



Te Mana Tangata Whakawhanake
MacDiarmid Institute
Advanced Materials & Nanotechnology

AMN

11th INTERNATIONAL CONFERENCE ON
**ADVANCED MATERIALS
& NANOTECHNOLOGY**

Conference Programme

9-13 FEBRUARY 2025

ŌTAUTAHI CHRISTCHURCH, NEW ZEALAND





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Sunday 9th February 2025

15.00 – 19.30	Registration Open Location: Reception desk
16.00	Mihi Whakatau (Welcome Ceremony) and Conference Opening Room: Auditorium
16.30	Plenary 1: Quantum Dots—A Journey of Nano-Explorations <i>Moungi Bawendi</i> Chair: Justin Hodgkiss Room: Auditorium
17.30 – 19.30	Icebreaker Reception Location: Exhibition Area, Te Pae Christchurch Convention Centre

Monday 10th February 2025

08.00-18.00	Registration Open Location: Reception desk				
08.30	Plenary 2: Seminar: Design and Synthesis of Nanomaterials for Biomedical and Energy Applications <i>Jackie Y. Ying</i> Chair: Peng Cao Room: Auditorium				
09.30	Transition to concurrent sessions				
09.40	Keynote 1: Molecular origin of slippery behaviour in tethered liquid layers <i>Chiara Neto</i> Chair: Sami Khan Room: Auditorium	Keynote 2: Ionic Materials for Next Generation Energy Technologies <i>Doug Macfarlane</i> Chair: Franck Natali Room: Dobson 1	Keynote 3: Simulating Josephson junctions one atom at a time <i>Jared Cole</i> Chair: Uli Zuehlcke Room: Dobson 4		
10.15	Morning Tea in the Exhibition Area				
	1A: Perovskites and optoelectronics	1B: Hydrogen production and utilisation	1C: Porous materials	1D: Spectroscopy and applications	1E: Innovative imaging
	Chair: Catherine Bishop	Chair: Antonio Tricoli	Chair: Shane Telfer	Chair: Michael Reid	Chair: Xianwen Mao
	Room: Auditorium	Room: Dobson 1	Room: Dobson 2	Room: Dobson 3	Room: Dobson 4
10.45		Hydrogen generation with sustainable resources using a combined molecular, computational and engineering approach <i>Keith Gordon</i>	Tailored nanoporous materials for carbon capture and conversion <i>Gurwinder Singh</i>	Photophysics and charge-transfer states in organic semiconductors <i>JaeHong Park</i>	Super Resolution Scanning Electrochemical Cell Microscopy <i>Kim McKeveloy</i>
11.10	Conjugated polyelectrolytes: Their diverse applications in perovskite optoelectronic devices <i>Han Young Woo</i>	Improvement of Photocatalytic Water Splitting activity by Facet-Selective Loading of Ultrafine Rhodium–Chromium Mixed-Oxide Cocatalyst <i>Yuichi Negishi</i>	Spatially resolved gas selectivity profiles in porous adsorbents <i>Luke Liu</i>	Advanced Ultrafast Photoluminescence Spectroscopy for Investigating Optoelectronic Materials <i>Kai Chen</i>	Method for quantifying slow-flow with photoacoustic imaging <i>Jami Shepherd</i>
11.35	Stabilising the active perovskite phase in a hybrid glass composite <i>Celia Chen</i>	Quinone-containing Ruthenium Complexes for Photocatalytic Hydrogen Generation <i>Winter Zakaria</i>	An upper bound visualization of design trade-offs in adsorbent materials for gas separations <i>Matthew Cowan</i>	Estimation of nanoparticle cluster size using fluorescence correlation spectroscopy towards the development of an adaptable biosensor for multi-analyte detection <i>Sneha Mathew</i>	Image analysis optimization for nanowire-based optical detection of molecules <i>Rubina Davtyan</i>
11.50	Lead-free Organic-Inorganic Hybrid Copper Halides for Optoelectronic Applications <i>Jonathan Halpert</i>	NiFe Catalyst Coated Membranes via Direct Membrane Deposition for High Performance Anion Exchange Membrane Water Electrolysers <i>Laura Titheridge</i>	Development of novel Hybrid Ultramicroporous Materials for Selective Gas Purification <i>Brooke Matthews</i>	Enhanced Size Determination of Dielectric Microspheres Using Whispering Gallery Modes and Fluorescence Spectroscopy <i>Azizeh Alidoust Ghatat</i>	Characterisation of Materials for Nanomedicine by Cryo-electron microscopy – Technical Considerations <i>Jacinta White</i>
12.05	Novel Donor-Acceptor Inverted S-T Gap Emitters for OLED Applications <i>Przemyslaw Data</i>	Utilisation of waste precipitated iron residues from non-ferrous hydrometallurgy in hydrogen-based ironmaking <i>Josh McArdle</i>	Hydrogen-bonded Organic Frameworks for Selective Hydrogen Isotope Separation <i>Edin Liu</i>	High Performance Ultrafast Photoluminescence Spectroscopy Enabled by a Transient Grating Optical Gate and Multiple-plate Continuum Light Source <i>Bo-Han Chen</i>	Metamaterial negative refractive index lens: experimental results and future pathways towards sub-wavelength resolution microwave imaging <i>Eva Anton</i>



Monday 10th February 2025 (continued)

12.20	Electro-absorption switching of nanoplatelets <i>Kyla Rutherford</i>	Comparative Analysis of NZ Titanomagnetite and Pilbara Hematite Reduction: Influence of Preoxidation and Bed Mass on Kinetics and Morphology <i>Bavinesh Maisuria</i>	Highly Selective MOF Fillers in Mixed Matrix Membrane for Efficient CO ₂ Separation <i>Ben Yin</i>	Unveiling Photophysical Dynamics with a Transient Absorption System Covering the Visible to the Near-infrared <i>Wei-Zong Feng</i>	
12.35		Mechanochemical reduction of New Zealand resources to TiFe for hydrogen storage <i>Alexander Haack</i>			
12.50	Lunch in the Exhibition Area				
13.50	Keynote 4: Atomically precise synthesis of metal nanoparticles for catalysis <i>Richard Tilley</i> Chair: Vladimir Golovko Room: Auditorium		Keynote 5: Electrode and electrolyte design for high-performance aqueous zinc-ion batteries <i>Zaipeng Guo</i> Chair: Peng Cao Room: Dobson 1		
14.25	Transition to concurrent sessions				
	2A: Clusters and nanoparticles	2B: Batteries and capacitors	2C: Biosensors	2D: Ferro-magnetic, ferro-electric and magnetic materials	2E: Materials for low energy systems and computing
	Chair: Štefan Vajda	Chair: Peng Cao	Chair: Bicheng Zhu	Chair: Daniel Sando	Chair: Natalie Plank
	Room: Auditorium	Room: Dobson 1	Room: Dobson 2	Room: Dobson 3	Room: Dobson 4
14.30	Gold ultrathin nanorods: synthesis and optical properties <i>Tatsuya Tsukuda</i>	Modified carbon black and NMC for improved lithium-ion battery performance <i>Amanda Ellis</i>	Active site engineered nanozymes for advanced biosensing and beyond <i>Moon Il Kim</i>	Tailoring antiferromagnetic spin textures using magnetoelectric BiFeO ₃ <i>Vincent Garcia</i>	Frictionless nanohighways in Bismuthene/Graphite <i>Maxime Le Ster</i>
14.55	Atomically precise clusters as the key active sites in selected materials for zero carbon systems <i>Vladimir Golovko</i>	Enabling soft polymers as solid polymer electrolytes for Lithium metal batteries by reinforcing mechanical properties <i>Mukundan Thelakkat</i>	Continuous Biomolecular Monitoring Using Molecularly Responsive Hydrogel Plasmonic Biosensor <i>Soohyun Park</i>	Grain Boundary Complexion Transitions in Ferroelectrics <i>Catherine Bishop</i>	Disordered Materials for Low Energy Electronics <i>Julie Karel</i>
15.20	Exploring Electronic Properties in Ligand-Interchangeable Gold Nanocluster Assemblies <i>Emma Vincent</i>	Converting Waste Woody Materials into Heteroatom-doped Electrode Materials for Electrochemical Energy Storage <i>Shanghai Wei</i>	An Electrochemical Aptasensor for Detection of Cancer Biomarkers and Extracellular Vesicles <i>Zarinah Amin</i>	Fast spin precession in ferrimagnetic Mn ₄ N thin films with perpendicular magnetic anisotropy <i>Yao Zhang</i>	Thin Film Growth of Co ₂ MnGeGa _{1-x} Heusler Alloys and Study of Their Structural, Electrical, and Magnetic Properties <i>Brijeshkumar Patel</i>
15.35	Synthesis and structural characterization of novel transition metal oxide clusters Ir ₃ In ₃ Sn ₁₂ O ₁₄ , RuIn ₆ Sn ₆ O ₁₆ and Ru ₄ In ₂ Sn ₂₀ O ₂₁ <i>Tilo Söhnel</i>	Biocompatible supercapacitor engineered from marine collagen impregnated with polypyrrole and tungsten disulfide <i>Roshan Khadka</i>	Implantable bioelectronics for in vivo and long-term measurement of potassium ions in pine xylem sap <i>Yi Chen</i>	Electronic Structure and Electrical/Magnetic Behavior of 2D-Stanene (Stanene-Oxide) Thin Film <i>Sekhar Ray</i>	Zero Angular Momentum Compensation in Rare Earth Nitrides <i>Elma Joshy</i>
15.50	Tuning the Electronic Properties of Doped Graphullerite – a Covalently Bonded form of C ₆₀ <i>Alex Barnes</i>			Terahertz spin-based sensors design <i>Dominik Legut</i>	Self-compensated memory structures with superconducting readout <i>Jackson Miller</i>
16.05	Afternoon Tea in the Exhibition Area				



Monday 10th February 2025 (continued)

