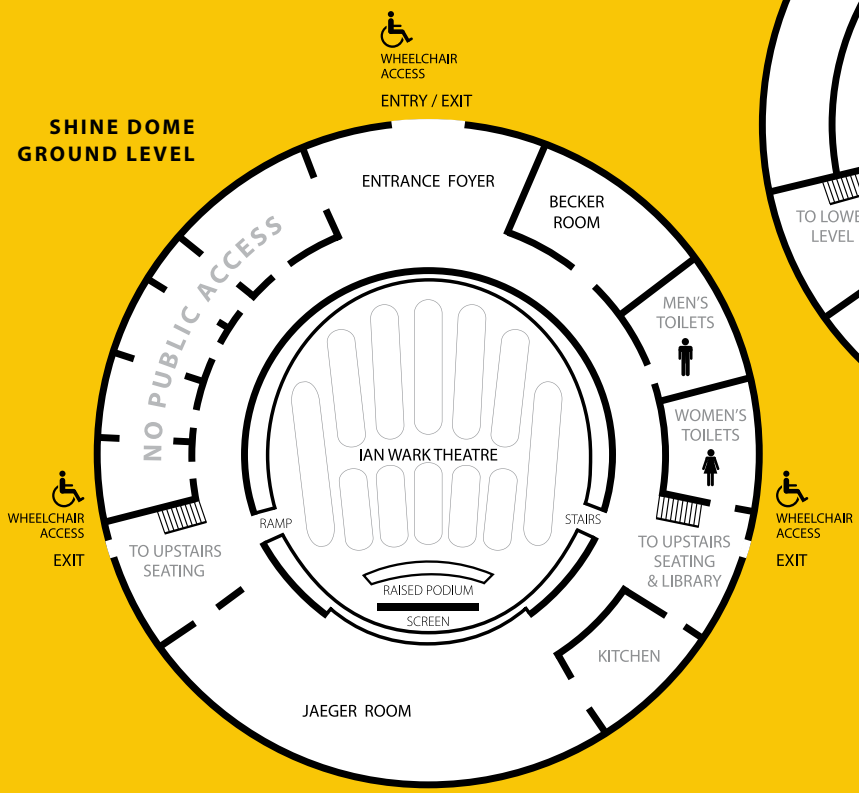
Australian Academy of Science

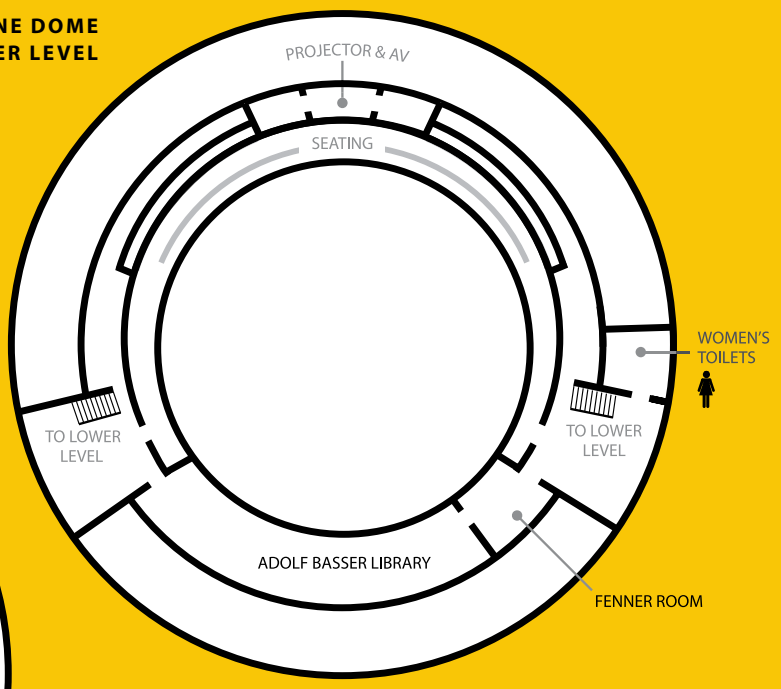
PROGRAM 22–24 MAY

Science at the Shine Dome 2018

SHINE DOME GROUND LEVEL



SHINE DOME UPPER LEVEL



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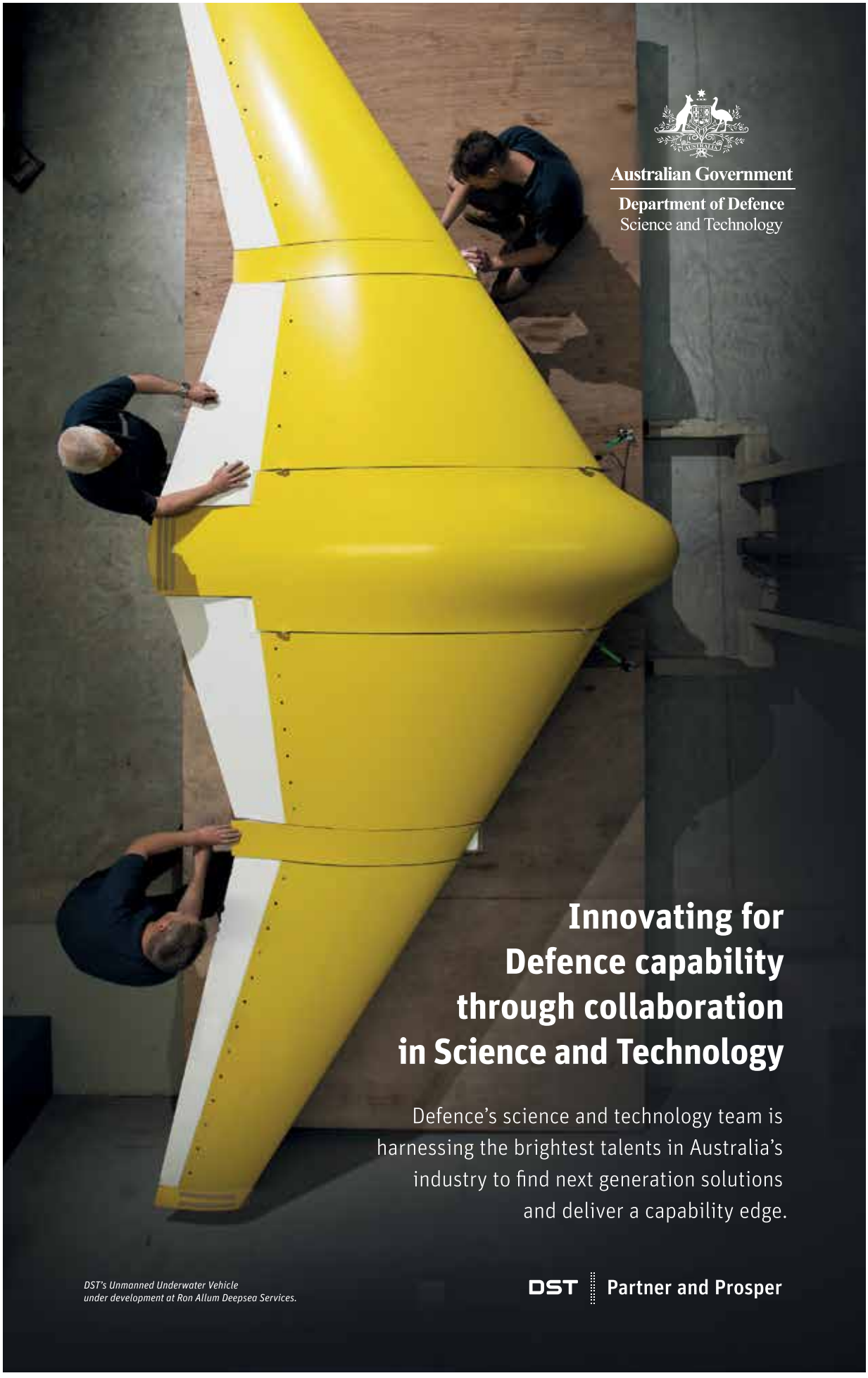
Australian Government
Department of Defence
Science and Technology
Innovating for Defence capability through collaboration in Science and Technology
Defence's science and technology team is harnessing the brightest talents in Australia's industry to find next generation solutions and deliver a capability edge.
DST's Unmanned Underwater Vehicle under development at Ron Allum Deepsea Services.
DST Partner and Prosper

President's welcome

Welcome to the Academy's flagship annual event—*Science at the Shine Dome*. This week the Academy shares and celebrates the best of Australian science. For me personally, this will be my last *Science at the Shine Dome* as President. I am so proud of what we have all achieved together.

Long-time attendees will notice some changes this year, in particular our symposium is being held on the first day to give the topic, selected annually to reflect a matter of national importance, the priority it deserves. The 2018 symposium, *Predict, Respond, Recover: science and natural disasters*, takes a multidisciplinary look at the role science plays in predicting, mitigating, responding to and recovering from natural hazards and weather events which so often affect our wide and diverse continent and countries across the globe. I thank especially Professor Helene Marsh for her contributions that will make this symposium such a rewarding experience.

This year for the first time we have been able to offer childcare and carers' assistance for *Science at the Shine Dome* attendees—there are many who would not be able attend in the absence of such assistance and the Academy is deeply grateful for the sponsorship provided by the University of Sydney enabling this support. I am thrilled that *Science at the Shine Dome* will also see a presentation delivered by a STEM educator, designed to stimulate discussion on the importance of collaboration between researchers and educators.

This week we warmly welcome 21 new Fellows who will be admitted to the Fellowship of the Australian Academy of Science. Election to the Fellowship is recognition of outstanding contributions to science and I look forward to inviting the Fellows to sign the historic Charter Book and to hearing about their research and achievements.

During the Awards ceremony, the Academy recognises and rewards a number of scientists for exceptional lifetime, early-career and mid-career achievements. This year the Academy is proud to be launching a new award, the Aboriginal and Torres Strait Islander Scientist Travelling Research Award. You can learn more about this award over the course of the event.

The Academy is committed to empowering the leading scientists of the future: early- and mid-career (EMCR) researchers. The Academy actively supports and promotes the interests of EMCRs through our dynamic EMCR Forum that currently has over 3500 members from all disciplines and areas of Australia. This year I am delighted that 30 EMCRs are being supported to attend through the generosity of sponsor organisations.

Science at the Shine Dome is also a time to celebrate the Academy's achievements over the past year, of which there are many. Our science projects and policy initiatives have played a crucial role in stimulating dialogue with government. Decadal plans for the agricultural sciences, space science and for taxonomy and biosystematics have all been launched in the past year. Each plan identifies gaps in each discipline and a plan for improvement over 10 years. The announcement of an Australian Space Agency benefited enormously from the Academy's decadal plans. The Academy has also played an important role in securing funding for the upgrade of the National Computational Infrastructure and is also leading the calls for a coordinated national approach to brain research.

Australia continues to play a significant role on the international stage due to its strong representation in inter-Academy bodies and international scientific societies and unions. In March, we joined Commonwealth of Nations

PHOTO: MARK GRAHAM

science leaders from around the globe to call on the Commonwealth Heads of Government to use the best available science to guide action on climate change.

The Academy's Communications and Outreach team launched an ambitious video project to make science more accessible and to engage the unengaged with accurate and informative science. I am proud to report we are now well known at home and abroad as a leading producer of original science videos on social and mainstream media: **www.science.org.au/curious/**. Our videos have reached millions across the globe, and on Facebook alone our followers have grown from 9000 to over 300,000 in only seven months. We are also continuing to build public awareness and understanding of science through our public lecture series and gatherings in the major capital cities in Australia.

The Academy's three national education programs, Primary Connections, Science by Doing and reSolve: Maths by Inquiry continue to have impact and remain responsive to the needs of the changing teaching and learning environment under the guidance of our recently constituted Education Committee, ably led by Professor Ian Chubb.

This year, the Science in Australia Gender Equity (SAGE) program that is a joint initiative of the Australian Academy of Science and the

... *continued from page 1*

Australian Academy of Technology and Engineering will reach an important milestone with some 20 SAGE members submitting applications for Bronze Accreditation under the Athena Swan Framework. I acknowledge the work of all SAGE members who have so enthusiastically taken this journey over the last two years and are committed to improving gender equity in STEMM.

Over the past year we have worked hard to support Australia's next generation of science leaders, introducing many new measures to enable scientists to work in diverse, inclusive and respectful environments. The Academy has invested much time and consideration in revising the Academy's Code of Conduct to ensure it is relevant and reflects the Academy's values. At our Annual General Meeting, held during *Science at the Shine Dome*, the Fellowship will be invited to ratify the Code of Conduct applying to all Fellows, staff and participants in Academy activities.

