 2 cont. | Thursday, 28 November 2024

	NCSS Auditorium		NCSS Seminar Room		AS Mezzanine	
	Session 13 Biological Systems & Life Science Chair: Lucille Chapuis		Session 14 Soft Matter, Foods & Nanomedicines Chair: Livia Salti Manni		Session 15 Instruments & Techniques Chair: Elizabeth Carter	
15:20	8	Keynote: Different approaches to enhance the treatment effectiveness of microbeam radiotherapy (MRT) in a preclinical breast cancer model Olga Martin	35	Keynote: Automatic Segmentation and Phenotyping of Wheat Root with Synchrotron X-ray Computed Tomography Ivan Lee	31	Keynote: Soft-contact piezo-controlled macro ATR-FTIR technique and expansion of beamline's capabilities into battery and catalysis research at Australian Synchrotron Jitraporn (Pimm) Vongsvivut
15:50	28	Synchrotron based micro-CT for precise targeting the areas of interest for biological FIB-SEM Denis Korneev	74	Synchrotron ftir microscopy reveals distinct polyphenol accumulation patterns in pigmented rice grain ultrastructure Achini Herath	105	BioSAXS – The Future of Solution Scattering at the Australian Synchrotron Andrew Clulow
16:10	52	Veterinary microbeam radiation therapy trials at the Australian Synchrotron Elette Engels	122	Microstructural and morphological analysis of poly(lactic-co-glycolic acid) organogels for in situ forming implants Alaa Bazeed	14	Synchrotron X-ray beam motion by electron source position scanning Nick Phillips
16:30	56	Personalising synchrotron breast-CT: patient-specific simulation, dosimetry, and imaging in preparation for clinical trials at the Australian Synchrotron Elette Engels	44	Towards non-lethal fox control: animal odour profiling and synthetic bait development for conditioned odour aversion Ashlyn Austin	13	X-rays 'flowing' backwards: Enabling the separation of edges and microstructure in dark-field imaging Samantha Alloo
16:50	19	Towards clinical phase-contrast X-ray imaging on the imaging and medical beamline for lung cancer diagnosis Lorenzo D'Amico	137	Isolating the Interface of an Emulsion using X-Ray Scattering and Tensiometry to Understand Protein-Modulated Alkylglyceride Crystallisation Marta Krasowska	146	Grazing Incidence Scattering at the Australian Synchrotron Nigel Kirby
17:10	Transit					
17:20	Plenary Lecture 4: Stephen Wilkins Thesis Medal					
18:00	Finish					
18:30	Dinner – NCSS Cafe					
20:30	Close					



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• **HYPERION II** FT-IR | FPA | IR Laser Imaging Microscope

- Selection of detectors for μ -FT-IR: Broad-, mid, narrow-band LN2-MCTs, thermoelectrically cooled (TE) MCT.
- Focal-plane array detector for infrared imaging (64 x 64 or 128 x 128 pixel).
- Optional QCL implementation by Laser Infrared Imaging Module (ILIM, laser class 1)
- Objective lense selection: .5x/15x/36x/74x IR, 20x ATR, 15x GIR, 4x/40x VIS.
- Spectral range extension – from Near-Infrared (NIR) to Far-Infrared (FIR)
- Selection of apertures: manual knife-edge, automated knife-edge aperture wheel. Metal apertures for NIR
- Selection of accessories and sample stages: macro IR imaging accessory, cooling/heating stage, sample compartment, etc.
- Selection of visual/optical tools: Darkfield illumination, Fluorescence illumination, VIS polarizers, IR polarizers, etc.

The HYPERION II is an innovation force in infrared microscopy. It provides IR imaging down to the diffraction limit and combines FT-IR microscopy and infrared laser imaging (ILIM) for the first time ever in a single device.

With the HYPERION II you are prepared for any eventuality. Whether you want to combine ATR, transmission, or reflection, with single-element MCT, FPA-, or laser imaging measurements.

Take control and let the HYPERION II work for you. It takes IR imaging to the next level provides excellent spatial resolution and peak sensitivity for all analytical tasks with its focal-plane array (FPA) detector.

But ultimately, our infrared laser imaging module (ILIM) bursts open the door to new, exciting discoveries by combining QCL technology and FT-IR into the HYPERION II at the same time.

The HYPERION II is compatible with INVENIO and the VERTEX series FT-IR spectrometers.

Innovation with Integrity

FT-IR

Program

Day 3 | Friday, 29 November 2024

09:00	4th Gen Sync Working Group Presentation & Panel Discussion					
10:30	Morning Tea					
	NCSS Auditorium		NCSS Seminar Room		AS Mezzanine	
	Session 16 Instruments & Techniques Chair: Pimm Vongsvivut		Session 17 Biological Systems & Life Science Chair: Olga Martin		Session 18 Advanced Materials Chair: Porun Liu	
11:00	114	Keynote: Australian Synchrotron: Facility update and new developments	Danielle Martin	46	Keynote: MicroCT of sense organs and the central nervous systems in fish, reptiles and crustaceans: a comparative and functional neuroanatomical approach.	Lucille Chapuis
11:30	94	Cutting Edge Chemical Crystallography	Rosemary Young	11	Revealing the tissue structural determinants of diffusion-weighted MRI contrast with phase contrast CT microscopy	Roger Bourne
11:50	95	The Source behind the Source - Scientific Computing at the Australian Synchrotron	Andreas Moll	125	Characterization of Alanine and Presage Dosimeters Using Ultra-High Dose Rate Synchrotron-Generated X-Rays and Electrons	Moshi Geso
12:10	120	High-Energy X-ray Diffraction Tomography at the Australian Synchrotron	Yang Cao	83	Lung Cancer Zoomed In: How the IMBL Is Helping Us Take A Closer Look at Cancer	Lucy Costello
12:30	48	The XAS Beamline - an update for 2025	Bernt Johannessen	70	Clinically Relevant Phase-Contrast CT Optimisation of Large Animal Imaging with Synchrotron Radiation	James Pollock
12:50	Transit					
13:00	Closing remarks & prizes					
13:20	Close					