	3A: Alloys, ceramics and oxides	3B: Photoactive materials and optical properties	3C: Antimicrobial materials	3D: Materials characterisation, porous and functional materials	3E: Condensed matter and magnetic materials
	Chair: Matt Watson	Chair: Keith Gordon	Chair: Rachael Wood	Chair: Ben Yin	Chair: Daniel Sando
	Room: Auditorium	Room: Dobson 1	Room: Dobson 2	Room: Dobson 3	Room: Dobson 4
16.35	Strengthening and toughening mechanisms of lightweight high-temperature high Nb-TiAl alloys using nanoscale-silicides <i>Jun Cao</i>	Spectroscopy and modelling of oxygenated calcium fluoride doped with erbium and europium ions <i>Michael Reid</i>	Plasma-Assisted Printing of Antimicrobials Set to Replace Industry Standards <i>Daniel Carleton</i>	Materials Characterisation and Modelling, Critical for the Materials Development Lifecycle <i>Jacinta White</i>	Multipole order and chirality in solids <i>Uli Zuehlcke</i>
16.50	Advanced Dielectric Materials for Capacitors: Excellent Dielectric Performance in Germanium and Tantalum Co-Doped TiO ₂ Ceramics <i>Yasmin Mingmuang</i>	Controlling excited state localisation in molecular photosensitisers <i>Georgina Shillito</i>	Accelerating Lab- to- Bedside Biodegradable Nanomaterial- based Antimicrobial Innovation <i>Shreehari Kodakkat</i>	Crystal Engineering of Hybrid Framework Materials Incorporating a Tantalum Based Pillar <i>Nathan Harvey-Reid</i>	Anisotropic Magnetoresistance and the Fermi surface of GdN <i>Ted Trewick</i>
17.05	The Effect of High-Energy Ball Milling on the Sintering Temperature Reduction in X7R-type Dielectric Material (Al _{0.5} Nb _{0.5})xTi _{1-x} O ₂ <i>Jirata Prachamon</i>	Photoactive 3d transition metal complexes <i>Stephan Kupfer</i>	Development of Bactericidal Nanostructures on 3D Polymeric Surfaces <i>Buddhika Naidelage</i>	Multicomponent Metal-Organic Frameworks Using Amino Acid and Peptide Ligands <i>Ghadir Dahalan</i>	Engineering of emergent magnetism in functional oxide superlattices <i>Freddy Lyzwa</i>
17.20	Ultrathin doped gallium oxide layers enabled by liquid metal alloys <i>Laetitia Bardet</i>	Raman studies of triphenylamine-based acceptor-donor dyes <i>Elkhansa Elbasher</i>	Active surface coatings with intrinsic antimicrobial properties <i>Sandya Athukoralalage</i>	Next-generation zeolite oxygen concentrator: a lifecare solution for COPD patients <i>Christina Howat</i>	Controlling Skyrmions in Cu ₂ OSeO ₃ through Doping: Insights into the Relationship Between Crystal Structure and Magnetic Ordering <i>Marco Vas</i>
17.40	Doping Studies of Gallium Oxide Thin Films Produced Using Sol-Gel Techniques <i>Kate Wislang</i>			Analysis of pyrolysis reactions for tris(dialkylamino) cyclopropenium chloride salts <i>Askin Eldiven</i>	Dimensionality-driven novel properties of topological semimetals and applications <i>Suk-Ho Choi</i>
18.00 – 19.00	Women and Gender Minorities in STEM Turanga (Central Library) - TSB Space, Level 1 (300m from Conference Venue) To help celebrate the International Day of Women and Girls in Science, we will be hosting a panel of people from diverse STEM backgrounds and pathways. Come along to hear their stories and learn about their experiences on fostering innovation, overcoming challenges and finding success in their professional journeys.				
19.00 – 20.30	Public Lecture: From curiosity to technological impact (free to attend, RSVP required) <i>Moungi Bawendi</i> Room: Auditorium Chair: Justin Hodgkiss Sponsored by: 				



Tuesday 11th February 2025

08.00 – 18.00	Registration Open Location: Reception desk				
08.30	Plenary 3: Conducting polymer devices to study the gut-brain axis <i>Róisín Owens</i> Chair: Jadranka Travas-sejdic Room: Auditorium				
09.30	Transition to concurrent sessions				
09.35	Keynote 6: Electrochemistry in Small Droplets <i>Minkyung Kang</i> Chair: Kim McKelvey Room: Auditorium		Keynote 7: Information Processing in Dopant Network Processing Units Wilfred G. van der Wiel Chair: Simon Brown Room: Dobson 4		
10.10	Morning Tea in the Exhibition Area				
	4A: Electrocatalysis	4B: Microfluidics	4C: Photonics	4D: Computational	4E: Neuromorphic, unconventional and physical computing Symposium
	Chair: Luke Liu	Chair: Geoff Willmott	Chair: Holger Fehske	Chair: Anna Garden	Chair: Simon Brown
	Room: Auditorium	Room: Dobson 1	Room: Dobson 2	Room: Dobson 3	Room: Dobson 4
10.40	Development of Sustainable Electrocatalysts for Anion Exchange Membrane Fuel Cells <i>Hamish Andrew Miller</i>	From Microfluidics to Engineering Thermodynamics - An Overview of the Energy Technology Lab at Otago <i>Sam Lowrey</i>	Silicon carbide as a platform for mid-IR metasurfaces <i>Stefan Maier</i>	Towards High-Throughput Rational Design of Organic Solar Cells and Semiconductor Materials using Machine Learning and Computational Chemistry <i>Geoffrey Robert Weal</i>	(10.40 – 11.10) In Materia Computing with Self-organizing Multiterminal Nanowire Networks <i>Carlo Ricciardi</i>
11.05	Repurposing Li ion battery materials as electrocatalysts for water splitting <i>Anthony O'Mullane</i>	Taking spin coating to another dimension <i>Finn McIntyre</i>	Giant magnitude of ultraviolet magnetic circular dichroism in thin film Co ₂ MnGa _{1-x} Ge _{1-x} Heusler alloys <i>Simon Granville</i>	Computational design of catalytic nanomaterials for oxidative abatement of air pollutants at very low temperatures <i>Konstantin Neyman</i>	
11.30	Investigating the use of Plasma Thermal Spraying for Alkaline Water Electrolysis Electrode Fabrication <i>Glen McClea</i>	Investigating Dynamics of Janus Particles using Microfluidic Devices <i>Stephen Chung</i>	Ultrafast UV Luminescence in ZnO Films Fabricated by MF+ECWR Magnetron Sputtering <i>Jiri Olejnicek</i>	A Divide and Conquer Approach to Nanoparticle Global Optimisation <i>Nicholas Smith</i>	(11.10 – 11.40) Neuromorphic Computing with Physical Neural Networks <i>Zdenka Kuncic</i>
11.45	Mapping Location of Oxygen Nanobubble Formation on Nickel Surfaces <i>Rizki Putri Andarini</i>	Rapid In-Situ Bacterial Detection Using Nanostructured Surfaces and Microfluidics <i>Amal Senevirathne</i>	Enhancing Upconversion Efficiency in Lanthanide Systems with Tunable Silver Plasmonic Nanoparticles <i>Romina Marie Mathew</i>	Elucidating the Electrolytes Involved in the Solvation of Vanadium Ions in the Catalytic Reactions within Redox Flow Batteries <i>Christopher Mills</i>	
12.00	Electrochemistry of V ⁵⁺ /V ⁴⁺ reaction on catalytic heteroatom-doped carbon electrode derived from ionic liquids <i>Pitambar Poudel</i>	Using Lab on a Chip to investigate the invasive biology of pathogenic fungi and oomycetes <i>Ayelen Tayagui</i>	Luminescent Materials with Memory are Optically Memristive Systems <i>Joseph Schuyt</i>	Melting of noble gas systems under extreme conditions <i>Diana Yu</i>	(11.40 – 12.10) Carbon nanotube based multi nanowire memristive switching devices <i>Natalie Plank</i>
12.15	Electroreduction of NO ₃ ⁻ to N ₂ on Pt(111) and Pd(111) Surface <i>Samantha (Sam) McIntyre</i>	CRISPR-Aptamer Integration: A Novel Approach for Robust and Cost-Effective Small Molecule Drug Testing <i>Anindita Sen</i>	Multi-wavelength lasing via self-frequency conversion in GaNAs-based nanowires <i>Irina Buyanova</i>	Probing Reaction Mechanisms on a Membrane Using Metadynamics Simulations <i>Brandon Meza González</i>	
12.30		Development of an Automated Microfluidic Ion Pipette Aspiration System for Analysing Viscoelastic Micro-particles <i>Chi Minh Truong</i>	Plasmon-coupled optical properties of molecular chromophores with resonance-tuned silver nanoparticles <i>Róisín Mooney</i>	Accurate representation of hydrogen in metals by machine-learning enhanced modelling of nuclear quantum effects <i>Kai Sellschopp</i>	
12.45	Lunch & Poster Session in the Exhibition Area				
13.45	Keynote 8: Multimodal imaging platform to study cartilage degeneration using compression-based depth-resolved polarisation-sensitive optical coherence tomography and vibrational spectroscopy <i>Frederique Vanholsbeek</i> Chair: Nicola Gaston Room: Auditorium		Keynote 9: Advances in Understanding Fundamentals of Memristive Devices Allow New Applications <i>Ilija Valov</i> Chair: Frank Mizrahi Room: Dobson 4		
14.20	Transition to concurrent sessions				



Tuesday 11th February 2025 (continued)

