

# UM2024

**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					
11:10	Plenary Lecture 1: <b>Giuliana Tromba &amp; Christian Dullin:</b> <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	
	<b>Session 1   Soft Matter, Foods &amp; Nanomedicines</b> Chair: Andy Clulow		<b>Session 2   Advanced Materials</b> Chair: Qinfen Gu		<b>Session 3   Biological Systems &amp; Life Science</b> Chair: Julian Vivian	
13:00	97	<b>Keynote:</b> Developing cryo-capabilities at the SAXS/WAXS beamline. The case study of water nanoconfinement in lipidic mesophases	Livia Salvati Manni & Patrick Zueblin	163	<b>Keynote:</b> Using the synchrotron to explore phase transitions in quantum materials	Mark Edmonds
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	
	<b>Session 4   Chemistry, Crystallography &amp; Biologics</b> Chair: Tam Greaves		<b>Session 5   Manufacturing, Engineering &amp; Industry</b> Chair: David Jenkins		<b>Session 6   Instruments &amp; Techniques</b> Chair: Ingrid Ukstins	
15:00	100	<b>Keynote:</b> Inverse cubic structure evolution within ionizable lipid nanoparticles correlates with mRNA transfection in macrophages	Jiali (Maggie) Zhai	75	<b>Keynote:</b> 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	20	Facile synthesis of spinel ferrite from fly ash waste as a stable and active ketonisation catalyst	Sasha Yang
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	Poster Slam - NCSS Auditorium					
17:30	Poster Session with canapes and drinks - NCSS Exhibition space					
19:30	Close					



# Program

Day 2 | Thursday, 28 November 2024

**09:00** **Plenary Lecture 2: Lifetime Contribution Medal and Research Award**

**09:50** Morning Tea

	NCSS Auditorium		NCSS Seminar Room		AS Mezzanine	
	<b>Session 7   Earth, Environment &amp; Cultural Heritage</b> Chair: Courtney Ennis		<b>Session 8   Instruments &amp; Techniques</b> Chair: Michael Jones		<b>Session 9   Manufacturing, Engineering &amp; Industry and Solid State Physics</b> Chair: Jun Wang	
<b>10:20</b>	81	<b>Keynote:</b> Gallium as a Potential Biosignature of Silica-Microbe Interactions in Hot Springs: Preparing for a Future Mars Sample Return Mission Michael Rowe	12	<b>Keynote:</b> X-ray speckle-based phase-contrast and dark-field imaging using UMPA at the Australian Synchrotron Marie Christine Zdora	63	<b>Keynote:</b> 3D micro-CT analysis of biochar in microstructure of metallurgical biocoke David Jenkins
<b>10:50</b>	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 Micah Barnes	17	Structural Expansion upon Cooling in the Skyrmion Hosting Material, Cu <sub>2</sub> OSeO <sub>3</sub> Marco Vas
<b>11:10</b>	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 <sub>4</sub> Sites for Enhanced Bifunctional Oxygen Electrocatalysis in Zinc-Air Batteries Saeed Askari
<b>11:30</b>	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 Sitarama Raju Kada
<b>11:50</b>	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	
	<b>Session 10   Advanced Materials</b> Chair: Yameng Fan		<b>Session 11   Chemistry, Crystallography &amp; Biologics</b> Chair: Maggie Zhai		<b>Session 12   Biological Systems &amp; Life Science</b> Chair: Michael Gardiner	
<b>13:00</b>	153	<b>Keynote:</b> In-situ Exploring Transition Metal Electrocatalysts for Energy Conversion Applications Porun Liu	61	<b>Keynote:</b> Synchrotron Insights: Observing microbially accelerated metal mobility and carbon capture in near-surface environments. Thomas Ray Jones	139	<b>Keynote:</b> XFM at the Australian Synchrotron provides fundamental insights into the life history and ecology of Australia's marsupials Alistair Evans
<b>13:30</b>	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
<b>13:50</b>	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
<b>14:10</b>	29	Acoustic wave assisted synthesis of monolithic MOF superstructures with hierarchical porosity and tunable properties Javad Khosravi Farsani	144	Lanthanide-naphthalimide complexes for multimodal imaging of cells Leila Hill	151	ASWEBRICK: a secured server of Auto-Rickshaw Santosh Panjkar
<b>14:30</b>	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	6	Harnessing ticks' tricks to develop therapies for inflammatory diseases Shankar Devkota