Above all, this is a week for the celebration of science. I cannot wait to hear the talks and presentations by our new Fellows and Award winners and I look forward to many stimulating discussions. I trust that you will all enjoy this week.

Professor Andrew Holmes
AC PresAA FRS FTSE

Australian National University

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CRICOS# 00120C MO_COS180925

By asking the big questions we could change the world

With more than 70 research centres and a vision of addressing some of society's greatest challenges, we are preparing for a bold new future.

There's never been a better time to join us.

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Program

Tuesday 22 May

	Science at the Shine Dome Symposium *Predict, respond, recover: science and natural disasters*
9.30 am	**Welcome** Professor Andrew Holmes AC PresAA FRS FTSE
9.40 am	*Natural hazards: an integral component of the Australian landscape* Mr Mark Crosweller National Resilience Taskforce
	Natural hazards in Australia: the key scientific questions Dr Richard Thornton Bushfire & Natural Hazards CRC
	Science in support of integrated disaster services Dr Sue Barrell Bureau of Meteorology
11.00 am	**Morning tea** EMCR group photo, EMCR grantee and Lindau participants group photos
11.30 am	*Improving predictions of severe weather and saving lives* Dr Dragana Zovko Rajak Bureau of Meteorology
	Boiling point: the changing nature of Australia's heatwaves Dr Sarah Perkins-Kirkpatrick UNSW Sydney
	Modelling the dynamic evolution of bushfires Associate Professor Jason Sharples UNSW Canberra
12.45 pm	**Lunch** Symposium speakers and committee group photo
1.45 pm	*The science of earthquakes: from the backyard to the beehive* Associate Professor Mark Quigley University of Melbourne
	The ecological impacts of marine heatwaves Professor Terry Hughes James Cook University
	Climate change, cyclones, storms and floods: a dangerous cocktail for young Australians Professor Helen Berry University of Sydney
	Evidence-based risk communication in the face of natural disasters Professor Vivienne Tippett Queensland University of Technology
3.30 pm	**Concluding remarks** Professor John Zillman AO FAA FTSE
5.00 pm–8.00 pm	**New Fellows admission and cocktail reception**

Wednesday 23 May

9.00 am	**Welcome** Professor Andrew Holmes AC PresAA FRS FTSE
9.20 am	Professor Alan Andersen FAA Charles Darwin University *Historical biogeography shapes community ecology: intercontinental contrasts in the structure and function of savanna ant communities*
	Professor David Blair FAA University of Western Australia *Gravitational waves and the birth of gravitational astronomy*
	Professor David Bowtell FAA Peter MacCallum Cancer Centre *Improving outcomes in ovarian cancer: challenges and opportunities*
	Professor Jennie Brand-Miller AM FAA University of Sydney *The glycemic index in health and disease*
	Professor Noel Cressie FAA University of Wollongong *Atmospheric carbon and the statistical science of measuring, mapping, and uncertainty quantification*
	Professor Christopher Dickman FAA University of Sydney *Ecology of desert mammals: are arid Australian faunas different?*
10.40 am	**Morning tea** New Fellows group photo
11.10 am	Professor Richard Ellis CBE FAA FRS University College London *Cosmic dawn: the quest for the first galaxies*
	Professor Gregory Goodall FAA Centre for Cancer Biology *The molecular circuitry that controls cancer cell invasion and metastasis*
	Professor Kliti Grice FAA Curtin University *Molecular fossils from microbes: the history and recovery of life recorded across mass extinction events and conditions associated with exceptional preservation of steroids, collagen and red blood cells in fossils*
	Professor Lloyd Hollenberg FAA University of Melbourne *Quantum reality bytes: from quantum bio-imaging to quantum computing*
	Professor Anne Kelso AO FAA National Health and Medical Research Centre *Future health*
	Professor Bostjan Kobe FAA University of Queensland *Structural basis of innate immunity signaling in animals and plants*
	Professor Kerrie Mengersen FAA Queensland University of Technology *Bayesian statistics methodology and practice*

Colour code Symposium | New Fellows | Fellows | Awardees | EMCRs/Lindau participants

	Professor Colin Raston AO FAA Flinders University *Spinning up sustainable chemistry*
	Sponsor address Dr Todd Mansell Defence Science and Technology
1.00 pm	**Lunch** New Fellows individual photos
2.00 pm	Professor Veena Sahajwalla FAA FTSE UNSW Sydney *Green microfactories: products from waste*
	Professor Martina Stenzel FAA UNSW Sydney *Plastic fantastic and the long way to nanomedicine*
	Professor Dacheng Tao FAA University of Sydney *Artificial intelligence, the future*
	Professor Joseph Trapani FAA Peter MacCallum Cancer Centre *The 'granule exocytosis' cell death signaling pathway: eliminating dangerous cells, maintaining immune homeostasis and surveillance against cancer*
	Dr John Volkman FAA CSIRO *Deciphering Earth's past environments through biomarkers*
	Professor Branka Vucetic FAA FTSE University of Sydney *The evolution of wireless networks*
	Professor Rachel Webster FAA University of Melbourne *Unlocking black hole physics*
	Professor Geordie Williamson FAA FRS University of Sydney *Symmetry and forms*
3.45 pm	**Session close**
6.25 pm	**Buses depart QT Hotel and University House**
6.30 pm	**Gala dinner, National Gallery of Australia**

Thursday 24 May

9.00 am	**President's Address** Professor Andrew Holmes AC PresAA FRS FTSE
9.25 am	**2018 Macfarlane Burnet Lecture** Professor Geoffrey Burnstock FAA FRS University of Melbourne
10.00 am	**Morning tea** Honorific Awardees (early morning session) individual photos
10.30 am	**2018 David Craig Medal** Professor Douglas Macfarlane FAA FTSE Monash University
	2018 Mawson Medal Professor Matt King University of Tasmania
	2018 Gustav Nossal Medal Professor Anushka Patel The George Institute for Global Health
	2018 Jacques Miller Medal Professor Killugudi Swaminatha Iyer University of Western Australia
	2018 Nancy Millis Medal Dr Marie-Liesse Asselin-Labat Walter and Eliza Hall Institute of Medical Research
	2018 Fenner Medal Dr Ceridwen Fraser Australian National University
	2018 Ruth Stephens Gani Medal Dr Irina Voineagu UNSW Sydney
	2018 Gottschalk Medal Professor Alex Fornito Monash University
	2018 Anton Hales Medal Dr Rhodri Davies Australian National University
	2018 Christopher Heyde Medal Dr Zdravko Botev UNSW Sydney
	2018 Dorothy Hill Medal Associate Professor Tracy Ainsworth UNSW Sydney
	2018 Pawsey Medal Dr Paul Lasky Monash University
	2018 Frederick White Medal Dr Alex Sen Gupta UNSW Sydney
11.35 am	*Importance of teacher-researcher networking and collaboration* Olivia Belshaw Head Teacher Science and Technology, Jindabyne Central School Australian Science Teachers Association
11.45 am	**Closing remarks**
	Smoking Ceremony outside the Shine Dome
12.00 pm	**Lunch** Awardee group and individual photos
1.00 pm	**Annual General Meeting**
1.00 pm	**EMCR Workshop 1,** IAN POTTER HOUSE *Getting the story right: writing the first draft* Presented by **Malini Devadas** from MD Writing and Editing
	EMCR Workshop 2, BECKER ROOM, SHINE DOME *Contributing to change: developing good policy in science* Presented by the **EMCR Forum**
	EMCR Workshop 3, IAN POTTER HOUSE *Career planning for research academics* Presented by **Lyn Airey and Kirsten Bartlett**, The GrantEd Group
	EMCR Workshop 4, FENNER ROOM, SHINE DOME *Building your online profile and getting your head around social media* Presented by **AusSMC**
3.30 pm	**New President portrait hanging** **Shine Dome foyer** Note: Depends on AGM finish time
4.30 pm	**Coach to airport**

Colour code Symposium | New Fellows | Fellows | Awardees | EMCRs/Lindau participants

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bushfire&natural HAZARDSCRC

THE BUSHFIRE AND NATURAL HAZARDS CRC

IS PLEASED TO SUPPORT

SCIENCE AT THE SHINE DOME SYMPOSIUM 2018

The CRC conducts a multi-disciplinary research program on the major national issues across the natural hazards spectrum.

The CRC is a partnership of all Australian and New Zealand fire, land and emergency service agencies; more than 30 universities; plus many federal, state and local government departments; professional and volunteer associations; and not-for-profit organisations.

The CRC is providing a long-term knowledge base that directly supports emergency services and other government and non-government agencies protect their communities through work to prevent, prepare for, respond to and recover from natural disasters.

The CRC is end-user driven. This means that users of the knowledge define and are involved in the ongoing development of the research program so that the work is conducted with a clear end use in mind.

The utilisation of our research by the end-users to the benefit of the broader Australian community is one of the CRC's key success stories and remains critical to the ongoing success of the CRC.

THE CRC WAS CREATED WITH A MISSION TO:

- Reduce the risks from bushfire and natural hazards
- Reduce the social, economic and environmental costs of disasters
- Contribute to the national disaster resilience agenda
- Build internationally renowned Australian research capacity and capability

Symposium

COMMITTEE

Dr Linda Anderson-Berry

Mr David Bruce

Professor David Black
AO FAA FRACI

Professor Helene Marsh
FAA FTSE

Professor John Zillman
AO FAA FTSE

CYCLONE TESTING STATION

JAMES COOK UNIVERSITY AUSTRALIA

The Cyclone Testing Station (CTS) aims to minimise loss and suffering by conducting research, testing and community education on the response of homes and other low-rise building to severe weather events.

jcu.edu.au/cts

Mr Mark Crosweller

National Resilience Taskforce

Mr Mark Crosweller heads the National Resilience Taskforce and was formerly Director General of the Emergency Management Australia Division of the Department of Home Affairs. He is responsible for leading national resilience policy advice and was formerly responsible for the coordination of Australia's response to crises, including natural disasters, and to terrorist or security-related incidents both domestically and internationally. Mark has 34 years of operational experience including as a fire-fighter, as well as 20 years in senior executive leadership and strategic management. During this period he has led major strategic reform at the national, state, territory and local government levels in governance, strategy, policy, operations and capability. He is responsible for briefing the Prime Minister and Cabinet in all aspects of disaster management. Mark is currently researching the ethical premise of leading people through the adversity and loss of disasters for his PhD. He was awarded the Commissioner's Commendation for Service in 1999, the National Medal for distinguished service in 2000 and the Australian Fire Service Medal in 2003.

Natural hazards: an integral component of the Australian landscape

The reality of the global future is one of climate change and its effects on increasing the frequency and intensity of natural hazard, socio-technical and security related events and their subsequent negative impacts on global society. The current absence of any detailed analysis of how leaders deal with loss and adversity in the human context and without an ethical premise to inform that leadership results in unnecessary and avoidable human suffering. If the greatest reason for engaging in risk (mitigation and adaptation), consequence management and resilience is to prevent or reduce mental and physical suffering, then it is critical that leadership responds in a manner that firstly genuinely understands that loss and suffering, and secondly acts to the fullest extent of its influence to prevent or reduce it.

Dr Richard Thornton

Bushfire and Natural Hazards CRC

Dr Richard Thornton is the Chief Executive Officer of the Bushfire and Natural Hazards Cooperative Research Centre (CRC). He has overall responsibility for the direction and performance of the centre, and led the team to develop the CRC following a Prime Ministerial funding commitment in 2013. Prior to that Richard was Deputy CEO and Research Director of the Bushfire CRC, a role he had held since 2004 where his responsibilities included leadership and oversight of the research program. Richard is a highly experienced research management executive with more than 20 years in the field, both with the Bushfire CRC and, previously, Telstra. Richard has a physics background and has worked in science fields including

nuclear and semiconductor physics, computational fluid mechanics, IT and telecommunications engineering and online services, primarily in the private sector. Richard has expertise in IP management, contract negotiation and development, and commercialisation of research.

