



SCIENCE AT THE SHINE DOME 2024



Program 9–12 September

ACKNOWLEDGEMENT OF COUNTRY

The Australian Academy of Science acknowledges and pays respect to the Traditional Owners of the land on which Science at the Shine Dome 2024 is held – the Ngunnawal People. As we come together to share our own knowledge, teaching, learning and research practices may we also pay respect to the knowledge embedded forever within the Aboriginal Custodianship of Country.

The Academy also acknowledges and pays respect to the Traditional Owners of all the lands on which the Academy operates, and its Fellows live and work. They hold the memories, traditions, cultures and hopes of the Aboriginal and Torres Strait Islander peoples of Australia.

The Academy is honoured to have Aunty Violet Sheridan at Science at the Shine Dome 2024 on Monday at the Shine Dome and Wednesday at the Arboretum to represent the Ngunnawal People and officially welcome all guests to Country and this event.

RECONCILIATION ACTION PLAN

The Academy's vision for reconciliation is that the contributions to knowledge from Australia's First Nations peoples are respected and celebrated, and that we draw on diverse knowledge systems, including Traditional Knowledges, to build a stronger, more inclusive, innovative, and sustainable nation and world.

At Science at the Shine Dome 2024, the Academy is proud to launch our Innovate Reconciliation Action Plan (Innovate RAP).

The Academy's Innovate RAP reaffirms the organisation's commitment to the journey of reconciliation and outlines the practical steps we will take to drive reconciliation and positive change. These steps include making systemic, strategic and sustainable contributions across the organisation to advance reconciliation.

On Tuesday afternoon the Innovate RAP will be officially launched. We encourage all guests to attend the launch in the Ian Wark Theatre.



Use the QR code to view the Academy's Innovate RAP.



PRESIDENT'S WELCOME, AUSTRALIAN ACADEMY OF SCIENCE

It is my immense pleasure to welcome you to Science at the Shine Dome 2024, the Australian Academy of Science's flagship event where our vibrant community gathers in the home of Australian science, united by our shared commitment to scientific excellence.

Over the course of this week, we will celebrate remarkable achievements in Australian science. We are here to honour the Fellows elected to the Academy in 2023 and 2024, and to recognise the outstanding contributions of Academy awardees over this period. The dedication and pioneering work of all of those we celebrate continue to push the boundaries of knowledge, advance our nation and globe, and inspire future generations of scientists.

Science at the Shine Dome 2024 is also a tribute to the collective strength of our scientific community. It is an opportunity for us to collaborate, share knowledge and work together to shape the future of science in Australia and beyond.

Since our last gathering in 2022, the Academy — together with the contributions of its Fellows and the broader scientific community — has advanced science in Australia and abroad. We have provided much-needed independent scientific advice that has shaped the actions of decision-makers in areas as diverse as AI, Great Barrier Reef sustainability, management of long COVID, national security matters, international environmental law, criminal justice outcomes, technological transfer, STEM skill development, and research infrastructure policy. Our efforts in public outreach and education have brought science to millions of people, and provided teachers and students with the tools and skills they need to embrace the opportunities that come with a grounding in science.

As we navigate the many challenges and opportunities before us, I am always reminded of the profound impact that science has on our society. Our work is instrumental to addressing global health crises, to decarbonising our economies, to strengthening national security, to building capabilities and industries on our shores that secure jobs, improve wellbeing and strengthen our economy, to forging our path to reconciliation with Indigenous Australians, and to unlocking the inspirational wonders of our world and our universe.

Our impact and independence are made possible by the unwavering commitment and excellence of our Fellowship, and the vital contributions made by donors and supporters who value the critical role of science in underpinning our democracy and civil society. I thank each and every one of them for their support and for enabling the Academy to lead with evidence.

I extend my heartfelt congratulations to our new Fellows and awardees. Your achievements are a source of pride for all and a beacon of excellence in the scientific community. I also express my deepest gratitude to all those who continue to support and advance science for the benefit of all.

I look forward to connecting with you, celebrating science and being inspired by your work.

Thank you, and welcome to Science at the Shine Dome 2024.

Professor Chennupati Jagadish AC PresAA FEng FTSE

President, Australian Academy of Science



Cover artwork: created by Leah Albert for the Australian Academy of Science. **Image sources:** Dr Pauline Treble and Ms Carol Tadros in Jenolan Caves collecting water samples **CREDIT:** ANSTO. Sir Mark Oliphant **CREDIT:** AUSTRALIAN ACADEMY OF SCIENCE ARCHIVES. Sir Ian Potter **CREDIT:** IAN POTTER FOUNDATION. Professor Dorothy Hill **CREDIT:** NATIONAL ARCHIVES OF AUSTRALIA. Cubesat from the M2 mission, a collaboration between UNSW Canberra Space and the Royal Australian Air Force (RAAF) **CREDIT:** UNSW. Illustrationes florae novae hollandiae **CREDIT:** BIODIVERSITYLIBRARY.ORG/PAGE/50449604. Australian lepidoptera and their transformations **CREDIT:** AUSTRALIAN ACADEMY OF SCIENCE LIBRARY COLLECTION. A research scientist takes note of coral growth on Wheeler Reef. **CREDIT:** A. CHINN. COPYRIGHT COMMONWEALTH OF AUSTRALIA (REEF AUTHORITY).



Australian Government
Defence

Congratulations to the Australian Academy of Science on 70 years' service as Australia's home of science!

Defence Science and Technology Group
is also celebrating a special anniversary
in 2024 – 50 years since our formation!

Our history stretches back to 1908
and our commitment to advancing
Defence science and capability into
real-world impact for the nation
remains central to what we do.

Enjoy your celebration!

dst.defence.gov.au



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PROGRAM

Colour coding in the program matches the lanyards worn by delegates.

👤 New Fellows 🧑‍🎓 EMCRs 🏆 Awardees 🤝 Event partners

Monday 9th September 2024

MONDAY	9.30am	Main Foyer	Registrations
		Arrival tea/coffee	Dorothy Hill Room
	10.00am	Ian Wark Theatre	Welcome: Anna-Maria Arabia , Chief Executive, Australian Academy of Science Welcome to Country: Aunty Violet Sheridan , Ngunnawal Elder President's Welcome: Professor Chennupati Jagadish AC PresAA FREng FTSE President, Australian Academy of Science
	10.20am		👤 New Fellows 2023 Admission Ceremony Professor Liming Dai FAA, UNSW Sydney Professor Mariapia Degli-Esposti FAA FAHMS, Monash University Professor Zaiping Guo FAA FTSE, University of Adelaide Professor Elaine Holmes FAA, Murdoch University Professor David Keith FAA, UNSW Sydney Professor David Komander FAA FRS, WEHI Professor Sharon Lewin AO FAA FAHMS, University of Melbourne Professor Jian Li FAA, Monash University Professor Gareth McKinley FAA FRS, Massachusetts Institute of Technology (MIT), United States Professor Belinda Medlyn FAA, Western Sydney University Professor Louis Moresi FAA, Australian National University Professor Rich Payne FAA, University of Sydney Professor Shizhang Qiao FAA, University of Adelaide Professor Brajesh Singh FAA, Western Sydney University Professor Peter Taylor FAA, University of Melbourne Professor Linfa Wang FAA FTSE, Duke-NUS Medical School, Singapore Professor Leslie Weston FAA, Charles Sturt University Professor Andrew Wilks FAA FTSE FAHMS, SYNthesis BioVentures Professor Xinghuo Yu FAA, RMIT University Professor Pankaj Sah FAA FAHMS, University of Queensland
	11.50am	Lunch	Jaeger Room/Dorothy Hill Room/Marquee
		Main Foyer	👤 Group photo of New Fellows elected in 2023 (meet in main foyer)
		Becker Room	👤 Portraits of New Fellows
		Ian Potter House Ballroom	Asia-Pacific Academic Mentoring Program (ISC RFP-AP) Lunch (invitation only)

MONDAY

1.00pm	Ian Wark Theatre	<p>📍 Platinum Partner Address: Helen Wilson, Department of Industry, Science and Resources</p> <p>🕒 New Fellows 2023 Presentations (10 minutes + 2-minute Q&A)</p> <p>Scientia Professor Liming Dai <small>FAA</small>, UNSW Sydney <i>Carbon science and innovation for clean energy and green chemistry</i></p> <p>Professor Mariapia Degli-Esposti <small>FAA FAHMS</small>, Monash University <i>Viral voyagers: unravelling the hidden marvels of the immune system</i></p> <p>Professor Zaiping Guo <small>FAA FTSE</small>, University of Adelaide <i>Interface chemistry and electrolyte design for high-performance rechargeable batteries</i></p> <p>Professor Sharon Lewin <small>AO FAA FAHMS</small>, University of Melbourne <i>Toward a cure for HIV infection</i></p> <p>Professor David Keith <small>FAA</small>, UNSW Sydney <i>Advances in the development and implementation of ecosystem conservation science</i></p> <p>Professor Andrew Wilks <small>FAA FTSE FAHMS</small>, SYNthesis BioVenture <i>The house that JAK built: the JAK/STAT pathway from bench to bedside</i></p>
2.45pm	Afternoon tea	Jaeger Room/Dorothy Hill Room/Marquee
	Main Foyer	📍 Group photo Asia-Pacific Academic Mentoring Program (ISC RFP-AP) (meet in main foyer)
	Becker Room	📍 Portraits of New Fellows
3.15pm	Ian Wark Theatre	<p>🕒 New Fellows 2023 Presentations (10 minutes + 2-minute Q&A)</p> <p>Professor David Komander <small>FAA FRS</small>, WEHI <i>The ubiquitin code</i></p> <p>Professor Elaine Holmes <small>FAA</small>, Murdoch University <i>Metabolic phenotyping: the route to effective personalised medicine</i></p> <p>Professor Jian Li <small>FAA</small>, Monash University <i>Combating Gram-negative 'superbugs'</i></p> <p>Professor Belinda Medlyn <small>FAA</small>, Western Sydney University <i>Australian vegetation under a changing climate</i></p> <p>Professor Louis Moresi <small>FAA</small>, Australian National University <i>Geodynamics: the journey from abstract ideas to everyday applications</i></p> <p>Professor Peter Taylor <small>FAA</small>, University of Melbourne <i>A strategy for constructing tractable epidemic models of malarial superinfection</i></p>
4.45pm		Close of session
5.00pm – 7.00pm	Marquee at Ian Potter House	📍 EMCR Networking Function

Tuesday 10th September 2024
TUESDAY

9.00am	Main Foyer	Registrations
	Arrival tea/coffee	Dorothy Hill Room
9.30am	Ian Wark Theatre	<p>🕒 New Fellows 2023 Presentations (10 minutes + 2-minute Q&A)</p> <p>Professor Linfa Wang <small>FAA FTSE</small>, Duke-NUS Medical School, Singapore <i>Lessons from bats: beyond viruses and pandemics</i></p> <p>Professor Tim Brodribb <small>FAA</small>, University of Tasmania <i>Plant vascular systems: finding the beat</i></p> <p>Professor Rich Payne <small>FAA</small>, University of Sydney <i>Drug discovery inspired by natural products</i></p> <p>Professor Shizhang Qiao <small>FAA</small>, University of Adelaide <i>Electrocatalysis for energy conversion</i></p> <p>Professor Brajesh Singh <small>FAA</small>, Western Sydney University <i>Soil biodiversity to improve soil, plant and human health</i></p>
10.45am	Morning tea	Jaeger Room/Dorothy Hill Room/Marquee
11.15am	Ian Wark Theatre	<p>🕒 New Fellows 2023 Presentations (10 minutes + 2-minute Q&A)</p> <p>Professor Leslie Weston <small>FAA</small>, Charles Sturt University <i>Adapting to change: invasive plants take up the challenge</i></p> <p>Professor Xinghuo Yu <small>FAA</small>, RMIT University <i>To switch or not to switch: that is the control question</i></p> <p>Professor Gareth McKinley <small>FAA FRS</small>, MIT, United States <i>Complex fluids everywhere!</i></p> <p>Professor Pankaj Sah <small>FAA FAHMS</small>, University of Queensland <i>Learning and memory formation and the amygdala</i></p>

12.30pm	Lunch	Jaeger Room/Dorothy Hill Room/Marquee
	Main Foyer	📸 Group photo of Lindau Delegates (meet in main foyer)
	Becker Room	🖼️ Portraits of New Fellows
	Ian Potter House Ballroom	Lindau Delegate Lunch (invitation only)
1.30pm	Ian Wark Theatre	President's Welcome: Professor Chennupati Jagadish AC PresAA FREng FTSE President, Australian Academy of Science
		📸 New Fellows 2024 Admission Ceremony
		Professor Nerilie Abram FAA, Australian National University
		Professor Andrew Blakers FAA FTSE, Australian National University
		Professor Rachelle Buchbinder AO FAA FAHMS, Monash University
		Professor Kylie Catchpole FAA FTSE, Australian National University
		Professor Mary Garson AM FAA, University of Queensland
		Professor Arthur Georges FAA, University of Canberra
		Professor Roslyn Gleadow FAA, Monash University
		Professor Dmitri Golberg FAA, Queensland University of Technology
		Professor Michael Kearney FAA, University of Melbourne
		Professor Matthew Kiernan AM FAA FAHMS, Neuroscience Research Australia
		Professor Glenn King FAA, University of Queensland
		Professor Mark Krumholz FAA, Australian National University
		Professor Zheng-Xiang Li FAA, Curtin University
		Professor Georgina Long AO FAA FAHMS, Melanoma Institute Australia
		Professor Budiman Minasny FAA, University of Sydney
		Professor Jose Polo FAA, University of Adelaide
		Professor Hrvoje Tkalčić FAA, Australian National University
		Professor Gene Tyson FAA, Queensland University of Technology
		Professor Madeleine van Oppen FAA, Australian Institute of Marine Science
		Professor Lianzhou Wang FAA, University of Queensland
		Professor Eric Warrant FAA, Lund University, Sweden
		Professor Willy Zwaenepoel FAA FTSE, University of Sydney
		Previous New Fellows Admission Ceremony
		Professor Tim Brodribb FAA, University of Tasmania (<i>elected 2023</i>)
		Professor Emma Johnston AO FAA FTSE, University of Sydney (<i>elected 2022</i>)
Professor Anne Dell FAA FRS, Imperial College London, UK (<i>Corresponding Member 2022</i>)		
Professor Peter Corke FAA FTSE, Queensland University of Technology (<i>elected 2019</i>)		
Professor Ben Andrews FAA, Australian National University (<i>elected 2013</i>)		
3.30pm	Afternoon tea	Jaeger Room/Dorothy Hill Room/Marquee
	Main Foyer	📸 Group photo of New Fellows elected in 2024 (meet in main foyer)
	Becker Room	🖼️ Portraits of New Fellows
4.00pm	Ian Wark Theatre	President's Address and Launch of Academy Innovate Reconciliation Action Plan: Professor Chennupati Jagadish AC PresAA FREng FTSE , President, Australian Academy of Science
5.30pm		Close of session
5.30pm – 7.30pm	Marquee at Ian Potter House	Spring Soiree

Wednesday 11 September 2024

WEDNESDAY	8.30am	Main Foyer	Registrations
		Arrival tea/coffee	Dorothy Hill Room
	9.00am	Ian Wark Theatre	<p>Welcome: Anna-Maria Arabia, Chief Executive, Australian Academy of Science</p> <p>📍 Platinum Event Partner Address: Professor Tanya Monro AC FAA FTSE, Department of Defence</p> <p>📍 New Fellows 2024 Presentations (10 minutes + 2-minute Q&A)</p> <p>Professor Nerilie Abram FAA, Australian National University <i>Unlocking the past to understand our future</i></p> <p>Professor Andrew Blakers FAA FTSE, Australian National University <i>The fastest energy change in history</i></p> <p>Professor Rachelle Buchbinder AO FAA FAHMS, Monash University <i>Optimising musculoskeletal health</i></p> <p>Professor Kylie Catchpole FAA FTSE, Australian National University <i>Energy and climate: reasons for optimism</i></p> <p>Professor Mary Garson AM FAA, University of Queensland <i>Molecules from the wild</i></p> <p>Professor Arthur Georges FAA, University of Canberra <i>Sex in dragons: a journey of discovery</i></p> <p>Professor Roslyn Gleadow FAA, Monash University <i>Photosynthesis, stress and plant defence are entangled</i></p>
	11.00am	Morning tea	Jaeger Room/Dorothy Hill Room/Marquee
		Main Foyer	📍 EMCR group photo (meet in main foyer)
		Becker Room	📍 Portraits of New Fellows 📍 Portraits of Awardees
	11.30am	Ian Wark Theatre	<p>📍 New Fellows 2024 Presentations (10 minutes + 2-minute Q&A)</p> <p>Professor Dmitri Golberg FAA, Queensland University of Technology <i>Nanomaterial properties and functions as revealed by in situ transmission electron microscopy</i></p> <p>Professor Michael Kearney FAA, University of Melbourne <i>Forecasting climate change effects on organisms with physics and physiology</i></p> <p>Professor Matthew Kiernan AM FAA FAHMS, Neuroscience Research Australia <i>Chance and design: neurotransmission, neuroscience and neurology</i></p> <p>Professor Glenn King FAA, University of Queensland <i>Harnessing the pharmacological complexity of animal venoms to develop eco-friendly insecticides and human therapeutics</i></p> <p>Professor Zheng-Xiang Li FAA, Curtin University <i>A living Earth: its evolution and dynamic inner workings</i></p> <p>Professor Georgina Long AO FAA FAHMS, Melanoma Institute Australia <i>Optimising cancer immunotherapy: we have a long way to go</i></p> <p>Professor Budiman Minasny FAA, University of Sydney <i>Soil carbon: much more than a climate solution</i></p> <p>Professor Jose Polo FAA, University of Adelaide <i>Exploring the boundaries of human reprogramming</i></p>
	1.30pm	Lunch	Jaeger Room/Dorothy Hill Room/Marquee
		Main Foyer	📍 International ECR group photo (meet in main foyer)
		Becker Room	📍 Portraits of New Fellows 📍 Portraits of Awardees
	Ian Potter House Ballroom	Future Earth Australia Lunch (invitation only)	

WEDNESDAY

2.30pm	Ian Wark Theatre	<p>New Fellows 2024 Presentations (10 minutes + 2-minute Q&A)</p> <p>Professor Emma Johnston AO FAA FTSE, University of Sydney (<i>elected 2022</i>) <i>Accelerating marine ecosystems</i></p> <p>Professor Hrvoje Tkalčić FAA, Australian National University <i>Earth's inner core: a planet within the planet</i></p> <p>Professor Gene Tyson FAA, Queensland University of Technology <i>Developing new approaches to understand the microbial world</i></p> <p>Professor Madeleine van Oppen FAA, Australian Institute of Marine Science <i>Harnessing microbial symbionts of corals for reef conservation</i></p> <p>Professor Lianzhou Wang FAA, University of Queensland <i>Reviving ceramics: old theories, new energy applications</i></p> <p>Professor Eric Warrant FAA, Lund University, Sweden <i>Seeing at the limits: the remarkable visual abilities of nocturnal insects</i></p> <p>Professor Willy Zwaenepoel FAA FTSE, University of Sydney <i>The ever-changing world of software systems</i></p> <p>Professor Mark Krumholz FAA, Australian National University <i>Astrophysical simulation methods for next-generation computing hardware</i></p>
4.30pm		Close of session
6.40pm	Coaches	From Peppers, Novotel and Sebel for Gala Dinner
7.00pm – 11.00pm	Gala Dinner	National Arboretum Canberra

Thursday 12 September 2024

THURSDAY

8.00am	Marquee at Ian Potter House	<p>Awardees, Supporters and Donors Breakfast (invitation only)</p> <p>2023 Aboriginal and Torres Strait Islander Scientist Award Ms Stephanie Beupark, University of Wollongong Ms Michelle Hobbs, Griffith University</p> <p>2023 Max Day Environmental Science Fellowship Award Dr Patrick Finnerty, University of Sydney Mr Shawn Scott, University of South Australia</p> <p>2024 Aboriginal and Torres Strait Islander Scientist Award Dr Justine Clark, Telethon Kids Institute Dr Joe Greet, University of Melbourne</p> <p>2024 Max Day Environmental Science Fellowship Award Ms Aviya Naccarella, Deakin University Dr Elvis Okoffo, University of Queensland</p> <p>Highly commended: Mr Christopher Keneally, University of Adelaide Highly commended: Dr Jiaying Li, University of Sydney</p>
9.00am	Main Foyer	Registrations
	Arrival tea/coffee	Dorothy Hill Room
9.30am	Ian Wark Theatre	<p>President's Welcome: Professor Chennupati Jagadish AC PresAA FREng FTSE President, Australian Academy of Science</p> <p>Platinum Partner Address: Dr Doug Hilton AO FAA FTSE FAHMS, CSIRO</p> <p>2023 Matthew Flinders Lecture Professor Lidia Morawska FAA, Queensland University of Technology <i>The science of air that helps us thrive</i></p> <p>2023 Ruby Payne-Scott Lecture Professor Jenny Graves AC FAA, La Trobe University <i>Sex in dragons</i></p>
10.45am	Morning tea	Jaeger Room/Dorothy Hill Room/Marquee
	Main Foyer	Group photo of 2023 Awardees (meet in main foyer)
	Becker Room	Portraits of Awardees