	5A: Photonics and medical spectroscopy	5B: Biomedical and therapeutic materials	5C: Catalysis	5D: Waste to value	5E: Neuromorphic, unconventional and physical computing Symposium (cont'd)
	Chair: Laura A. Cobus	Chair: Joe Chen	Chair: Anthony O'Mullane	Chair: Ben Yin	Chair: Frank Mizrahi
	Room: Auditorium	Room: Dobson 1	Room: Dobson 2	Room: Dobson 3	Room: Dobson 4
14.25	Demonstration of fermionic time-reversal symmetry in a photonic topological insulator <i>Holger Fehske</i>	Designing light activated biomaterials for tissue engineering and regenerative medicine applications <i>Khoun Lim</i>	Catalysing Global Green Hydrogen Production <i>Antonio Tricoli</i>	New Wool-Derived Materials for Pollutant Gas Absorption <i>Amy Cruickshank</i>	(14.25-14.55) Analog Behavior in Oxide-Based CBRAM/ECRAM <i>Michael Kozicki</i>
14.50	Exciton and phase engineering for efficient quasi-2D perovskite light-emitting diodes <i>Chuanjiang Qin</i>	Engineered biomaterials comprises bioactive molecules for surgical sutures potential for wound healing <i>Azam Ali</i>	Rational Design of Carbon-Neutral Catalysts in Buried Junction Systems for a Sustainable Future <i>Tae-Hyuk Kwon</i>	Novel Cellulose Fibres from Whole Plant Material <i>Helen Ashmead</i>	(14.55 – 15.25) Creation of various functions and improvement of the device performance by means of ionic nanoarchitectonics <i>Kazuya Terabe</i>
15.15	Bridging the visible and mid-IR with nano-optics to watch ultrafast vibrational energy cascades <i>Rakesh Arul</i>	Soft conducting polymer hydrogel actuators to study brain cell behavior <i>Kirill Zhurenkov</i>	Separating Chiral and Catalytic Moieties in MOF Asymmetric Catalyst <i>Mohana Arul</i>	A Zero-Liquid-Discharge Method for Cleaner Vanadium Recovery Using Volatile Reagents <i>Aston Pearcy</i>	(15.25-15.55) Two-dimensional materials for next-generation electronics and optoelectronics technologies <i>Sumeet Walia</i>
15.30	Feasibility of Portable Raman Spectroscopy as a Clinical Tool for the Assessment of Photodamage in Skin <i>Ira Mautner</i>	Cellular Nanoinjection for Biomedical Applications <i>Roey Elnathan</i>	Extraordinary performance of a platinum-copper dual single atom electrocatalyst for the selective oxidation of 5-hydroxymethylfurfural to 2,5-furandicarboxylic acid <i>Yongfang Zhou</i>	Sustainable approach to recover and recycle critical materials from Lithium ion waste batteries <i>Thilini Rathnayaka Mudiyansele</i>	
15.45	Metal-oxide and organic dye-based hybrid flexible printed photodetector for healthcare application <i>Swati Suman</i>	Cobra Venom Factor Prevented Hemodynamic Effects Induced by PEGylated Nanoparticles in a Rodent Model of Acute Hypersensitivity Reaction <i>Yunn-Hwa Ma</i>	Unique Liquid Metal Activation Pathways with Applications for Renewable Fuels <i>Mariam Ameen</i>		
16.00	Afternoon Tea in the Exhibition Area				
	6A: Nano and micro mechanical control	6B: Collaboration and engagement	6C: Proteins and micelles	6D: Hydrogen storage materials	6E: Neuromorphic, unconventional and physical computing Symposium (cont'd)
	Chair: Sami Khan	Chair: Anna Garden	Chair: Jenny Malmstrom	Chair: Chris Bumby	Chair: Michael Kozicki
	Room: Auditorium	Room: Dobson 1	Room: Dobson 2	Room: Dobson 3	Room: Dobson 4
16.30	Acoustically Levitated Droplets as Advanced Materials <i>Geoff Willmott</i>	He Honoka Hauwai / German-New Zealand Green Hydrogen Centre for Research, Networking and Outreach <i>Sally Brooker</i>	Protein reconfiguration and adsorption at the oil-water interface <i>Catherine Whitby</i>	Bridging Scales: Advanced Simulations of Metal Hydride Materials for Hydrogen Storage <i>Paul Jerabek</i>	(16.30 – 17.00) The role of ergodicity in the performance of memristive reservoir computing <i>Valentina Baccetti</i>
16.55	Stroking Through Electrolyte: Liquid Metal Droplet Propulsion Through Pulse Time Modulation <i>Richard Fuchs</i>	Towards A Green Industry Sector: Decarbonising the Industrial Sector in Germany and Cooperation Potential with New Zealand <i>Franziska Teichmann</i>	Lipid-sealed microchambers with integrated ion-sensing transistors – A new tool for membrane protein studies <i>Adam Micolich</i>	Assessing Impurity Effects on FeTi Alloys for Hydrogen Storage: A Multicomponent Thermodynamic Model <i>Ebert Alvares</i>	(17.00 – 17.15) Research Software and Machine Learning Practices in Neuromorphic Computing: A Comprehensive Analysis and Roadmap <i>Ryan Daniels</i>
17.10	From Movie Screen To Science: Bringing Big Hero Six's Reconfigurable Approach To The Microscale <i>Nicholas Carlisle</i>	Practical educational resources co-created with Mātauranga Māori and Pacific knowledge to empower a new generation of community scientists <i>Matthew Cowan</i>	Reconfigurable Pickering Emulsions <i>Shivangi Chourasia</i>	Exploring Hydrogen Storage in Silicon-Doped Ti-Fe Alloys Using Effective Bond Energy Formalism <i>Lekshmi Dinachandran</i>	(17.15 – 17.30) Dynamics of induced pathways in thermistor grid networks <i>Matthew Arnold</i>
17.25	Tiny Robots: A Giant Step Towards Managing Gut Health <i>Adam Carlisle</i>		Micelles Based Synthesis of 2D and 3D Covalent Organic Frameworks Using Surfactants <i>Sri Varshini Murugan</i>	Nanometer-scale analysis of hydrogen storage in complex hydrides using small angle neutron scattering and simulations <i>Arnab Majumdar</i>	(17.30 – 17.45) Fabrication and characterization of S-shaped dinaphthothienothiophene (S-DNTT) OFETs based on silicon substrates <i>Rafael Ashkazzadeh</i>
17.40	Squeezing Through the Gut: Micro-Manufacturing of Smart Capsule <i>Martin Allen</i>		Stimuli-responsive microcapsules for sustainable chemistry <i>Hui Yang</i>	Synthesis of TiFe intermetallic for hydrogen storage applications via direct calciothermic reduction of ilmenite sand <i>Zarar Rasheed</i>	(17.45 – 18.00) Thickness dependent (analog) switching in SiOx/Cu/SiOx memristive devices <i>Rouven Lamprecht</i>
17.55	Improving the size and safety of microbiota sampling capsule robots <i>Angus Quigley</i>		Challenges in Connecting Casein Micelle Structure with Rheology of Skim Milk Concentrate <i>Cynthia Andriani</i>	Sustainable fabrication of MOF and Polyamide 12 composites for Advanced Hydrogen Storage through Selective Laser Sintering <i>Chengming Shang</i>	
18.15 – 19.15	Tech Tasters Session Chair: Natalie Plank Room: Dobson 1 Sponsored by:				



Wednesday 12th February 2025

08.00-17.30	Registration Open Location: Reception desk				
08.30	Plenary 4: A Catalyst Life and its Circumstances <i>Beatriz Roldan Cuenya</i> Chair: Christina Roth Room: Auditorium				
09.30	Transition to concurrent sessions				
09.35	Keynote 10: Perovskite Quantum Dots for Solar Cells and Beyond <i>Lianzhou Wang</i> Chair: Bernt Johannessen Room: Auditorium		Keynote 11: Multilayer spintronic neural networks with radio-frequency connections <i>Frank Mizrahi</i> Chair: Ilia Valov Room: Dobson 4		
10.10	Morning Tea in the Exhibition Area				
	7A: Computational materials and modelling	7B: Photovoltaics and light harvesting	7C: Spintronics and magnetic effects	7D: Science commercialisation	7E: Neuromorphic, unconventional and physical computing Symposium (continued)
	Chair: Kai Sellschopp	Chair: Michael Price	Chair: Simon Granville	Chair: Kevin Sheehy	Chair: Ilia Valov
	Room: Auditorium	Room: Dobson 1	Room: Dobson 2	Room: Dobson 3	Room: Dobson 4
10.40	Highly tuneable hydrogen evolution catalysts of MoS ₂ on 2D carbon-based supports <i>Anna Garden</i>	Singlet Fission Enhanced 2d Perovskite Solar Cells <i>Nate Davis</i>	Magneto- versus Electro- caloric effects and what they can tell us <i>Annie Powell</i>	Small but Mighty? Innovation, Policy and Sustainability Transitions in New Zealand and its OECD Peers <i>Kira Matus</i>	(10.40-11.10) Neuromorphic Computing – An Interdisciplinary Approach <i>Rainer Waser</i>
11.05	Rational Catalyst Design for CO ₂ Electrochemical Reduction Reaction <i>Ziyun Wang</i>	Exceeding 2.2 V Open-Circuit Voltage in Perovskite/Organic Tandem Solar Cells via Multi-Functional Hole-Selective Layer <i>Jin Young Kim</i>	Forming ultimately tunable magnetic materials; fundamental interests in spin-orbit physics to applications in cryogenic electronics <i>William Holmes-hewett</i>	None and a Million – Challenges Identifying Just One Problem for a Platform Technology to Solve <i>Daniel Mak</i>	(11.10 – 11.40) Brain-like data processing through multistable memristive circuits <i>Ronald Tetzlaff</i>
11.30	Computational materials discovery for new battery electrode materials <i>Joseph Nelson</i>	Symmetry Breaking Charge Separation in Linked Violanthrone Dimers <i>Nina I. Novikova</i>	Efficient generation, conversion and manipulation of electron and photon spins in semiconductor nanostructures for room-temperature opto-spintronics <i>Weimin Chen</i>	Commercialisation of Carbon Free Alkalinity to Enhance the Removal of CO ₂ <i>Christopher Oze & Megan Danczyk</i>	(11.40 – 12.10) Ferroelectric domain wall memory- From simple binary resistance switch to memristive properties <i>Pankaj Sharma</i>
11.55	Implementing Machine Learning Towards Nanocluster Global Optimisation <i>Elouan Hay-Fourmond</i>	Morphology control of Y ₆ thin films in single-component solar cells <i>Nikita Shumilov</i>	Spin-selective electron transfer in chiral materials: Towards the next generation of spintronics <i>Muhammad Hanif</i>	Addressing the global plastics problem – value added adhesives derived from recycled plastics <i>Ibrar Hussain</i>	
12.10	Developing machine learning models for atomistic simulations: Potential applications and prospects in metal hydride materials <i>Archa Santhosh</i>			Closing the loop: Circular Economy Strategies for Critical Materials in the Energy Transition <i>Jim Goddin</i>	(12.10 – 12.40) Understanding volatile threshold switching in metal-oxide-metal devices and its application as a solid-state neuron <i>Robert Elliman</i>
12.25	Halogen Bonding within Ionic Liquids <i>Muhammad Ali Hashmi</i>			Dendritic Identifiers as Oracles in Agri-Food Supply Chains <i>Michael Kozicki</i>	
12.40	Lunch in the Exhibition Area				
13.40	Keynote 12: (Cancer) Theranostics with (Intrinsically) Radiolabeled Nanomaterials <i>Weibo Cai</i> Chair: Jadranka Travas-sejdic Room: Auditorium		Keynote 13: Advanced Materials Capabilities at the Australian Synchrotron <i>Bernt Johannessen</i> Chair: Geoff Waterhouse Room: Dobson 1		Keynote 14: The physics and challenges of unconventional physical computing <i>Daniel Brunner</i> Chair: Zdenka Kuncic Room: Dobson 4
14.15	Transition to concurrent sessions				