Natural hazards in Australia: the key scientific questions

Natural hazards are an inevitable part of life in Australia. Physical hazards such as flood, cyclone, fire and earthquake have always been here. It is only because we choose to put the things we value in front of them that they become a problem. It is imperative that we better understand what we as a community can do to reduce the impacts from such hazards. In order to do this we need a robust evidence base to help the various actors determine the most appropriate course of action. This presentation will touch on some of the key research questions that were drawn from a set of national priorities recently developed by the Bushfire and Natural Hazards CRC in conjunction with the broader emergency management sector. Importantly, what will become apparent is that the answers we are seeking can only be found through multi-disciplinary and co-produced research.

Dr Sue Barrell

Bureau of Meteorology

Dr Sue Barrell has had a long career in the Bureau of Meteorology, Australia's national weather, climate and water agency. Her experience spans roles right across the bureau, from forecaster to researcher to climate change negotiator to senior executive. In 2017, Sue was appointed as the bureau's Chief Scientist, and Group Executive, Science and Innovation. Her responsibilities include Science to Services, Enterprise Innovation, Global and National Science Relationships, and Diversity, Inclusion and STEM. Sue has been involved in international efforts in relation to climate policy and coordination and integration of earth observations, including through the World Meteorological Organization (WMO) and its Executive Council, and other major international climate-related organisations. In 2016–17, Sue was Permanent Representative for Australia with the WMO and a member of its Executive Council. Sue was also recognised as a Superstar of STEM and advocates for girls and women to take up science careers.

Science in support of integrated disaster services

The Bureau of Meteorology supports all Australians in their preparedness and response to natural disasters through timely, accurate and relevant advice and warning services, delivered through a consistent multi-hazard early warning system framework. The bureau's disaster risk systems and services are built on, and evolve with, world-class science, and are designed to meet the changing needs of its users, especially those across emergency services and the broader community. This address will focus on the contribution that evolving science and technology will make to better informing the safety decisions of Australians, through improving the quality and effectiveness of bureau services across the spectrum of natural disasters, across the disaster preparedness to recovery lifecycle, and across the impact-based service value chain. Through exploration and uptake of emerging science and technology initiatives such as machine learning, evolution of high performance computing, highly agile numerical modelling and data assimilation solutions and engagement with social science, the bureau is aiming for an integrated service approach, which will enable users to combine disaster warning information with sector-specific information to make more timely, localised and highly contextual safety decisions.

Dr Dragana Zovko Rajak

Bureau of Meteorology

Dr Dragana Zovko Rajak was born in Mostar, Bosnia and Herzegovina. She completed undergraduate studies in physics and geophysics at the University of Zagreb, Croatia, and her PhD at the School of Earth Sciences at the University of Melbourne in 2016. Her PhD thesis focused on examining possible mechanisms and sources of turbulence generation around thunderstorms using a three-dimensional numerical model. This work has important implications not only for the aviation industry but also for fundamental understanding of turbulence and cloud–environment interactions. Since 2016, Dragana has been a part of the High Impact Weather team at the Bureau of Meteorology. Her research involves application of numerical weather prediction systems to high impact weather, as well as understanding the physical processes that contribute to severe weather events in Australia, including east coast lows and severe thunderstorms.

Improving predictions of severe weather and saving lives

The impact of severe weather events is reduced by timely preparation, and part of this process is predicting

where the worst conditions will occur. These forecasts are never perfect, but modern advances in science and computing power are improving our ability to understand and forecast extreme weather events with increasing accuracy. This in turn enables better risk management and preparedness for the event. One next-generation technique in weather forecasting is ensemble prediction, where multiple forecasts are run from slightly different starting conditions to estimate not just a forecast, but also error bars on the forecast, as well as a range of possible outcomes. This presentation will show how science and ensemble prediction are used to improve forecasts of severe weather events, such as the April 2015 east coast low, which brought flooding, damaging winds and coastal erosion to the north coast of New South Wales.

Dr Sarah Perkins-Kirkpatrick

University of New South Wales

Dr Sarah Perkins-Kirkpatrick is an ARC Future Fellow at the Climate Change Research Centre, UNSW. She has dedicated her career to researching extreme weather events in a climate context. Her most recent research has pioneered how heatwaves are measured, what drives them, how they will change in a warming climate, and the human contribution behind these changes. Her Future Fellowship will also investigate how human morbidly and mortality rates during heatwaves may be linked to climate change. Sarah has published over 50 academic papers, received a Young Tall Poppy Award for excellence in science communication, was named a UNSW rising star who will change the world, and won the 2016 Australian Meteorological and Oceanographic Society early-career researcher award. She previously held an ARC DECRA fellowship, where she researched Australian heatwaves and how they are changing. Sarah is a regular contributor to The Conversation and mainstream media on climate change.

Boiling point: the changing nature of Australia's heatwaves

Heatwaves have always punctuated Australia's extreme climate. However, they are steadily growing longer, hotter and more frequent because of human-induced climate change. As greenhouse emissions continue to rise, so too will heatwave intensity, frequency and duration. This presentation will explore where Australia is headed in the landscape of heatwaves over the next century, and how we compare to other regions across the world. It will explain how we can determine the human contribution behind recent observed heatwaves, and the influence of climate variability. The changing nature of those vulnerable to heatwaves will also be discussed.

Associate Professor Jason Sharples

UNSW Canberra

Jason Sharples is Associate Professor in Applied Mathematics at the University of New South Wales, and is a Fellow of the Australia and New Zealand Modelling and Simulation Society. He is part of the Applied and Industrial Mathematics Research Group and the Computational Science Initiative in the School of Physical, Environmental and Mathematical Sciences at UNSW Canberra, where he specialises in combustion and bushfire dynamics modelling and simulation. Jason has led a number of research projects that consider extreme and dynamic fire behaviour, the development of large conflagrations, and bushfire risk management. He is also a volunteer firefighter with the ACT Rural Fire Service.

Modelling the dynamic evolution of bushfires

The behaviour and spread of a bushfire are driven by a range of processes, which can act in combination to produce dynamic variation in the shape and the rate of spread of the fire. Parameterising these complex interactions to predict a fire's dynamic evolution is a difficult task, but recent research has produced a number of interesting insights. After a brief introduction to some of the ways that fire propagation has been modelled historically, this presentation will discuss the use of coupled fire-atmosphere models, and refer to some specific scenarios where fires interact dynamically with the surrounding atmosphere. It will also discuss the use of geometric aspects of the fire's perimeter as simple alternatives to model dynamic fire spread. Specifically, it will cover the pros and cons of using local fire line curvature, before introducing the concept of pyrogenic potential flow as a computationally efficient alternative to fully coupled fire-atmosphere models.

Associate Professor Mark Quigley

University of Melbourne

Mark Quigley is Associate Professor of Earthquake Science at the University of Melbourne. Mark was Associate Professor at the University of Canterbury in Christchurch, New Zealand from 2008–15. His research in Christchurch made him the world's leading authority on the 2010–11 Canterbury earthquake sequence, for which he was awarded the 2011 New Zealand Prime Minister's Science Communication Prize. Mark has also conducted research in Antarctica, Iran, the Tibetan Himalaya, Mexico, East Timor, the Grand Canyon and Australia. He has delivered more than 130 science talks across the world. He is a recipient of the Geological Society of America Public Service Award, a Fellow of the Geological Society of America, and an editor of the journal Geology. Mark's research bridges geology, seismology and engineering. He is currently working to better characterise Australian seismic hazard at sites of key national interest, and conducting research in seismically active regions worldwide.

The science of earthquakes: from the backyard to the beehive

Geological investigations of earthquakes have much to offer society. They provide information relevant for developing robust building design codes and land use policies aimed at reducing future seismic risks to life and infrastructure. They assist us to understand the inner workings of Earth and the influence of anthropogenic processes on seismicity and hazard. Cutting-edge investigations of surface ruptures and earthquake hazards, including liquefaction and rockfall, underpinned many policy decisions undertaken by government in the wake of the fatal 2011 Christchurch earthquake and its aftershocks in New Zealand. This presentation will explore the science of earthquakes and associated phenomena, from the collection and analysis of field data in Christchurch's backyards and communications with decision makers and the public, to utility in decision-making processes in the New Zealand Government. Recent earthquake hazard analyses and their challenging implications for risk characterisations in Australia will also be discussed.

Professor Terry Hughes
FAA

James Cook University

Professor Terry Hughes is the Director of the Australian Research Council's Centre of Excellence for Coral Reef Studies, headquartered at James Cook University in Townsville, where he is a Distinguished Professor. Terry's research interests encompass coral reef ecology, macroecology and evolution, and marine social-ecological systems. A recurrent theme in his studies is the application of new scientific knowledge towards improving management of marine environments. He was elected a Fellow of the Australian Academy of Science in 2001. Terry has been awarded many prizes, including the prestigious Darwin Medal of the International Society for Coral Reef Studies and an Einstein Professorship conferred by the Chinese Academy of Sciences.

The ecological impacts of marine heatwaves

Heat stress due to global warming is already seriously affecting key marine ecosystems, and the people who depend on them for their livelihoods and food security. In Australia, the record-breaking marine heatwaves in the summer of 2016 and 2017 killed half the corals in the northern and central Great Barrier Reef, the world's largest coral reef system. Furthermore, the coral assemblages of the recent past are unlikely to have enough time to fully recover in coming decades because of the increasing frequency of climate-driven die-offs, leading to the emergence of new ecosystems. Elsewhere in Australia, other sensitive marine ecosystems, including kelp beds and mangrove forests, are increasingly threatened by marine heatwaves. These ecological responses are a harbinger of further radical shifts in the condition and species composition of all ecosystems, especially if action on climate change fails to achieve the Paris Accord's +1.5-2 °C global average target.

Professor Helen Berry

University of Sydney

Helen Berry is Professor of Climate Change and Mental Health in the Sydney School of Public Health, University of Sydney. She is a psychiatric epidemiologist and expert in how climate change, disasters and social and physical place influence mental health and wellbeing. She is currently advising on a major new mental health disaster impact and recovery study of the impact of Cyclone Debbie on the Northern Rivers of NSW in 2017. Helen has developed multiple population screening measures including the Australian Community Participation Questionnaire, the Brief Weather Disaster Trauma Exposure and Impact Screen and others that are included in the Northern Rivers project. Helen has been supported by major competitive research funding and other awards and has led influential research-policy initiatives. Helen has previous experience in public policy and the 'for-social-gain' relationships services sector. She holds honorary appointments at the Australian National University and the University of Melbourne and is a Director of Altitude Consulting.

Climate change, cyclones, storms and floods: A dangerous cocktail for young Australians

As Earth keeps warming, weather-related disasters are becoming more frequent, intense, unpredictable and longer lasting. These disasters are associated with substantial harm to mental health. Living through cyclones, major storms and floods can be a particularly terrifying experience for children and young people. For a substantial minority, that terror can be traumatising, even leading to serious long-term mental health problems. Immediate trauma screening and early intervention are vitally important to help avert these problems, but often help is too little, too late. In the continuing absence of adequate service provision, action must be taken in other sectors to help protect and promote young people's mental health. Novel findings from primary and high school children hit by Cyclone Larry in Queensland in March 2006 uncovered the importance of children's personal social connectedness in protecting them from trauma. Did connectedness similarly protect young people after Cyclone Debbie devastated the Northern Rivers area in NSW in March and April 2017?