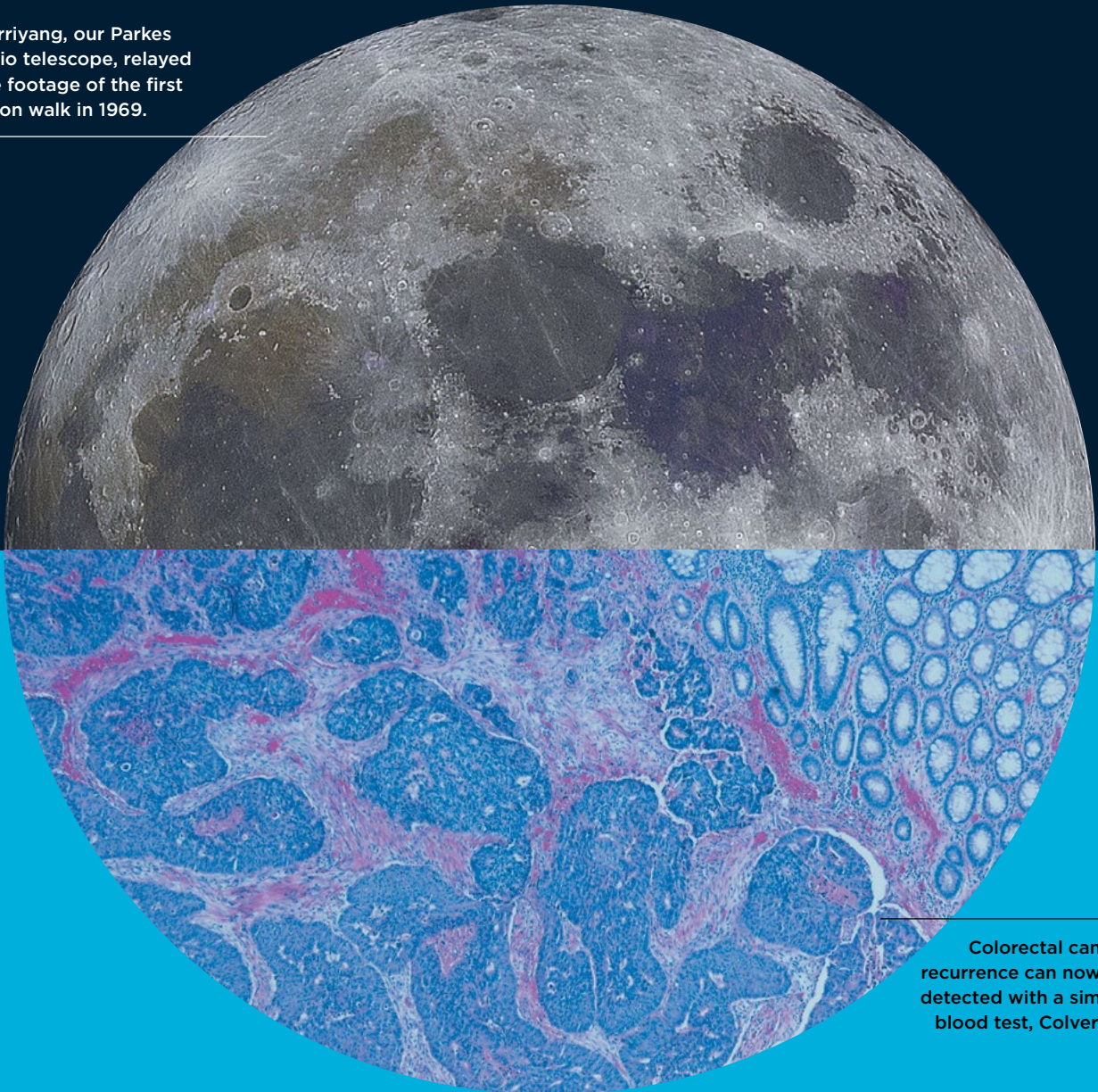
11.15am	Ian Wark Theatre	<p>📍 2023 Award Presentations (10 minutes + 2-minute Q&A)</p> <p>2023 Jacques Miller Medal Awardee Presentation Professor Di Yu, University of Queensland <i>CD4+ T cells: empowering the immune system's full potential</i></p> <p>2023 Nancy Millis Medal Awardee Presentation Professor Renae Ryan, University of Sydney <i>The twisted link between dual function transporter/channel proteins and brain disease</i></p>
11.45am		<p>📍 Medal Presentations for 2023 Awardees</p> <p>David Craig Medal 2023 Professor David Craik AO FAA FRs, University of Queensland</p> <p>Hannan Medal 2023 Professor Richard Hartley FAA FRs (<i>not in attendance</i>), Australian National University</p> <p>Jaeger Medal 2023 Professor Matthew England FAA, UNSW Sydney</p> <p>Suzanne Cory Medal 2023 Professor Terry Hughes FAA, James Cook University Professor Catherine Lovelock FAA (<i>not in attendance</i>), University of Queensland</p> <p>Thomas Ranken Lyle Medal 2023 Professor Susan Scott FAA, Australian National University Professor Nick Wormald FAA, Monash University</p> <p>Anton Hales Medal 2023 Associate Professor Teresa Ubide, University of Queensland</p> <p>Christopher Heyde Medal 2023 Dr Valentina Wheeler, University of Wollongong</p> <p>Dorothy Hill Medal 2023 Associate Professor Raffaella Demichelis, Curtin University</p> <p>Fenner Medal 2023 Associate Professor Emily Wong, Victor Chang Cardiac Research Institute</p> <p>Gottshalk Medal 2022 Dr Alisa Glukhova, WEHI</p> <p>Gottshalk Medal 2023 Professor Si Ming Man, Australian National University</p> <p>John Booker Medal 2023 Dr Amelia Liu, Monash University</p> <p>Le Fèvre Medal 2023 Associate Professor Rona Chandrawati, UNSW Sydney Professor Tianyi Ma, RMIT University</p> <p>Moran Medal 2023 Professor David Frazier, Monash University Dr Rachel Wang, University of Sydney</p> <p>Pawsey Medal 2023 Professor Yuerui Lu (<i>not in attendance</i>), Australian National University</p>
1.00pm	Lunch	Jaeger Room/Dorothy Hill Room/Marquee
	Main Foyer	📍 Group photo of 2024 Awardees (meet in main foyer)
	Becker Room	📍 Portraits of Awardees

1.30pm	Ian Wark Theatre	<p>2024 Macfarlane Burnet Lecture Professor David Lindenmayer AO FAA, Australian National University <i>Disturbance begets disturbance: feedbacks and disturbance-stimulated flammability in forests</i></p> <hr/> <p>2024 Ruby Payne-Scott Lecture Professor Kerrie Mengersen FAA FASSA, Queensland University of Technology <i>Bayesian statistical science in the 2020s</i></p>
2.30pm		<p>🎧 2024 Award Presentations (10 minutes + 2-minute Q&A)</p> <hr/> <p>2024 David Craig Medal Awardee Presentation Professor Justin Gooding FAA FTSE, UNSW Sydney <i>From understanding single molecule thick films to commercialising sensing technologies to help save lives</i></p> <hr/> <p>2024 Suzanne Cory Awardee Presentation Professor Peter Koopman FAA, University of Queensland <i>Genes and the building of the embryo</i></p> <hr/> <p>2024 Nancy Millis Awardee Presentation Professor Anita Ho-Baillie, University of Sydney <i>Next-generation solar cells</i></p> <hr/> <p>2024 Gustav Nossal Medal Awardee Presentation Professor Andrew Steer FAHMS, Murdoch Children's Research Institute <i>Scratch an itch: global control of neglected tropical diseases</i></p>
3.30pm		<p>🎧 Medal Presentations for 2024 Awardees</p> <hr/> <p>Mawson Medal 2024 Dr Adriana Dutkiewicz, University of Sydney</p> <hr/> <p>Anton Hales Medal 2024 Dr Andrew King, University of Melbourne</p> <hr/> <p>Christopher Heyde Medal 2024 Professor Serena Dipierro, University of Western Australia Dr Christopher Lustri, University of Sydney</p> <hr/> <p>Dorothy Hill Medal 2024 Associate Professor Ailie Gallant, Monash University</p> <hr/> <p>Fenner Medal 2024 Associate Professor Ana Martins Sequeira, Australian National University</p> <hr/> <p>Frederick White Medal 2024 Dr Hamish Clarke, University of Melbourne</p> <hr/> <p>Gottschalk Medal 2024 Professor Eric Chow, Monash University Associate Professor Kirsty Short, University of Queensland</p> <hr/> <p>John Booker Medal 2024 Associate Professor Lining Arnold Ju, University of Sydney</p> <hr/> <p>Le Fèvre Medal 2024 Professor Yao Zheng, University of Adelaide</p> <hr/> <p>Pawsey Medal 2024 Professor Jiajia Zhou, University of Technology Sydney</p> <hr/> <p>Ruth Stephens Gani Medal 2024 Dr Sonia Shah, University of Queensland Dr Stephin Vervoort, WEHI</p>
4.45pm		<p>Close of session: Anna-Maria Arabia, Chief Executive, Australian Academy of Science</p>
5.00pm		<p>Coaches to airport: meet outside main entrance of Shine Dome</p>



Collaborate with us to create a better future

Murriyang, our Parkes
radio telescope, relayed
live footage of the first
moon walk in 1969.



Colorectal cancer
recurrence can now be
detected with a simple
blood test, Colvera™.

From helping the world watch the first steps on the Moon to developing new cancer treatments and diagnostic tools, we collaborate with partners across the globe to solve today's biggest challenges through innovative science and technology.

Australia's National Science Agency



NEW FELLOW 2022



Professor Emma Johnston
AO FAA FTSE University of Sydney



Professor Emma Johnston is the University of Sydney's Deputy Vice-Chancellor (Research).

A highly awarded and world-leading authority in marine science and conservation, Professor Johnston's current research focuses on global change including marine debris, biological invasions, extreme events and Antarctica's environmental future. She was previously Dean of Science and Pro-Vice-Chancellor of Research at the University of New South Wales. As the past President of Science &

Technology Australia (STA), an elected position, Professor Johnston is a highly influential figure in the Australian higher education and research sector. She has led major research projects for industry, government, the Australian Research Council and the Australian Antarctic Science Program, and has contributed to the development of international and national research strategies, priorities and plans. She is a sustainability and diversity champion and a Chief Author of the Australian State of the Environment Report. She is a trusted advisor working across a range of government and industry bodies. Professor Johnston is a Director on the Board of CSIRO and the Great Barrier Reef Marine Park Authority, and a governor of the Ian Potter Foundation.

Accelerating marine ecosystems

Human activities are causing countless changes to ocean and coastal ecosystems. Fishing has

depleted predator populations, pollution has reduced local biodiversity, and ocean warming is shifting species and decimating populations of foundation species, such as kelps and corals. These dramatic changes are increasingly documented across great swathes of the ocean, yet they represent only the tip of the iceberg. Beneath the surface lies increased ecological process rates; driven by human activities and causing a pervasive 'speeding up' of marine ecosystems. Professor Johnston provides evidence that four major drivers of global ecological change (warming, nutrient pollution, disturbance and species additions) act in unison to increase the fundamental rates of organisms, populations and communities. This ecological acceleration requires a rapid shift in our scientific approach to understanding marine ecosystems, the reprioritisation of our conservation strategies, and a transformation of the way we use the services of the sea.

NEW FELLOWS 2023



Professor Tim Brodribb FAA
University of Tasmania



Professor Tim Brodribb graduated with honours in 1989 from the University of Tasmania where he studied the evolution of conifers in the southern hemisphere during his PhD. Under the supervision of paleobotanist Professor Bob Hill, he explored the gradual extinction of conifers from Australia over the last 50 million years. In 2000–05 he joined Harvard University as a postdoc, establishing a research program working on adaptation in plant vascular systems in Costa Rican trees. Following this he returned to Australia as an Australian Research Fellow (ARC) investigating the

evolution of vascular systems in leaves and how this may explain the evolutionary rise of flowering plants. This led to a Future Fellowship in 2010 where he established a connection between damage to the water transport system during drought and plant death. Currently Professor Brodribb's lab team is developing new techniques to visualise and quantify plant stress.

Plant vascular systems: finding the beat

Vascular plants use a complex system of organic pipes and valves to stay hydrated in the dry atmosphere. Professor Brodribb's work explains how this regulated system has evolved to manage the dangerous pressures required to extract water from soils. He shows how evolution of the venation system of leaves has allowed angiosperms to thrive, but also how quickly and lethally this system can fail under critically low vascular pressures during drought. He describes the importance of dynamic pressure regulation in plant vascular systems and the evolution of

the valves responsible. Finally, he introduces new techniques to translate the pressure pulse of plants into quantifiable 'behaviours', allowing the performance of tree species and crop varieties to be characterised and compared. This understanding of whole-plant performance provides a means by which his team can predict plant success and vulnerability into the future.



Professor Liming Dai FAA
UNSW Sydney



Professor Liming Dai joined the University of New South Wales (UNSW) in 2019 as an Australian Laureate Fellow, Scientia Professor. He is also

Director of the ARC Centre of Excellence for Carbon Science and Innovation. Before joining UNSW, he spent two years in the Cavendish Laboratory and 10 years with CSIRO. He was then an associate professor of polymer engineering at the University of Akron, the Wright Brothers Institute Endowed Chair Professor of Nanomaterials at the University of Dayton, and the Kent Hale Smith Professor of Macromolecular Science and Engineering at Case Western Reserve University. He is a Highly Cited Researcher (materials science, chemistry) and an Associate Editor of Nano Energy. He is a Fellow of the Royal Society of Chemistry, the US National Academy of Inventors, the American Institute for Medical and Biological Engineering, the European Academy of Sciences, the Academia Europaea, and the Australian Academy of Science.

Carbon science and innovation for clean energy and green chemistry

The energy, transportation and chemical sectors are among the most

intensive greenhouse gas producers, causing serious air pollution and climate extremes. To achieve net-zero emissions, we must replace our current fossil-fuel-based energy with clean energy of zero emissions. Catalysts are the key to clean production of energy and chemicals for reducing or eliminating greenhouse gas emissions. Instead of using expensive and unsustainable critical minerals as catalysts, Professor Dai and his team use carbon-based metal-free electrocatalysts (C-MFECs) pioneered by them for global decarbonisation. Recent research effort worldwide has shown great potential of C-MFECs for clean production of energy and chemicals from abundant sunlight, seawater, air and waste feedstocks, as demonstrated in this talk. Carbon catalysts can be developed from carbon wastes (e.g. CO₂ from greenhouse gas emissions). So, the impact is not just for the environment remediation and climate restoration, but it will also contribute billions of dollars to Australia through the carbon circular economy.



Professor Mariapia Degli-Esposti FAA FAHMS
Monash University



Professor Mariapia Degli-Esposti is a Professor at Monash University where she heads the Experimental and Viral Immunology Group within the Biomedicine Discovery Institute and the Department of Microbiology. She also holds an appointment at the Lions Eye Institute as an Honorary Fellow. Professor Degli-Esposti is an immunologist whose work has provided seminal insights into the immune system's response to viruses. She defined cellular and molecular mechanisms that enable pathogen protection whilst limiting immunopathology. Her work revealed



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novel interactions and immunoregulatory functions of natural killer cells and how they limit inflammation and influence the development of autoimmunity. Her studies also addressed the breadth of responses required for effective anti-viral immunity and uncovered the importance of strain-specific antibodies in protecting against viral reactivation and disease. Her work has provided fundamental knowledge into the functioning of the immune system and components that could be harnessed therapeutically.

Viral voyagers: unravelling the hidden marvels of the immune system

The immune system plays a crucial role in fighting pathogens, but immune processes also regulate and limit inflammation to ensure optimal functioning of tissues and organs. Understanding the regulation of immune responses is therefore essential for achieving the delicate equilibrium that guarantees protection against infections while averting harmful inflammation, thereby achieving optimal immunity. Viruses capable of establishing lifelong infections have developed strategies to effectively manipulate immune responses. By studying infection with the herpesvirus cytomegalovirus, Professor Degli-Esposti and her team have gained several new insights into critical aspects of effective immunity. She discusses new mechanisms pertaining to the initiation and regulation of adaptive immune responses.



Professor Zaiping Guo FAA FTSE
University of Adelaide



Professor Zaiping Guo is an Australian Laureate Fellow at the School of Chemical Engineering, the University of Adelaide. She received her PhD from the University of Wollongong in 2003 and was elected

a Fellow of the Australian Academy of Science and the Australian Academy of Technological Sciences and Engineering in 2023. Her research focuses on the design and application of electrode materials and electrolyte for energy storage and conversion, including rechargeable batteries, hydrogen storage, and fuel cells. Her research achievements have been recognised through numerous awards, including an ARC Queen Elizabeth II Fellowship in 2010, an ARC Future Professorial Fellowship in 2015, an ARC Laureate Fellowship in 2021, and the Clarivate Analytics Highly Cited Researcher Award from 2018 to 2022. In 2020, she was honoured with a NSW Premier's Prize for Science & Engineering for her outstanding achievements in engineering or information and communications technology.

Interface chemistry and electrolyte design for high-performance rechargeable batteries

The electrochemical interface in rechargeable batteries, which acts as the critical boundary between electrode and the electrolyte, significantly influences battery performance by regulating the dynamics of charge carrier ions. Despite its importance, progress in addressing interface-related issues in batteries has been limited, primarily due to the complex nature of interface itself and difficulties in its characterisation due to its nanoscale dimensions. Professor Guo and her team research pioneer strategies for engineering interfacial chemistry and innovating electrolytes design to effectively address interface issues. For instance, they have eliminated dendrite formation in aqueous zinc-ion batteries (AZIBs) by stabilising the solid electrolyte interphase at the Zn/electrolyte interface. Additionally, their development of an aqueous-based soft solvating electrolyte has enabled AZIBs to achieve exceptional cycling stability and operational safety from -45 to 60°C . These advancements offer valuable insights and pave the way for superior performance in rechargeable batteries.



Professor Elaine Holmes FAA
Murdoch University



Professor Elaine Holmes is an ARC Laureate Fellow at Murdoch University and was previously a Premier's Science Fellow. She holds a PhD in renal toxicology from the University of London (1992) and previously headed the Division of Computational Systems Medicine at Imperial College London. Professor Holmes is a pioneer in metabolic phenotyping, developing analytical frameworks for biomarker discovery and applying them to various diseases. She co-developed the Metabolome-Wide Association Study concept, revealing links between the gut microbiome and conditions like obesity, inflammatory bowel disease and certain cancers. A Highly Cited Researcher (500+ publications, H-index 147, 92982 citations), Professor Holmes is a Fellow of the Academy of Medical Sciences (UK) and the Australian Academy of Science. Her current research focuses on the gut microbiome's role in healthy aging, exploring the impact of nutrition on the microbiome.

Metabolic phenotyping: the route to effective personalised medicine

Humans are complex ecosystems with thousands of biochemical processes working together through time to maintain health. To understand the biology of humans and to deliver effective healthcare, we require knowledge of how the body works at the level of genes, proteins and metabolites. The metabolic phenotype can provide a window onto dynamic biochemical responses to physiological and pathological stimuli. Metabolic profiling strategies for analysing biosamples, encompassing high-resolution spectroscopic methods (NMR spectroscopy, LC-MS, GC-MS etc) in combination with

computational modelling tools are well-suited to generating metabolic signatures reflecting gene–environment interactions. Metabolic phenotyping has emerged as an enabling tool for exploring dynamic interactions between our genes and environment (diet, lifestyle, microbiomes), and their phenotypic expression across diverse human populations. The capacity for mapping complex metabolic interactions afforded by phenotyping methods enhances classical clinical chemistry approaches to medicine, offering diagnostic, prognostic and mechanistic insight to human disease, treatment, nutrition and xenobiotic exposure.



Professor David Keith FAA
UNSW Sydney



Professor David Keith is Professor of Botany in the Centre for Ecosystem Science at the University New South Wales. His research applies theory, new methods and empirical advances in ecosystem, community and population ecology to conservation and management of biodiversity. His scientific expertise combines empirical field studies and modelling to understand the dynamics of ecosystems and populations of plant and animal species in response to environmental change, fire regimes and management. Professor Keith led the development of the IUCN Red List of Ecosystems and the Global Ecosystem Typology, and has been a long-term contributor to methods and guidelines supporting the Red List of Threatened Species. He has served for more than 20 years on Australian national and state statutory committees for threatened biodiversity and has leadership roles in IUCN ecosystem committees and co-chairs the GEO Global Ecosystem Atlas Scientific and Technical Committee.

Advances in the development and implementation of ecosystem conservation science

Ecosystems are foundational to sustaining Earth’s biodiversity, human wellbeing and planetary stability. Yet many are undergoing declines driven by uncertain causes and mechanisms. Breakthrough methods to assess risks of ecosystem collapse emerged just a decade ago. They are applied increasingly by ecosystem managers around the world to develop and implement practical strategies for risk reduction in diverse ecosystem types. The first comprehensive typology of Earth’s ecosystems enables ecosystem assessment, management and monitoring at scale by grouping ecosystem types that share similar responses to environmental change and human pressures. Both advances have been adopted in global policy agreements, with 195 nations now confronting the challenges of policy implementation. Quality science is pivotal to these efforts, both through attention to detail and innovations that come with big ideas. Professor Keith reflects on the dual contributions of these elements in developing general scientific solutions to a multitude of context-specific problems in the management of mechanistically diverse ecosystems.