**14:50** Afternoon Tea

# Program

Day 2 cont. | Thursday, 28 November 2024

	NCSS Auditorium		NCSS Seminar Room		AS Mezzanine	
	<b>Session 13   Biological Systems &amp; Life Science</b> Chair: Lucille Chapuis		<b>Session 14   Soft Matter, Foods &amp; Nanomedicines</b> Chair: Livia Salti Manni		<b>Session 15   Instruments &amp; Techniques</b> Chair: Elizabeth Carter	
<b>15:20</b>	<b>8</b>	<b>Keynote:</b> Different approaches to enhance the treatment effectiveness of microbeam radiotherapy (MRT) in a preclinical breast cancer model Olga Martin	<b>35</b>	<b>Keynote:</b> Automatic Segmentation and Phenotyping of Wheat Root with Synchrotron X-ray Computed Tomography Ivan Lee	<b>31</b>	<b>Keynote:</b> 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
<b>15:50</b>	<b>28</b>	Synchrotron based micro-CT for precise targeting the areas of interest for biological FIB-SEM Denis Korneev	<b>74</b>	Synchrotron ftir microscopy reveals distinct polyphenol accumulation patterns in pigmented rice grain ultrastructure Achini Herath	<b>105</b>	BioSAXS – The Future of Solution Scattering at the Australian Synchrotron Andrew Clulow
<b>16:10</b>	<b>52</b>	Veterinary microbeam radiation therapy trials at the Australian Synchrotron Elette Engels	<b>55</b>	Aleurone layer volume determines zinc content in black rice accessions Vito Butardo	<b>14</b>	Synchrotron X-ray beam motion by electron source position scanning Nick Phillips
<b>16:30</b>	<b>56</b>	Personalising synchrotron breast-CT: patient-specific simulation, dosimetry, and imaging in preparation for clinical trials at the Australian Synchrotron Elette Engels	<b>44</b>	Towards non-lethal fox control: animal odour profiling and synthetic bait development for conditioned odour aversion Ashlyn Austin	<b>13</b>	X-rays 'flowing' backwards: Enabling the separation of edges and microstructure in dark-field imaging Samantha Alloo
<b>16:50</b>	<b>19</b>	Towards clinical phase-contrast X-ray imaging on the imaging and medical beamline for lung cancer diagnosis Lorenzo D'Amico	<b>137</b>	Isolating the Interface of an Emulsion using X-Ray Scattering and Tensiometry to Understand Protein-Modulated Alkylglyceride Crystallisation Marta Krasowska	<b>146</b>	Grazing Incidence Scattering at the Australian Synchrotron Nigel Kirby
<b>17:10</b>	Transit					
<b>17:20</b>	Plenary Lecture 3: Stephen Wilkins Thesis Medal					
<b>18:00</b>	Finish					
<b>18:30</b>	Dinner - NCSS Cafe					
<b>20:30</b>	Close					

# Program

Day 3 | Friday, 29 November 2024

<b>09:00</b>	4th Gen Sync Working Group Presentation & Panel Discussion					
<b>10:30</b>	Morning Tea					
	NCSS Auditorium		NCSS Seminar Room		AS Mezzanine	
	<b>Session 16   Instruments &amp; Techniques</b> Chair: Pimm Vongsvivut		<b>Session 17   Biological Systems &amp; Life Science</b> Chair: Olga Martin		<b>Session 18   Advanced Materials</b> Chair: Porun Liu	
<b>11:00</b>	114	<b>Keynote:</b> Australian Synchrotron: Facility update and new developments	Danielle Martin	46	<b>Keynote:</b> MicroCT of sense organs and the central nervous systems in fish, reptiles and crustaceans: a comparative and functional neuroanatomical approach.	Lucille Chapuis
<b>11:30</b>	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
<b>11:50</b>	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
<b>12:10</b>	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
<b>12:30</b>	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
<b>12:50</b>	Transit					
<b>13:00</b>	Closing remarks & prizes					
<b>13:20</b>	Close					