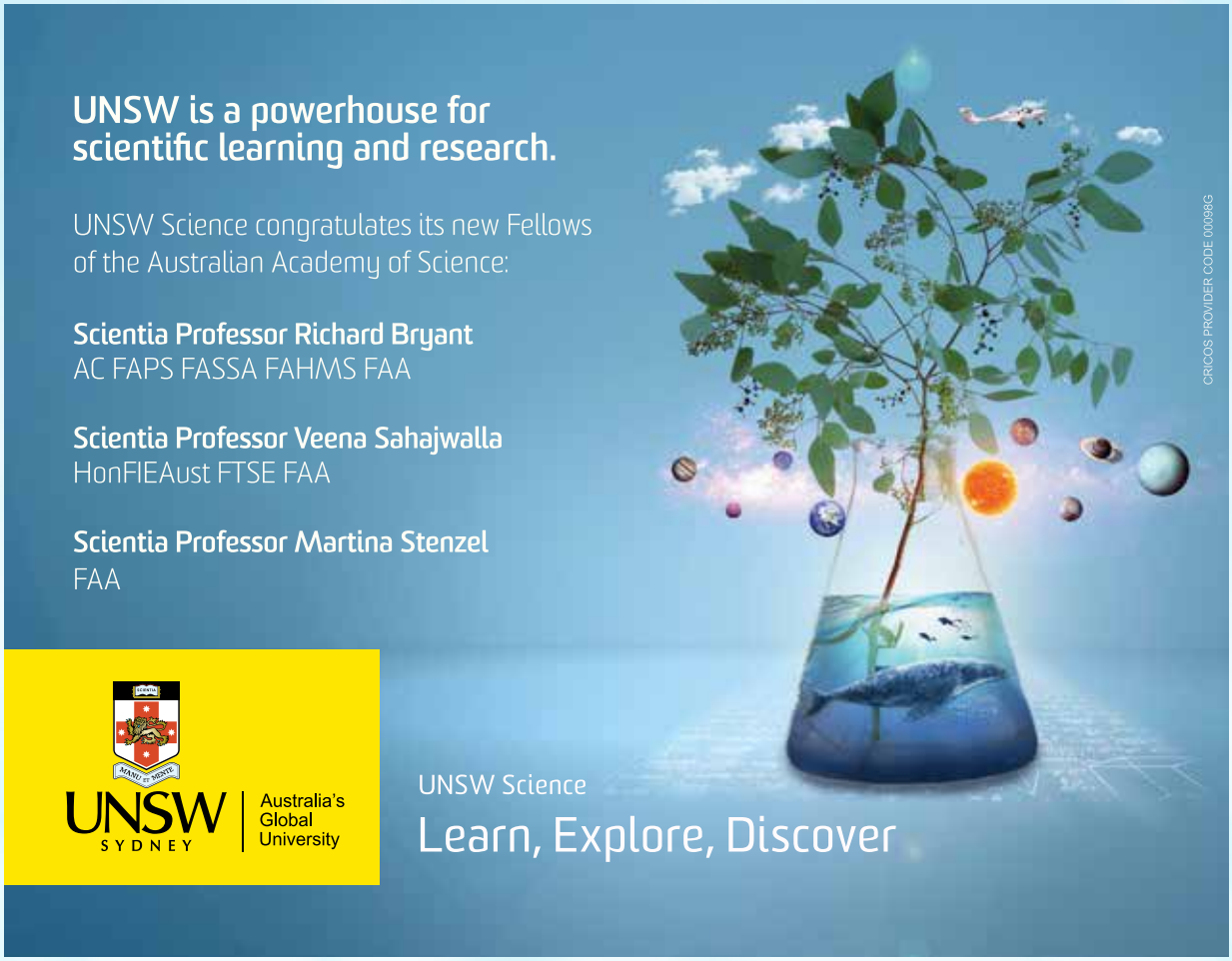
Professor Vivienne Tippett

Queensland University of Technology

Professor Vivienne Tippett has more than 25 years of experience in health services as a clinician, researcher and consultant. She is a Professor of Clinical Science and Director of Research at QLD University of Technology [QUT]. Her research interests lie in pre-hospital trauma management and emergency health systems development; clinical care and performance indicators for the prehospital sector; disaster and mass casualty response and emergency communications. She is a past Director of the Australian Centre for Prehospital Research (QLD Ambulance Service) and received a Distinguished Services Medal from the service in 2011. She is currently a CRC Lead Researcher on the Bushfire and Natural Hazards CRC and a member of the Executive Board of the Centre for Disaster and Emergency Management at QUT. In 2013, Professor Tippett was identified as one of 125 Leading Women in Queensland by the YWCA.

Evidence-based risk communication in the face of natural disasters

In the past, experience, intuition and anecdotal information have shaped the design of public risk communication and education campaigns, potentially limiting their effectiveness. Historically, community-facing emergency warnings have been developed through modification of internal operational communications. This presentation describes multi-hazard research being conducted via the Bushfire and Natural Hazard CRC, to examine opportunities for optimising emergency warnings by applying behavioural psychology and risk communications theory. This suite of studies has applied a mixed methodology, including community testing and industry consultation and collaboration, to test whether or not message modification can improve message comprehension and potential compliance with official emergency warning messages. Results are demonstrating that modification of warnings has the potential to improve community comprehension and behavioural intention in the face of a natural hazard.



New Fellow presentations

Professor Alan Andersen
FAA

Professor Alan Andersen is a University Professorial Fellow with Charles Darwin University. He was previously a Chief Research Scientist with CSIRO Land and Water, and Officer-in-Charge of CSIRO's Tropical Ecosystems Research Centre in Darwin from 1995 to 2016. Professor Andersen's primary research interests are in the global ecology of ant communities, where he integrates community ecology, historical and contemporary biogeography, and systematics to gain a predictive understanding of ant diversity, behavioural dominance and functional composition in relation to environmental stress and disturbance. He applies this understanding to the use of ants as bioindicators of ecological change. He also has broad research interests in the ecology of tropical savannas, and the ecology and management of fire.

Historical biogeography shapes community ecology: intercontinental contrasts in the structure and function of savanna ant communities

History is a profound but under-appreciated factor driving variation in the structure and function of biological communities. Professor Andersen illustrates this by linking inter-continental variation in the structure and function of savanna ant communities to variation in their evolutionary histories. The inter-continental contrast is especially pronounced between Australia and the Neotropics, whose savanna ant faunas have totally contrasting evolutionary origins. Australian savannas have evolved in association with its central arid zone, and its ant fauna is overwhelmingly dominated by arid-adapted elements. In contrast, Brazilian savannas have evolved in association with tropical forest, and the generic composition of its savanna ant fauna is very similar to that of forest. These forest origins are reflected by an exceptionally high diversity of tree-nesting species, which is a feature of tropical forests but does not occur in savannas in Australia or South Africa. Such contrasting origins mean that Australian and Neotropical savannas have functionally as well as compositionally very different ant communities, which Professor Andersen will illustrate through comparative responses to environmental stress (aridity) and disturbance (fire).

Professor David Blair FAA

PHOTO: MATTHEW GALLIGAN PHOTOGRAPHER 2016

Professor David Blair is an experimental physicist. He developed the first southern hemisphere gravitational wave detector NIOBE, and the Sapphire Clock. He led the development of a site near Perth for a proposed southern hemisphere laser interferometer gravitational wave detector, and the

creation of the Gravity Discovery Centre for teaching Einsteinian physics to schools and the public. The research centre at Gingin pioneered studies of high optical power phenomena in gravitational wave detectors. In 2005 it became the Australian International Gravitational Research Centre. Its research contribution to the LIGO Scientific Collaboration helped enable the first detection of gravitational waves in 2015. It is now part of the ARC Centre of Excellence for Gravitational Wave Discovery OzGrav. Professor Blair leads the Einstein-First education project, developing Einsteinian physics for schools. He is a Fellow of the American Physical Society, was Western Australian Scientist of the Year, and has received the ANZAAS Medal, the Eureka Prize, the Clunies Ross Medal and the Boas Medal.

Gravitational waves and the birth of gravitational astronomy

Einstein's 1916 prediction of gravitational waves was finally confirmed theoretically by Feynman in 1957. Weber began the seemingly impossible task of constructing gravitational wave detectors in the 1960s. Despite false claims of detection in 1970, he correctly pointed out that Einstein's wave solution, when combined with Schwarzschild's spherically symmetric solution obtained a few months earlier, contains the prediction that the collision of black holes would create an explosion of gravitational waves with power comparable to the total luminosity of all the stars in the visible universe. The next 40 years marked the development of ultra-sensitive measurement technologies that encompassed cryogenics, superconductivity, supermirrors and parametric transducers. This work culminated in the development of long baseline gravitational wave detectors in which test masses move in response to the stretching and shrinking of space. On 14 September 2015, the first gravitational wave signal was detected from a merging pair of black holes. Less than two years later, a pair of merging neutron stars was detected, along with an electromagnetic outburst that proved that gravity travels at the speed of light. The smallest amounts of energy ever detected marked the most colossal outbursts of energy, and opened the era of gravitational astronomy. An Australian detector remains a high priority.

Professor David Bowtell FAA

Professor David Bowtell is co-head of the Cancer Genomics and Genetics, and Women's Cancer programs at the Peter MacCallum Cancer Centre. He is also a Visiting Professor at Dana-Farber Cancer Institute, Boston, and was Director of Research at Peter Mac from 2000 to 2009. Professor Bowtell has an extensive background in human cancer genomics. He is Principal Investigator for the Australian Ovarian Cancer Study (AOCS), one of the largest population-based cohort studies of ovarian cancer in the world involving over 3000 women, and CASCADE, a rapid autopsy study. Professor Bowtell's research has focused on the classification of ovarian cancer, mechanisms of primary and acquired drug resistance, and the role of BRCA1/2 and related mutations in ovarian cancer genetic risk and therapeutic response.

Improving outcomes in ovarian cancer: challenges and opportunities

Ovarian cancer affects around 1 in 70 Australian women during their lifetime but has a much higher incidence in women with certain mutations, such as BRCA1 or BRCA2. Identifying individuals at increased genetic risk provides an excellent opportunity to prevent disease. We have come to realise that ovarian cancer is a misleading term on at least two counts—most so-called ovarian cancers do not arise in the ovary, and the subtypes are largely unrelated in terms of their biology. These findings present challenges for research—for example, in obtaining suitable numbers to form strong associations between a tumour's biology and patient survival. From a clinical perspective, ovarian cancer is a good example of how human cancer diagnosis is shifting from an anatomical classification to one based on genetic 'wiring', allowing a more personalised approach to treatment. One of the most distressing aspects of ovarian cancer is the progressive development of resistance by the tumour to chemotherapy. For example, less than 10% of women survive more than five years after the recurrence of this cancer. Until now we've known rather little of how this occurs in patients. The development of affordable DNA sequencing is providing an unprecedented view of the evolution of chemotherapy in patients and suggesting approaches to reverse or circumvent this resistance.

Professor Jennie Brand-Miller AM FAA

Professor Jennie Brand-Miller holds a Personal Chair in Human Nutrition in the Charles Perkins Centre and the School of Life and Environmental Sciences at the University of

Sydney. She studied food science and technology before obtaining a doctorate in nutrition at the University of New South Wales. She is internationally renowned for her work on carbohydrates and the glycemic index (or GI) of foods, with over 300 scientific publications. Professor Brand-Miller received the 2003 Clunies Ross Medal for contributions to science and technology in Australia, and was a finalist in the Australian of the Year awards in 2006. Her books about the glycemic index have been bestsellers and made 'GI' a household term. She is a proud recipient of bilateral Cochlear Nucleus implants.

The glycemic index in health and disease

Health authorities have long recommended that we eat less fat and fewer refined sugars. Australians have obediently reduced both fat and sugar but the obesity rate has more than doubled, type 2 diabetes has tripled, and cardiovascular disease is still the number one cause of death. A new paradigm has arisen: that the processed starches which replaced the energy from fat may increase the risk of obesity, diabetes and heart disease—more so than fat and sugar—a finding that has enormous implications for the global food and agricultural sectors. Both quantity and quality of carbohydrate are relevant to the debate. Carbohydrates of any kind can produce adverse effects on blood glucose (blood sugar) levels after consumption, a characteristic that reflects their rate of digestion and absorption, their 'glycemic index' or 'glycemic load' per serving (GI and GL respectively). Professor Brand-Miller will focus on well-designed studies demonstrating that carbohydrates that are slowly digested and absorbed (low GI or GL carbs) are good for health, helping to improve weight control, weight maintenance, insulin sensitivity, serum lipids, inflammatory markers, memory recall, physical endurance and the long-term risk of chronic lifestyle-related diseases such as type 2 diabetes.

Professor Noel Cressie
FAA

PHOTO: MARK NEWSHAM COPYRIGHT

Professor Noel Cressie is Distinguished Professor and Director of the Centre for Environmental Informatics in the National Institute for Applied Statistics Research Australia at the University of Wollongong. He is also Adjunct Professor at the University of Missouri, USA. Cressie received a BSc (Hons I) from the University of Western Australia and MA and PhD degrees from Princeton University, USA. His past appointments have been at Flinders University of South Australia, Iowa State University, and Ohio State University. He has published in the areas of goodness-of-fit, hierarchical statistical modelling, empirical-Bayesian and Bayesian methods, and in spatial and spatio-temporal statistics, including geostatistics and remote sensing. Professor Cressie is the author or co-author of over 250 peer-reviewed publications, including three books. He is the recipient of the Committee of Presidents of Statistical Societies' 2009 R.A. Fisher Award, the Statistical Society of Australia's 2014 Pitman Medal, the Royal Statistical Society's 2016 Barnett Award, and the Institute for Mathematical Geosciences' 2017 Matheron Award. He is a Fellow of the American Statistical Association, the Institute of Mathematical Statistics and the Spatial Econometrics Association, and an Elected Member of the International Statistical Institute.