Professor David Komander FAA FRS WEHI



Professor David Komander’s studies have unlocked, catalysed and enabled research into the ubiquitin system, where he has shaped the current understanding of the ‘ubiquitin code’. He showed that many proteins in the ubiquitin system assemble, recognise and cleave ubiquitin chains with high linkage

specificity, developed methods to study ubiquitination and deubiquitinases (DUBs), and explained linkage-specificity using structural biology methods. Professor Komander’s work also explained how PINK1, Parkin and USP30 regulate mitochondrial turnover via phosphorylated ubiquitin, with relevance in early onset Parkinson’s disease.

The ubiquitin code

Proteins in our cells are continuously modified to modulate their function or trigger their disposal. Ubiquitination refers to modification of proteins with another protein named ubiquitin, comes in many forms and constitutes a complex code that determines protein fate. Professor Komander aspires to read, understand and rewrite the ubiquitin code.



Professor Sharon Lewin AO FAA FAHMS University of Melbourne



Professor Sharon Lewin is the Director of the Peter Doherty Institute for Infection and Immunity, a joint venture between the University of Melbourne and Royal Melbourne Hospital; Director of the Cumming Global Centre for Pandemic Therapeutics; and Melbourne Laureate Professor at the University of Melbourne.

Professor Lewin is an infectious diseases physician and basic scientist. Her research focuses on understanding why HIV persists on treatment and developing clinical trials aimed at ultimately finding a cure for HIV infection. She is recognised as a leading global expert in HIV science and is currently President of the International AIDS Society, a global organisation with over 17,000 members. She has received numerous awards, including being appointed an Officer of the Order of Australia (AO) in recognition

of her distinguished service to medical research, and to education and clinical care, in the field of infectious diseases, particularly HIV and AIDS.

Toward a cure for HIV infection

Despite the great success of antiviral therapy (ART), treatment is life long for the majority of people living with HIV. The main reason ART is unable to cure HIV infection is the persistence of long-lived proliferating latently infected cells and impaired clearance of HIV-infected cells. One strategy to allow safe cessation of ART is to 'reduce and control' the reservoir. Our main focus to reduce the reservoir has been on latency reversal to enhance protein presentation and immune mediated clearance, while also boosting HIV-specific immunity to both clear latently infected cells and maintain long-term control of low levels of residual virus replication. The application of new technologies using single cell RNA sequencing as well as mRNA for delivery of therapeutics is now greatly expanding our understanding of the reservoir as well as allowing for the development of novel therapeutics.



Professor Jian Li FAA
Monash University



Professor Jian Li is an elected Fellow of the Australian Academy of Science, Australian Academy of Health and Medical Sciences, and American Academy of Microbiology. He has an internationally recognised track record in antimicrobial pharmacology and drug discovery. His group has reported the majority of modern polymyxin pharmacology data, which led to the first scientifically based dosing recommendations for colistin and have improved clinical practice worldwide. His team has developed a novel lipopeptide drug, QPX9003

(BR11-693), against Gram-negative 'superbugs' from concept to clinical trials. Professor Li has 454 publications and is a Clarivate Highly Cited Researcher in pharmacology and toxicology (2015–2017, 2022). He is Editor-in-Chief of the International Journal of Antimicrobial Agents, past President of the International Society of Anti-Infective Pharmacology (ISAP), and an invited reviewer for 33 funding bodies (e.g. NIH, Wellcome Trust). Professor Li has received numerous prestigious awards, including the Australian Academy of Science Jacques Miller Medal (2017).

Combating Gram-negative 'superbugs'

Antimicrobial resistance has become a major global health challenge. The Gram-negative 'superbugs' *Acinetobacter baumannii*, *Pseudomonas aeruginosa* and *Klebsiella pneumoniae* can develop resistance to all currently available antibiotics. They have been identified as the top-priority pathogens by the World Health Organization (WHO), as few novel antibiotics will be available in the near future. Professor Li's inter-disciplinary research focuses on the discovery of novel antimicrobials against these difficult-to-treat Gram-negative 'superbugs', underpinned by clinical and fundamental pharmacological research. This presentation provides an overview of a novel lipopeptide antibiotic QPX9003 discovered in his lab from concept to clinical trials. QPX9003 was designed by rationally navigating the narrow chemical space of polymyxins and successfully disconnecting the efficacy from toxicities by balancing the complex interrelationships between the structure-activity-toxicity-pharmacokinetics axes. The team's drug discovery program highlights how international academic-industry collaborations can be successfully executed to deliver outcomes with the potential for providing significant real-world value for human health.



Professor Belinda Medlyn FAA
Western Sydney University



Professor Belinda Medlyn is Distinguished Professor of Ecosystem Modelling at the Hawkesbury Institute for the Environment, Western Sydney University. She has a BSc (Maths) from the University of Adelaide and a PhD in theoretical biology from UNSW. Her research aims to predict how vegetation will be affected by the changing climate. To do so, she works closely with experimental scientists studying how plants and ecosystems respond to atmospheric carbon dioxide, rising temperature, droughts and heatwaves, to develop evidence-based models of vegetation function. Professor Medlyn has been a Clarivate Analytics Highly Cited Researcher since 2018, and in 2019 won the Australian Research Council Georgina Sweet Laureate Fellowship.

Australian vegetation under a changing climate

Australian vegetation has been powerfully shaped by past climate, meaning that the changing climate of the 21st century is likely to drive significant changes in vegetation extent and function. Predicting what form these changes are likely to take is critical for the land sector, but presents a major scientific challenge. Professor Medlyn summarises some key recent breakthroughs in our understanding of the effects of CO₂ enrichment, warming, heatwaves and drought on Australian plant species, and explains how this research can be used to inform predictive models of vegetation function. She also highlights some of the main outstanding uncertainties and data gaps.



Professor Louis Moresi FAA
Australian National University



Professor Louis Moresi is a Professor of Geophysics / Geodynamics and is interested in understanding the evolution of the deep Earth over geological time, how this evolution is recorded in the superficial geological record, and how to build computation modelling tools to simulate Earth. The tools of his trade are computational programs and numerical algorithms. Professor Moresi is a strong supporter of open source code so his publications will also find links to repositories where the source code is available with examples of how to reproduce peer-reviewed benchmarks and published results. The future of scientific communication is to weave together natural language, mathematical descriptions, technical information and discussion into living documents.

Geodynamics: the journey from abstract ideas to everyday applications

Geodynamics studies how planets, including Earth, form and evolve over

time. Professor Moresi tells the story of how geodynamics has developed from a small, technical field to a subject of everyday, practical applications. To arrive at this point, his community has incorporated in their models, processes that work at smaller and smaller scales and shorter and shorter times. This is also a story driven by increasingly powerful computers and a cultural change towards open sharing, interoperability and re-useability of all their work.



Professor Rich Payne FAA
University of Sydney



Professor Richard J. Payne is Professor of Organic Chemistry and Chemical Biology at the University of Sydney and since 2020 has been NHMRC Leadership Fellow and Deputy Director of the ARC Centre of Excellence for Innovations in Peptide and Protein Science. Professor Payne's research focuses on the design and synthesis of complex biomolecules with a view to addressing important problems in biology and medicine. His lab is recognised for pioneering a number of technologies for the assembly of large polypeptides and proteins by chemical

synthesis. These methods have underpinned the discovery of modified peptide and protein drug leads for a range of diseases including anti-inflammatories, anti-thrombotics and anti-infectives. His research has been recognised by awards including the Prime Minister's Prize for Physical Scientist of the Year, HG Smith Medal and the AJ Birch Medal.

Drug discovery inspired by natural products

Over the past decade, enormous advances in analytical chemistry, genomics and proteomics have underpinned the rapid discovery of new classes of natural products that serve as excellent starting points for drug discovery programs. This talk outlines strategies that Professor Payne's lab has developed and employed to capitalise on the privileged chemical structures and bioactivity of natural products for the discovery of new drug leads for a range of human diseases. Examples include salivary proteins from blood-feeding ticks, flies and mosquitoes as inspiration for clot-busting drugs, and the modification of human peptides as novel anti-inflammatory agents. The final part of the lecture highlights the use of mRNA display technologies to discover natural product-inspired cyclic peptide molecules as therapeutic leads, including antivirals for SARS-CoV-2.



History making research is in our DNA

The University of Adelaide is home to groundbreaking research, with three esteemed fellows—Prof Zaiping Guo FAA FTSE, Prof Shizhang Qiao FAA, and Prof Jose Polo FAA—recognised by the Australian Academy of Science in 2023 and 2024. Discover history making research at the University of Adelaide, where innovation thrives.

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Professor Shizhang Qiao FAA
University of Adelaide



Professor Shizhang Qiao joined the School of Chemical Engineering of the University of Adelaide (UoA) in March 2012 as a Professor (the inaugural Chair of Nanotechnology). Professor Qiao is the founding Director of the Centre for Materials in Energy and Catalysis (CMEC) and Director of the Australian Research Council (ARC) Industrial Transformation Training Centre for Battley Recycling. His research expertise is in nanostructured materials for new energy technologies, including electrocatalysis, photocatalysis, batteries and fuel cells. In recognition of his achievements in research, Professor Qiao was honoured with inaugural ARC Australian Industry Laureate Fellow (2023), Pioneers in Energy Research (Energy and Fuel, 2023), South Australian Scientist of the Year (2021), inaugural UoA Vice-Chancellor's Award for Excellence in Research (2019), ARC Australian Laureate Fellow (2017), ExxonMobil Award (2016), and ARC Discovery Outstanding Researcher Award (2013).

Electrocatalysis for energy conversion

Compared to modern fossil fuel-based industrial refineries, the emerging electrocatalytic refinery (e-refinery) is a more sustainable and environmentally benign strategy to convert renewable feedstocks and energy sources to transportable fuels and value-added chemicals. E-refinery promisingly leads to the defossilisation, decarbonisation and decentralisation of the chemical industry. A crucial step in realising this prospect is the knowledge-guided design of appropriate reactions and optimal electrocatalysts with high activity and selectivity for anticipated reaction pathways, which dominantly involve cleavage and formation of chemical bonds between H, O and C. In this presentation, Professor Qiao talks about

his team's recent progress in mechanism understanding and material innovation for some crucial electrocatalytic reactions (OER, HER, CRR etc.), which are achieved by combining atomic-level material engineering, electrochemical evaluation, theoretical computations, and advanced in situ characterisations. A special emphasis is placed on the rational exploration of electrocatalysts for the production of green hydrogen by seawater splitting and chemicals by CO₂ reduction reaction.



Professor Pankaj Sah FAA FAHMS
University of Queensland



Professor Pankaj Sah is a neuroscientist who is Executive Director (research) at the Queensland Brain Institute. After training in medicine, he did his PhD at the Australian National University. Following postdoctoral studies at the University of California, San Francisco and the University of Queensland, he established his own laboratory at the Department of Physiology at the University of Newcastle in 1994. He then moved as group leader to the John Curtin School of Medical Research at the Australian National University and was recruited as a founding member of the Queensland Brain Institute in 2003. His interests are in understanding the mechanisms that underlie learning and memory formation in the mammalian brain. His laboratory is known for studying the amygdala using a combination of molecular tools, electrophysiology, anatomical reconstruction and behaviour. He is Editor-in-Chief of the partner journal *npj Science of Learning*.

Learning and memory formation and the amygdala

One of the most interesting questions in biology is how nervous systems learn, store memories and retrieve them. This activity is evolutionarily old and critical for

survival. To fully understand this, what is required is a system where sensory input during learning and measured output during recall are clear. Moreover, the nature of the recalled memory, its information content, has to be clear. Pavlovian fear learning provides one such paradigm. In mammals, it is well established that the amygdala and its connections play a central role in this form of learning. Professor Sah describes why the amygdala and fear conditioning have become a central paradigm to understand learning and memory formation, and his team's contributions to the neural circuits and molecular mechanisms that may underpin this simple form of learning.



Professor Brajesh Singh FAA
Western Sydney University



Professor Brajesh Singh is Distinguished Professor of Soil Biology at Hawkesbury Institute for the Environment, Western Sydney University. Through his fundamental research, he identifies the quantitative relationships between microbial diversity and ecosystem/host functions and how natural/anthropogenic pressures such as climate change affect this. His applied research harnesses the knowledge gained in fundamental research to improve agriculture productivity, restoration success and environmental sustainability. Outcomes from his research have informed multiple policy decisions at national and international levels, and he is currently working with multiple government and inter-governmental bodies including the European Commission and United Nations agencies such as the Food and Agriculture Organization (FAO) to support the implementation of relevant Sustainable Development Goals. He serves on UN-FAO's Intergovernmental Panel on Soil and is the Chair of FAO's International Network on Soil Biodiversity (FAO-NETSOB). Professor Singh is a

Fellow of the Australian Academy of Science, American Academy of Microbiology, Australian Society of Soil Science and American Society of Soil Science. He is a Clarivate Highly Cited Researcher, a Humboldt Research Awardee and an AMI Horizon Award Dorothy Jones Prize recipient.

Soil biodiversity to improve soil, plant and human health

Soil biodiversity provides key ecosystem functions including primary productivity, climate regulation and nutrient cycling. Similarly, plant-associated microbiota, which are mainly recruited from soils, play critical roles in the provision of vital host functions including nutrient absorption, provisions of key phytohormones, metabolites, and resilience against biotic (e.g. pathogens and pests) and abiotic (e.g. drought, heatwave) disturbances. Soil biodiversity also plays a direct role in plant and human health via reducing exposure to pathogens, suppressing antibiotic resistance gene transfer, and degrading harmful chemical pollutants from the environments. In this presentation, Professor Singh provides overview, empirical data and maps in direct evidence for 1. linkage between soil biodiversity and ecosystem functions at local to global scales; 2. current and future global distribution of pathogens; and 3. the critical role of soil biodiversity in suppressing pathogens. He argues that effective conservation policies of soil biodiversity are integral to improving health outcomes for ecosystems, humans and plants.



Professor Peter Taylor FAA
University of Melbourne



Professor Peter Taylor works in the fields of stochastic modelling and applied probability, with particular emphasis on applications in queueing, telecommunications, biological modelling, economics, healthcare and disaster management. Professor Taylor

is the Editor-in-Chief of the Journal of Applied Probability and Advances in Applied Probability. In 2017, he was awarded the Ren Potts Medal by the Australian Society for Operations Research, in 2018 the George Szekeres Medal by the Australian Mathematical Society and in 2019 the ANZIAM Medal.

A strategy for constructing tractable epidemic models of malarial superinfection

The concurrent presentation of separately-acquired malaria infections is known as superinfection. Population-level compartmental models of malarial superinfection usually take the form of countably infinite systems of ordinary differential equations which are difficult to simulate or analyse. Professor Taylor discusses a novel strategy for deriving tractable systems of integrodifferential equations for such models. The approach is predicated on the fact that we can characterise within-host dynamics using a network of infinite-server queues with a time dependent batch arrival rate that is a function of the intensity of mosquito-to-human contact. He illustrates this approach in the context of the classical Bailey model of superinfection for *Plasmodium falciparum* malaria.



Professor Leslie Weston FAA
Charles Sturt University



Professor Leslie Weston's research focuses on chemical ecology and physiology with an emphasis on the generation of a deeper understanding of the plant and its rhizosphere and associated microbiome, and how plant interactions with weeds, herbivores and pests are mediated by evolutionary adaptation and production of defence metabolites or secondary products. Her research interests have included development of a fundamental understanding of the localisation, biosynthesis and regulation of secondary plant products including

those in root exudates as sources of novel chemistry. Recently, 'omics' approaches have been applied to investigate plants and their complex interactions with other plants, grazing livestock, pests and soil microorganisms. Professor Weston and her team have recently investigated soil health and microbial diversity in the rhizosphere and the role of bioactive molecules in plant defence, while exploring the chemistry of plants, algae and soil microbes using metabolomics. In 2008 Professor Weston received the BioFirst Fellowship in Life Sciences which brought her to Australia from Cornell University. In 2023 she was elected a Fellow of the Australian Academy of Science and in 2024 was nominated for the 2025 David Craig Medal in chemistry research offered by the Academy.

Adapting to change: invasive plants take up the challenge

Invasive plants and pests can adapt to new environments, some rapidly and others over considerable periods of time, resulting in behavioural changes over time. In the last 500 years, we have seen a rapidly increasing spread in the number of plants and other non-native organisms introduced around the world. These newcomers adapt to their environment through evolution by natural selection, such that changes occur in these non-native populations in contrast to those remaining behind. At a time when we are experiencing rapid environmental changes and selection pressures, understanding how organisms adapt to these changes is critical, and is particularly important for land and property managers. Farming practices, including adoption of conservation tillage systems, have led to the emergence of new and sometimes problematic weed and pest species. In addition, climate change across southern Australia has resulted in warmer temperatures and increasing frequency of droughts along with heavy precipitation events, which also impact the prevalence and range of invasive pests. Professor Weston's research has addressed the emergence, identification and invasion history of some of these weedy pests, and studied the mechanisms used to enhance their invasion success.



Professor Andrew Wilks FAA FTSE FAHMS SYNthesis BioVentures



Professor Andrew Wilks is a serial entrepreneur with 25 years on the 'dark side', following a highly successful academic career as a cancer researcher at the Ludwig Institute for Cancer Research. He discovered and named key cell signalling molecules, including the JAK family of kinases, and went on to found Cytopia in 1997, one of Australia's earliest ASX-listed drug discovery companies where he developed a number of new therapeutics aimed at cancer and hematological disorders. Since then, he has founded or co-founded 12 drug discovery companies. Professor Wilks holds an Adjunct/ Honorary Professorship at Monash University and is an Honorary Enterprise Professor at the University of Melbourne. He is a Fellow of the Australian Academy of Science, the Australian Academy of Technological Sciences and Engineering, and the Australian Academy of Health and Medical Sciences. He has been the recipient of a number of awards including the Ausbiotech Innovation Industry Leadership Award (2016), the ATSE Clunies Ross Medal (2017) and the Martin Lackmann Award (2021).

The house that JAK built: the JAK/ STAT pathway from bench to bedside

Professor Wilks charts the trajectory of the JAK family of protein tyrosine kinases from their discovery in 1989, as an oddly idiosyncratic novel kinase family (dubbed 'just another kinase'), through to their integration into one of the most important intracellular signalling pathways: the JAK/STAT pathway. The central role played by this pathway downstream of a host of cytokine and interleukin receptors has highlighted the JAKs as prime

targets for potential drug development. The development of clinically efficacious JAK inhibitors, such as his team's own JAK1/2 inhibitor Momelotinib (Molecule from MELbourne) – recently approved by the FDA and marketed for the treatment of myelofibrosis (a highly malignant bone marrow cancer) as Ojjaara by GSK – underscores the significant progress in treating such malignancies and a growing range of chronic inflammatory diseases, such as IBD, SLE and even alopecia.



Professor Xinghuo Yu FAA RMIT University



Professor Xinghuo Yu is a Distinguished Professor and an Associate Deputy Vice-Chancellor at RMIT University, Melbourne. He received BEng and MEng degrees from the University of Science and Technology of China in 1982 and 1984 respectively, and his PhD from Southeast University, Nanjing, China in 1988. His research interests are in control systems, intelligent and complex systems, and power and energy systems. His awards and honours include the 2018 MA Sargent Medal from Engineers Australia, 2018 Australasian Artificial Intelligence Distinguished Research Contribution Award from the Australian Computer Society, and 2013 Dr.-Ing. Eugene Mittelmann Achievement Award from IEEE Industrial Electronics Society. He is an Honorary Fellow of Engineers Australia, and a Fellow of the Australian Academy of Science, IEEE, Australian Computer Society and Australian Institute of Company Directors. He was the President of IEEE Industrial Electronics Society in 2018 and 2019.

To switch or not to switch: that is the control question

Control systems have been a fundamental technology since the beginning of the Industrial Revolution in the 18th century. The introduction of switching from human intuition in controllers has shown to significantly improve performance, though it has also presented considerable mathematical challenges in analysis and synthesis. Professor Yu's distinguished contributions include pioneering a new terminal sliding mode control theory, uncovering chaos in digitisation of switching control systems, and applying these advancements to complex network systems. These developments have been directly applied to address industrial problems such as smart grids, robotics and cybersecurity, creating substantial social benefits.

Corresponding Members



Professor Gareth McKinley FAA FRS Massachusetts Institute of Technology (MIT), United States



Professor Gareth H. McKinley is the School of Engineering Professor of Teaching Innovation and former Associate Head and Interim Head of the Department of Mechanical Engineering at MIT. His research interests include extensional rheometry, microfluidic rheometry and non-Newtonian fluid dynamics. He is a co-founder of Cambridge Polymer Group and a member of the Scientific Advisory Boards of Rheosense Inc. and ActNano Inc. He is the author of over 350 technical publications and has won the Publication Award of the Society of Rheology twice (2007; 2022) as well as the 2021 Walters Award from J. Non-Newtonian Fluid Mechanics. He was awarded the Bingham Medal of The Society of

Rheology in 2013, the Gold Medal from the British Society of Rheology in 2014 and the GI Taylor Medal from the Society for Engineering Science (SES) in 2022. In 2019 he was elected to the National Academy of Engineering and also inducted as a Fellow of the Royal Society of London.