Wednesday 12th February 2025 (continued)

	8A: Medical nanotechnology and spectroscopy	8B: Synchrotron-based methods for materials science and engineering <i>Sponsored by:</i> 	8C: Additive manufacturing and printing	8D: Tissue engineering and analysis	8E: Neuromorphic, unconventional and physical computing Symposium (continued)
	Chair: Azam Ali Room: Auditorium	Chair: Geoff Waterhouse Room: Dobson 1	Chair: Luke Liu Room: Dobson 2	Chair: Khoon Lim Room: Dobson 3	Chair: Zdenka Kuncic Room: Dobson 4
14.20		Synchrotron-Based Characterization of Advanced Materials: From Structure to Function <i>Qinfen Gu</i>	Understanding mechanically activated changes during additive manufacturing <i>Ronan Daly</i>	Mechanical testing of human endometrial tissue towards modelling the invasive behaviour of endometriosis <i>Rachael Wood</i>	(14.20 – 14.50) A multiscale approach for plasmoelectronic effects in self-assembled gold nanoparticle networks <i>Jeremie Grisolia</i>
14.45	Sonodynamic Therapy of Solid Tumors: From Small-Molecule to Targeted Nanomaterial Sonosensitizers <i>Alejandro Sosnik</i>	The XAS Beamline in Melbourne: 100% Efficient and Awesomely Fast <i>Bernt Johannessen</i>	3D printed plug flow reactor in space? Catalytic decomposition of a green propellants <i>Matthew Watson</i>	Designing Light-activated Hydrogels for Biofabrication of Complex Tissues and Biointerfaces <i>Tim Woodfield</i>	(14.50 – 15.20) Energy efficient, scalable, self-formed Ag nanostructure based neuromorphic devices exhibiting high degree of linearity for In-memory computing <i>Giridhar Kulkarni</i>
15.10	A New Class of Sulfoxide Polymer-Lipid Conjugates for stealth LNP <i>On Ting Choy</i>	(15.10 – 15.35) Refining structures of electrochemical catalysts for energy storage and conversion <i>Jinqiang Zhang</i>	Development of Advanced Biobased Materials: PHA-Plant Biomass Composites for 3D Printing Applications <i>Yi Chen</i>	Stiffness Patterning hydrogels to engineer stem cell-derived cardiac scar tissue for disease modelling <i>Harrison Parritt</i>	(15.20 – 15.50) Critical oscillator networks for reservoir computing applications <i>Petro Feketa</i>
15.25	Evaluation of Dynamic Light Scattering as a Potential Quality Control Method for Radiolabeled Antibody for Successful Tumor Detection <i>Jeongsoo Yoo</i>	(15.35 - 15.50) Facile dissociation of molecular nitrogen on crystalline lanthanide surfaces <i>Kiersten Kneisel</i>	Optimizing material use with high-precision capillary printing for electronic device fabrication <i>Céline Ternon</i>	Harnessing oxygen availability to fabricate advanced biological materials for tissue engineering applications <i>Axel Norberg</i>	
15.40	Enhanced UV-B Emission in BaB8013: Optimizing Gd3+ Doping with Pb2+, Ce3+, and Pr3+ for Phototherapy Applications <i>Leelakrishna Reddy</i>		The use of cellulose in additive manufacturing (3D printing) and thermoforming <i>Erica Sue-Tang</i>		
15.55	Afternoon Tea in the Exhibition Area				



POP-UP NANO AND MATERIALS SCIENCE STATION

GROUND FLOOR OF TŪRANGA
8 & 9 FEBRUARY, 11AM-2PM | FREE ENTRY

What if a boat could have sails made of solar panels? What if your car could be powered by hydrogen? Just how small is a nanoparticle, and why does it matter? Come along to explore these questions (and more) with hands-on demonstrations of the amazing applications of nanotechnology and materials science that are being developed right now!

Christchurch City Council   To Mana Tangata Whakawhanake
MacDiarmid Institute
Advanced Materials & Nanotechnology



Wednesday 12th February 2025 (continued)

	9A: Thermal management and materials	9B: Synchrotron-based methods for materials science and engineering (continued) <i>Sponsored by:</i> 	9C: Biosensors	9D: Textured surfaces	9E: Neuromorphic, unconventional and physical computing Symposium (continued)
	Chair: Takao Mori Room: Auditorium	Chair: Geoff Waterhouse Room: Dobson 1	Chair: Jadranka Travas-sejdic Room: Dobson 2	Chair: Geoff Willmott Room: Dobson 3	Chair: Valentina Baccetti Room: Dobson 4
16.25	Cost-effective fabrication of advanced thermal management materials for high-power electronic devices <i>Fei Yang</i>	The vibrational analysis of crystalline systems at the Australian Synchrotron THz/Far-IR Beamline: from porous materials to interstellar ice surfaces <i>Courtney Ennis</i>	Advanced Nanocellulose composites for Information processing <i>Thomas Dandekar</i>	Enhancing the Performance and Longevity of Biomass Combustors: Leveraging Microtextures to Reduce Soot Accumulation <i>Sami Khan</i>	(16.25 – 16.40) Stochastic Spiking in Percolating Networks of Nanoparticles enables Optimization and Classification <i>Sofie Studholme</i>
16.50	Optimizing Thermal Conductivity and Mechanical Properties of Hot-pressed Copper-Titanium/Diamond Composites <i>Jingnan Ma</i>	Momentum for catalysis: how surface reactions shape the RuO ₂ flat surface state <i>Vedran Jovic</i>	Electrical characterization of thin films for carbon nanotubes for gas phase biosensor applications <i>Sangar Begzaad</i>	Femtosecond Laser Processing and Other Methods to Create Micropatterned Surfaces for Energy Applications <i>Kirill Misiuk</i>	(16.40 – 16.55) The growth and stability of nanofilaments in atomic switches <i>Kannan Ridings</i>
17.05	Thermal characterisation of cFET Stability <i>Volker Nock</i>		Comparative Analysis of Adenosine CNT-FET Aptasensor performance: Impact of Functionalization Routes and Buffer Solutions <i>Alireza Zare</i>	Unveiling Structure Selectivity Relationships in Electrochemical CO ₂ Reduction Using Patterned Electrodes <i>Campbell Tiffin</i>	(16.55 – 17.10) Modeling and theoretical insights into capacitive, inertial, and resistive effects in memristive devices for neuromorphic systems <i>Sahitya Yarragolla</i>
17.20	Development and characterization of novel and stable nanoparticles embedded PCM-in-water emulsions for thermal energy storage <i>Sunil Lonkar</i>	Understanding anomalous cyclic voltammetric behaviour of gold clusters <i>Shailendra Kumar Sharma</i>	Smart and multifunctional chitosan film as a biosensor in intelligent food packaging <i>Shuva Bhowmik</i>	Fabrication of Nano- and Microstructures on Polysulfides Surfaces <i>Abigail Mann</i>	(17.10 – 17.25) Temperature regulation as instance of homeostasis with bio-inspired feedback mechanisms <i>Maximiliane Noll</i>
17.35	Thermoacoustic characterization of phase change materials <i>Laura A. Cobus</i>		Optimizing LAMP Assays for In-Field Detection of Kauri Dieback Pathogens <i>Zhuoyue Wang</i>		
19.30 – late	Conference Dinner (RSVP Required) Location: Waitaki Room, Te Pae Christchurch Convention Centre				

WOMEN AND GENDER MINORITIES IN STEM PANEL

TSB SPACE IN TŪRANGA
10 FEBRUARY, 6-7PM | FREE ENTRY

To help celebrate the International Day of Women and Girls in Science, we will be hosting a panel of people from diverse STEM backgrounds and pathways. Come along to hear their stories and learn about their experiences on fostering innovation, overcoming challenges and finding success in their professional journeys.