Atmospheric carbon and the statistical science of measuring, mapping, and uncertainty quantification

Too much carbon dioxide (CO_2) in the atmosphere is a threat to long-term sustainability of Earth's ecosystem. Atmospheric CO_2 is a leading greenhouse gas that has increased to levels not seen since the middle Pliocene, approximately 3.6 million years ago. One of NASA's remote sensing missions is the Orbiting Carbon Observatory-2, whose principal science objective is to estimate the global geographic distribution of CO_2 sources and sinks at Earth's surface, through time. This starts with the measurement

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of radiances from soundings and moves on to retrievals of the atmospheric state, from which maps of gap-filled and de-noised geophysical variables and their uncertainties are made. With the aid of a model of transport in the atmosphere, CO_2 fluxes can be estimated. Uncertainty quantification using hierarchical statistical models is critical at all stages.

Professor Christopher Dickman FAA

PHOTO: © THE UNIVERSITY OF SYDNEY / STEFANIE ZINGSHEIM

Professor Chris Dickman has long been fascinated by patterns and processes in biological diversity. His work focuses mostly on mammals and other biota in arid environments and on varied projects in applied conservation and management. He is a Professor in Terrestrial Ecology at the University of Sydney, and directed the university's Institute of Wildlife Research for 22 years. He has recently held professorial fellowships from the Australian Research Council, including a Discovery Outstanding Research Award. He is a prolific trainer of postgraduates, supervising 145 honours and higher research degree students. He has written 440 journal articles and book chapters, with four of his books winning Whitley awards or medals. Chris is an active contributor to science panels for government, non-government and philanthropic organisations, and is the recipient of many national and international awards, including New South Wales Plant and Animal Scientist of the Year in 2010.

Ecology of desert mammals: are arid Australian faunas different?

Most of the world's deserts are relatively young, forming or expanding during the Miocene and becoming more arid during the Pliocene-Pleistocene epochs. As conditions dried, mammal faunas adapted in situ or moved in from more mesic surrounding regions. Despite the phylogenetic diversity of founders in the world's deserts, the arid conditions have been claimed to shape convergent similarities in the morphology, behaviour, ecology and physiology of the extant mammal faunas. Yet profound differences occur too. Professor Dickman will highlight ecological and behavioural differences that have been described recently in mammals from different world deserts, and present brief results on two groups—rodents and dasyurid marsupials—from long-term studies in Australia's most extreme arid region, the Simpson Desert. He will show that larger and more frequent rainfall events occur in Australia compared with other world deserts, and propose that this climatic variability drives boom and bust population dynamics and also selects for unique adaptations in the local faunas. The boom–bust dynamic also carries inherent risks: refuge patches that are used during bust periods are often degraded for other largely pastoral uses, while boom periods provoke irruptions of introduced predators. Careful management is needed to ensure the continuity of extant desert faunas.

Professor Richard Ellis CBE FAA FRS

(Corresponding Member)

Professor Richard Ellis is Professor of Astrophysics at University College London. He studied at UCL and Oxford and became a professor at Durham and Cambridge Universities. In 1999 he moved to California and became Director of Caltech Optical Observatories overseeing the scientific exploitation of the Palomar and twin Keck telescopes. He returned to Europe in 2015.

Cosmic dawn: the quest for the first galaxies

The first billion years after the Big Bang is widely regarded as the final observational frontier in assembling a complete picture of cosmic history. During this period, early stars and galaxies formed and the universe was bathed in light for the first time. Hydrogen clouds in the space between galaxies transformed from an atomic gas to a fully ionised medium consisting of detached protons and electrons. How and when did this 'cosmic reionisation' occur, and were early star-forming galaxies the primary agents? Recent progress has raised the exciting prospect that we will soon be able to directly witness this dramatic period when the universe emerged from darkness and the first galaxies began to shine.

Professor Gregory Goodall FAA

After graduate studies at the University of Adelaide in enzymology and protein chemistry, Professor Greg Goodall undertook postdoctoral training at the Roche Institute of Molecular Biology in New Jersey, USA. After moving to Switzerland to work with Witold Filipowicz at the Friedrich Miescher Institute, he embraced the world of RNA and post-transcriptional mechanisms of gene regulation, and has continued in this research field since returning to Adelaide. He is now a Section Leader in the Centre for Cancer Biology, SA Pathology, co-Director of the Centre for Cancer Biology's ACRF Cancer Genomics Facility, and an Adjunct Professor of the University of South Australia. He is an NHMRC Principal Research Fellow. His recent work has been on microRNAs and circular RNAs involved in cell invasion, epithelial to mesenchymal transition and cancer metastasis.

The molecular circuitry that controls cancer cell invasion and metastasis

In the early stages of a cancer, the cancer cells reside in a single localised tumour, but if untreated they can eventually change into an invasive type of cell that can spread to other parts of the body. We are studying the molecular control processes that

specify whether a cancer cell remains immobile, or transitions to the invasive form. Professor Goodall's team has found that a certain type of molecule, called microRNA, plays a crucial role in controlling this transition, and has been mapping the regulatory circuitry involved, determining what controls the microRNAs, and what effects they have, at the molecular level. The team aims to understand these processes sufficiently well to be able to design ways to intervene in the cellular transition, thereby preventing metastatic spread of cancers.

Professor Kliti Grice FAA

PHOTO: ANNABELLE FOUCHARD

Professor Kliti Grice has held two Australian Research Council QEII fellowships and a Discovery Outstanding Research Award at Curtin University. She was merit promoted to Professor in 2007 and is the inaugural Director of the WA-Organic and Isotope Geochemistry Centre. In 2014 she was awarded the title of John Curtin Distinguished Professor at Curtin University. Awards received include the Western Australian Premier's Inaugural Science Award for Early Career Achievement in Science, the international Pieter Schenck Award and the Gibbs Maitland Medal. She is also an elected Honorary Fellow of the Geochemical Society and European Association of Organic Geochemistry, and a Fellow of the Royal Australian Chemical Institute. Professor Grice has published over 160 journal articles and book chapters, and has supervised 25 PhD students—more than 60% female—in chemistry, organic geochemistry and Earth sciences. Her scholars and research fellows have secured highly successful careers in industry, government and academia.

Molecular fossils from microbes: the history and recovery of life recorded across mass extinction events and conditions associated with exceptional preservation of steroids, collagen and red blood cells in fossils

Novel biomarker and stable isotopes approaches have been applied to reconstruct the paleoenvironmental setting of a Devonian aged fossiliferous deposit in the Canning Basin, Western Australia. Highly unusual carbonate concretions, referred to as 'Gogo nodules', form around the decaying soft tissue of, for example, fish and invertebrates. Biomarkers and stable isotopes derived from green sulfur bacteria and sulfate reducing bacteria play a significant microbial role in the preservation of the biolipids via hydrogen sulfide vulcanisation. The abundance of steroids derived from cholesterol, with an original biological stereochemistry, links to the exceptional preservation of lipids derived from crustaceans, for example. This discovery of steroids including sterols derived from an individual Devonian fossil bridges the disciplines of molecular fossil and isotope geochemistry to the field of paleontology. Microbially-induced carbonate encapsulation, preventing complete transformation and decomposition, has significantly expanded our understanding of steroid occurrence and diagenesis in the geosphere. Very recently it has been demonstrated that an ichthyosaur vertebra of 183 million years old was found to contain cholesterol but also contains red and white blood cell-like structures and collagen. The small size of the red blood cells was attributed to an evolutionary adaptation to low oxygen levels in the atmosphere when the ichthyosaur lived.

Professor Lloyd Hollenberg FAA

PHOTO: © CASAMENTO PHOTOGRAPHY 2011

Professor Lloyd Hollenberg is the Thomas Baker Chair in the School of Physics at the University of Melbourne. He completed his PhD in 1989 in theoretical particle physics and worked at the KEK Accelerator, Japan in 1990 as a Japan Society for the Promotion of Science Fellow. He has also worked at the Max Planck Institute for Nuclear Physics and the University of Munich as an Alexander von Humboldt Fellow. Professor Hollenberg is the Deputy Director of the ARC Centre of Excellence in Quantum Computation and Communication Technology (2011–24), and was awarded an ARC Laureate Fellowship (2013–18). He is well known internationally for his work in quantum computing and the development of quantum sensing at the nano–bio interface. He was awarded the 2012 Walter Boas Medal, the 2013 Victoria Prize and the 2016 Royal Society (Victoria) Medal for Excellence in Scientific Research, and led the team that won the 2013 Eureka Prize for Excellence in Interdisciplinary Research.

Quantum reality bytes: from quantum bio-imaging to quantum computing

To our classically evolved sensibilities the quantum world is very strange and we may never fully understand it. However, as experiments and theory probe further into the quantum realm, and the ability to control quantum systems is refined, it has become clear

that quantum technology based on harnessing these 'spooky' quantum properties can be powerful. Quantum science is producing surprising new capabilities in imaging and computing.

Professor Anne Kelso AO FAA

PHOTO: IDPHOTO.COM.AU

Professor Anne Kelso has been Chief Executive Officer of the National Health and Medical Research Council (NHMRC) since 2015. After gaining her PhD at the University of Melbourne, she spent many years as a biomedical researcher in immunology at the Swiss Institute for Experimental Cancer Research, the Walter and Eliza Hall Institute of Medical Research and the Queensland Institute of Medical Research (QIMR). At QIMR, she was also Director of the Cooperative Research Centre for Vaccine Technology for six years before returning to Melbourne in 2007 as Director of the World Health Organization's Collaborating Centre for Reference and Research on Influenza at Melbourne Health and the Peter Doherty Institute for Infection and Immunity. Professor Kelso has served as President of the Australasian Society for Immunology, Secretary-General of the International Union of Immunological Societies, and as a member of committees advising the World Health Organization and the Australian Government on seasonal and pandemic influenza. She represents the NHMRC on the Australian Medical Research Advisory Board, advising the Minister for Health on the Medical Research Future Fund.

Future health

We are used to hearing that government funding for research is an investment—in health and well-being, in solutions to our problems, in jobs and prosperity. But how would you invest it? Researchers, the community and governments would probably answer this question differently. The funders themselves have to navigate these differences, balancing present and future needs of society, community advocacy and political expectations, while managing the inertia imposed by historical funding patterns. With the establishment of the Medical Research Future Fund, Australia has embarked on an important experiment in priority-driven medical research funding to complement and build on the funding provided by the National Health and Medical Research Council. In this changing environment, NHMRC must decide how to support the research sector most effectively to achieve our ultimate goal of improving the health of the community and future generations.

Professor Bostjan Kobe FAA

Professor Bostjan Kobe is Professor of Structural Biology and NHMRC Principal Research Fellow at the School of Chemistry and Molecular Biosciences, University of Queensland. He received his BSc in chemistry at the University of Ljubljana, Slovenia, and his PhD at the University of Texas Southwestern Medical Center at Dallas, USA. His laboratory focuses on applying structural biology approaches to understanding infection and immunity. He received the 2001 Minister's Prize for Achievement in Life Sciences, an ARC Federation Fellowship in 2005, the 2009 ASBMB Roche Medal and the 2018 ASBMB Beckman Coulter Discovery Award. He was the President of the Society of Crystallographers in Australia and New Zealand and a member of the ARC College of Experts. He has more than 230 publications and more than 14,000 citations.

Structural basis of innate immunity signaling in animals and plants

Innate immunity pathways represent the first line of defence in organisms from animals to plants. Although the animal and plant pathways are thought to have evolved independently, the proteins involved have recruited several common protein domains. Such domains include the LRR (leucine-rich repeat) and the TIR (Toll/interleukin-1 receptor) domains. Both of these domains are found, for example, in TLRs (Toll-like receptors) and TLR adaptors in animals, and NLRs (nucleotide binding, leucine-rich repeat receptors) in plants. Professor Kobe determined the first crystal structures of a protein with LRRs (porcine ribonuclease inhibitor), and its complex with the ligand ribonuclease A. This work set the foundation for understanding the interaction functions of proteins with LRRs (such as TLRs) and solenoid proteins (proteins built from short structural repeats) in general. More recent work has led to the characterisation of the signaling function TIR domains. His team reconstituted large assemblies of the TLR adaptors MAL and MyD88, and determined the structure of the filamentous assembly of MAL by cryo-electron microscopy. Its studies suggest a general mechanism of function of TIR domains, which involves 'signaling by cooperative assembly formation (SCAF)' with prion-like features that leads to the activation of effector enzymes.