Complex fluids everywhere!

We encounter complex or ‘non-Newtonian’ fluids in almost aspect of our daily lives; from personal care products to most foodstuffs and packaging materials. We are also largely made up of equally complex fluid components; in fact blood, sweat and tears are all non-Newtonian in their responses! One of the characteristics that distinguishes such materials are their tensile properties – even though they may flow as liquids, their properties in tension are markedly different; we may describe them as stringy, sticky or tacky. Almost every industry has its own descriptors for such phenomena, and the distinct way complex fluids respond in strong extensional flows governs everything from atomisation of mucus and the drooling of babies to production of plastic films and ultra-strong fibres. Professor McKinley gives an overview of how the underlying molecular characteristics of the molecules undergoing deformation in such flows leads to the dramatic phenomena observable macroscopically.



Professor Linfa Wang FAA FTSE
Duke-NUS Medical School, Singapore



Professor Linfa Wang is a Professor of the Programme in Emerging Infectious Diseases at Duke-NUS Medical School, and the inaugural executive director of PREPARE, Ministry of Health, Singapore. He is an international leader in the field of emerging zoonotic viruses and virus–host interaction. He played a key role in identification of bats as the natural host of SARS-like viruses. In response to the COVID-19 pandemic, he has served and is serving on multiple WHO committees for COVID-19, including the WHO IHR Emergency Committee. Professor Wang has more than 500 scientific publications, including papers in Science, Nature, Cell, NEJM and The Lancet. Professor Wang was elected to the Australian Academy of Technological Sciences and Engineering in 2010, the American Academy of Microbiology in 2021, the Australian Academy of Science in 2023 and the Singapore National Academy of Science in 2024. He received the Singapore President Science Award in 2021.

Lessons from bats: beyond viruses and pandemics

In the last three decades, we have had multiple zoonotic disease outbreaks caused by bat-borne viruses or viruses with ancestral lineages in bats: Hendra in Australia (first detected in 1994), Nipah in Malaysia/Singapore (1998–99), SARS outbreak (2002–03), MERS outbreak (2012), large scale Ebola virus outbreak (2014) and SARS-CoV-2 (2019–20). Bats became ‘famous’ mostly associated with viral diseases outbreaks. However, bats are also the longest living mammal relative to body size and they are resistant to many diseases from which humans suffer, from cancer to metabolic, heart and immune diseases. Professor Wang discusses the lessons learnt from studying bat biology and bat immunology and how we can translate ‘bat knowledge’ into improving human health in general.

Absent new Fellow
Also elected in 2023,
but unable to join us, is:

Professor Michael Fuhrer FAA

NEW FELLOWS 2023

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Enhancing coral resilience

Professor van Oppen is an ecological geneticist whose pioneering research in assisted evolution is paving the way for the development of cutting-edge approaches to helping corals survive climate change.

Much of Prof. van Oppen and her team’s research over the last ten years has been carried out in AIMS’ National Sea Simulator in Townsville, where advanced capabilities allow multi-generational and spawning experiments on many reef organisms simultaneously.

Congratulations Prof Madeleine van Oppen
2024
Australian Academy of Science Fellow
★★★★★

NEW FELLOWS 2024



Professor Nerilie Abram FAA
Australian National University



Professor Nerilie Abram is a climate scientist at the Australian National University. Her research uses Antarctic ice, tropical corals and climate models to understand how Earth's climate system behaved over the last millennium, at both regional and global scales. Her multidisciplinary approaches have brought critical perspectives to modern day human-induced climate change, including bushfire, drought, the onset of anthropogenic warming and the ways that climate change is altering natural climate variability. She is a Deputy Director of the Australian Centre for Excellence in Antarctic Science and the ARC Centre of Excellence for the Weather of the 21st Century, and was a coordinating lead author on the IPCC Special Report on the Ocean and Cryosphere in a Changing Climate.

Unlocking the past to understand our future

Human-caused climate change is one of the greatest global challenges of our time. To fully understand and effectively respond requires more information than is possible from our direct observations of the climate system. Professor Abram demonstrates the critical role that paleoclimate information plays in detecting the initiation of human-caused climate warming, and identifying impacts of human-caused change on difficult to measure aspects of the climate system such as Antarctic sea ice. She also demonstrates how paleoclimate information can quantify climate extremes that are beyond recent human experience but which society needs to be prepared for in a warming world.



Professor Andrew Blakers FAA FTSE
Australian National University



Professor Andrew Blakers is Professor of Engineering at the Australian National University. His research interests include solar cell technology, pumped hydro energy storage, and 100% renewable energy futures. He was joint winner of the Queen Elizabeth II Prize for Engineering in 2023 for PERC solar cell technology. He is appalled by the callous disregard of fossil fuel interests for their own children in their rush to personal profit. Just like cigarette executives. He is encouraged by the exponential growth of solar, which is fast enough to completely decarbonise the world by 2042, and hopes that the renewable energy community has the last laugh, albeit a bitter one. He deeply appreciates the beauties of the outdoors, walking, running, skiing and being in nature.

The fastest energy change in history

The fastest energy change in history is underway. Solar and wind comprised 80% of global power plant additions in 2023. Global solar and wind generation will soon overtake nuclear and hydro generation. Solar and wind are being installed 20 times faster than hydro and nuclear. Solar generation is doubling every three years. At current growth rates, solar is tracking to decarbonise the world within 20 years. This is compelling market-based evidence that solar and wind are the cheapest sources of electricity – in history. Australia is the global renewable energy pathfinder. Australia is moving from 85% fossil fuels in 2017 to 75% solar/wind in 2030 (plus 7% hydro). Lessons from Australia are highly relevant to other countries.



Professor Rachelle Buchbinder
AO FAA FAHMS Monash University



Professor Rachelle Buchbinder combines rheumatology practice with clinical research. She is an NHMRC Investigator Fellow and Professor (Distinguished Academic)/Head, Musculoskeletal Health and Wiser Health Care Units in the School of Public Health and Preventive Medicine, Monash University. Professor Buchbinder is known internationally as a vocal proponent of evidence-based medicine and for her landmark studies, particularly those examining treatments accepted into practice before their proper evaluation. Her 2021 book, 'Hippocrisy, how doctors are betraying their oath', written with orthopaedic surgeon Ian Harris, aims to highlight society's overreliance on medicine for a general audience.

Optimising musculoskeletal health

Professor Buchbinder highlights her work as a vocal proponent of evidence-informed high-value musculoskeletal health care as well as its challenges. She describes an evaluation of a world-first mass media campaign that successfully shifted misconceptions about back pain and musculoskeletal trials that have challenged the value of accepted treatments, been influential in changing paradigms about the value of placebo-surgical trials and tested implementation strategies to improve care.



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2025 Prime Minister's Prizes for Science



To receive the Prize for New Innovators is just a wonderful recognition for me and my team. It gives me a new sense of hope for the work we are doing and how our research will continue in the future.

Associate Professor Lara Herrero

Institute for Glycomics, Griffith University

Recipient of the 2023 Prize for New Innovators



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It is a great honour to receive the Malcolm McIntosh Prize for Physical Scientist of the Year. This recognition will continue to inspire me and young scientists to think big and address challenges for the future.

Professor Yueui (Larry) Lu

ARC Centre of Excellence for Quantum Computation and Communication Technology, Australian National University

Recipient of the 2023 Malcolm McIntosh Prize for Physical Scientist of the Year



Professor Kylie Catchpole
 FAA FTSE Australian National University



Professor Kylie Catchpole is Professor in the School of Engineering at the Australian National

University, and is internationally recognised as a global leader in energy research. Her group has demonstrated record efficiency solar cells, and their work on solar hydrogen generation was listed as one of the global top 10 innovations by the Innovation for a Cool Earth Forum (ICEF) in 2020. Professor Catchpole is a Fellow of the Australian Academy of Science and the Australian Academy of Technological Sciences and Engineering, and has been awarded the John Booker Medal for Engineering Science from the Australian Academy of Science. Her research currently focuses on energy modelling for the design and analysis of energy systems that are fair, affordable, decarbonised and resilient.

Energy and climate: reasons for optimism

We are currently in the early stages of a whole-of-economy energy transition away from fossil fuels and towards energy from renewable sources. This will be the largest shift in how we use energy since the industrial revolution. Solar, wind and batteries are growing rapidly, while transport and heating are being decarbonised via electric vehicles and heat pumps. Research into more efficient solar cells and cheaper ways to produce hydrogen will further accelerate the energy transition. There are therefore strong reasons for optimism – furthermore, optimism itself can empower people to make the transition happen. In education, we have a tremendous opportunity to teach this sense of optimism and agency to our students, to enable them to make their own positive difference to the world.



Professor Mary Garson AM FAA
 University of Queensland



Emerita Professor Mary Garson completed a PhD degree at the University of Cambridge, UK, then

undertook postdoctoral research as an Overseas Research Fellow of the Royal Society in Rome, Italy, followed by a research fellowship held at New Hall, Cambridge. After working as a medicinal chemist in the pharmaceutical sector, she emigrated to Australia as a Queen Elizabeth II Research Fellow at James Cook University. Later, she was appointed the first female Professor of Chemistry at the University of Queensland. She has completed 425 SCUBA dives for sample collection linked to research into marine natural products chemistry; the flatworm *Maritigrella marygarsonae* ('little female sea tiger') is named in her honour. Among many distinguished science leadership contributions, she is a global champion for women in chemistry and has been elected the Vice President/President-Elect of the International Union of Pure and Applied Chemistry from 2024 onwards.

Molecules from the wild

Professor Garson's research career has focused on understanding natural products: the chemistry, biochemistry and physiology of their formation; their incredible structural diversity; the ecological role they play in intra- and interspecies signalling; and other bioactivities associated with them. Groundbreaking contributions have included pioneering stable isotope studies to define unusual biosynthetic pathways leading to fungal polyketide antibiotics, and understanding how antimalarial terpenes are biosynthesised by marine sponges. Ecological studies have explored how antipredator chemical defence and aversive compounds are perceived in aquatic environments. Although

best known for pioneering work on natural products from biodiverse and challenging marine environments, Professor Garson has also made key discoveries on the chemistry of Asian medicinal plants. Among many distinguished engagement contributions, she acknowledges her role as a global champion for women in science and how this has led to her current role as President-Elect of the International Union of Pure and Applied Chemistry.



Professor Arthur Georges FAA
 University of Canberra



Professor Arthur Georges is an international expert on the evolution and ecology of reptile

sex determination. His proposal that genetic and environmental sex determination represent ends of a continuum have revolutionised understanding of how the complex thermal environment of nests dictates sex in reptiles. His recent work on sex reversal reveals molecular mechanisms of temperature sex determination and provides astonishing insight into the evolution of TSD and GSD, and how environment interacts with genotype to determine sexual fate. His work redirected thinking on how reptiles survived past climate changes, and how human activities constrain their ability to respond to future challenges.

Sex in dragons: a journey of discovery

Biological sex, that is the possession of a functional testes or ovary, is a dichotomous phenotypic trait that can be determined by genotype, environment, or the interaction of genotype and environment. Professor Georges and his team's unique contribution comes from the study of species with sex chromosomes, but where environment subsequently reprograms development to reverse sexual fate. He and his team have followed a path of discovery that has

taken us from the field to the laboratory and back again to demonstrate highly conserved and ubiquitous thermosensitive mechanisms of chromatin modification that influences expression of key sex genes and thus sexual fate. They have an excellent model for the study of developmental reprogramming under the influence of environment, a topic of wide interest. Sex reversal by temperature in the wild also has important implications for our understanding of how reptile species can respond to rapid climate change.



Professor Roslyn Gleadow FAA
Monash University



Professor Ros Gleadow researches the effect of climate change on food security, focusing on plants that make cyanide and the impact on human and animal health. This has led to new perspectives on the evolution of cyanogenic glucosides in plants and roles beyond herbivore defence. Projects include the effect of environmental challenges (CO₂, temperature, soil nitrogen, drought and salinity) on the nutritional value

of sorghum, cassava, taro, eucalypts and cycads. Professor Gleadow is Past President of the Global Plant Council and the Australian Society of Plant Scientists, Chair of Eucalypt Australia and the International Working Group for Safe Cassava, and former Director of the Monash Agtech LaunchPad.

Photosynthesis, stress and plant defence are entangled

Many plants contain cyanogenic glucosides (CNglycs), which break down to release hydrogen cyanide when plants are crushed or chewed. Plants that are young, stressed or have been heavily fertilised become toxic to animals, including humans, causing paralysis and even death. The deployment of CNglycs for defence had always been considered to come at the cost of reduced plant growth due to the diversion of valuable resources away from photosynthesis and primary metabolism. However, new evidence from molecular and physiological studies shows that, rather than a simple cost/benefit trade-off, CNglycs may increase resilience of plants to environmental stress and optimise nitrogen management, enhancing rather than detracting from growth and photosynthesis. This helps explain why so many plants make CNglycs and why humans appear to have preferentially domesticated cyanogenic plants such as sorghum and cassava.



Professor Dmitri Golberg FAA
Queensland University of Technology



Professor Dmitri Golberg is a Distinguished Professor at Queensland University of Technology (QUT), a Co-Director of the QUT Centre for Materials Science, and an Australian Research Council (ARC) Laureate Fellow. After gaining his PhD and 10-year research career at a research institute in Moscow, Russia, in 1995 he joined the National Institute for Materials Science (NIMS) in Tsukuba, Japan. He moved on to QUT in 2017 after more than 20 years of Nanotube Group Leadership at NIMS. Professor Golberg is an author of 750+ original papers in peer-reviewed international journals cited more than 70,000 times. He also registered 130+ Japanese, European and US patents, and delivered 150+ invited, keynote and plenary lectures during international scientific forums. During his career he received the prestigious Tsukuba Prize (2005), Thomson Reuters Research Front Award (2012), Seto Prize by Japan Microscopy Society (2016), and NIMS President Award (2017).

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Nanomaterial properties and functions as revealed by in situ transmission electron microscopy

Knowing electro-mechanical, thermo-conducting and opto-electronic properties of a nanomaterial is of prime importance as far as its possible integration into modern industry is considered. However, in most cases, such property measurements have been accomplished using instruments with no direct access to the nanomaterial atomic structure, its defects and crystallography and spatially resolved chemistry. Professor Golberg demonstrates the full usefulness of various state-of-the-art in situ and operando transmission electron microscopy (TEM) techniques for property and function analysis of diverse frontier materials, such as individual carbon and boron nitride nanotubes, graphene-like nanosheets, nanowires, nanoparticles and nanocomposites. Elasticity, plasticity, fracture strength and toughness, electrical conductance, thermal gradients, photocurrents, photovoltages and spatially resolved luminescence of a nanomaterial are unambiguously determined inside TEM, while employing piezo-driven probes, sensors and nanomanipulators and/or optical fibres inserted into the microscope column.



Professor Michael Kearney FAA
University of Melbourne



Professor Michael Kearney is an ecologist and evolutionary biologist working at the interface between biology and physics to understand how organisms are limited by their environments. Professor Kearney did his undergraduate studies at Monash University and PhD at the University of Sydney, including a Fulbright exchange to the USA. He has developed conceptual and computational tools to compute the thermodynamic

constraints on animals and plants and uses them to ask basic and applied questions, including the impact of climate change on biodiversity. His evolutionary work includes understanding the ecological forces that favour the evolution of all-female, clonal organisms (parthenogens). He is a field biologist at heart and his favourite scientific moments are when he is wandering around the Australian arid zone watching nature in action.

Forecasting climate change effects on organisms with physics and physiology

Understanding how environmental conditions limit where species can and can't occur is fundamental to ecological science and necessary for forecasting climate change impacts. Professor Kearney gives an overview of how biological and physical sciences can be integrated to achieve this understanding and thereby improve our forecasts of the effects of global environmental change for conservation, health and agriculture. He may also sneak in some Australian animals he's worked on that have given up sex and males and reproduce by cloning.



Professor Matthew Kiernan AM FAA FAHMS
Neuroscience Research Australia



Professor Matthew Kiernan is the Chief Executive Officer and Institute Director, Neuroscience Research Australia. He holds appointments as the Scientia Professor of Neuroscience at the University of New South Wales, Sydney and Senior Staff Specialist in Neurology at South Eastern Sydney Local Health District. He is past President of the Australian and New Zealand Association of Neurologists, having helped shape neuroscientific research and the training of neurologists across Australia and New Zealand. Professor Kiernan is Chair of the World Federation

of Neurology Specialty Group in Neurodegenerative Disease, Chair of the World Congress of Neurology, President of the Brain Foundation and Editor Emeritus of the Journal of Neurology, Neurosurgery and Psychiatry (BMJ Publishers, United Kingdom), having served as Editor-in-Chief from 2010–22.

Chance and design: neurotransmission, neuroscience and neurology

Original knowledge regarding human brain function was largely derived from cellular and animal models. However, the advent of technological advances has led to new concepts in the understanding of signal transmission and brain information processing. This new molecular understanding of the human nervous system, combined with rapid developments across medical imaging technologies, has promoted an understanding of the inner workings of the human nervous system, in addition to tracking plastic change following injury and disease. Presently, there is an unprecedented number of treatments now being introduced to neurological practice. Through the establishment of national platforms and global collaborative networks, the introduction of precision medicine will become commonplace in clinical practice. The selection of appropriate outcome measures for clinical trial development will be critical to future therapeutic success. While there has been progress towards therapy development, improvement in research infrastructure will be necessary to accelerate a greater translation of effective therapies.



Professor Glenn King FAA
University of Queensland



Professor Glenn King did his PhD at the University of Sydney before postdoctoral studies at the University of Oxford. After academic stints at the University

of Sydney and the University of Connecticut Health Center, he joined the Institute for Molecular Bioscience at the University of Queensland in 2007. Professor King is a leader in the field of venoms-based drug and insecticide discovery. His early work on spider venoms led him to found Vestaron Corporation, an agricultural biotechnology company that has developed the world's first peptide-based bioinsecticides. Professor King's current research focuses on the development of peptide drugs to treat cardiovascular and nervous system disorders. He recently co-founded Infensa Bioscience, a biotech company developing drugs for treating stroke and myocardial infarction. His laboratory maintains one of the largest venom collections in the world, sourced from more than 500 species of invertebrates. In 2023 he received the Prime Minister's Prize for Innovation for his translational work.

Harnessing the pharmacological complexity of animal venoms to develop eco-friendly insecticides and human therapeutics

We are literally surrounded by venomous animals, which make up more than 20% of all animal species on the planet. Most gardens in Australia contain venomous ants, spiders and wasps, while some provide homes for more exotic venomous creatures such as assassin bugs and centipedes. Despite their sinister reputation, only a very small minority of these animals are dangerous to humans. Indeed, on the contrary, venomous animals have provided therapeutics to treat human disorders as diverse as diabetes, hypertension and chronic pain. Professor King illustrates his team's research on the evolution, composition and pharmacology of arthropod venoms, and describes how their work on spider venoms led to development of the world's most eco-friendly insecticide based on a compound from venom of the Blue Mountains funnel-web spider. Finally, he describes their ongoing work to develop drugs for heart attack and stroke based on a venom compound from the K'gari funnel-web spider.



Professor Mark Krumholz FAA
Australian National University



Professor Mark Krumholz received his PhD in 2005 from UC Berkeley and then held a Hubble Postdoctoral Fellowship at Princeton (2005–08). He joined the astronomy department at the University of California, Santa Cruz in 2008 as assistant and then associate professor, before moving to a professorship at ANU in 2015.

Astrophysical simulation methods for next-generation computing hardware

We can observe astronomical systems, but we cannot perform controlled experiments on them. Instead, we rely on numerical experiments to understand how they work. Designing software to perform these experiments is a challenge that combines astrophysics, applied mathematics and computer science. Professor Krumholz describes his research group's work on algorithms optimised for efficient simulations on next generation GPU-accelerated hardware, and presents some preliminary applications of the group's latest code to the problem of galactic winds.



Emeritus Professor Zheng-Xiang Li FAA
Curtin University



Emeritus Professor Zheng-Xiang Li's work aims to better understand how Earth has evolved through

dynamic interactions between tectonic plates and Earth's deep interior, which has implications for resource exploration, and the evolution of life and environment. Professor Li received his BSc from Peking University (1982) and PhD from Macquarie University (1989). He worked for UWA during 1990–2006, progressed from Post-Doc Fellow to Senior Principal Research Fellow/Professor, and moved to Curtin University in 2007 where he served as Professor, John Curtin Distinguished Professor, and ARC Laureate Fellow. He was a Co-Leader of three UNESCO and IUGS-sponsored IGCP projects, Chief Editor of *Tectonophysics*, and is currently the Honorary Editor-in-Chief of *Earth and Planetary Science*. He is a recipient of the Geological Society of Australia's S.W. Carey Medal, Fellow of both the Geological Society of America and the American Geophysical Union, and Fellow of the Australian Academy of Science.