Thursday 13th February 2025

08.00 – 16.00	Registration Open Location: Reception desk				
08.30	Plenary 5: Glasses made from hybrid perovskites and metal-organic frameworks: Characterisation and Properties <i>Thomas Bennett</i> Chair: Paul Kruger Room: Auditorium				
09.30	Transition to concurrent sessions				
09.35	Keynote 15: Soft Materials to Understand Cell-Material Interactions and to Pattern Magnetic Clusters <i>Jenny Malmstrom</i> Chair: Catherine Whitby Room: Auditorium		Keynote 16: Unveiling the hidden secrets of spintronic materials with neutron scattering <i>Kirriily Rule</i> Chair: Simon Granville Room: Dobson 1		
10.10	Morning Tea in the Exhibition Area				
	10A: Catalysis and Innovative materials	10B: Materials for Environmental and Water Management	10C: Gas separation, concentration and CO2 utilisation	10D: Thermo- and piezo-electric materials	10E: Photovoltaic, light harvesting and optical materials
	Chair: Ziyun Wang	Chair: Amy Cruickshank	Chair: Paul Kruger	Chair: Fei Yang	Chair: Michael Reid
	Room: Auditorium	Room: Dobson 1	Room: Dobson 2	Room: Dobson 3	Room: Dobson 4
10.40	Designing Metal Single Atom Catalysts for Tomorrow's Energy Sector <i>Geoffrey Waterhouse</i>	Water and Light: Breaking Down Biofilms with Greener Photodynamic Materials <i>Heather Buckley</i>	Computational insight into the chemical processes underpinning a humidity driven molten carbonate membrane for direct air capture of carbon dioxide <i>Patricia Hunt</i>	Development of thermoelectric materials & devices for energy saving and IoT energy harvesting <i>Takao Mori</i>	Ultrafast Coulomb Interactions in Organic Semiconductors for Next Generation Solar Panels <i>Michael Price</i>
11.05	Are Transition Metal (Oxy)Nitrides Active Catalysts for Electrochemical Nitrogen Reduction? <i>Prasanth Gupta Sridhar Gupta</i>	Advanced Water Management Through Thermoresponsive Hydrogel Composites <i>Jonghwi Lee</i>	Fundamental developments toward robust high-permeance ZIF-62 glass membranes <i>Matthew Cowan</i>	Strain induced Flexible Piezoelectric device employing Semiconducting Nanowire Network <i>Celine Ternon</i>	Non-Volatile Solid Additives for High-Efficient Eco-Friendly Organic Photovoltaic Cells <i>Shinuk Cho</i>
11.30	Stable organic cages from aromatic macrocycles: inclusion and assembly <i>Nigel Lucas</i>	Electrochemical oxidation of low concentration methane on Pt/Pt and Pt/CP under ambient conditions <i>Ting Wu</i>	Novel Hybrid Anion-Pillared MOFs For Strategic Gas Separations <i>Sydney Koia</i>	Mitigating Triboelectric Effects in Piezoelectric Signal Measurements <i>Alireza Akbarinejad</i>	Resolving the emissive intermediate in singlet fission with magnetic fields <i>Damon De Clercq</i>
11.45	Growth of a Poyoxometalate-Capped Giant Iron-Based Molecular Mineral Structure from Water <i>Masooma Ibrahim</i>	Highly efficient zeolite supported Au-Pt alloy nanoparticles for long-term removal of ethylene at 0 degree C <i>Mingyue Lin</i>	Analogues of MUF-16 that further enhance CO2 capture performance in industrial applications <i>Elnaz Jangodaz</i>	Defects induced high thermoelectric power factor in sustainable thermoelectric materials <i>Peter Murmu</i>	Morphological control of Y6 thin films reveals charge transfer generation is facilitated by co-facial interactions <i>Aditi Kumar</i>
12.00	Textile Sensor Consists of 2D Materials <i>Azam Ali</i>	Deep Eutectic Solvent (DES) as Green Absorbent for Scrubbing of Aromatic VOCs in Newly Decoration House: Formula Screening Using COSMO-RS <i>Min-hao Yuan</i>	Development of Defect-Free Metal-Organic Framework (MOF) Membranes for Enhanced Gas Separation performance <i>Harikrishnan Raghavan</i>	Increasing the thermoelectric power of CuI by defect engineering with ion implantation <i>Martin Markwitz</i>	Optimizing growth of self-assembled aluminide stacks for optical applications <i>Angelo Vitaliti</i>
12.15	Highly Active Catalysis by Ligand-promoted Stable, Low Loading, and High Dispersion of Pd <i>Varinder Singh</i>			Soft Magnetic Materials for Inductive Power Transfer to Electric Vehicles <i>Nick Long</i>	Stretching Long-Lived Excited States Using Molecular Design, A Transient Resonance Raman Study <i>Samuel Harris</i>
12.30				Exploring Non-Classical Properties of Amyloid Fibrils <i>Donn Adam Gito</i>	Fundamental Properties and Device Applications of Square SnO2 Nanotubes <i>Ryan Adams</i>
12.45	Lunch in the Exhibition Area				
13.45	Keynote 17: CO2 Electro-Reduction: From Metallic Foams to Gas Diffusion Electrodes <i>Christina Roth</i> Chair: Aaron Marshall Room: Auditorium		Keynote 18: Unveiling dynamic biotic-abiotic interactions in photosynthetic biohybrids <i>Xianwen Mao</i> Chair: Thomas Dandekar Room: Dobson 1		
14.20	Transition to concurrent sessions				



Thursday 13th February 2025 (continued)

	11A: CO2 reduction	11B: Biosensors and electronics	11C: Electrocatalysis	11D: Nanoparticles	11E: Modelling and materials theory
	Chair: Aaron Marshall	Chair: Thomas Dandekar	Chair: Hamish Andrew Miller	Chair: Vladimir Golovko	Chair: Paul Jerabek
	Room: Auditorium	Room: Dobson 1	Room: Dobson 2	Room: Dobson 3	Room: Dobson 4
14.25	Effect of cathodic potential in electrochemical CO2 reduction <i>Lei Wang</i>	Innovative Applications of Laser-Scribed Graphene <i>Bicheng Zhu</i>	Function-coordinated Electrocatalysts for Carbon Dioxide Reduction <i>Yuhang Li</i>	Changing Metals and Their Atoms on by One in Subnanometer Clusters and Switching Supports to Control Catalytic Activity and Selectivity <i>Štefan Vajda</i>	
14.50	The role of structural dynamics in liquid metal catalysts <i>Charlie Ruffman</i>	A strategy towards biomimetic and transient polymer (bio)electronics <i>Jadranka Travas-Sejdic</i>	Nanoscale Structure—Activity Mapping of Electrocatalysts <i>Cameron Bentley</i>	Molecular effects for tuning charge transport in nanostructured hybrid materials <i>Simon Tricard</i>	Why is gallium liquid at room temperature*? <i>Nicola Gaston</i>
15.15	Liquid metal chemistry towards CO2 reduction and other catalytic reactions <i>Torben Daeneke</i>	Designed solar harvesting protein antenna for bioelectronics and biocatalysis <i>Dominic Glover</i>	Oxygen Driven Defect Engineering of Monolayer MoS2 for Tunable Electronic, Optoelectronic, and Electrochemical Devices <i>Sindhu Priya Giridhar</i>	Catalytic activities of waste-derived gold nanoparticles <i>Michelle Lau</i>	Modelling surface solidification of binary alloys with a phase-field Lattice Boltzmann model <i>Alexander Smith</i>
15.30	Metal-Organic Frameworks for CO2 Electrocatalysis <i>Shae Patel</i>	Copolymers of gelatin and conducting polymers for Transient Electronics <i>Xin Sun</i>	Theoretical investigation and screening of dual-atom catalysts (DACs) for the oxygen reduction reaction <i>Yu Mao</i>	Ultra-Small Gold Nanoparticle Particle Adsorption and Uptake is Directed by Particle Capping Agent <i>Aaron Elbourne</i>	High-throughput Predictions of Impact Ionization Properties for Material Discovery <i>Ryan Hall</i>
15.45	Immobilized Molecular Catalysts for Heterogeneous Electrochemical Hydrogen Evolution (HER) and CO2 Reduction (CO2RR) <i>Kieran Demonte</i>	High Precision Multiplexed Measurements of Insect Odorant Receptors Immobilised on Carbon Nanotube Field Effect Transistor Platforms <i>Danica Fontein</i>	Oxygen bubble formation under confinement <i>Ghazaleh Ramezani</i>	Improving the memory of percolating networks of nanoparticles <i>Ben Monaghan</i>	
16.00 – 16.30	Conference Closing Room: Auditorium				