Professor Kerrie Mengersen FAA

PHOTO: ANTHONY WEATE/QUT

Professor Kerrie Mengersen's training and expertise is in mathematical and applied statistics and statistical computing, with a focus on Bayesian statistics. She has held academic positions in a variety of universities in Australia, the USA and the UK, with a long-term appointment as Professor and now Distinguished Professor at the Queensland University of Technology. She is actively involved in national and international professional societies, including service as President of the Statistical Society of Australia and the International Society for Bayesian Analysis, and Managing Editor of the Australian and New Zealand Journal of Statistics. Her focus is on contributing to Australia's research strengths in statistics, promoting the use of statistics in other sciences, increasing awareness of statistics in the community, and supporting young people—particularly women—in the profession.

Bayesian statistics methodology and practice

The field of Bayesian statistics has grown exponentially over the past thirty years and provides a rich opportunity for the merger of mathematics, data, computation and application. Indeed, it has been called a 'modelling revolution'. But what is it that is so revolutionary? Professor Mengersen will reflect on some of the ways in which the Bayesian paradigm challenges the way we think about probability, models, algorithms and new data sources. Specific examples include the formulation of priors, hierarchical and mixture likelihoods, and the development of MCMC and alternative computational methods. These comments will be set in the context of real-world problems in which we have been engaged in the areas of health, environment and industry. Examples include the development of a national cancer atlas, facilitation of international trade, monitoring of the Great Barrier Reef and creation of a jaguar corridor across the Peruvian Amazon.

Professor Colin Raston AO FAA

Professor Colin Raston is Professor in Clean Technology at Flinders University. He completed a PhD at the University of Western Australia and postdoctoral studies at the University of Sussex. He was a lecturer at the University of Western Australia, then Professor of Chemistry at Griffith University, Monash University, the University of Leeds and the University of Western Australia. He is a former President, Queensland Branch President and Chair of the Inorganic Division of the Royal Australian Chemical Institute (RACI). He has received the RACI's Green Chemistry Challenge Award, the HG Smith Award for the most distinguished contribution to research in chemistry in Australia in the previous ten years, the Burrows Award for distinguished research in inorganic chemistry and the Leighton Memorial Award for outstanding contributions to the profession. In 2015 he shared the Ig Nobel Prize in Chemistry with colleagues at the University of California, Irvine and the University of Western Australia.

Spinning up sustainable chemistry

Continuous flow processing has scalability incorporated at the inception of the science as well as overcoming problems encountered in traditional batch (flask) chemistry, for example uneven heat and mass transfer. Professor Raston's team has developed the continuous flow vortex fluidic device (VFD) which has a rapidly rotating tube with controllable speed inclined at 45 degrees relative to the horizontal position for optimum results, with liquids delivered at controllable flow rates to the base or positions along the inside of the tube through jet feeds, exiting at the top of the tube. The VFD microfluidic platform generates high shear within the thin film of liquid and has remarkably diverse processing capabilities with high green chemistry credentials. These include the synthesis of small molecule pharmaceuticals, materials synthesis, such as the ability to slice high tensile carbon nanotubes and exfoliate graphene and other 2D materials, fold proteins (partially 'unboil an egg') and enhance enzymatic reactions which are important to the pharmaceutical industry, and control self-assembly processes, for example in the formation of liposomes. Fluid flow in the VFD is inherently complex and reaction rates and yields can be dramatically increased relative to conventional batch processing, as well as gaining access to new chemistry.

Professor Veena Sahajwalla FAA FTSE

Australian Research Council (ARC) Laureate Professor Veena Sahajwalla

is revolutionising recycling science to unlock the wealth of resources embedded in the many complex wastes currently destined for landfill. As a materials scientist and engineer and founding Director of the Centre for Sustainable Materials Research and Technology (SMaRT) at the University of New South Wales, Sydney, she is producing a new generation of green materials, products and resources made entirely or primarily from waste. Professor Sahajwalla also heads the ARC Industrial Transformation Research Hub for 'green manufacturing', a leading national research centre that works in collaboration with industry to ensure new science is translated into real world environmental and economic benefits. She has received numerous international and national honours for her research and leadership. In 2017, she received the PLuS Alliance Prize for Research Innovation and was awarded the prestigious Jubilee Professorship by the Indian Academy of Sciences.

Green microfactories: products from waste

Professor Sahajwalla is a materials scientist and engineer who was born and raised in Mumbai—one of the most densely populated cities on Earth. She is all too aware of the huge amounts of waste that society can produce and has made it her mission to lessen its environmental and social impact. Her SMaRT team has developed innovative pathways to reduce the environmental harm caused by vast amounts of electronic waste, and is developing the science of microrecycling of electronic waste in partnership with a number of global businesses and organisations. The world's waste mountains are packed with useful elements like carbon and hydrogen and materials like silica and metals, which industries generally access from virgin resources. The team is leading the global race to create microfactory technology that untangles the complexity of electronic waste through selective thermal transformation solutions, which bring a small-scale solution to the world's massive waste problem for the first time. In future, these microfactories will enable industries to produce many value-added products and resources, using materials largely derived from waste, to meet existing and new industry and consumer demands. By decentralising manufacturing, this new microfactory technology will bring positive economic and social impacts.

Professor Martina Stenzel FAA

Professor Martina Stenzel studied chemistry at the University of Bayreuth, Germany, before completing her PhD in 1999 at the Institute of Applied Macromolecular Chemistry, University of Stuttgart, Germany. She started as a postdoctoral fellow at the University of New South Wales in 1999 and is now a Professor in the School of Chemistry as well as Co-Director of the Centre for Advanced Macromolecular Design (CAMD). Her research interest is focused on the synthesis of functional nanoparticles for drug delivery applications. Professor Stenzel has published more than 280 peer reviewed papers mainly on polymer and nanoparticle design. She is Scientific Editor of Materials Horizons and serves currently on a range of editorial boards. She has received a range of awards including the 2011 Le Fèvre Memorial Prize from the Australian Academy of Science.

Plastic fantastic and the long way to nanomedicine

The use of plastics has revolutionised our way of living. Commodity plastics have invaded all areas of life ranging from everyday low-cost objects to high-end products in the health, electronic and energy sectors. Thanks to recent advances in polymer design, researchers can now access precision polymer structures that are suitable for the generation of nanoscopic devices such as nanoparticles. This opened up the opportunity to generate tailor-made nanoparticles for medical applications and we are therefore entering the world of nanomedicine—the marriage of nanotechnology and medicine. Nanoparticles made from various polymer materials can now facilitate the treatment of cancer, addressing challenges such as the fast clearance of the drug from the bloodstream. However, before we can use nanoparticles in a biological setting, we need to understand how nanoparticles of different sizes and shapes can be generated and how they can be loaded with anti-cancer drugs. Material scientists can turn to nature for inspiration as viruses, nature's nanoparticle, have evolved to be highly successful in circulating the body without being detected and cleared by the body's defence mechanism. Combination of the latest development in polymer design and nature's building blocks enabled the formation of drug-loaded nanoparticles that were shown to invade cancer cells reminiscent of a Trojan horse.

Professor Dacheng Tao FAA

Professor Dacheng Tao is Professor of Computer Science and ARC

Laureate Fellow in the School of Information Technologies and the Faculty of Engineering and Information Technologies, and the Inaugural Director of the UBTECH Sydney Artificial Intelligence Centre, at the University of Sydney. He mainly applies statistics and mathematics to Artificial Intelligence and Data Science. His research interests spread across computer vision, data science, deep learning, image processing, machine learning and video surveillance. Professor Tao's research results have been explained in a monograph and more than 500 publications of prestigious journals and prominent conferences, with several best paper awards. He has been a Highly Cited Researcher in engineering since 2014 and computer science since 2015, and received the 2015 Australian Scopus Eureka Prize for excellence in international scientific collaboration. He is a Fellow of the Institute of Electrical and Electronic Engineers, American Association for the Advancement of Science, Optical Society of America, International Association for Pattern Recognition, International Society for Optical Engineering, Institution of Engineering and Technology, and the British Computer Society. He is a Foreign Member of the Academia Europaea.

Artificial intelligence, the future

Since the concept of a Turing machine was first proposed in 1936, the capability of machines to perform intelligent tasks has been growing exponentially. Artificial intelligence (AI), as an essential accelerator, pursues the target of making machines as intelligent as human beings. It has already reformed how we live, work, learn, discover and communicate. Professor Tao will review his team's recent progress on AI by introducing some representative advancements from algorithms to applications, and illustrate the steps for its realisation from perceiving to learning, reasoning and behaving. Many challenges lie ahead to move AI from the narrow to the general. He will discuss some examples and shed light on his team's future target. Today, we teach machines how to be as intelligent as ourselves. Tomorrow, they will be our partners in our daily lives.

Professor Joseph Trapani FAA

Professor Joe Trapani leads the Cancer Immunology Program at the Peter MacCallum Cancer Centre (Peter Mac). His research interests include the immunopathology of viral and autoimmune diseases, apoptosis induction by cytotoxic lymphocytes and cancer immunotherapy. He has authored more than 310 research papers, reviews and book chapters on these topics, collectively cited more than 22,000 times. Professor Trapani became interested in how the immune system defends against viruses and cancer as a postdoctoral fellow at Sloan-Kettering Cancer Institute, New York, where he discovered a number of the genes/proteins that killer lymphocytes use to eliminate virus-infected cells. He found that one protein (perforin) forms pores in the target cell, providing access for proteases ('granzymes') to trigger cell death. With his colleagues, Professor Trapani also devised ways of harnessing killer ('CAR T') lymphocytes for human cancer immunotherapy. His team also showed that children who inherit hypomorphic perforin gene mutations frequently develop blood cancers, a failure of immune surveillance.

The 'granule exocytosis' cell death signaling pathway: eliminating dangerous cells, maintaining immune homeostasis and surveillance against cancer

Cytotoxic T lymphocytes and natural killer cells (collectively, 'cytotoxic lymphocytes') eliminate virus-infected and transformed cells through the synergistic actions of diverse toxins co-packaged within, and released from, their cytoplasmic lysosome-like secretory vesicles. Upon the formation an immune synapse with the targeted cell, the vesicles release a pore-forming protein (perforin), monomers of which coalesce into large transmembrane pores that permit the free diffusion of pro-apoptotic serine proteases ('granzymes') into the target cell cytosol, where caspases are activated and programmed cell death is triggered. Professor Trapani will briefly describe some of the studies that pinpoint the key features of cell death signalling, the mode of perforin/granzyme synergy and the structural basis for perforin pore-formation. Genetically modified perforin-deficient mice have also been instrumental in studying the response to many pathogenic viruses and provided among the first incontrovertible evidence for Burnet's hypothesis of 'cancer immune surveillance', initially raised in the 1950s. In humans, perforin deficiency ('perforinopathy') may be manifested in various ways: the perforin-null state is invariably fatal soon after birth, due to cytokine hypersecretion syndrome (familial hemophagocytic lymphohistiocytosis, FHL), whereas the inheritance of hypomorphic mutations leads to heightened systemic inflammatory sequelae and a marked susceptibility to cancer, particularly haematological cancers. He will also discuss the pathogenesis of these conditions.

Dr John Volkman FAA

(Elected 2017)

Dr John Volkman is an Honorary Fellow at CSIRO's Marine and Atmosphere Flagship in Hobart, Tasmania. He joined CSIRO in 1982 and retired as a Chief Research Scientist and program leader in 2012. He then worked for three years part-time in China studying petroleum geochemistry. He is currently co-Editor in Chief of the international journal Organic Geochemistry. Dr Volkman gained his PhD in organic chemistry from Melbourne University in 1978 and was awarded Docteur honoris causa by the Université de la Méditerranée in 2011. He is a Fellow of the Royal Australian Chemical Institute and the Geochemical Society. His speciality is the analysis of organic compounds (biomarkers) in natural waters, sediments and petroleum as part of studies of the origins of organic matter in the geosphere. He also has interests in environmental chemistry, algal and bacterial lipid chemistry and environmental effects of aquaculture.