A living Earth: its evolution and dynamic inner workings

Earth as a unique habitable planet started as a fireball at initial accretion, but quickly became a waterball with increasing land area. Plate tectonics started over 3 billion years ago, and a billion years later, it evolved into a 600 million-year supercontinent cycle accompanied by the birth and demise of superoceans. This dynamic evolution history was driven by an evolving internal feedback system featuring an early stage of primarily vertical differentiation driven by gravity, then one billion years of early plate tectonics featuring small but increasing-scale convection. The last 2 billion years has been dominated by the supercontinent cycle and its coupled mantle twin in deep Earth. Such dynamic processes not only drive surface features, but also influence the operation of the core and the geomagnetic field. We are in the transition between two supercontinents, with the next supercontinent predicted to form in 280 million years by closing the Pacific Ocean.



Professor Georgina Long

AO FAA FAHMS

Melanoma Institute Australia



Professor Georgina Long is Co-Medical Director of Melanoma Institute Australia (MIA), and Chair of Melanoma Medical Oncology and Translational Research at MIA and Royal North Shore Hospital, the University of Sydney. She was jointly named 2024 Australian of the Year with Professor Richard Scolyer AO, recognised with the Australian Academy of Health and Medical Sciences Outstanding Female Research Medal (2021) and Officer of the Order of Australia (2020). She has received numerous awards, including ESMO Fulbright U.S. Mission Australia Award for Leadership Excellence (2024), Women for Oncology Award (2023), the Ramaciotti Medal for Biomedical Research (2021), Vice Chancellor's Award for Excellence Award for Outstanding Research (2021), USYD (2021), Research Australia GSK Research Excellence Award (2018) and Sir Zelman Cowen Universities Fund Prize for Discovery in Medical Research (2016). She has a number of CINSW Premiers Awards, Outstanding Cancer Researcher (2018), Excellence Translational Cancer Research Award (2017), Wildfire Highly Cited Publication Award (2021), and highly-cited, original, peer-reviewed article published (2011, 2014, 2016, 2017, 2018, 2019 and 2020).

Optimising cancer immunotherapy: we have a long way to go

Checkpoint inhibitor immunotherapy has revolutionised the treatment of many cancers, in particular melanoma. Despite long-term durable control of advanced melanoma in more than 50% of patients with combination therapy (anti-PD-1 plus anti-CTLA-4),

the oncology field is yet to realise the potential to cure more cancers by targeting the immune compartment. A multifactorial approach of optimising checkpoint inhibitor dosing is estimated to enhance outcomes for another 20–30% of patients across cancers. A focus on biomarker selected patients is one approach, however, simple alterations to platforms and procedures could impact outcomes now. Neoadjuvant immunotherapy, unlike neoadjuvant chemotherapy, enhances the long-term anti-tumour immune effect compared with adjuvant administration. The NADINA trial demonstrated a near 70% reduction in recurrence/death from melanoma due to neoadjuvant administration. Dosing strategies and schedules for checkpoint inhibitors need to be refined and optimised, given the distinct mechanism of action compared with chemotherapy, which has driven current dosing concepts.



Professor Budiman Minasny FAA

University of Sydney



Professor Budiman Minasny is a Professor in soil-landscape modelling at the University of Sydney.

He is a soil scientist, with an undergraduate degree from Universitas Sumatera Utara in Indonesia and a MAg and PhD in soil science from the University of Sydney. Professor Minasny is passionate about the role of soil in managing climate change, food, water and energy security, and maintaining biodiversity.

Soil carbon: much more than a climate solution

Soil carbon sequestration is considered an economically viable method for mitigating climate change, offering multiple co-benefits. However, current soil conditions are contributing

to carbon emissions due to ongoing degradation. Addressing these emissions is crucial for climate security. Soil carbon is crucial for planetary health and human survival, influencing not only climate change and soil conditions but also enhancing food systems, water and nutrient cycling, biodiversity, and overall ecosystem health. Increasing soil carbon levels positively impacts these areas, stressing the importance of tackling soil degradation to achieve broader environmental and societal benefits.



Professor Jose Polo FAA

University of Adelaide



Professor Jose Maria Polo is Professor of Epigenetics at the University of Adelaide and Professor in the Department of Anatomy and Developmental Biology at Monash University. He graduated from Buenos Aires University as a Biochemist. In 2002, he started his PhD under the supervision of Dr Ari Melnick at the Albert Einstein College of Medicine, New York, working in lymphomagenesis and B-cell maturation. In 2008, he moved to the laboratory of Dr Konrad Hochedlinger at the Harvard Stem Cell Institute to work on reprogramming. In 2011, Professor Polo established his independent research group at Monash University to work on the mechanism underpinning reprogramming and cell fate in different biological paradigms, and in 2016 he co-founded Mogrify to translate reprogramming technologies into clinical applications. In 2021, Professor Polo became the inaugural Director of the Adelaide Centre for Epigenetics and Program Leader of the recently established South Australian Immunogenomics Cancer Institute.

Exploring the boundaries of human reprogramming

Human fibroblasts can be reprogrammed to induced pluripotent stem cells (iPSCs) by expressing four transcription factors. Similar to embryonic stem cells, iPSCs can differentiate into any cell type, revolutionising personalised regenerative medicine, cell replacement therapies, disease modelling and drug screening. Additionally, reprogramming can be achieved between various cell types, opening the door for in vivo reprogramming in clinical applications. However, the molecular mechanisms underpinning reprogramming are not well understood. Using various cellular, biochemical and genomics techniques, Professor Polo's team has reconstructed reprogramming trajectories across different biological paradigms, including induced pluripotency, cancer and aging. This has allowed them to uncover unexpected roles of transcription factors and cell populations, leading to promising potential alternative therapies and modelling of early embryonic development in vitro with the generation of induced trophoblast stem cells and blastocyst-like structures, termed iBlastoids. Professor Polo explores these findings as well as the boundaries of cellular reprogramming.



Professor Hrvoje Tkalčić FAA
Australian National University



Professor Hrvoje Tkalčić is a professor and Head of Geophysics at the Research School of Earth Sciences at the Australian National University. He graduated from the University of Zagreb with a Diploma of Engineering in Physics degree, specialising in geophysics with meteorology. He gained his PhD in geophysics from UC Berkeley in 2001. He was a postdoctoral fellow at SCRIPPS Institute/University of California San Diego and Lawrence Livermore National Lab. His research interests include the structure and dynamics of Earth's interior using observational seismology and mathematical geophysics, from the crust to Earth's centre. He is a director of the Warramunga Seismic and Infrasound Array in the Northern Territory, Australia, operated on behalf of the UN Comprehensive Test Ban Treaty Organisation and the Australian Government. He received an inaugural award from AuScope for Excellence in

Research in 2016 and the Price Medal from the Royal Astronomical Society in London in 2022. He was elected a Fellow of the American Geophysical Union in 2020.

Earth's inner core: a planet within the planet

Advances in global seismology, high-pressure mineral physics, geodynamics, computational methods and mathematical geophysics have enabled considerable progress in understanding Earth's inner core – a metallic ball about the size of Pluto. For example, Professor Tkalčić's team proved its solidity by unambiguously detecting shear waves spreading through it, confirmed the existence of the innermost inner core, obtained images of the thermal convection cell at its top, and discovered the shuffling nature of its rotation. However, recent progress has been impeded by an uneven global distribution of seismic sensors and significant earthquakes that generate core-sensitive seismic waves. Consequently, the inner core remains enigmatic. Professor Tkalčić reviews his research group's recent contributions and ambitions, with stops at Earth's centre, the outback, the Southern Ocean bottom, and Mars. As he hopes to demonstrate, innovative methods and the proliferation of seismic sensors will play a central role in global and planetary seismology in the coming decades.

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Professor Gene Tyson FAA
Queensland University of Technology



As a microbial ecologist and bioinformatician, Professor Gene Tyson is an internationally recognised authority in the development and application of meta-omic and bioinformatic approaches to better understand complex microbial communities. Through the innovation and integration of these techniques, Professor Tyson has made seminal contributions to the field, including the discovery of novel bacterial and archaeal lineages and the identification of key microorganisms and metabolic functions that influence human and environmental health. His research reach and significance are substantial, with over 145 peer-reviewed papers and the application of his novel bioinformatic tools aiding the widespread adoption of meta-omics in microbiology. In 2020, he established the Centre for Microbiome Research at Queensland University of Technology, where his group employs the meta-omic approaches he helped pioneer to investigate microbial communities across diverse clinical and environmental settings.

Developing new approaches to understand the microbial world

Professor Tyson's dissertation research, which demonstrated for the first time that metagenomic data could be used to reconstruct genomes directly from environmental samples, was recognised as one of the Breakthroughs of the Year by Science. Since then, he has continued to make significant contributions to the field of microbiology. At the Centre for Microbiome Research (CMR), his group employs novel meta-omic, cultivation and visualisation approaches to investigate microbial communities from diverse habitats. His ultimate research goal is to develop a holistic understanding of microbial ecosystems and the role they play in clinical and environmental settings.



Professor Madeleine van Oppen FAA
Australian Institute of Marine Science



Professor Madeleine van Oppen is a world-leading marine molecular ecologist recognised for her research on microbial symbioses and climate change adaptation of reef-building corals. Her work has driven a fundamental shift in coral reef conservation and restoration as she conceptualised and pioneered the field of assisted evolution of corals, a suite of bioengineering approaches aimed at accelerating the adaptation of corals to climate change-driven summer heatwaves that cause destructive coral bleaching events.

Harnessing microbial symbionts of corals for reef conservation

Global warming has caused a decline of coral reefs worldwide, with the most extreme temperature anomalies recorded during the last summer which saw unprecedented levels of coral bleaching and mortality. Climate models predict such conditions will become annual events by mid-century, and there is concern corals are unable to adapt fast enough to prevent the collapse of coral reefs. Professor van Oppen's research explores whether coral thermal tolerance can be augmented via manipulation of the coral microbiome (photosymbionts, bacteria). Her team employed experimental evolution of photosymbiont cultures under elevated temperatures and demonstrate heat-evolved symbionts enhance the upper thermal tolerance of the coral holobiont. Following inoculation, heat-evolved symbionts remained stably associated with their coral host in the lab and in the field, highlighting benefits may persist long-term. Manipulation of bacterial symbionts is less advanced, but the team's recent identification of probiotic candidates that form temporally stable symbioses with coral is promising.



Professor Lianzhou Wang FAA
University of Queensland



Professor Lianzhou Wang is professor and Australian Research Council (ARC) Australian Laureate Fellow in the School of Chemical Engineering, Director of Nanomaterials Centre, and Senior Group Leader of Australian Institute for Bioengineering and Nanotechnology, the University of Queensland. His research focuses on the design and application of semiconductor nanomaterials for renewable energy conversion and storage including photocatalysts for hydrogen production, low-cost solar cells and rechargeable batteries. He has published more than 600 journal articles and filed 19 patents, with a H-index of 125. His honours and awards include ARC QEII Fellowship, Future Fellowship, Laureate Fellowship and Industry Laureate Fellowship, Scopus Young Researcher Award, and Research Excellence Award in Chemical Engineering. Professor Wang serves as the Editor/Associate Editor/editorial board of more than 10 journals. He is a fellow of the Australian Academy of Science, Royal Society of Chemistry and Academia Europaea, and is named on the Clarivate Highly Cited Researchers list.

Reviving ceramics: old theories, new energy applications

Material innovation has been the cornerstone of human civilisation, supporting us through the Stone, Bronze, Iron, Steel, and Silicon ages, and potentially into the Quantum Era. As a ceramic scientist, Professor Wang's research has focused on the design and development of semiconductor nanomaterials for renewable energy conversion and storage over the past decades. Despite the rapid advancement of technology, traditional ceramic processing and

sintering theories remain invaluable tools for material innovation. Professor Wang shares his team's research journey in advancing crystal growth theory and interfacial engineering to develop new semiconductor materials. These innovations are crucial for harnessing Australia's rich material and mineral resources for renewable solar energy conversion and energy storage applications.



Professor Willy Zwaenepoel
FAA FTSE University of Sydney



Professor Willy Zwaenepoel is a world leader in experimental software systems. He is well known for his groundbreaking work on distributed shared memory and has made fundamental contributions to a variety of subjects, including multicast communication, fault tolerance, internet servers, graph processing, virtualisation, and storage systems. The influence of his work is evidenced by its large number of citations and its translation into production systems. Professor Zwaenepoel has received numerous awards for his teaching and research and has mentored young researchers who went to renowned institutions, or who started successful companies.

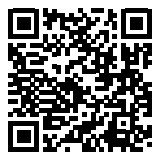
The ever-changing world of software systems

At the start of Professor Zwaenepoel's career, he and his colleagues were ecstatic about having their own personal workstation with a few tens of MB of disk space and a high-speed (3Mbps!) network. Now, the cloud offers access to quasi-unlimited computing power and data storage, with networks offering tens of GB of bandwidth. These amazing developments have made for an exciting journey for those like him working on software systems. The challenges and opportunities to translate improved hardware capability into user benefits have been many. Professor Zwaenepoel chronicles a few of the developments in which he has played a role.

Corresponding Member



Professor Eric Warrant FAA
Lund University, Sweden



Professor Eric Warrant is Professor of Zoology at the University of Lund in Sweden. He studied physics and entomology at UNSW and completed a PhD in visual science at the Australian National University in 1990. Following a postdoc and research fellowship at the University of Lund, he became Professor in 2002. He is a past president of the International Society of Neuroethology. Professor Warrant leads an active research group studying vision and visual navigation in nocturnal animals and has discovered neural principles that permit vision in

dim light. He has recently turned his attention to the sensory basis of long-distance migration in the Bogong moth, particularly the role of Earth's magnetic field and the stars in migratory navigation.

Seeing at the limits: the remarkable visual abilities of nocturnal insects

Despite their tiny eyes and brains, nocturnal insects have remarkable visual abilities. The work of Professor Warrant and his team over many years – particularly on fast-flying moths and bees and on ball-rolling dung beetles – has shown that nocturnal insects are able to distinguish colours, to detect faint movements, to learn visual landmarks, to orient to the faint pattern of polarised light produced by the moon and, like the Australian Bogong moth, navigate by the stars. These impressive visual abilities are the result of exquisitely adapted eyes and visual systems, the product of millions of years of evolution. Nocturnal animals typically have highly sensitive eye designs and visual neural circuitry that is optimised for extracting reliable information from dim and noisy visual images. Professor Warrant elaborates on these adaptations to show how biological sensors – even very small ones – are capable of high performance at the limits of what is physically possible.

Absent new Fellows
 Also elected in 2024,
 but unable to join us, are:

Professor Louisa Degenhardt
AO FAA FASSA FAHMS

Professor Calum Drummond
AO FAA FTSE

Professor Shahar Mendelson FAA

Professor Vince Poor FAA ForMemRS
 (Corresponding Member)



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SCIENCE AT THE SHINE DOME 2024

Gala Dinner



7.00pm – 11.00pm, Wednesday 11 September
The National Arboretum

This evening brings together people from across the Australian science sector to connect as a community and celebrate excellence. It is made even more special as the celebrations honour the 70th anniversary of the Academy.

Guests have the opportunity to network and mingle with Academy Fellows, Members and Senators of the Australian Parliament, Nobel Laureates, Chief Scientists, senior representatives from the research, education and industry sectors, government officials, journalists, members of the diplomatic community, and researchers from all disciplines and career levels.

A special address will be made by Her Excellency the Hon Ms Sam Mostyn AC, Governor-General of the Commonwealth of Australia.

The keynote address will be delivered by the Hon Ed Husic MP, Minister for Industry and Science.

During the evening, the Academy's most prestigious medals for 2023 and 2024 are presented. The 2023 Matthew Flinders Medal is being awarded to Professor Lidia Morawska FAA, while Professor David Lindenmayer AO FAA is receiving the 2024 Macfarlane Burnet Medal. The Ruby Payne-Scott Medal is being presented to Professor Jenny Graves AC FAA for 2023, and to Professor Kerrie Mengersen FAA for 2024. More information on these premier awards can be found in the Academy awards section of this program.

We are delighted to be able to bring this event to you in such a beautiful venue, with the generous support of our Science at the Shine Dome Gala Dinner Partner, the University of Sydney.

Coaches depart Peppers Gallery, Ovolo, Sebel and Novotel at 6.45pm, and return at the conclusion of the evening. No bookings are required for the coaches; simply be at the front of one of these hotels at 6.35pm to take advantage of these transfers.
Pre-dinner drinks are being served from 7.00pm, with formal proceedings beginning at 7.30pm.
Dress code: formal (black tie optional).



ACADEMY AWARDS 2023



Premier honorific awards 2023

Premier honorific awards are the Academy's most prestigious awards, recognising researchers of the highest standing over a career of whatever length.

Matthew Flinders Medal and Lecture

The Matthew Flinders Medal and Lecture is a Premier career award that recognises scientific research of the highest standing in the physical sciences, and honours the contributions of Australia's early scientific researchers.



Professor Lidia Morawska FAA
Queensland University of Technology



Professor Lidia Morawska is Distinguished Professor and Australian Laureate Fellow at Queensland University of Technology; the Director of the International Laboratory for Air Quality and Health, a WHO Collaborating Centre; the Centre Director for the ARC Training Centre for Advanced Building Systems Against Airborne Infection Transmission (THRIVE) hosted at QUT; and holds a position of Vice-Chancellor Fellow at the Global Centre for Clean Air Research (GCARE), University of Surrey, as well as an Adjunct Professor at Jinan University. Professor Morawska is a physicist and conducts fundamental

and applied research in the interdisciplinary field of air quality and its impact on human health and the environment, with a focus on the science of airborne particulate matter. An author of more than 1,000 publications, Professor Morawska has been involved at the executive level with a number of relevant national and international professional bodies, is an International Honorary Member of the American Academy of Arts and Sciences, a Fellow of the Australian Academy of Science, Queensland Academy of Arts and Sciences and Royal Society of Biology, and is acting as an advisor to WHO. She is the recipient of numerous scientific awards.

The science of air that helps us thrive

Nothing is more fundamental than the air we breathe. Deprived of it, we would die in minutes, but keeping it safe for humans remains an aspirational challenge. From ultrafine particles formed in the air through complex physiochemical processes involving gaseous precursors, to large respiratory particles containing pathogens, the

composition of air has an impact on our health. Radon emanating from soil has a different impact than volatile organic compounds emitted by paints. Uncovering the complex science of air using advanced sensing instruments and computational methods is fascinating, but understanding it is critical to making our air healthy and designing our environment to support this goal. The science of maintaining air quality in our buildings without environmental disruption is no easier than designing extraterrestrial buildings where there is no external atmosphere. The indoor–outdoor interface is what makes air quality in Earth's buildings so elusive. Most modern buildings do badly; but this fact suggests affordable ways to improve human health and wellbeing once we understand how to do so. The ability to transform our internal atmospheres would make our minute-by-minute breathing so much safer, creating an economically productive industry for the design and operation of future buildings, and the transformation of current ones to help us thrive.

Ruby Payne-Scott Medal and Lecture

The Ruby-Payne-Scott Medal and Lecture is a Premier career award that recognises female researchers of the highest standing in the physical and/or biological sciences. It is one of the most prestigious career awards of the Academy and honours Ruby Payne-Scott's pioneering contribution to radiophysics and radio astronomy.



Professor Jenny Graves AC FAA
La Trobe University



Professor Jenny Graves is an evolutionary geneticist who exploits our distant relationship to

Australian animals to discover how genes and chromosomes evolved, and how they work in all animals including humans. She uses this perspective to explore how sex works and how it evolved, (in)famously predicting the demise of the human Y chromosome. In a 50-year career, starting at the University of Adelaide

and the University of California (Berkeley) and encompassing La Trobe University and the Australian National University, Professor Graves has produced three books and more than 400 research articles and won many honours and awards, including the Academy's Macfarlane Burnet and Ruby Payne-Scott career medals, and Companion of the Order of Australia. She is an International Member of the US National Academy of Sciences and a Fellow of the Australian Academy of Science, and has served on the Executive of the latter as Foreign Secretary and Education Secretary. She has won the L'Oreal-UNESCO Prize for Women in Science, and the Prime Minister's Prize for Science.

Sex in dragons

Professor Graves spent the first 40 years of her career researching the genes and chromosomes that determine sex in mammals, but she

now recognises that reptile sex is much more interesting, being influenced by environmental stresses. Working with a group at the University of Canberra headed by Professor Arthur Georges FAA, she is involved in research on Australia's dragon lizards which has really shaken up the whole sex determination field. The research group's model reptile, the Central Bearded Dragon, has Z and W sex chromosomes like birds, but when it's hot, hatchlings all develop as females. Mating sex-reversed females with normal males completely changes the system from genetic to temperature sex. Sex reversal also allows them to untangle the interactions of genes, chromosomes and the environment. The group uses powerful omics techniques to identify the sex gene and unscramble the genetic and epigenetic pathways by which it directs development of testes or ovaries.

Career honorific awards 2023

Career honorific awards recognise lifelong achievement in the outstanding contribution to the advancement of science.

David Craig Medal

The David Craig Medal is awarded in honour of the outstanding contribution to chemical research of Emeritus Professor David Craig AO FAA FRS. It recognises contributions of a high order to any branch of chemistry by active researchers. The recipient of this medal delivers several public lectures across Australia.