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Poster Presentations

Poster Session: Tuesday 11 February 2025, 12.45-13.45

Location: Exhibition Area, Te Pae Christchurch Convention Centre

P.01	Immobilization and Catalytic Conversion of Polysulfides by In-Situ Generated Nickel in Hollow Carbon Nanofibers for High Performance Lithium–Sulfur Batteries	Jou-Hyeon Ahn
P.02	Elucidating Ca ²⁺ and H ₂ O ₂ Signalling in Plant Roots: Responses to Osmotic Stress, PAMPs and Force Sensing Using Linear Treatment Gradients	Claudia Allan
P.03	Optimizing UHPFRC Mixtures with Nano-Kaolin Clay and Steel Fibers for Improving 3D Concrete Printing Performance	Fadi Althoey
P.04	Towards the Development of a Novel Electrochemical Sensor for the On-Site Detection of Illicit Drugs	Elise Bailey
P.05	The Development of a Harakeke (Phormium tenax) Membrane Towards Sustainable Water Purification	Jaye Barclay
P.06	Where is My Capsule?	Farzaneh Baserisalehi
P.07	Power dissipation for 2D and 3D percolating networks of nanoparticles (PNNs)	Phil Bones
P.08	Developing Novel Lanthanide Framework Materials for CO ₂ Uptake and Catalysis	Yichao Cai
P.09	Construction of a Z-Scheme Heterojunction for Next-Generation Photovoltaic Devices	Jodi Carter
P.10	Contact Angle Experiments for resin 3D Printing vs PMMA Micro-Milling – ELISA Lab-On-A-Chip Development	Alice Cerdeira
P.11	Photophysics of Luminescent Polyacene Metal Organic Frameworks	Sanutep Chan
P.12	Perovskite precursor mixing and dispensing using PDMS based microfluidic channels	Linda Chen
P.13	In-situ Characterization of WS ₂ and GaN/WS ₂ Heterostructure by Reflection High-Energy Electron Diffraction	Po-Yen Chen
P.14	Potential in using CMUTs for particle manipulation	Joe Chen
P.15	UPWEARS – A EU Horizon project on sustainable e-textile solution for sportswear	Yi Chen
P.16	Carbon dioxide Captured by Amino Acids Containing Deep Eutectic Solvents	Hung-Yi Chi
P.17	Structural and Magnetic Phase Transitions in CoMoO ₄ and CuMoO ₄	Shen Chong
P.18	Dopaminergic Janus Synapse on Neuroligin-2 Modified Gold-Coated Microspheres	Taek Dong Chung
P.19	Unveiling Aggregation Propensity of Amyloid-β and Its Mutants Through Relaxation Dynamics	Priya Dey
P.20	Carbon Nanotube Network System for Reservoir Computing	Marissa Dierkes
P.21	N-Heterocyclic Carbene as a Coordinating Moiety Between Metal Nanoparticles and Spin Crossover Compounds in Nanostructured Hybrid Materials for Neuromorphic Learning	Daniel Galvis
P.22	Evaluation of Calcium/Lithium-based Metal-Organic Frameworks for Gas Adsorption by p-DFT and Vibrational Mode Analysis	Jake Gilchrist
P.23	A soft hybrid material for self-powered and static tactile sensing	Chang Soo Han
P.24	Investigating the Influence of Matrix Stiffness on Chondrocyte Behaviour through Tuneable Alginate Hydrogels	Maede Hasannasab
P.25	AI-based automatic process flow diagram generation model for interaction of academia and industry	Byeongmin Ha
P.26	Exploring the dual-doping effects of Zn and Te in the Skyrmion hosting system of (Cu _{1-x} Zn _x)O(Se _{1-y} Te _y)O ₃	Branwen Hastings
P.27	Acoustic pump-probe microfluidic device	Logan Henderson & Jordan Hay
P.28	Development of non-toxic AgInS ₂ quantum dots for luminescent solar concentrators in zero-emission buildings	Sandhuli Hettiarachchi
P.29	Exploring Structural Variability in Tri-HBC Compounds: Implications for π-Stacked Porous Solid Design	Panchami Hirave
P.30	Harnessing Solvent-Induced Browning Chemistry of Amino Acids for Nanoparticle Synthesis and Drug Delivery Applications	Teh-Min Hu
P.31	Promoting Bone Regeneration with ECM-Functionalized Titanium Surfaces Mimicking Biomimetic Elastic Proteins	Jun-hyeog Jang
P.32	Contrast enhanced NIR-II photoacoustic imaging with barium sulfate and pigment admixture	Mansik Jeon
P.33	Computational Study of Carbonation Reaction for Carbon Capture and Storage in Concrete	Sohdam Jeong
P.34	Unravel the Sugarcoating; Surface patterning with unprotected sugars towards mimicking the glycocalyx	Jude Kalan
P.35	Anti-Fouling Properties of Phosphonium Ionic Liquid Coatings in the Marine Environment	Sajith Kaniyadan Baiju
P.36	Ion beam tuning of optical properties of halide perovskites	John Kennedy
P.37	Composite polymer electrolyte with surface-functionalized silica mesopore fillers	Jae Hyun Kim
P.38	Cellulose-Based Dispersion of Single-Walled Carbon Nanotubes for Solution Processing Applications	Joonyoung Kim
P.39	Asymmetric gradient orbital interaction of hetero-metal active sites for promoting photocatalytic C–C coupling processes	Taekyu Kim
P.40	Effect of Structural Characteristics and Molecular Weights of Biscarbazole-based HTMs on Photovoltaic Performance of Solid-State DSSCs	Younghwan Kwon
P.41	Monovalent ion-selective membranes with enhanced interlayer adhesion	Ji-Hyeon Lee
P.42	A New Pixelation Method Using Ag Thin Film within a Tandem Structure for High-Resolution Full-Color Quantum Dot Light-Emitting Diodes	Kwangkeun Lee
P.43	Precursor crystalline structure from organic pigment red 122 for polysulfide confinement and conversion in lithium–sulfur batteries	Seung Geol Lee
P.44	Dual modification of high-voltage LiFe _{0.4} Mn _{0.6} PO ₄ cathode for accelerated low-temperature kinetics	Youngil Lee
P.45	Spectroscopic and Computational Investigation of the Efficient Formation of Glycine on Olivine and Ice Surfaces in Interstellar Environments	Jacob Lewis
P.46	Slip flow of concentrated emulsions in microchannels: Effects of surface wettability	Ssu-Kai Li
P.47	Fascinating and special Circular Dichroism of Helical Assemblies of silver nanowires	Zheng Fong Li
P.48	Anomalous Magnetization Hysteresis Behavior of Thulium Iron Garnet (TmIG) under Magnetic Circular Dichroism (MCD)	Wei Hsiang Liao

Poster Presentations (continued)

Poster Session: Tuesday 11 February 2025, 12.45-13.45

Location: Exhibition Area, Te Pae Christchurch Convention Centre

P.49	Crystallization and Young's Modulus of Nanofilm of Physical Elastomer Immersed in Nonsolvent: Effect of Film Thickness	Chih-Jung Lin
P.50	Lipid nanoparticles efficiently deliver DNA vaccine to robustly induce antigen-specific immune responses	Shih-jen Liu
P.51	Comparison of CO ₂ photocatalytic reduction efficiency using BiAX (A=O, S, Se, Te; X=Cl, Br, I)/g-C ₃ N ₄ as catalysts	YuYun Lin
P.52	Enhancing Advanced Material Reliability through Deep Learning: A Conceptual Framework	Jung-Hua Lo
P.53	Validation of Gelatine Layering Method for Ultrasound Powering and Communication	Kaleb McGillivray-Seaton
P.54	Sustainable Aerogels: Harnessing Canola Seed Meal Proteins	Steven McNeil
P.55	Effect of gangue content on the compressive strength of hydrogen direct reduced iron ore pellets	Shaira Mendoza
P.56	Synthesis of Magneto-thermal Catalysts for CO ₂ Hydrogenation	Akshita Mogaveera
P.57	Superalkalis as catalysts for carbon dioxide activation	Juliet Nelson
P.58	Turning Chrome Shavings Waste into Functional Materials: A Sustainable Approach	Braydon Nikolaison
P.59	Tracking Exciton Diffusion in Photoactive and Electronic Frameworks using Ultrafast Spectroscopy	Sam Otter
P.60	Perovskite encapsulated metal-organic frameworks	Adrian Owens
P.61	A neuromorphic device for Arithmetic Operations: Influence of Presynaptic Pulsing Scheme on Mathematical Precision	Mousona Pal
P.62	An ultrasensitive detection method for ribonuclease H utilizing in vitro transcription of fluorogenic RNA light-up aptamer	Hyun Gyu Park
P.63	Stabilized cathode/sulfide electrolyte interface by modified lithium borate coating	Yong Joon Park
P.64	A Computational Investigation into Hydrogen Production on Twisted Molybdenum Disulfide	Kayla Prendergast
P.65	Development of a hybrid optoelectronic radiation sensor using a Gd ₂ O ₃ glass scintillator and a TiO ₂ photoconductor	Marilou Raduban
P.66	Isolation and Characterisation of Algal Nanocellulose for Tissue Scaffolding Applications	Janet Reid
P.67	A Comprehensive Guide to Exploring Electrochemical Nitrogen Reduction in Model Catalysts	Zulfitri Rosli
P.68	Quinone-containing Molecular Catalysts for Photocatalytic Hydrogen Generation	Leah Sammon
P.69	Ruthenium-gold cluster catalysts for CO ₂ reduction	Michelangelo Santos
P.70	Investigating the Thermal and Structural Properties of 2D Low Temperature Melting Metals	Caitlin Scott
P.71	Detection of Food Freshness Using Biodegradable Composite Polymer	San San Shen
P.72	Innovative Exosome Isolation Technology Utilizing a Sequential Combination of Charge-Based Filtration, Tangential Flow Filtration, and Lipoprotein-Specific Adsorption	Sehyun Shin
P.73	Optimized Extraction Methods for Purifying Bio-Synthesized Indigo from Bacterial Residue and Contaminants	Younga Son
P.74	High-performance bipolar membranes for efficient direct seawater electrolysis	Hyeong-Bee Song
P.75	Optogenetic and chemogenetic modulation of cognitive function in mice	Kyoungso Suk
P.76	Nanostructure, Morphology, and Electrochemistry of Degradable Oligo(3-hexylthiophene) Grafted onto Poly(caprolactone)	Yuhka Uda
P.77	The plasma-assisted thermal catalytic process for CO ₂ conversion	Settakorn Upasen
P.78	Tuning magnetic properties in rare-earth nitrides: exploring GdNdN for compensation points	Kiri Van Koughnet
P.79	Tailoring Functional Properties of Perovskite Oxides Using Anisotropic Epitaxy	David Walker
P.80	Study on the preparation of CO ₂ based monomers via cyclization of Glycidyl Methacrylate and CO ₂ and its polymerization	Cheng-Chien Wang
P.81	Wicking dynamics of two-ply channels in porous medium-based microfluidic devices	Yung-Ching Wang
P.82	Raman spectroscopy to investigate historic paint samples	Carlie Watt
P.83	Synthesis and properties of wool keratin-polysaccharide composite hydrogels	Junfeng Wu
P.84	Symmetry Engineering Novel Domain Structures in Barium Titanate Thin Films	Tianyuan Wu
P.85	The synthesis and luminescence properties of ZnO-doped Y ₂ O ₃ ceramics	Yu-Hui Xue
P.86	Proteolytic reaction-based electrochemical biosensor chip for point-of-care testing	Haesik Yang
P.87	Development of smart wound-healing device based on conducting polymers	Kourtney Yang
P.88	Percolation-Controlled Carbon-based Nanomaterials for High Performance Dielectric Composite Materials	Segi Yu



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We are focused on delivering benefits for the people of Aotearoa New Zealand from natural processes occurring in the Earth's crust and Earth surface processes that directly affect our infrastructure, industry and environment.

Our materials team is focused to create, characterise, and integrate new materials systems to underpin the clean technologies (hydrogen, ammonia, thermoelectrics), that will deliver a sustainable and resilient net-zero carbon energy future for Aotearoa New Zealand.