Deciphering Earth's past environments through biomarkers

We are all familiar with the preservation of animal fossils in the ancient sediment record and how they can provide us with information on how life on Earth has evolved. All organisms also synthesise a variety of organic compounds called lipids which, under favourable conditions, can be preserved in sediments. Biosynthetic pathways have evolved and diversified greatly over geological time and thus certain lipids, termed biomarkers (also known as chemical fossils), are restricted to specific groups of organisms such as plants, animals, microalgae, macroalgae, bacteria and archaea. From analyses of these sedimentary biomarkers using advanced analytical techniques including high resolution gas chromatography – mass spectrometry and high performance liquid chromatography – mass spectrometry, we can deduce what organisms were present in the environment, how the organic carbon was cycled and preserved and what environmental conditions must have been present when those sediments were deposited. Dr Volkman will give some examples using specific lipids such as alkenones, highly branched isoprenoid alkenes and alkyl diols made by some microalgae to show what we can learn about the evolution of life on Earth and how palaeoenvironmental conditions have changed over geological time.

Professor Branka Vucetic FAA FTSE

(Elected 2017)

PHOTO: © CASAMENTO PHOTOGRAPHY

Professor Branka Vucetic is an ARC Laureate Fellow and Director of the Centre of Excellence for IoT and Telecommunications at the University of Sydney. Her current work is in the areas of wireless networks and the Internet of Things. In the area of wireless networks, she focuses on the design of ultrahigh reliability and ultralow latency communications systems and communications for millimetre wave frequency bands. In the area of the Internet of Things, Professor Vucetic works on delivering wireless connectivity for mission-critical applications. She has provided essential R&D support to the Federal Government's $100m Smart Grid, Smart City national demonstration project on its wireless solutions. Professor Vucetic was awarded the Chinese Government Friendship Award in 2014 for continuous and sustained cooperation in education, science and technology. She is a Fellow of Institute of Electrical and Electronic Engineers, the Australian Academy of Technology and Engineering, and Engineers Australia.

The evolution of wireless networks

Over the last three decades wireless cellular, Wi-Fi and satellite communication networks, which enable multiple devices to connect without any physical link, have advanced to an applied science that plays a major role in many aspects of modern life. Professor Vucetic will present the evolution and development of various generations of mobile wireless technologies along with their significance, applications and her contributions to its theoretical and technology advances. Current research in wireless networks concentrates on the next generation cellular technology 5G, which will enhance the traditional smart phone and internet access services and support the development of the emerging Internet of Things (IoT) applications. She will discuss present communications research challenges and future IoT latency critical use cases.

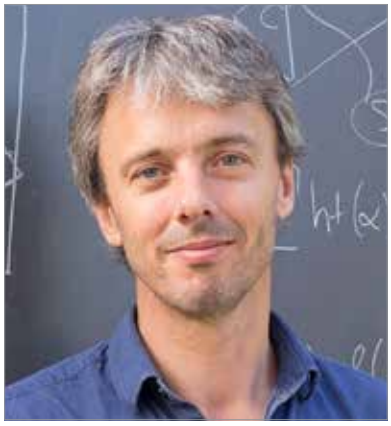
Professor Rachel Webster FAA

Professor Rachel Webster is the Head of the Astrophysics group at the University of Melbourne. Since gaining her PhD at the University of Cambridge, she has held academic positions at the University of Toronto and the University of Melbourne, and senior positions within the Australian and international astronomical communities. These include Chair of the ARC College of Experts PCE panel, the National Committee for Astronomy, Astronomy Australia Limited and the Visiting Committee of the Space Telescope Science Institute in the USA. She has been awarded a number of distinguished lectureships including the Caroline Herschel Distinguished Lectureship at the Space Telescope Science Institute. She has received several awards for mentoring and supervision, including the Nature Mid-career Mentoring Award. As well as a distinguished research program in cosmology and extragalactic astrophysics, specifically in gravitational lensing, quasar astrophysics, the epoch of reionisation and the cosmology of the local neutral hydrogen distribution, Professor Webster has a strong interest in climate change and plays an active role in sustainability initiatives. She remains a committed advocate of equity and diversity within the scientific community.

Unlocking black hole physics

Gravitational lensing can provide a natural telescope to super-resolve the innermost regions of quasars. Quasars are luminous beacons powered by supermassive black holes with the potential to map the far reaches of the universe. Professor Rachel Webster will explain how a star in a distant galaxy can magnify the surrounds of a black hole, enabling measurement of both the geometry and kinematics of the gas in their local environments. A detailed physical understanding of quasars will allow their use as either standard rods or candles, and will also explain the mechanisms by which supermassive black holes are able to influence the evolution of their host galaxies.

Professor Geordie Williamson FAA FRS



Professor Geordie Williamson studied at the University of Sydney with majors in Mathematics and English, and honours in Pure Mathematics. He completed his doctoral studies at the University of Freiburg in Germany under the supervision of Wolfgang Soergel. He went on to a postdoctoral research fellowship at the University of Oxford, working with Raphael Roquier, where he was also a Junior Research Fellow at St Peter's College. He then spent five years at the Max Planck Institute for Mathematics in Bonn as an Advanced Researcher, before returning to the University of Sydney as a Professor in 2017. He works primarily in representation theory (the study of linear symmetry) but his research interests include questions in number

theory, topology and geometry. He has had visiting positions throughout the world, including at the Mathematical Sciences Research Institute in Berkeley, the Research Institute for Mathematical Sciences in Kyoto and the Centre for the Quantum Geometry of Moduli Spaces in Aarhus. His work has been recognised with several international awards, including the Prize of the European Mathematical Society and the Chevalley Prize of the American Mathematical Society.

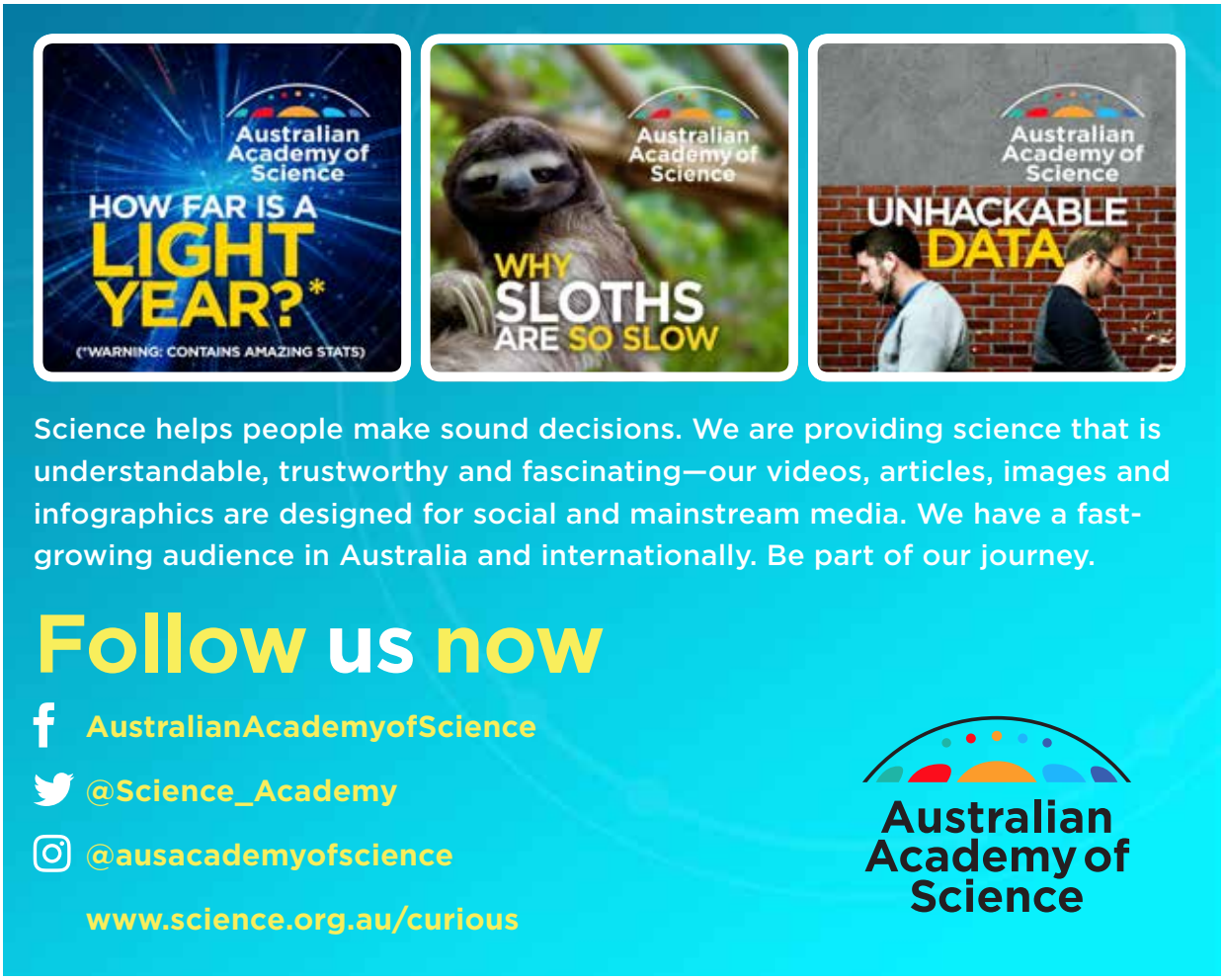
Symmetry and forms

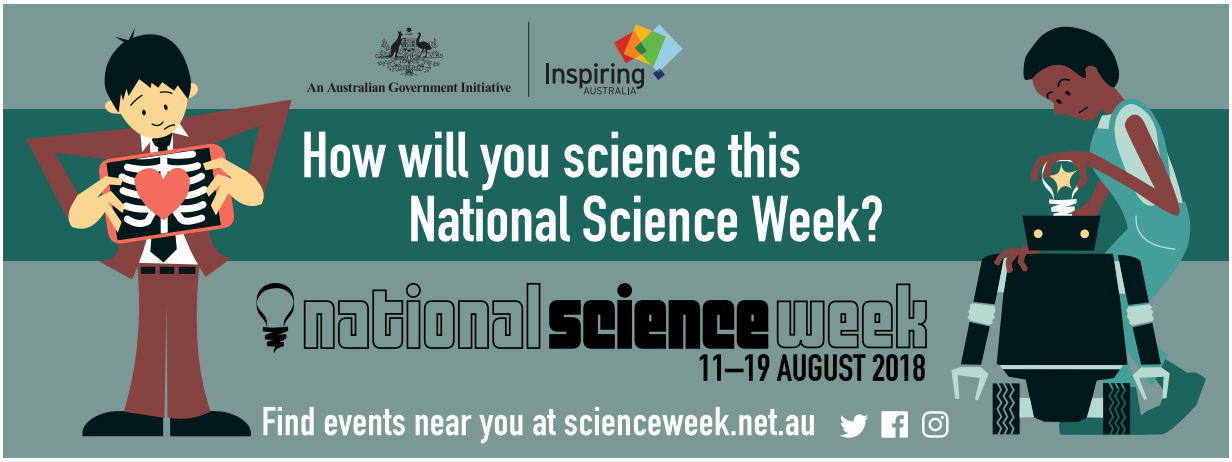
The notion of a representation of a group is fundamental to pure mathematics. Professor Williamson will try to explain what a representation is, and how representations often have a surprising intrinsic geometry.

Absent new Fellows

Also elected this year, but unable to join us for the New Fellow Presentations, are:

- **Professor Richard Bryant AC FAA**
- **Professor Peter Cawood FAA**





Annual gala dinner

We look forward to celebrating this year's Annual Gala Dinner at the National Gallery of Australia.

This event, at the National Gallery's majestic Gandel Hall, brings together the who's who of Australian science. We will welcome Nobel Prize winners, Prime Minister's Science Prize winners, Chief Scientists, Academy Fellows, senior representatives from the science sector, Members and Senators of the Australian Parliament, Government officials, and members of the diplomatic community.

The evening will include a fireside chat between Australian of the Year, Professor Michelle Simmons, and Adjunct Professor Virginia Haussegger, Director of the 50/50 by 2030 Foundation at the University of Canberra.

We will hear from Professor Alex Brown, Wardliparingga Aboriginal Research Unit, South Australian Health & Medical Research Institute.

We will also officially launch the Academy's inaugural Aboriginal and Torres Strait Islander Scientist Travelling Research Award.

The Academy will present the prestigious Macfarlane Burnet Medal to Professor Geoffrey Burnstock.

We are delighted to be able to bring this event to you in such a stunning venue, with the generous support of the University of South Australia.