Professor David Craik AO FAA FRS
University of Queensland



Professor David Craik AO FAA FRS is a Professor at the Institute for Molecular Bioscience at the University of

Queensland and Director of the ARC Centre of Excellence for Innovations in Peptide and Protein Science. His research focuses on applications of cyclic peptides and toxins in drug design. He is recipient of a number of prizes in the peptide field, including the du Vigneaud Award of the American Peptide Society and the Hirschmann Award of the American Chemical Society. He is author of more than 840 papers and has trained 70 PhD students.

Hannan Medal

The Hannan Medal is a career award that recognises outstanding research in any of the fields of statistical science, pure mathematics, and applied mathematics and computational mathematics, and is made in one of those three areas in turn at two-yearly intervals. It honours the contribution to time series analysis of Professor EJ Hannan FAA FASSA, Professor of Statistics at the Research School of Social Sciences of the Australian National University.



Professor Richard Hartley FAA FRS
Australian National University



Professor Richard Hartley has made important and pioneering contributions in the area of computer vision, both theoretical and applied, especially in the mathematical underpinnings of the field. He is one of the founders of the research field of multiview geometry, which is the technical foundation behind the computation of digital 3D models from sets of images or videos. This technology allows construction of models of cultural or archeological sites, as well as city and anatomical models. It also facilitates robot navigation in complex environments, and production

of real (tangible) models of objects through scanning and 3D printing. The goal of his recent research is to provide a theoretical basis for ensuring that the models are correct and accurate. In one of his notable contributions he has identified the exact conditions under which available data is sufficient to allow unambiguous model creation. This work relies on advanced methods of algebraic and projective geometry.

Jaeger Medal

The Jaeger Medal is a career award made in honour of the contribution of Professor John Conrad Jaeger FAA FRS to Australian Earth science. The award is made to a scientist for investigations of a high order into the solid Earth or its oceans carried out in Australia or having some connection with Australian Earth science. Although work carried out during a candidate's entire career will be taken into consideration, special weight will be given to recent research.



Professor Matthew England FAA
UNSW Sydney



Professor Matthew England is Scientia Professor of Ocean & Climate Dynamics at the University of New South Wales Centre for Marine Science and

Innovation, Deputy Director of the Australian Centre for Excellence in Antarctic Science, and the global Academic Lead of the International Universities Climate Alliance (IUCA). His research focuses on large-scale ocean circulation and the influence of the oceans on regional and global climate, from the tropics to Antarctica, spanning time-scales of seasons to millennia.

Suzanne Cory Medal

The Suzanne Cory Medal recognises outstanding research in all of the biological sciences, being awarded in alternate years in the biomedical sciences and in all of the biological sciences excluding biomedical sciences. It is a career award that is open to any biological science researcher regardless of time since their major degree. It honours the contributions made to science by Professor Suzanne Cory AC FAA FRS who, as a molecular biologist, has made major contributions to understanding the genetic causes of cancer.



Professor Terry Hughes FAA
James Cook University



Distinguished Emeritus Professor Terry Hughes is one of the world's foremost coral reef ecologists. A dominant

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theme in his research is the resilience of tropical reefs to multiple drivers of change, including overfishing, coastal pollution and anthropogenic climate change. His research has enabled him to translate fundamental and innovative science into practical solutions that improve the management and governance of marine environments. In recent years, his research has increasingly evolved to encompass the interface between biology and the social sciences, enabling a broader evaluation of the linkages between coral reef ecosystems, the goods and services they provide to people, coral reef governance, and the welfare of human societies. Professor Hughes is an advisor to many governments, agencies and NGOs. He has received three Honorary Doctorates, from Universiti Malaysia Terengganu (2014), Trinity College, Dublin (2019), and James Cook University, Australia (2023).



Professor Catherine Lovelock FAA
University of Queensland



Professor Catherine Lovelock is Professor at the University of Queensland. She is an ARC Laureate Fellow and Fellow of the Australian Academy of Science. Her research focuses on climate change and its impacts on coastal plant communities as well as the role of coastal wetlands in adaptation and climate change mitigation or blue carbon. She leads projects in Australia and internationally to enhance restoration of mangroves and other coastal wetlands for climate change mitigation, adaptation and other benefits. She was lead author of the 2019 IPCC Guidelines for National Greenhouse Gas Inventories (Wetlands) and led the development of Australia's first blue carbon method for the voluntary carbon market.

Thomas Ranken Lyle Medal

The Thomas Ranken Lyle Medal is a career award that commemorates the contribution of Sir Thomas Ranken Lyle FRS to Australian science and industry generally and in particular to his own fields of physics and mathematics. The purpose of the medal is to recognise outstanding achievement by a scientist in Australia for research in mathematics or physics.



Professor Susan Scott FAA
Australian National University



Professor Susan Scott is a Distinguished Professor at the Australian National University and an internationally recognised mathematical physicist with a stellar research career spanning four decades. She has made fundamental advances in our understanding of the fabric of space-time in general relativity, and in gravitational-wave science. Her groundbreaking discoveries probe the existence and nature of singularities, including black holes, the global structure of space-time, and possible initial and final endstates for the universe. Professor Scott has also been a pioneer in the analysis of astrophysical signatures in gravitational-wave experiments, including the searches for gravitational waves from asymmetric neutron stars and from inspiralling binary systems of black holes and neutron stars. She has played an important role in the development and promotion of gravitational research worldwide, and a leading role in Australia's participation in the first detection of gravitational waves in 2015. She is a role model for girls and women wishing to follow careers in the physical sciences.



Professor Nick Wormald FAA
Monash University



Professor Nick Wormald is a Professor of Mathematics at Monash University. He specialises in random graphs and probabilistic combinatorics, graph theory and enumeration. He has experience in several areas of combinatorics, discrete probability and theoretical computer science, including the analysis of graph algorithms, minimal Steiner trees and the analysis of real-life networks. He has also worked on the optimisation of underground mine access networks. In 1979, he earned a PhD in mathematics from the University of Newcastle. After appointments in Canada (Waterloo, 1979), USA (LSU, 1980), Australia (Newcastle 1982; QEII Fellowship), New Zealand (Auckland, 1984), Australia (Melbourne, 1991) and Canada (Waterloo, 2003), he returned yet again to Australia (Monash, 2013) on an Australian Laureate Fellowship. He was awarded the 1993 research medal of the Australian Mathematical Society and the 2006 Euler Medal of the Institute of Combinatorics and its Applications.

Mid-career honorific awards 2023

Mid-career awards recognise outstanding contributions to the advancement of science by researchers between eight and 15 years post-PhD in the calendar year of nomination.

Jacques Miller Medal

The Jacques Miller Medal for Experimental Biomedicine has been established to honour the contributions made to science by Professor Jacques Miller AC FAA FRS that include the discovery of the function of the thymus and the identification, in mammalian species, of the two major subsets of lymphocytes and their functions. The award recognises research of the highest standing in the field of experimental biomedicine.



Professor Di Yu

University of Queensland



Professor Di Yu holds the position of Chair in Paediatric Immunotherapy and serves as the inaugural

Director of the Ian Frazer Centre of Children's Immunotherapy Research at the University of Queensland. Additionally, in his role as a Professor of Immunology, he leads the Systems and Translational T-cell Immunology Laboratory (STTIL) at the University of Queensland Frazer Institute. He received his PhD from the Australian National University, followed by postdoctoral training at the Garvan Institute of Medical Research. Before joining the University of Queensland, he was a faculty member at Monash University and the Australian National University. His research is dedicated to exploring T cell subsets and developing new therapies to modulate their functions in clinical settings, aiming to treat autoimmune diseases and cancer. He is deeply passionate about assessing individuals' immune status and co-founded the Systems Immunology special interest group of the Australian and New Zealand Society for Immunology.

CD4+ T cells: empowering the immune system's full potential

CD4+ T cells are a major population of lymphocytes. They predominantly assist other immune cells in immune responses, unlike CD8+ T cells and natural killer (NK) cells, which perform cytotoxic killing of infected or cancerous cells, or B cells, which produce antibodies against pathogens. Nevertheless, the assistance of CD4+ T cells is essential for immune competence and balance. The critical role of CD4+ T cell help in mounting antibody responses was initially demonstrated by Professor Jacques Miller in the 1960s. In the past 20 years, research, including that by Professor Yu and his team, has revealed fundamental knowledge about the collaboration between B cells and CD4+ T cells. Professor Yu presents how his team's discoveries in experimental medicine related to CD4+ T cell function can benefit diagnoses and therapies for autoimmune, allergic and infectious diseases, as well as improve human vaccine efficacy.

Nancy Millis Medal

The Nancy Millis Medal of the Australian Academy of Science has been established to honour the contributions made to science by Professor Nancy Millis AC MBE FAA FTSE and recognises her importance as a role model for women aspiring to be research leaders.



Professor Renae Ryan

University of Sydney



Professor Renae Ryan is an international leader in the field of membrane protein structure and function.

She has dedicated her career to understanding the molecular architecture and choreography of

neurotransmitter transporters and their link to neurological disease, providing the basis for the development of new medications. Professor Ryan has produced a rich body of highly respected and influential research appearing in top-tier multidisciplinary journals. Evidence of her esteem comes from the award of over 20 prizes including the International Award from the Biochemical Society, the Nancy Millis Medal and the Eureka Prize for Outstanding Mentor of Young Researchers. She has served as Secretary-General of the Asian Biophysical Association and is the Australian Ambassador for the USA Biophysical Society. Professor Ryan is a globally respected leader and advocate for gender equity, diversity and inclusion, and a sought-after supervisor, mentor and role model for women in science.

The twisted link between dual function transporter/channel proteins and brain disease

Cells from all life forms are surrounded by a lipid membrane containing transport proteins that control the movements of molecules into and out of cells and are vital for a plethora of physiological processes including cell-to-cell communication, obtaining nutrients, extruding waste and maintaining cell viability. Glutamate transporters are enigmatic dual function proteins that also possess chloride channel activity, two processes thought to be structurally and mechanistically distinct. They are found across all domains of life and in humans, they perform the essential role of regulating the excitatory neurotransmission to ensure normal brain function. Dysfunction of these transporters is linked to several neurological diseases such as episodic ataxia, which is characterised by periods of severe incoordination and paralysis and associated with migraine and epilepsy. Professor Ryan and her team's research has revealed a direct link between the chloride channel and disease and raises interesting questions about the physiological role of the chloride channel function.

Early-career honorific awards 2023

Early-career awards recognise outstanding contributions to the advancement of science by researchers no more than 10 years post-PhD in the calendar year of nomination.

Anton Hales Medal

The Anton Hales Medal recognises research in the Earth sciences and honours the contributions to the Earth sciences by Professor Anton L Hales FAA. Professor Hales was the founding director of the Research School of Earth Sciences at the Australian National University.



Associate Professor Teresa Ubide

University of Queensland



Associate Professor Teresa Ubide is a volcano scientist passionate about investigating the rock record to better understand magma transport and storage through Earth's upper mantle and crust. She developed microchemical techniques to interrogate magmatic crystals and their carrier melts, providing a better understanding of past eruptions as a key for future activity. Associate Professor Ubide's research is bringing new insight into the inner workings of volcanoes, using crystal and melt archives to constrain magmatic processes in space and time, contributing to better forecast volcanic activity. Her ARC Future Fellowship investigates volcanic arcs as factories of critical metals for the energy transition. Associate Professor Ubide joined the University of Queensland in 2016, after holding a postdoctoral fellowship at Trinity College Dublin. She undertook her postgraduate research in Spain and The Netherlands (Vrije Universiteit Amsterdam) and received her PhD from the University of Zaragoza in December 2013. She was born and raised by the sea, in San Sebastián.

Christopher Heyde Medal

The Christopher Heyde Medal honours the contributions to mathematics by Professor Christopher Charles Heyde AM FAA FASSA. Professor Heyde was the Foundation Dean of the School of Mathematical Sciences at the Australian National University, and Professor Emeritus of Statistics at Columbia University, New York. In 2023 the medal recognises outstanding achievement in pure mathematics, applied, computational and financial mathematics.



Dr Valentina Wheeler

University of Wollongong



Dr Valentina Wheeler is a geometric analyst specialising in elliptic and parabolic partial differential equations. Her primary focuses of research are geometric flows and their applications. A geometric flow describes a movement through space and time via geometric deformation of a mathematical object. Dr Wheeler is interested mostly in models that have direct applicability to real life phenomena, as for example those describing biological membranes and the motion of fire fronts. A past Berlin Mathematical School graduate at Freie University, she is currently a proud member of the Australian mathematical community based at the University of Wollongong.

Dorothy Hill Medal

The Dorothy Hill Medal honours the contributions of Professor Dorothy Hill AC CBE FAA FRS to Australian Earth science, and her work in opening up tertiary science education to women. The award recognises research in the Earth sciences by women researchers.



Associate Professor Raffaella Demichelis

Curtin University



Associate Professor Raffaella Demichelis leads a team at Curtin University doing research in minerals chemistry. Her work proved a new nucleation theory and opened new perspectives in the description of complex mineral structures. She co-authored software packages and tools used worldwide in academia and industry. Associate Professor Demichelis spreads her enthusiasm for science through engaging with outreach and community-building activities. She advocates for an inclusive and sustainable research environment, contributing to local and national initiatives such as co-founding networks in WA; chairing the EMCR Forum of the Australian Academy of Science; and co-authoring the ACOLA report on modernising research assessment. Recognitions for her work include the Caglioti prize (Italian Academy of Science), the Houtermans award (European Association of Geochemistry) and the Dorothy Hill Medal.

Fenner Medal

The Fenner Medal recognises outstanding contributions to science by Professor Frank Fenner AC CMG MBE FAA FRS. It recognises outstanding research in biology.



Associate Professor Emily Wong
Victor Chang Cardiac Research Institute



Associate Professor Emily Wong is Head of the Regulatory Systems Laboratory at the Victor Chang Cardiac Research Institute (VCCRI) and a member of the School of Biotechnology and Biomolecular Sciences at UNSW Sydney. She is internationally known for her work on the evolution and comparative genomics of enhancers. She uses computational systems methods to elucidate the genome's regulatory networks and regulatory regions in development and aging. She received her PhD in Bioinformatics and Computational Genomics in Sydney before postdoctoral training at the European Molecular Biology Laboratory – European Bioinformatics Institute (EMBL-EBI), in Cambridge, UK, and at the University of Queensland. Associate Professor Wong has held numerous postdoctoral fellowships including EMBO long-term and advanced fellowships and an ARC Discovery Early Career Award. In 2019, she started her lab at the VCCRI. She is currently an NHMRC Investigator (EL2) (2022–26) and a Snow Fellow (2023–30).

Gottschalk Medal

The Gottschalk Medal recognises outstanding research in medical science and honours the contributions to science of Professor Alfred Gottschalk FAA.



Dr Alisa Glukhova WEHI



Dr Alisa Glukhova is a laboratory head in the Structural Biology Division at WEHI and a Senior Research Fellow in the Department of Biochemistry and Pharmacology at the University of Melbourne. She earned her PhD in Chemical Biology in 2014 from the University of Michigan, where she worked on solving structures of lipid-modifying enzymes using x-ray crystallography. During her postdoctoral training at Monash Institute of Pharmaceutical Sciences, she used x-ray crystallography, cryo-electron microscopy and pharmacology techniques to study different G protein-coupled receptors. Since joining WEHI in 2020, Dr Glukhova has focused on understanding the structural and biochemical aspects of the Wnt signalling pathway, an important pharmacological target for treating many cancers. Using structural biology, her team captures snapshots of different stages in the Wnt signalling cascade to understand the atomic picture and gain insights into various aspects of signal transmission through Wnt pathways.



Professor Si Ming Man
Australian National University



Professor Si Ming Man is a CSL Centenary Fellow and NHMRC Leadership Fellow. His laboratory focuses on innate immunity in the host defence against infectious diseases and the development of cancer and other chronic diseases. He is a recipient of the Gottschalk Medal for 2023.

John Booker Medal

The John Booker Medal in Engineering Science recognises outstanding research in engineering mechanics that addresses problems in the static and dynamic response of physical systems within engineering and applied mathematics disciplines. It honours the memory of Professor John Robert Booker AO FAA who worked in the area of theoretical geomechanics, was Professor in the Department of Civil and Mining Engineering at the University of Sydney (1970–98), and held a personal chair in engineering mechanics at the University of Sydney.



Dr Amelia Liu Monash University



Dr Amelia Liu received her PhD from the University of Melbourne and did post-doctoral research in the Electron Microscopy Center, Materials Science Division, Argonne National Laboratory (US-DoE). Dr Liu returned to Australia and Monash University and has been employed at Monash in a variety of roles. These include a Margaret Clayton Women in Research fellowship in the School of Physics and Astronomy and managing research capabilities in the Monash Centre for Electron Microscopy. She is currently an ARC Future Fellow and Senior Lecturer in the School of Physics and Astronomy. Dr Liu's principal research interest is in the nature of glass and how the disordered structure of glass influences its behaviour and properties. Her work has been recognised with several awards including from the Australian Microscopy and Microanalysis Society.

Le Fèvre Medal

The Le Fèvre Medal for research in chemistry commemorates the work of Professor Raymond James Wood Le Fèvre FAA FRS. Its purpose is to recognise outstanding basic research in chemistry.



Associate Professor Rona Chandrawati

UNSW Sydney



Associate Professor Rona Chandrawati is a Scientia Associate Professor and NHMRC Emerging Leadership Fellow in the School of Chemical Engineering at UNSW Sydney, and a co-Director of the Australian Centre for Nanomedicine. She obtained her PhD from the University of Melbourne in 2012 and was then a Marie Curie Fellow at Imperial College London before returning to Australia as a Lecturer (2015–17), Scientia Senior Lecturer (2018–20), and Scientia Associate Professor (2021–present). Her research group focuses on organic and inorganic nanomaterials for sensing and drug delivery. Associate Professor Chandrawati's research has been recognised through awards such as the 2023 Le Fèvre Medal, the 2023 Eureka Prize Finalist for Innovative Research in Sustainability, the 2021 Eureka Prize Finalist for Outstanding Early Career Researcher, and the 2021 NSW Early Career Researcher of the Year as part of the NSW Premier's Prizes for Science & Engineering.



Professor Tianyi Ma

RMIT University

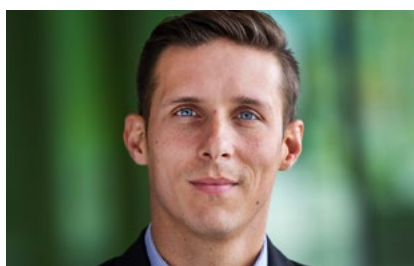


Professor Tianyi Ma is RMIT University's Distinguished Professor. He is an Australian Research Council (ARC) Future Fellow, Fellow of the Royal Society of Chemistry (RSC),

and a Clarivate Highly Cited Researcher in both chemistry and materials science. His international standing is evidenced by more than 400 publications in top-tier journals. His H-index is 90, and he has more than 35,000 citations. His research has been acknowledged via the Australian Academy of Science Le Fèvre Medal, Young Tall Poppy Science Award, ARC Discovery Early Career Researcher Award, Australia's nominee for the 2023 ASPIRE Prize and the John Jeyes Award of RSC. His scientific impact and leadership are evidenced by his supervision of 35 PhD students, more than A\$30 million in government and industry funding, and engagement in international academic roles, such as Associate Editor, Editorial Board Member and Guest Editor for over 10 international journals.

Moran Medal

The Moran Medal recognises the contributions to science of Patrick Alfred Pierce Moran FAA FRS. Its purpose is to recognise outstanding research by scientists in one or more of the fields of applied probability, biometrics, mathematical genetics, psychometrics and statistics.



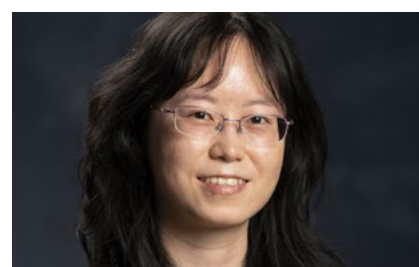
Professor David Frazier

Monash University



Professor David T. Frazier is Professor of Statistics and Econometrics at Monash University, working in Bayesian Statistics and its applications to time series and forecasting. Professor Frazier's research interests are broad, but his primary focus has been on the area of simulation-based inference. Notably, he is one of only a handful of researchers to have made significant contributions to this field, which straddles the Bayesian and

frequentist statistical paradigms. This includes novel methodological and theoretical developments in the realms of synthetic likelihood, approximate Bayesian computation, indirect inference and generalised Bayesian inference. His most recent work has focused on the challenging – but critically important – issue of model misspecification in simulation-based inference and forecasting; explorations that are at the cutting edge of thinking in this field.



Dr Rachel Wang

University of Sydney



Dr Rachel Wang is a statistician in the School of Mathematics and Statistics at the University of Sydney. Her research interests broadly lie in statistical network modelling and statistical machine learning, and their applications to large-scale, complex genomics data. Before joining the University of Sydney, she received her PhD in Statistics at the University of California, Berkeley and worked as a Stein Fellow in the Department of Statistics at Stanford University. She was a Harrington Faculty Fellow at the University of Texas in 2021–22.