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New Zealand Synchrotron Group Ltd

Website: <https://synchrotron.royalsociety.org.nz/>

New Zealand Synchrotron Group Ltd (NZSG) was formed in 2006 to oversee New Zealand's involvement in the Australian Synchrotron. That facility, which is owned by ANSTO, is located in Melbourne and is a key resource for research into advanced materials. There are currently 14 beamlines which allow a range of advanced measurement techniques. A further 4 are under construction.

Eight NZ institutions and the government provide the funding for NZ researchers to use the facility. Acting on behalf of the research sector, NZSG administers the access arrangements, including selecting which proposals obtain time at the Synchrotron and funding the costs of researchers travelling to Melbourne.

The Royal Society Te Apārangi provides secretariat services for NZSG. Enquires can be made to synchrotron@royalsociety.org.nz.

Tech Taster Session Sponsor & Exhibitor



Hi-Tech Product Design Innovation and Engineering

inFact

Website: www.infact.co.nz

InFact is a product design and hi-tech engineering consultancy specialising in the development of sustainable new technology products and services that deliver on important environmental and science-based projects.

We work closely with research providers including Universities and CRI's to engineer reliable products and systems that enable scientists to scale research into larger field trials or to create investor ready products and services.

With 26 years and over 500 projects, InFact has developed many world-first innovations in collaboration with science including Wireless Power Uni-Services, Forest Flows Scion, Hitman Log Sonics Callaghan Innovation and Kauri Spore detection Plant and Food.

Our team of mechanical, embedded systems and cloud designers and engineers love the wide variety of new technology challenges. We take time to invest in our relationships with our clients, making sure we are working on projects that have real meaning in today's world.



AMN11 Exhibitors



Ara Ake Limited

Website: www.araake.co.nz

Ara Ake is New Zealand's national energy development centre, committed to advancing a low-emissions energy future. Based in Taranaki, it connects innovators, industry leaders, researchers, and government to identify and support the development of cutting-edge energy solutions.

With a focus on decarbonization, renewable energy integration, and resilience, Ara Ake fosters innovation, facilitates partnerships, and accelerates the deployment of sustainable technologies. By bridging gaps across the energy ecosystem, Ara Ake is pivotal in achieving New Zealand's net-zero carbon goals, delivering environmental, social, and economic benefits to the nation.



AXT PTY LTD

Website: www.axt.com.au/segments/materials-science

AXT can assist you with your materials science and nanotechnology research projects with solutions sourced from suppliers from around the world.

Electron Microscopy: SEM's, FIB's and STEM's from TESCAN are complimented by a range of in situ systems including physical, mechanical, thermomechanical and electrochemical testing in different environments.

X-ray Analysis: Your choice of Rigaku XRDs and XRFs, or laboratory XAS and microCTs.

Chemical Analysis: Choose from EXUM Instruments revolutionary LALI-TOF-MS or Oxford Instruments benchtop NMR.

Microfabrication: We have systems that can microfabricate polymers, metals or ceramics with micron/sub-micron resolutions.

Quantum Computing: The Quantum Diamond Computer is perfect for teaching.



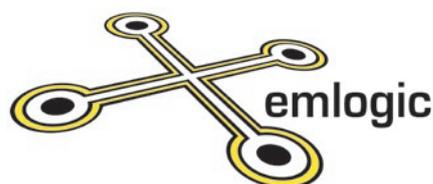
Bio-strategy, Part Of DKSH Group

Website: www.dksh.com/nz-en/home/technology/industries/scientific-instrumentation

DKSH are the local experts in chemical and physical material characterisation and analysis; offering quality instruments from leading brands including Perkin Elmer, Elementar, Biolin Scientific, QATM, Jasco, Brookfield, Bettersize, ICSPI and SPECTRO.

Our extensive brand offering covers a wide range of techniques including: FTIR, HPLC, LC-MS, Particle Size Analysis, Surface Tension, Hardness, ICP-OES, XRF, various molecular spectroscopy techniques and more.

Supporting our valued customers are a team of technical sales and applications specialists that understand the importance of providing you with the best solutions available for your application and material testing requirements. Our team are looking forward to meeting you.



Embedded Logic Solutions Pty Ltd

Website: www.emlogic.com.au

For the past 20 years, Embedded Logic Solutions has been a leading provider of cutting-edge research technologies and equipment to the scientific research community. Our offerings cover a wide range of application areas, including microfabrication, semiconductors, photonics, electronics, microfluidics, and many more.

At the upcoming AMN Conference, we will be showcasing several key technologies:

- » Laser Induced Deep Etching Technology (LIDE) by LPKF: An innovative process for structuring glass substrates used in semiconductor, MEMS, and microfluidic applications, ensuring defect-free results.
- » Boston Microfabrication 3D Printer: Capable of achieving resolutions as fine as 2µm, enabling the fabrication of high-resolution components with small channels, suitable for microfluidic, microneedle, and various other applications.

LPKF Laser Systems: Renowned for their capability to produce printed circuit boards in one day, these systems are much more than just tools for machining substrates for printed circuit boards, offering broad capabilities for various advanced applications, using a multitude of materials.



AMN11 Exhibitors (continued)



Ezzi Vision Pty Ltd

Website: www.ezzivision.com.au

Ezzi Vision, with over 25 years of expertise, leads in industrial and scientific vacuum and thin film technology. Our products redefine precision and fuel advancements in quantum science, ushering in a future of endless possibilities. Few of our products include Edwards Vacuum Pumps, MBraun Glove-Box Systems, HotDisk AB Thermal Conductivity, Kashiyama Dry Pumps, Thyracont Vacuum Gauges, MPFPI Electrical Feedthroughs, Meivac Sputter and E-beam Sources, Ezzi Vacuum Branded Vacuum Fittings, Veeco Ion Sources and Ion Beam Deposition Systems, HHV thin film deposition systems, ARS Cryogenic coolers and cryostats, Hobersal Vacuum Furnaces and much more. Join us as we embark on a journey of limitless innovation.

Ezzi Vision is in Melbourne, Sydney and Perth which provides both Local Sales and Service support.



NANOVACUUM
ENABLING NANOFABRICATION

Nano Vacuum Pty Ltd

Website: www.nanovacuum.com.au

Nano Vacuum is ISO9001:2015 certified and has a team has over 50 years of experience within the micro/nano-fabrication industry.

Our range of deposition, etching, plasma modification, clean/inert environments, packaging, lithography and surface characterisation tools offer micro/nano-fabrication resources to ensure you stay at the forefront of the highly competitive research space.

Our extensive customer base includes academia, government, defence, aerospace, semiconductor and private industry, covering industries and R&D sectors within Quantum, Space/Aerospace, Defence, Semiconductor, Photovoltaics, Microfluidics, Photonics, Wearable Electronics, Opto-electronics, Sensors, Batteries/Fuel Cells, MEMS, OLED/LEDs, SiC and GaN Power Devices, Medical/Dental Implants, Condensed Matter Physics and Material Science.

For the space industry, we offer Thermal Vacuum Chambers (TVAC) for thermal and vacuum testing of satellite payloads to ensure mission critical components can withstand the harsh space environment.

Find out more at: www.nanovacuum.com.au.



OpenStar Technologies

Website: www.openstar.tech

In just three years, OpenStar has developed the technology to revive the levitated dipole concept as a viable fusion approach. The concept requires a superconducting magnet to levitate inside a vacuum chamber and produce a significant magnetic field to confine a plasma, all while entirely disconnected from any external technologies. The company successfully integrated its key enabling power supply that sits onboard the donut-shaped device, a world-first application for this technology. This feat broke records and allowed the team to achieve their inaugural plasma around their first prototype.



Scitek

Website: www.scitek.com.au

Scitek specialise in scientific vacuum and vacuum enabled technologies, including surface coating, analysis, and lithography. Our expertise encompasses physics, material engineering, chemistry, biotech, food sciences, and pharmaceutical. We have factory trained engineers and manufacturer certified lab to provide the highest level of support. Scitek have served the academic and industry sectors in the Trans-Tasman region for over 30 years.

We look forward to providing market-leading, cost-effective solutions to your scientific requirements.



Shimadzu Scientific Instruments

Website: www.shimadzu.com.au

Since 1875, Shimadzu has been pursuing leading-edge science and technologies in analytical instruments including chromatographs and mass spectrometers.

Since Shimadzu completed Japan's first medical X-ray system, we have been contributing to the early detection and treatment of diseases in healthcare worldwide through medical imaging systems.

Our advanced analytical technologies, such as high-performance liquid chromatography and mass spectrometry, support research and development in a wide range of fields, including pharmaceuticals, infectious diseases, and life sciences.

With these technologies, Shimadzu will continue our efforts to provide various solutions from clinical to research field.



AMN11 Tech Tasters



Open Star

Website: www.openstar.tech/

In just three years, OpenStar has developed the technology to revive the levitated dipole concept as a viable fusion approach. The concept requires a superconducting magnet to levitate inside a vacuum chamber and produce a significant magnetic field to confine a plasma, all while entirely disconnected from any external technologies. The company successfully integrated its key enabling power supply that sits onboard the donut-shaped device, a world-first application for this technology. This feat broke records and allowed the team to achieve their inaugural plasma around their first prototype.



Munro Medical – Smart implants for better outcomes

Website: www.munromedical.com/

Founder & President: Associate Professor Deborah Munro

Munro Medical is dedicated to challenging the norm, identifying opportunities, and solving complex problems. With expertise in biomedical research, patents, regulatory affairs, and engineering, we aim to revolutionise treatment options through innovative medical devices. Established in 2016 in Portland, Oregon, we are now based in Christchurch, New Zealand, focusing on wireless, battery-free implantable devices. Our flagship product is a wireless implantable sensor to monitor bone healing after spinal fusion surgery. Traditional x-rays take over four months for conclusive results, but our “smart rod” reduces this to a mere eight weeks, enabling faster recovery and immediate intervention for potential complications.

FABRUM.