Pawsey Medal

The Pawsey Medal recognises the contributions to science in Australia by Professor Joseph Pawsey FAA FRS. Its purpose is to recognise outstanding research in physics.



Professor Yuerui Lu
Australian National University



Modern information technologies are increasingly focused on the development of integrated opto-electronic devices with compact footprints and integrated functionalities. Key in the downscaling of integrated opto-electronic devices to the nanometre scale has been ultra-thin, two-dimensional (2D) 'quantum' materials. Professor Yuerui Lu's team at the Australian National University has developed new types of atomically thin 2D materials and devices with peculiar optical and electronic properties, enabling new applications in electronics, photonics and space.

These novel materials facilitate devices that are significantly smaller, less massive, and require much lower power to operate. His discovery could introduce new materials and devices in applications ranging from smaller and fast-speed 3D cameras for future smartphones, and low-weight and high-quality satellite electronics – making future space missions more accessible and cheaper to launch. His work was chosen by the Australian Research Council (ARC) to be a national highlight in 2020.

Aboriginal and Torres Strait Islander Scientist Award 2023

This award recognises research in the physical and biological sciences, allowing interdisciplinary and sociocultural research that could straddle the social sciences and humanities, by outstanding Aboriginal and Torres Strait Islander PhD students and early- and mid-career scientists. It aims to support their research and/or the expansion and growth of their research networks and international knowledge exchange through visits to relevant international centres of research. Awards are up to \$20,000, with additional support provided to attend the Academy's biennial Science at the Shine Dome event.



Ms Stephanie Beaupark
University of Wollongong

Ms Stephanie Beaupark is a Ngugi artist, scientist and curator who specialises in facilitating Indigenous-led knowledge exchange between Indigenous and westernised sciences through creative practice. She is an Associate Lecturer at the University of Wollongong, a Research Associate with the ARC Centre of Excellence for Australian Biodiversity and Heritage and a PhD candidate at the University of Wollongong, where she is studying the Indigenous science of Australian plant dyes.



Ms Michelle Hobbs
Griffith University

Ms Michelle Hobbs is an Indigenous ecologist, a descendent of Bidjara of Central Queensland. She is an Associate Lecturer and PhD candidate at Australian Rivers Institute and School of Environment and Science, Griffith University. Ms Hobbs specialises in freshwater ecology of dryland to tropical rivers, particularly freshwater mussels and fish, with recognition of Indigenous ecological knowledges. She has several years of industry experience as an environmental consultant, covering ecology of marine

and freshwater systems and impact assessments. Ms Hobbs has worked in policy (water quality) and wildlife conservation with the Queensland Government, contributing to policy strategies, community consultation and stakeholder engagement. She has diverse field experience across Australia, Papua New Guinea, south east Asia and Canada. She has been a member of the Technical Advisory Group for the Native Fish Management and Recovery Strategy for the Murray–Darling Basin Authority since 2020, and teaches biology and ecology undergraduate courses at Griffith University.

Max Day Environmental Science Fellowship Award 2023



The Max Day Environmental Science Fellowship Award is an annual award of up to \$20,000 per awardee to assist PhD students or early-career researchers with their research. It provides funding support toward research expenses, courses and the cost of travel. The award is named in honour of Dr Maxwell Frank Cooper Day AO FAA who spent a lifetime championing entomology, conservation and forestry, as well as helping other scientists. Through sponsoring this award, Dr Day is acknowledging the support that he himself received as a young researcher to travel overseas to gain his PhD at Harvard.



Dr Patrick Finnerty

University of Sydney

Dr Patrick Finnerty is a Postdoctoral Research Fellow in the Global Ecology Lab at the University of Sydney. His research is wildlife conservation focused, with his current projects exploring implementing species reintroduction or 'rewilding' efforts across NSW to aid species recovery, improving ecosystem resilience, and

engaging local communities. Additionally, as part of his doctorate, and as funded by the Australian Academy of Science Max Day Environmental Science Fellowship Award, he explored novel ways to mitigate human wildlife conflict across Australia and Southern Africa. Specifically, he developed a novel tool to define, artificially replicate and deploy the odour of plants we know herbivores naturally avoid as a non-invasive way to gently nudge problematic herbivores away from plants we value. The overarching aims of his research are to produce applicable findings and provide tangible benefits in crucial real-world conservation and wildlife management efforts.



Mr Shawn Scott

University of South Australia

Mr Shawn Scott is a PhD candidate at the University of South Australia. His research focuses on the conservation ecology of herpetofauna, particularly how South Australian frog and reptile communities respond to disturbances such as fire.



The EMCR (Early- and Mid-Career Researcher) Forum is the voice of Australia's future scientific leaders. If you're an EMCR and want to contribute to improving the national research environment, become a member to hear about opportunities.



ACADEMY AWARDS 2024



Premier honorific awards 2024

Premier honorific awards are the Academy's most prestigious awards, recognising researchers of the highest standing over a career of whatever length.

Macfarlane Burnet Medal and Lecture 2024

The Macfarlane Burnet Medal and Lecture recognises scientific research of the highest standing in the biological sciences. It is a Premier career award that commemorates the contributions to science by Professor Sir Frank Macfarlane Burnet OM KBE MD FAA FRS NOBEL LAUREATE.



Professor David Lindenmayer
AO FAA Australian National University



Professor David Lindenmayer is a world-leading expert in forest ecology and resource management, conservation science and biodiversity conservation. He currently runs five large-scale, long-term research

programs in south-eastern Australia, primarily associated with developing ways to conserve biodiversity in farmland, wood production forests, plantations and reserves. He has maintained some of the largest long-term research programs in Australia, with some exceeding 42 years in duration. Professor Lindenmayer has published more than 1442 scientific works, including 929 peer-reviewed papers in international scientific journals. He has published 49 books, including many award-winning textbooks and other seminal books, and is among the world's most productive and most highly cited scientists, particularly in forest ecology and conservation biology.

Disturbance begets disturbance: feedbacks and disturbance-stimulated flammability in forests

Large parts of the world, including Australia, are experiencing more frequent and severe wildfires. Climate change is a key driver of fire regime change – so too are disturbances such as logging and thinning. In this lecture, Professor Lindenmayer outlines new insights into disturbance-stimulated flammability in forests and its implications for fire behaviour, fire regimes and forest management.

Ruby Payne-Scott Medal and Lecture 2024

The Ruby Payne-Scott Medal and Lecture is a Premier career award that recognises female researchers of the highest standing in the physical and/or biological sciences. It is one of the most prestigious career awards of the Academy and honours Ruby Payne-Scott's pioneering contribution to radiophysics and radio astronomy.



Professor Kerrie Mengersen

FAA FASSA

Queensland University of Technology



Professor Kerrie Mengersen is a Distinguished Professor of Statistics and Director of the Centre for Data Science at QUT, Australia. She is an elected member of the Australian Academy of Science and

the Academy of the Social Sciences in Australia, and a Vice-President of the International Statistical Institute. She is passionate about developing methods to break open data and reveal insights that can help address critical challenges in health, environment, society and industry. She can be found perched on a stool at the intersection of statistics, machine learning, AI and technology, and being constantly amazed and challenged by the current and future-promised traffic.

Bayesian statistical science in the 2020s

Bayesian methods are now pervasive in statistical modelling and analysis. Interestingly, although this approach has its origins in the late 18th century, some

of the key theoretical, methodological and practical challenges faced then are still being addressed today. These include formulation of the prior distribution, characterisation of the data through the likelihood and computational algorithms that enable implementation of the approach. In this lecture, Professor Mengersen reviews the state of Bayesian statistical science in our time. Touching on the above issues, she discusses their role in data-informed decision making, learning and AI, and describes some of the ways in which she and her team have been implementing Bayesian approaches to address substantive environmental, health and societal challenges. This research is joint with a range of collaborators acknowledged in the presentation.



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Career honorific awards 2024

Career honorific awards recognise lifelong achievement in the outstanding contribution to the advancement of science.

David Craig Medal and Lecture 2024

The David Craig Medal is awarded in honour of the outstanding contribution to chemical research of Professor David Craig AO FAA FRSC. It recognises contributions of a high order to any branch of chemistry by active researchers. The recipient of this medal delivers several public lectures across Australia.



Professor Justin Gooding FAA FTSE
UNSW Sydney



Professor Justin Gooding is a Scientia Professor in the School of Chemistry at the University of New South Wales. He is a National Health and Medical Research Council Leadership Fellow and has just been awarded an Australian Research Council Australian Industry Laureate Fellow. He is also a fellow of the Australian Academy of Science and the Australian Academy of Technological Sciences and

Engineering. He is the 2024 David Craig Medalist and a three time Eureka Prize winner. He is the inaugural editor-in-chief of ACS Sensors and the founding co-director of the Australian Centre for NanoMedicine and the New South Wales Smart Sensing Network. Professor Gooding leads a research team of over 40 researchers interested in surface modification and nanotechnology for biosensors, electrocatalysis and 3D cell printing. He has been involved in the commercialisation of glucose biosensors, 3D bioprinters and an in vivo sensing platform for therapeutic drug monitoring.

From understanding single molecule thick films to commercialising sensing technologies to help save lives

Biosensors comprise integrating a biological molecule, that can recognise a biomarker of interest, with an electrode or optical instrument, to give

a solid device that is exposed to a biofluid without any sample preparation. Examples are the glucose meters for diabetic patients and the COVID test kits. As biosensors are solid devices interacting with a solution, they are interfacial devices and so how the interface is designed is of paramount importance to the function of the final biosensors. In this lecture, Professor Gooding covers fundamental advances in modifying surfaces with self-assembled monolayers to make better performing, or completely new, types of biosensors. He explains the importance of monolayer chemistry in facilitating commercialisation of a glucose biosensor, a 3D bioprinter for developing model cancers for drug and treatment testing, and a new class of biosensor that can monitor therapeutic drug levels in the body in real time.

Mawson Medal and Lecture 2024

The Mawson Medal and Lecture recognises research in the Earth sciences and honours the contribution to science in Australia by Sir Douglas Mawson FAA FRSC, geologist and Antarctic explorer.



Dr Adriana Dutkiewicz
University of Sydney



Dr Adriana Dutkiewicz received her PhD in Earth Sciences from Flinders University in 1997 for her work on

Quaternary paleoclimate of salt lakes. Following her PhD she worked on commercial projects at CSIRO focusing on fluid migration in petroleum reservoirs. She has been at the University of Sydney since 2000 where she has held three ARC Fellowships including a QEII Fellowship and a Future Fellowship. Her research includes the discovery of the oldest oil preserved in rocks, with implications for the composition of the early biosphere, and the construction of the first digital global map of deep-sea sediments using big data analysis and machine learning. She and her team

have linked deep-sea sediments and plate tectonics, advancing our understanding of the deep-sea sedimentation and the long-term carbon cycle. Dr Dutkiewicz is a recipient of the Academy's Dorothy Hill Medal and JG Russell Award, and the CSIRO Medal for Scientific Achievement.

Suzanne Cory Medal

The Suzanne Cory Medal recognises outstanding research in all of the biological sciences, being awarded in alternate years in the biomedical sciences and in all of the biological sciences excluding biomedical sciences. It is a career award that is open to any biological science researcher regardless of time since their major degree. It honours the contributions made to science by Professor Suzanne Cory AC FAA FRS who, as a molecular biologist, has made major contributions to understanding the genetic causes of cancer.



Professor Peter Koopman FAA
University of Queensland



Professor Peter Koopman is Emeritus Professor at the University of Queensland (UQ), a Fellow of the Australian Academy of Science, and former Australian Research Council Federation Fellow and National Health and Medical Research Council Senior Principal Research Fellow. He has over 40 years' experience as a biomedical research scientist, specialising in developmental biology and molecular genetics. He has published more than 300 research papers, attracted some \$56 million in competitive research funding, and won numerous national and international research awards. Professor Koopman also served as UQ's inaugural Executive Director of Research Ethics and Integrity. In his spare time, he investigates research data fraud, is director of a biotech startup, advocates for equity and diversity in STEM, and maintains a website on sex development.

Genes and the building of the embryo

Few mysteries in biology are as captivating as how the human embryo, with all its astonishing complexities, assembles itself starting with a single cell. Professor Koopman's research has focused on how genes function as the 'blueprint', and how that blueprint is read. He played a key role in the discovery of the gene Sry, and showed that it is the essential male sex-determinant on the Y chromosome. His subsequent body of work has exposed the genetic and cellular pathways by which males and females come to be, providing new avenues for diagnosing and managing human variations in sex development. In parallel, his research group isolated the master switch genes that drive the formation of the skeleton and lymphatic systems during embryonic development. Together, these discoveries have impacted on areas as diverse as paediatric medicine, stem cell biology, cancer therapy, pest management, gender studies and sport.

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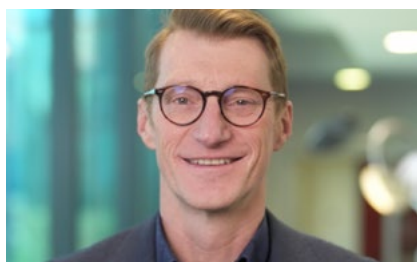
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Mid-career honorific awards 2024

Mid-career awards recognise outstanding contributions to the advancement of science by researchers between eight and 15 years post-PhD in the calendar year of nomination.

Gustav Nossal Medal

The Gustav Nossal Medal for Global Health honours the contributions made to fields of cellular immunology, antibody formation and tolerance and vaccine research science by Professor Sir Gustav Nossal AC CBE FAA FTSE FRSc. The award recognises research of the highest standing in the field of global health.



Professor Andrew Steer FAHMS
Murdoch Children's Research Institute



Professor Andrew Steer is Director of Infection, Immunity and Global Health at the Murdoch Children's Research Institute, and Group Leader of the Tropical Diseases Research Group at MCRI (founded 2012). He is an Honorary Professorial Research Fellow in the Department of Paediatrics at the University of Melbourne, as well as a paediatric infectious diseases physician at the Royal Children's Hospital in Melbourne. He is a Fellow of the Australian Academy of Health and Medical Sciences.

Scratch an itch: global control of neglected tropical diseases

The neglected tropical diseases are a group of 20 diseases that disproportionately afflict billions of the most disadvantaged people in the world, contributing to the cycle of poverty. For several of these diseases, major progress has been made in their public health control via whole-of-community treatment, especially using the drug ivermectin. The contribution

of ivermectin to global health was recognised by the Nobel Prize. Scabies, the latest addition to the World Health Organization's list of neglected tropical diseases, is caused by a tiny mite that burrows into the skin, causing severe itch and serious complications caused by bacterial infection. Professor Steer's collaborative team has conducted clinical trials in the Pacific that demonstrated that ivermectin mass treatment can substantially reduce the burden of scabies among whole populations. These trials have paved the way for new global efforts to control scabies, with funded national programs and an international framework for control.

Nancy Millis Medal

The Nancy Millis Medal of the Australian Academy of Science honours the contributions made to science by Professor Nancy Millis AC MBE FAA FTSE, and recognises her importance as a role model for women aspiring to be research leaders.



Professor Anita Ho-Baillie
University of Sydney



Professor Anita Ho-Baillie is the John Hooke Chair of Nanoscience at the University of Sydney, an ARC Future Fellow and Adjunct Professor at UNSW. She completed her Bachelor of Engineering on a Co-op scholarship in 2001 and her PhD in 2005 at UNSW. Her research focuses

on engineering nanoscale materials and devices to integrate solar cells into various surfaces, generating clean energy. She is a Highly Cited Researcher (2019–23), a 2021 Australian Museum Eureka Prize finalist, and was named Top Australian Sustainable Energy Researcher by The Australian's Annual Research Magazine. In 2022, she won the Royal Society of NSW Warren Prize for pioneering next-gen solar cells. She was a finalist in four categories for the 2023 Australian Space Awards, Scientist of the Year at the 2024 Australian Space Awards and received the Nancy Mills Medal from the Australian Academy of Science. She is a Fellow of the Australian Institute of Physics, Royal Society of NSW, and Royal Society of Chemistry.

Next-generation solar cells

The development of next-generation solar cells will play a key role in the transition to a carbon-free economy. Solar cell technology based on silicon has a theoretical energy conversion efficiency limit of approximately 30%. This is because it only partially converts high-energy light to electrical energy. Professor Ho-Baillie speaks about the work by her research group focusing on developing multi-junction solar cells to overcome this problem. This approach uses different semiconductor materials within a single solar cell with the aim of converting sections of the solar spectrum to electricity more efficiently. Her group incorporates the class of materials called metal halide perovskites into these multi-junction solar cells, demonstrating record efficiencies. In addition, their recent breakthrough resolved the key instability problem with perovskite cells, by preventing them from degrading in heat and humidity. This work represents a critical step towards making durable, commercially viable perovskite cells.

Early-career honorific awards 2024

Early-career awards recognise outstanding contributions to the advancement of science by researchers no more than 10 years post-PhD in the calendar year of nomination.

Anton Hales Medal

The Anton Hales Medal recognises research in the Earth sciences and honours the contributions to the Earth sciences by Professor Anton L Hales FAA. Professor Hales was the founding director of the Research School of Earth Sciences at the Australian National University.



Dr Andrew King
University of Melbourne



Dr Andrew King is a Senior Lecturer in Climate Science at the University of Melbourne. He completed his PhD at UNSW in 2015 and has since worked at Melbourne as a postdoc, DECRA fellow and lecturer. Dr King is interested in climate extremes, past and future changes, and climate variability.

Christopher Heyde Medal

The Christopher Heyde Medal honours the contributions to mathematics by Professor Christopher Charles Heyde AM FAA FASSA. Professor Heyde was the Foundation Dean of the School of Mathematical Sciences at the Australian National University, and Professor Emeritus of Statistics at Columbia University, New York. In 2024 this medal recognises outstanding achievement in pure mathematics, and applied, computational and financial mathematics.



Professor Serena Dipierro
University of Western Australia



Professor Serena Dipierro took her PhD in Mathematical Analysis at the International School for Advanced Studies (SISSA, Trieste) in 2012. After postdoc positions at the Universidad de Chile and University of Edinburgh, and a Humboldt Fellowship, she held permanent positions at the University of Melbourne and the Università di Milano. In 2018 she moved to the University of Western Australia, where she is now Professor of Mathematics. Professor Dipierro has been awarded the Australian Mathematical Society Medal, the Bartolozzi Prize from the Italian Mathematical Union and the Christopher Heyde Medal. Her research focuses on partial differential equations, free boundary problems, nonlocal equations, calculus of variations, nonlinear analysis, and applications.



Dr Christopher Lustrì
University of Sydney



Dr Christopher Lustrì completed his undergraduate studies at the Queensland University of Technology. He then moved to the UK to complete a PhD at the University of Oxford, studying exponential asymptotics and fluid dynamics. Dr Lustrì returned to Australia in 2013

to take up a postdoctoral position at the University of Sydney studying discrete integrable systems. He started as a lecturer in mathematics at Macquarie University in 2016, and moved to the University of Sydney in 2023.

Dorothy Hill Medal

The Dorothy Hill Medal honours the contributions of Professor Dorothy Hill AC CBE FAA FRS to Australian Earth science, and her work in opening up tertiary science education to women.



Associate Professor Ailie Gallant
Monash University



Associate Professor Ailie Gallant is a climate scientist in the School of Earth, Atmosphere and Environment at Monash University. Her past work has focused on hydroclimatology: investigating links between climate and precipitation, with a particular focus on drought. Her current work investigates how the weather changes during periods of drought, and how fast the land can dry during drought. Her past work has also included investigating variability and trends in climate extremes, including heatwaves and extreme precipitation. Associate Professor Gallant is a Chief Investigator for the ARC Centre of Excellence for Climate Extremes, and the recently established ARC Centre of Excellence for 21st Century Weather. She is a former ARC DECRA Fellow and Young Tall Poppy Award Winner (2015).

Fenner Medal

The Fenner Medal recognises outstanding contributions to science by Professor Frank Fenner AC CMG MBE FAA FRS. It recognises outstanding research in biology.



Associate Professor Ana Martins Sequeira

Australian National University



Associate Professor Ana Sequeira is a marine ecologist focusing on the analyses of marine

megafauna movement and the development of statistical movements to understand processes in the ocean. She has pioneered the development of global distribution models for marine megafauna species and her work has been used to inform changes in species conservation status. Associate Professor Sequeira leads the global scientific project MegaMove, which aims to reveal global ocean space use by marine megafauna across taxa including cetaceans, other marine mammals, sharks, sea birds and turtles. She leads the largest collaborative network of marine movement ecologists and aims to generate the research needed to improve marine megafauna conservation globally.

Frederick White Medal

The Frederick White Medal honors the contributions to Australian science of Sir Frederick White KBE FAA FRS. It recognises the achievements of scientists in Australia who are engaged in research of intrinsic scientific merit that has made an actual or potential contribution to community interests, to rural or industrial progress, or to the understanding of natural phenomena that have an impact on the lives of people.



Dr Hamish Clarke

University of Melbourne



Dr Hamish Clarke researches bushfire risk, fire management and climate change at the University of Melbourne. He is currently a Westpac Research Fellow and was recently awarded an ARC Mid-Career Industry Fellowship to support climate-adapted bushfire risk management. Dr Clarke was previously based at the University of Wollongong, Western Sydney University and the NSW Environment Department. He is committed to public interest science and effective engagement with fire managers, policy makers and the community. He writes at the Future Fire substack and is

inaugural chair of Natural Hazards Research Australia's new Early- and Mid-Career Academic and Practitioner Network.

Gottschalk Medal

The Gottschalk Medal recognises outstanding research in medical science and honours the contributions to science of Professor Alfred Gottschalk FAA.



Professor Eric Chow

Monash University



Professor Eric Chow is a sexual health epidemiologist and biostatistician at Monash University.

He heads the Health Data Management and Biostatistics Unit and co-heads the Clinical Evaluation Unit at the Melbourne Sexual Health Centre. Professor Chow's research program aims to improve the treatment, prevention and control of sexually transmitted infections (STIs), with a particular focus on gonorrhoea and human papillomavirus (HPV). He has published more than 380 peer-reviewed articles and was named Australia's top researcher in the field of sex and sexuality by The Australian in 2024.



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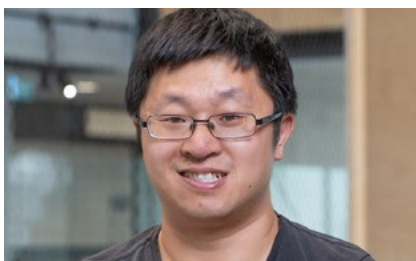
Associate Professor Kirsty Short
University of Queensland



Associate Professor Kirsty Short is an NHMRC Leadership Fellow with a primary interest in pandemic preparedness for respiratory virus infections. Her research focuses on influenza virus, SARS-CoV-2 and all aspects of viral pathogenesis including transmission, immunity, antiviral development and public policy.

John Booker Medal

The John Booker Medal in Engineering Science recognises outstanding research in engineering mechanics that addresses problems in the static and dynamic response of physical systems within engineering and applied mathematics disciplines. It honours the memory of Professor John Robert Booker AO FAA who worked in the area of theoretical geomechanics, was Professor in the Department of Civil and Mining Engineering at the University of Sydney (1970–98), and held a personal chair in engineering mechanics at the University of Sydney.



Associate Professor Lining Arnold Ju
University of Sydney



Associate Professor Lining (Arnold) Ju works at the Mechanobiology and Biomechanics Laboratory at the University of Sydney. His team has pioneered multiple biomechanical

nanotools, including blood-clot-on-a-chip microfluidic devices (Nature Materials 2019), single-cell biomembrane force probes (Nature Communications 2018), and 4D hemodynamic modeling (Nature 2021). His novel understanding of the mechanics behind blood clot formation has profound implications for diagnosing and preventing heart attacks and strokes. Associate Professor Ju's vision is to build novel platforms that integrate advanced biomanufacturing, high-throughput biomechanical manipulation, and artificial intelligence for biobank data processing. Associate Professor Ju was recently awarded the prestigious \$8 million Snow Fellowship. This acknowledgment fuels his mission to create microdevices that monitor and alert individuals worldwide at risk of life-threatening conditions.

Le Fèvre Medal

The Le Fèvre Medal for research in chemistry commemorates the work of Professor Raymond James Wood Le Fèvre FAA FRS. Its purpose is to recognise outstanding basic research in chemistry.



Professor Yao Zheng
University of Adelaide



Professor Yao Zheng received his PhD degree (Chemical Engineering) in 2014 from the University of Queensland with Professor Shizhang Qiao. Professor Zheng is currently a Professor in the School of Chemical Engineering at the University of Adelaide. He has worked for the past 15 years in electrocatalysis by combining experimentation and theoretical computation to drive discoveries of catalysis principles and catalyst design. He has developed new electrocatalyst candidates for various electrocatalysis applications

including oxygen- and hydrogen-involving reactions, CO₂ reduction, and other electrocatalytic-refinery processes. Professor Zheng has published more than 180 research papers which have attracted over 44,000 citations, with an h-index of 84. He was a Clarivate Highly Cited Researcher (Chemistry) from 2019 to 2023.

Pawsey Medal

The Pawsey Medal recognises the contributions to science in Australia by Professor Joseph Pawsey FAA FRS. Its purpose is to recognise outstanding research in physics.



Professor Jiajia Zhou
University of Technology Sydney



Dr Jiajia Zhou is a Professor in the Faculty of Science at the University of Technology Sydney. She joined the UTS Institute for Biomedical Materials and Devices in 2016, where she has focused on reducing the size of nanoparticles while maintaining their beneficial optical properties. This work addresses a significant challenge in enhancing resolution and sensitivity in fields such as nanothermometry, quantum biotechnology, bioimaging and tracking. Dr Zhou has also applied these technologies to the development of rapid COVID-19 antigen tests and the detection of proteins in the food industry.

Ruth Stephens Gani Medal

The Ruth Stephens Gani Medal honours the contribution to human cytogenetics of Ruth Stephens Gani. It recognises distinguished research in human genetics, including clinical, molecular, population and epidemiological genetics and cytogenetics.



Dr Sonia Shah
University of Queensland



Dr Sonia Shah is a Group Leader and Heart Foundation Future Leader Fellowship based at the Institute for Molecular Bioscience, the University of Queensland. Her research uses large-scale genomics and health data to improve the understanding of cardiovascular disease, with the goal to improve disease prevention and facilitate drug discovery. Her previous research uncovered a polygenic contribution in familial hypercholesterolemia, and she co-led the first large-scale genetic study of heart failure. Her current research is focused on addressing the diversity gap in cardiovascular research, with a focus on understanding risk in women, and she leads the South Asian Genes and Health in Australia study. She is the recipient of the Australian Academy of Science Ruth Stephens Gani Medal for her contribution to genetics research.



Dr Stephin Vervoort WEHI



Dr Stephin Vervoort is an emerging leader in the field of molecular control of RNA polymerase II (RNAPII)-mediated transcription in health and disease, and the therapeutic targeting of this process in cancer. Dr Vervoort's work has discovered numerous novel regulatory mechanisms controlling RNAPII. Dr Vervoort recently received the prestigious CSL Centenary and Snow Medical Fellowships, highlighting his standing as one of the emerging scientific leaders Australia.

Aboriginal and Torres Strait Islander Scientist Award 2024

This award recognises research in the physical and biological sciences, allowing interdisciplinary and sociocultural research that could straddle the social sciences and humanities, by outstanding Aboriginal and Torres Strait Islander PhD students and early- and mid-career scientists. It aims to support their research and/or the expansion and growth of their research networks and international knowledge exchange through visits to relevant international centres of research. Awards are up to \$20,000, with additional support provided to attend the Academy's biennial Science at the Shine Dome event.



Dr Justine Clark
Telethon Kids Institute



Dr Justine Clark is an Aboriginal South Australian and early-career cancer researcher. Dr Clark completed her PhD in the Myeloma Research Laboratory at SAHMRI focusing on the roles of receptor tyrosine kinases in myeloma disease development. She is currently undertaking her postdoctoral research within the Indigenous Genomics Team at Telethon Kids Institute. Her research aims to utilise precision medicine to reduce cancer health disparities experienced by Aboriginal and Torres Strait Islander peoples.



Dr Joe Greet
University of Melbourne



Dr Joe Greet is a proud Koori man and riparian ecologist at the University of Melbourne. He works collaboratively on research to inform restoration of wetland ecosystems including through restoration of swamp forests that provide critical animal habitat, developing Traditional Owner-led research and management programs to Care for Birrarung's billabongs, and understanding and managing the impacts of feral deer on native vegetation.

Max Day Environmental Science Fellowship Award 2024



The Max Day Environmental Science Fellowship Award is an annual award of up to \$20,000 per awardee to assist PhD students or early-career researchers with their research. It provides funding support toward research expenses, courses and the cost of travel. The award is named in honour of Dr Maxwell Frank Cooper Day AO FAA who spent a lifetime championing entomology, conservation and forestry, as well as helping other scientists. Through sponsoring this award, Dr Day is acknowledging the support that he himself received as a young researcher to travel overseas to gain his PhD at Harvard.



Ms Aviya Naccarella

Deakin University

Ms Aviya Naccarella is an ecologist with an interest in ecosystem processes. Her research is cross-disciplinary, and her passion lies in bringing together researchers, land managers and communities to work towards common conservation goals. Ms Naccarella's PhD at Deakin University focuses on understanding ecological interactions between mammals, plants, soils and fungi. Her research explores how we apply this knowledge to conservation projects aimed at restoring ecosystem function.



Dr Elvis Okoffo

University of Queensland

Dr Elvis Okoffo is an outstanding early-career researcher and emerging international leader in innovative sampling and analytical techniques to assess human and environmental exposures to plastics. Dr Okoffo's groundbreaking research has provided a much-needed methodological framework utilising pressurised liquid extraction and pyrolysis gas chromatography coupled to mass spectrometry to provide the first quantitative mass loads of plastic

and bioplastic in biosolids. In their current role as Research Fellow at the University of Queensland, Dr Okoffo focuses on further developing analytical techniques for the rapid screening of plastics, including microplastics, nanoplastics, and bioplastics to allow understanding of their impact on humans and the environment. Dr Okoffo aims to provide valuable insights into the distribution, abundance and impacts of plastic pollution, ultimately contributing to the development of effective strategies for mitigating its adverse effects on ecosystems and human health.

2024 highly commended applicants



Mr Christopher Keneally

University of Adelaide

Mr Chris Keneally is a PhD candidate studying aquatic microbial ecology. He holds an undergraduate degree in microbiology and immunology, and an honours degree in microbial ecology. Mr Keneally has worked on a range of government research programs during his study. His current research aligns with Project Coorong, which is part of the joint Australian and South Australian governments' Healthy Coorong, Healthy Basin program. His work ranges broadly from remote boat-based fieldwork, to wet-lab microbiology and dry-lab bioinformatics. He is interested in answering questions about complex systems, and his work aims to inform policy and decision-making.



Dr Jiaying Li

University of Sydney

Dr Jiaying Li is a Sydney Horizon Fellow at the University of Sydney. She received her PhD in Environmental Engineering from the Australian Centre for Water and Environmental Biotechnology at the University of Queensland (UQ) in 2020. She was a Postdoctoral Research Fellow and Research Fellow at Queensland Alliance for Environmental Health Sciences at UQ in 2020–24. She joined the School of Civil Engineering at the University of Sydney as a Sydney Horizon Fellow in 2024. Dr Li's research focuses on wastewater-based epidemiology for chemical exposure and infectious diseases, and contaminants of emerging concern in urban wastewater systems. She has been committed to integrating wastewater engineering, environmental chemistry and genomic sequencing to enhance the understanding and safeguard of public health and wellbeing.

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Australian delegates waiting to board the boat on Lake Constance for the Baden-Württemberg trip to Mainau Island.

Fellowships to the LINDAU NOBEL LAUREATE MEETINGS

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The Australian Academy of Science, with funding from the Science and Industry Endowment Fund (SIEF), welcomes applications from young researchers to attend the Lindau Nobel Laureate Meeting in Germany. These annual meetings provide an opportunity for an exchange between different generations, cultures and disciplines, with 30–40 Nobel Laureates connecting with up to 600 of the next generation of leading scientists from all over the world.

The theme of Lindau Meetings alternates between the three Nobel Prize scientific disciplines – physics, chemistry, and physiology or medicine – with an interdisciplinary meeting taking place every five years. Australian research institutes and universities can endorse a maximum of two young researchers each, with 10 candidates nominated (15 in interdisciplinary years) for final selection by the Lindau Council.

Next year's 74th Lindau Nobel Laureate Meeting, dedicated to the discipline of chemistry, will be held from 29 June to 4 July 2025.

Use the QR code to find out more.

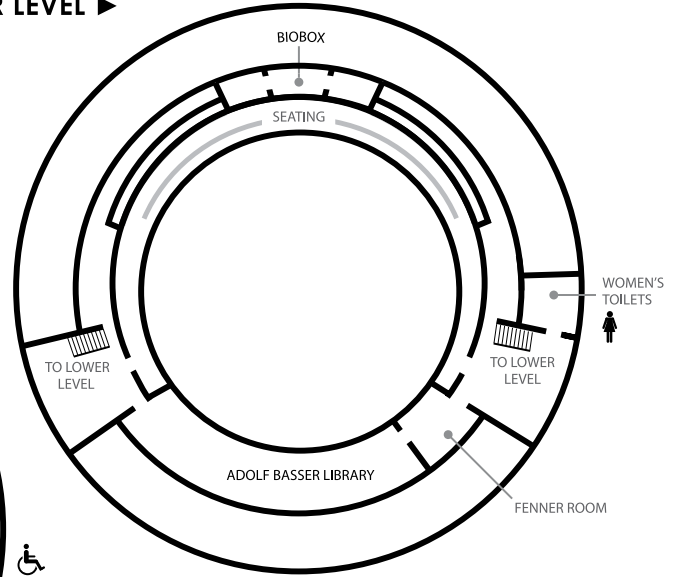
This year, 11 of Australia's brightest young scientists attended the 73rd meeting dedicated to physics (including two delegates accepted during the COVID-19 pandemic and one put forward via a separate nomination process). The delegation was led by Academy Fellow and

astrophysicist Professor Elaine Sadler AO FAA, and the meeting provided a unique opportunity for the young scientists to share their research, experiences and ideas, and gain inspiration from fellow emerging scientists and Nobel Laureates.

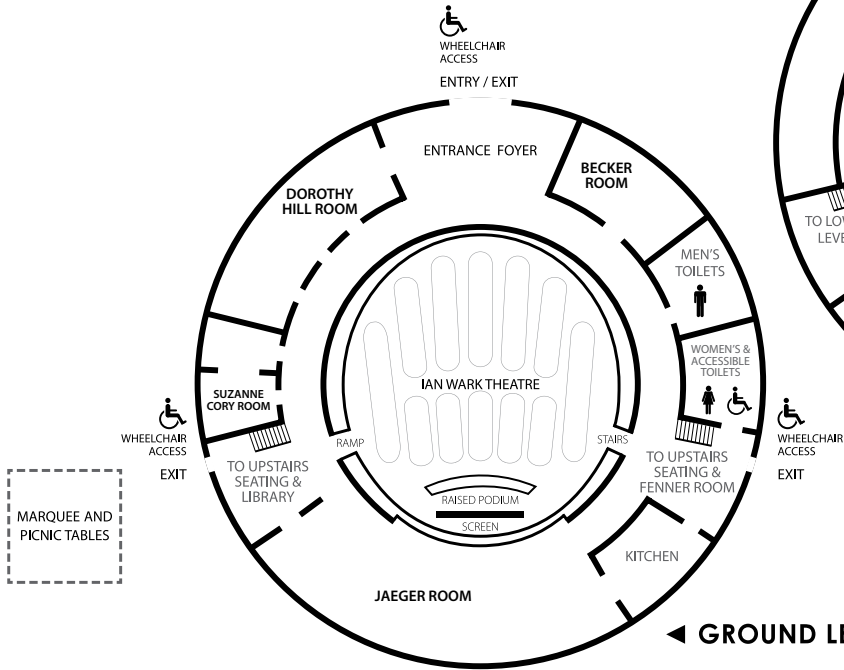


MAPS

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◀ GROUND LEVEL



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- MAIN ENTRANCE
- AUSTRALIAN NATIONAL UNIVERSITY CAMPUS
- ACCOMMODATION



EVENT INFORMATION

Code of Conduct

By registering for and attending any Science at the Shine Dome 2024 function, in person or online, attendees agree to adhere to the Australian Academy of Science's Participant Code of Conduct. The code is available at science.org.au/code-conduct.

Event app

The Science at the Shine Dome event app is available through app stores for attendees to download. The app contains the event program, the full printed program, information about the event, speakers and attendees, as well as an in-app messaging function to connect with other attendees. Instructions on how to download and access this app are on the back of your name badge. Please see information desk staff if you need assistance.

Information desk

An information desk in the main foyer of the Shine Dome will be staffed from 8.30am to 5.00pm each day of the event. For any assistance or event queries, please see Academy staff at this information desk.

Lanyard colours

Colour coding in the program matches the lanyards worn by attendees.

 **Fellows:** yellow


 **New Fellows:** red

 **Awardees:** green

 **EMCRs:** purple

 **Guests:** blue

 **Event partners:** orange

 **Academy staff:** white

Group photos and individual portraits

Group photos will be taken at the following times. Please meet in the main foyer at your designated time.

Monday lunch:

 Fellows elected in 2023

Monday afternoon tea:

Asia-Pacific Academic Mentoring Program mentors and mentees

Tuesday lunch:

Lindau Delegates

Tuesday afternoon tea:

 Fellows elected in 2024


Wednesday morning tea:

 All EMCRs

Wednesday lunch:

International ECRs

Thursday morning tea:


 Awardees from 2023

Thursday lunch:


 Awardees from 2024

For portraits, New Fellows and Awardees are invited to make their way to the Becker Room (located in the Shine Dome, adjacent to the main foyer) during any lunch, morning tea or afternoon tea break on any of the following days:

Monday, Tuesday, Wednesday:

 New Fellows

Wednesday, Thursday:

 Awardees

Luggage

Academy staff at the information desk can store luggage onsite. Please note that luggage is stored at your own risk.

Parking

Free car parking is available in the Academy's Gordon Street carpark. Additional pay parking areas are available within short walking distance to the Shine Dome. Please note that the forecourt area of the Shine Dome is set down and pick up only.

Public transport

The Shine Dome is a short walk from public transport stations/stops. More information on public transport options can be found at www.transport.act.gov.au.

Taxis

Academy staff at the information desk can book taxis for attendees as required.

Coach transfers

Gala dinner: Coaches will transfer attendees to and from the National Arboretum for the Gala Dinner on Wednesday evening. Coaches will pick up and drop off at the hotels below. No bookings are required, but attendees need to be at the designated pick-up point at 6.35pm to utilise this service.

Peppers and Ovolo: coach will depart Peppers Hotel, from Edinburgh Avenue at 6.45pm

The Sebel Canberra Civic: coach will depart YHA Hostel, from corner of Akuna Street and Hillside Lane at 6.45pm

Novotel Canberra: coach will depart Novotel Hotel, from Northbourne Avenue at 6.45pm

Airport: Coaches to the airport from the Shine Dome will be provided at 5.00pm on Thursday 12 September. There is no charge, and no bookings are required. Please be at the main entrance of the Shine Dome with your luggage at 4.55pm.

Accessibility

Two accessible parking spaces are available within the Academy car park. The ground floor of the Ian Wark Theatre, and the Jaeger Room, Becker Room and amenities are all wheelchair accessible. Due to the heritage of the building however, doorways into the venue are only equipped for access by standard wheelchairs.

Hearing loop

The Ian Wark Theatre, both upstairs and downstairs, is equipped with an Infrared Hearing Loop. See Academy staff at the information desk to obtain a receiver and required attachments.

Mobile phones

Attendees are asked to respect speakers and other guests by switching phones to silent while events are in session. However attendees are encouraged to engage with the Academy and the event on social media, using the hashtag [#ShineDome24](#).

Diversity and Inclusion Grants

The Academy, with the support of Diversity and Inclusion Partner, the University of Queensland, has offered a range of grants to remove barriers to attend the event. Assistance grants allow carers and parents to attend, and to support those with disabilities to participate fully in the event. If you applied for a grant, Academy staff have been in contact. If you have any questions relating to these grants, please contact Events Manager, Lisa Crocker.

Quiet room and parent facilities

The Suzanne Cory Room in the Shine Dome is available for parents or others who require a quiet space. There are also full parent room facilities in Ian Potter House. Please see the information desk if any other facilities are required.

Children and parents

Children are welcome to attend all parts of Science at the Shine Dome. They must be accompanied at all times by a parent or guardian. A range of activity packs are available for children at the information desk in the main foyer.

Those breastfeeding are welcome to breastfeed anywhere at the event, and the Suzanne Cory Room in the Shine Dome is available if a quiet space is preferred. Full parent room facilities are also available in Ian Potter House.

First aid

For any emergency or medical assistance, please notify staff at the information desk in the main foyer. A number of Academy of staff are first aid trained, and can assist if required.

Wi-fi

Complimentary wi-fi can be accessed throughout the venue – 'Academy-Guest'. No password is required.

Event livestream



The Science at the Shine Dome livestream covers all ceremonies, lectures and presentations in the Ian Wark Theatre at the Shine Dome. Those travelling to or from the event, and those unable to attend in person, are invited to tune in to this livestream. The livestream is available via the QR code.

Academy staff contacts

Landline numbers will divert to mobiles.

General event enquiries

Lisa Crocker: 0488 044 186

Jamie Evans: 02 6201 9488

Media enquiries

Academy Media: 02 6201 9444

New Fellows

Helen Longdon: 02 6201 9404

Awardees

Kira Scaife: 02 6201 9467

Early- and mid-career researchers

Dr Mari Kondo: 02 6201 9486

Lindau Delegates and International ECRs

Lynn Allan: 02 6201 9461

Asia-Pacific Academic Mentoring Program

Nina Maher: 0477 143 196

2024 EVENT PARTNERS

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Australian Government
Defence



Australian Government
Department of Industry,
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Engage online

Tune in to the livestream online.



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