Fabrum

Website: www.fabrum.nz/

For 20 years, Fabrum’s patented cryogenic technology has enabled the global movement towards clean energy transition. Fabrum delivers solutions to support a zero-emission future for mobility in aviation, marine, heavy

transport, and heavy industry. The Fabrum patented cryocooler technology has been applied in electrolyzers, hydrogen liquification plants, boil-off gas management systems, and hydrogen refuelling stations. Fabrum’s composite technology has also been adopted into heavy industry mobility, on-board aviation fuel tanks, and superconductivity. Fabrum, headquartered in Christchurch, New Zealand, has built an impressive list of global IP and solution success, applying its sustainable solutions to enable humanity to tread lightly.



Aspiring Materials

Aspiring Materials

Website: www.aspiringmaterials.com

Aspiring Materials uses globally abundant magnesium-rich rocks like olivine to capture CO₂ and produce low-emission materials for industries like steel, energy, and cement. Their patented process converts olivine into magnesium hydroxide, reactive silica, and critical minerals, enabling cost-efficient carbon capture and industrial uses. With 1.6 tonnes of CO₂ eliminated per tonne of olivine, Aspiring offers a reliable, scalable solution for impactful industrial decarbonization.



Dual Axis spin coating

Conventional (single-axis) spin coating is a fundamental microfabrication technique due to its low cost and effectiveness in producing very thin uniform film layers. These films are an integral component in common devices such as smartphones, solar cells, and CD’s. However, the limitations of the technique constraining coatings to flat rigid surfaces have restricted the design possibilities for these technologies. Curve coating is a new method to spin coat using dual-axis rotation, enabling the same advantages of common spin coating to be applied on curved surfaces. This new technique has the potential to unlock new opportunities in microfabrication and other coating-based applications.



Notes:

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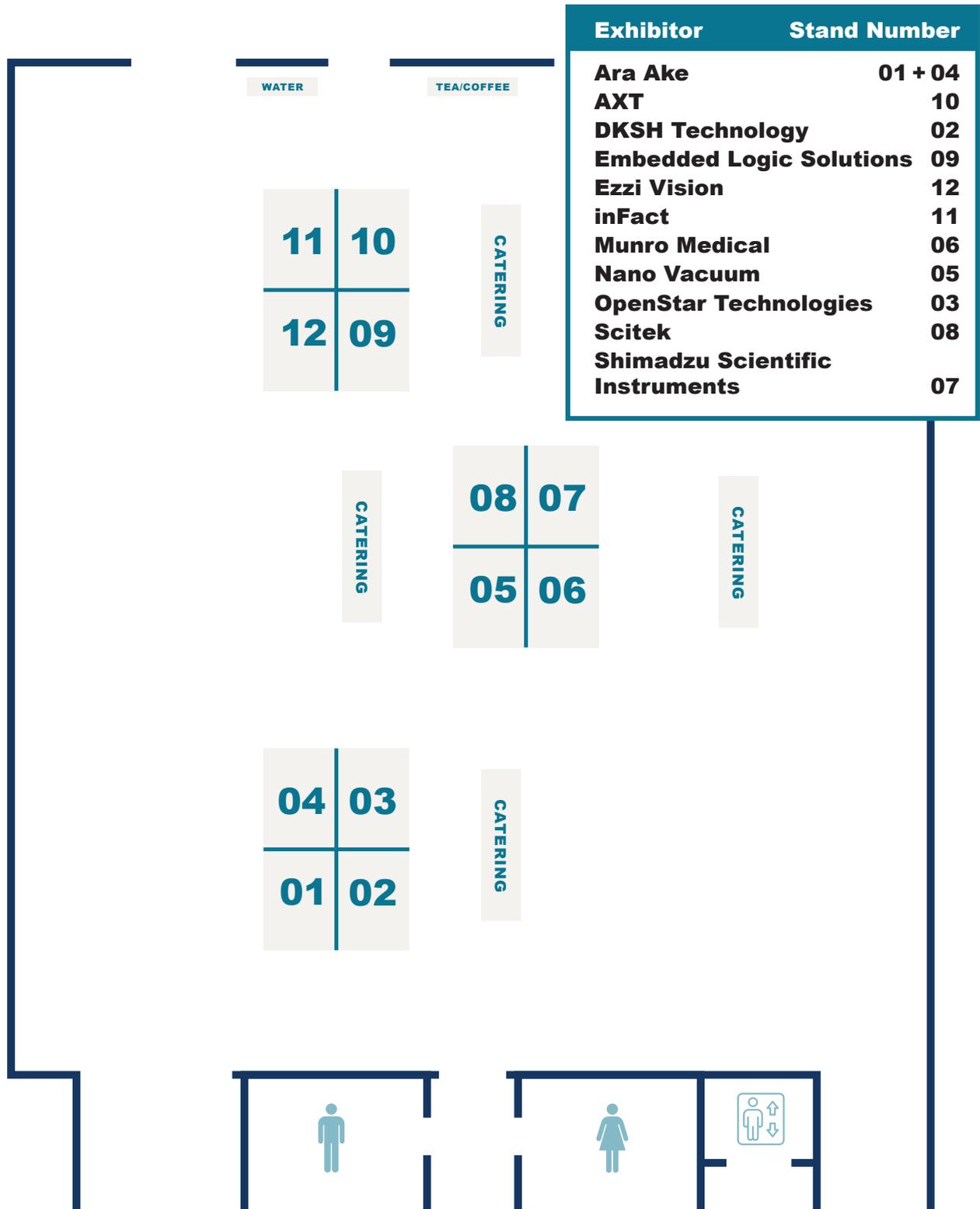


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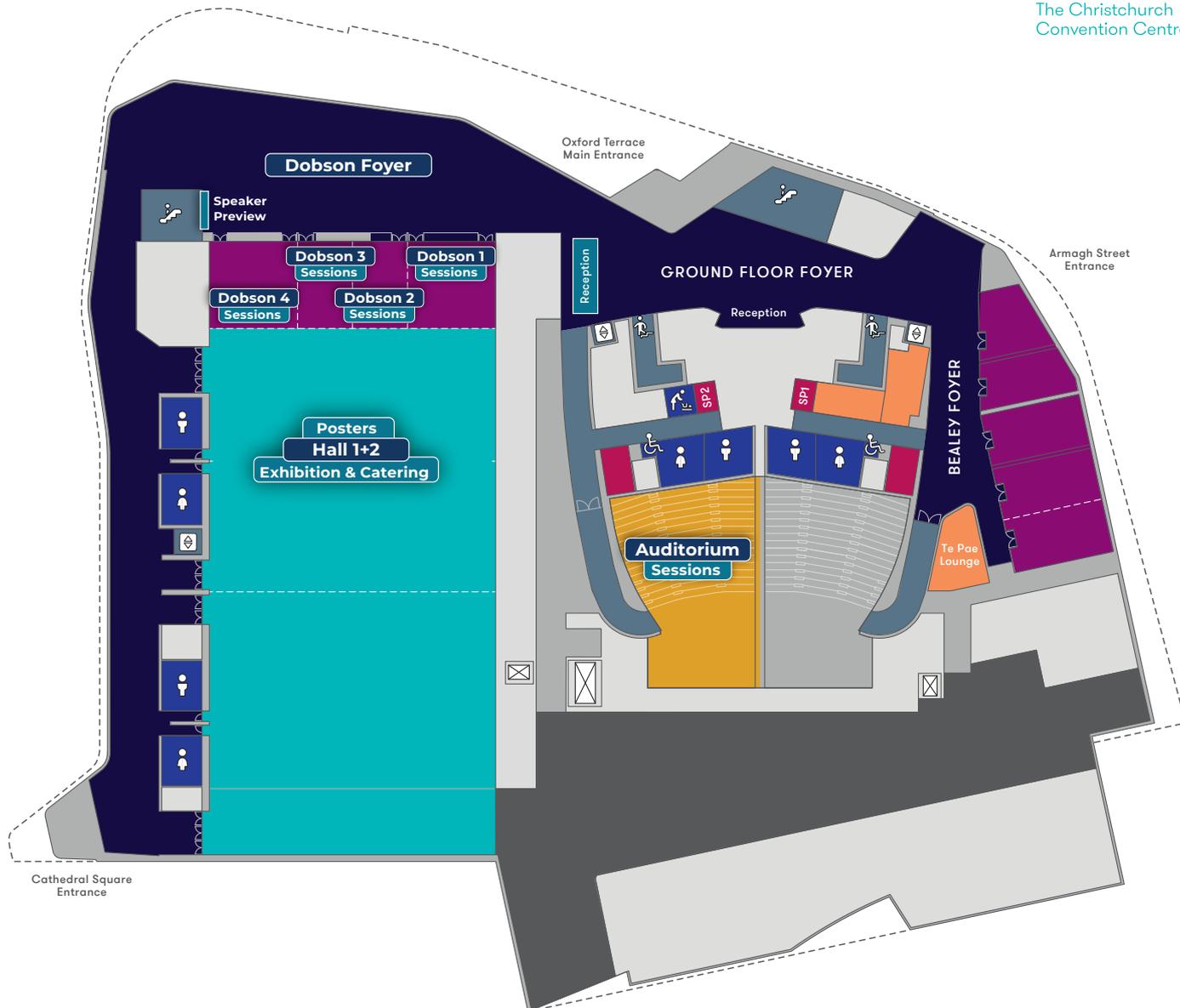
EXHIBITION FLOORPLAN



Exhibitor	Stand Number
Ara Ake	01 + 04
AXT	10
DKSH Technology	02
Embedded Logic Solutions	09
Ezzi Vision	12
inFact	11
Munro Medical	06
Nano Vacuum	05
OpenStar Technologies	03
Scitek	08
Shimadzu Scientific Instruments	07



Venue Floorplan



Key:

- | | | | |
|--|----------------------|--|---------------|
| | Stairs | | Meeting Rooms |
| | Escalator | | Foyers |
| | Passenger Lift | | Auditorium |
| | Back of House Lift | | Halls |
| | Toilets | | |
| | Toilets - Accessible | | |
| | Parents Room | | |

Special Dietary Requirements

If you indicated your dietary requirement during the online registration, this has been forwarded to the Te Pae catering team.

Depending on your requirement, the main food may be suitable for you or a separate table will have food to suitable for you.

Please make yourself known to the catering staff who will assist or please see the