Buses depart QT and University House: 6.25 pm
Drinks and canapes: 6.30 pm
Dinner: 7.30 pm
Dress code: Black tie/cocktail

University of South Australia

Enterprising research, inspired by excellence

Since its founding, the University of South Australia has demonstrated an ongoing commitment to Indigenous research and education.

With research excellence in the areas of Aboriginal Health and Wellbeing we continue to nurture our engagement with existing Aboriginal researchers and support more Aboriginal people to start their research career or become involved in research in some capacity, which has been recognised by our partnership with the South Australian Health and Medical Research Institute (SAHMRI).

To find out more about our Aboriginal Research partnerships visit **unisa.edu.au/wardliparingga**

Resilience and Vulnerability by Jelina Haines, School of Information Technology and Mathematical Sciences

University of South Australia

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Aboriginal and Torres Strait Islander Scientist Travelling Research Award

Opening 24 May 2018 for applications

The Australian Academy of Science is launching the **Aboriginal and Torres Strait Islander Scientist Travelling Research Award** at Science at the Shine Dome on Thursday 24 May 2018. This is a competitive award to support outstanding Aboriginal and Torres Strait Islander scientists in the natural sciences.

The award recognises research by PhD students and early- and mid-career scientists. It aims to support the expansion and growth of their research networks and international knowledge exchange through visits to relevant international centres of research.

Two annual awards of $5500 are planned, with additional support provided to attend Science at the Shine Dome. Further details on the award, including how to apply, will be available after the awards launch on the travel opportunities section of our website: **science.org.au/opportunities/travel**

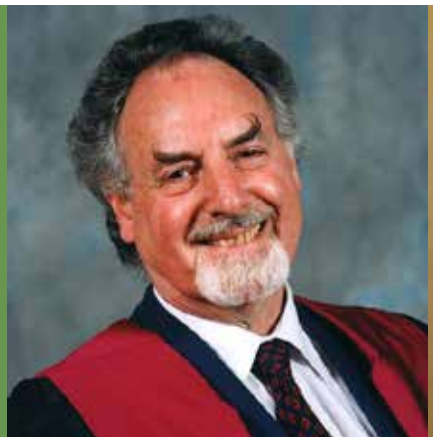
The Academy is working to match the initial donation of $250 000 (to be contributed over five years) so that the future of this valuable award can be secured. If you would like to donate to this award or find out more information, please contact Isobel Griffin, Manager Development and Stewardship **isobel.griffin@science.org.au**

Above: Sash Gwion Gwion on Mitchell Plateau NW Kimberley.

IMAGE COURTESY OF KIMBERLEY FOUNDATION AUSTRALIA AND GRAHAME WALSH ARCHIVE. COPYRIGHT OWNER RESERVES ALL RIGHTS.

2018 Macfarlane Burnet Medal and Lecture

The Macfarlane Burnet Medal and Lecture recognises scientific research of the highest standing in the biological sciences, and commemorates the contributions to science by Sir Frank Macfarlane Burnet OM KBE MD FAA FRS Nobel Laureate. The lecture is delivered at the Academy's Science at the Shine Dome in May.



Professor Geoffrey Burnstock FAA FRS

University College London and Melbourne University

Professor Geoffrey Burnstock is internationally recognised for the discovery of purinergic neurotransmission, a novel signalling system between cells that is of central importance for many biological processes. His 1976 discovery challenged established concepts of the biology of cell messengers and neurotransmission. More recently, he has focused on a cell communication process that takes place in metabolism known as purinergic signalling. This research has had an impact on the understanding of pain mechanisms, bone formation and skin and bladder cancer and kidney disease. He continues to be an inspiration for many and his vision and creativity have enabled and driven the research of a very large number of laboratories around the world. He has had a very large impact on this field by his initial discovery and its elaboration, involving challenge to Dale's principle of 'One nerve terminal—one transmitter'.

The discovery and development of purinergic signalling

This is a story against the odds. Coming from humble beginnings in the UK, immigrating to Australia gave me the opportunity to propose a revolutionary hypothesis. Most scientists did not accept this for the next 20 years. However, with persistent accumulation of new experimental evidence, my hypothesis was finally accepted. It is currently leading to exciting new therapeutic developments by the research of thousands of medical scientists in many countries in the world. The main conceptual steps involved in the development of my hypothesis follow.

In Melbourne in the 1960s, my colleagues and I showed that the classical autonomic neurotransmitters acetylcholine and noradrenaline were not the only neurotransmitters in autonomic nerves. We showed that non-cholinergic, non-adrenergic nerve transmission occurs. This was demonstrated by using the sucrose gap recording technique, which had been introduced earlier by Burnstock and Straub in 1957 using the taenia coli, the preparation favoured by the Oxford Pharmacology Department. We showed that ATP was the new neurotransmitter in both the gut and the bladder. ATP, being a purine nucleotide, led me to propose the term 'Purinergic Signalling' in a Pharmacological Review in 1972. Later, we showed that ATP was a co-transmitter in most nerves in both the peripheral and central nervous systems. This finding questioned Dale's Principle that one nerve releases only one transmitter. The turning point in the acceptance of the Purinergic Signalling Hypothesis was when receptors for ATP and adenosine were characterised in the early 1990s. Subtypes of P1 adenosine, P2X ion channel and P2Y G protein-coupled nucleotide receptors were identified. Evolutionary studies showed that ATP receptors similar to those found in mammals are also present in primitive animals, indicating the early presence of purinergic signalling. Studies of the mechanisms of ATP release and enzymatic inactivation followed, as did immunohistochemical expression of ATP and adenosine receptor subtypes in most cells. My recent focus has been on the pathophysiology and therapeutic potential of purinergic signalling. For example, the drug Clopidogrel, a P2Y12 receptor antagonist against platelet aggregation, is in wide use for the treatment of thrombosis and stroke and a P2Y2 receptor agonist for the treatment of dry eye. There are currently many explorations for the use of purinergic agents for the treatment of other diseases, including chronic cough, visceral pain, osteoporosis, neurodegenerative diseases and cancer.

Academy Awards 2018

CAREER HONORIFIC AWARDS recognise life-long achievement in the outstanding contribution to the advancement of science.

2018 David Craig Medal and Lecture

The David Craig Medal and Lecture is awarded in honour of the outstanding contribution to chemical research of the late 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 Douglas MacFarlane
FAA FTSE
Monash University

Professor Doug MacFarlane's research has focused on the discovery and development of novel liquid salt compounds that offer unique properties as media and solvents for a wide range of applications. Research into these 'ionic liquids' has experienced major expansion over the last 25 years. The discoveries of Professor MacFarlane's group have contributed to the study and use of ionic liquids, helping to establish the area as a major field of chemistry. His group has explored application of ionic liquids in sustainable energy technologies, producing major advances in energy storage in advanced batteries, as chemical energy storage as hydrogen and ammonia, and as thermal energy storage materials for domestic use. The intellectual property arising from some of these developments has been spun out into several start-up companies. His group has also pioneered the use of biocompatible families of these liquid salts as media for therapeutic proteins and as novel pharmaceuticals. These developments have opened up new treatment modalities, including as a topical treatment for skin cancer.

2018 Mawson Medal and Lecture

The Mawson Medal and Lecture recognises outstanding contributions to earth science in Australia, and commemorates the work of the late Sir Douglas Mawson OBE FAA FRS, geologist and Antarctic explorer. The recipient of this medal delivers a lecture at the Congresses of the Geological Society of Australia.

Professor Matt King
University of Tasmania

Professor Matt King has made seminal contributions to the understanding of the function and threat posed by the two great ice sheets, Greenland and Antarctica. With a commitment to meticulous field measurements,

The Australian Academy of Science invites nominations and applications for its 2019 research conference, research awards and travelling fellowships.

Information on the awards, including eligibility criteria and nomination/application procedures, is available on the website
www.science.org.au/opportunities

2019 FUNDING

his research has opened new arenas of research and changed thinking on the timescales over which ice sheets and solid Earth beneath them are responding to external forces. Professor King has made international contributions to at least three major areas of polar research: demonstration of the great sensitivity of the ice sheets to small changes in forces acting upon them; the first agreed estimate of the contribution of the Antarctic Ice Sheet to sea level change; and a dramatic revision to the understanding of the timescale of interactions between the Antarctic Ice Sheet and solid Earth beneath it. His work has had substantial influence on international practice, conventions and climate change assessments.

MID-CAREER HONORIFIC AWARDS recognise outstanding contributions to the advancement of science by scientists 8–15 years post-PhD in the calendar year of nomination.

2018 Gustav Nossal Medal

The Gustav Nossal Medal recognises outstanding research in global health and honours the contributions made to fields of cellular immunology, antibody formation and tolerance and vaccine research science by Sir Gustav Nossal AC CBE FAA FRS FTSE.

Professor Anushka Patel
University of New South Wales, Sydney

Professor Anushka Patel, Chief Scientist at the George Institute for Global Health, is an international leader in our understanding of cardiovascular disease management in global populations. With her focus on low- and middle-income countries, she has not only made ground-breaking research discoveries that have overturned conventional thinking about cardiovascular disease risk factor management, but has also made a significant impact on disruptive low-cost strategies to deliver effective care. As one of the few clinician scientists globally working in this area, Professor Patel's work is inspired by the epidemic of chronic non-communicable diseases affecting populations around the world, particularly disadvantaged groups in Asia.

2018 Jacques Miller Medal

The Jacques Miller Medal recognises research of the highest standing in the field of experimental biology research, and is made in honour of 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.

Professor Killugudi Swaminathan Iyer
University of Western Australia

Professor Swaminathan Iyer in the School of Molecular Sciences at the University of Western Australia leads an internationally recognised research program in the field of bionanotechnology. His transdisciplinary research program focuses on integrating fundamental concepts of cell and molecular biology with bioengineering to develop innovative nanoformulations that are designed for the treatment of currently untreatable medical emergencies like traumatic brain injuries, cardiovascular diseases, placental disorders in pregnancy, and breast, cervical and colorectal cancers. The nanoformulations developed by Professor Iyer's research group are able to track the localisation of the drug and pathological process simultaneously during treatment: a single procedure potentially leads to both diagnosis and therapy in one hit. The ultimate goal of his research is to enable an overall increase in quality and length of life for patients, through informed decisions about timing, dosage, drug choice and treatment strategies for personalised medicine, with improved efficacy and lower off-target toxicity.

2018 Nancy Millis Medal

The Nancy Millis Medal for Women in Science honours the contributions made to science by the late Professor Nancy Millis AC MBE FAA FTSE, and recognises her importance as a role model for women aspiring to be research leaders. It recognises exceptional leadership by a woman researcher who has established an independent research program in any branch of the natural sciences.

Dr Marie-Liesse Asselin-Labat
Walter and Eliza Hall Institute of Medical Research

Dr Marie-Liesse Asselin-Labat is internationally recognised as a leading researcher in cancer biology, tissue-

specific stem cells and development and is emerging as one of Australia's young leaders in medical research in the lung stem cell and cancer research field. Using multiple strategies combining genetic approaches as well as computational studies, her team has demonstrated that some lung cell types are efficient in repairing their DNA following exposure to DNA-damaging agents while others are not so proficient. These results provide novel insights into the pathogenesis of lung diseases such as lung cancer and emphysema. Dr Asselin-Labat also identified key regulators of basal stem cell production in the embryonic lung. Her work sheds lights on the molecular events that are critical in normal lung formation and maintenance that may be altered in lung disorders and impacts therapeutic applications.

EARLY-CAREER HONORIFIC AWARDS recognise outstanding contributions to the advancement of science by scientists up to 10 years post-PhD in the calendar year of nomination.

2018 Fenner Medal

The Fenner Medal is awarded in honour of the outstanding contributions to science by the late Professor Frank Fenner AC CMG MBE MD FAA FRS. It recognises distinguished research in biology.

Dr Ceridwen Fraser
Australian National University

Dr Ceridwen Fraser's research combines genetic with environmental and ecological data to discover the processes that drive biodiversity patterns. She has contributed extensively to our understanding of how plants and animals can travel long distances to colonise new lands, and to our knowledge of how species responded to past climate change. For example, her work has revealed evidence that, during past ice ages, many shallow-water marine species were scoured from sub-Antarctic shores by sea ice, while land-based Antarctic species sheltered near warm volcanoes. Her research has also helped us to understand how established populations can block immigrants, and how large-scale disturbances that wipe out communities, such as earthquakes, can create opportunities for immigration and change. Her research is grounded in assessment of how past processes have influenced contemporary biodiversity patterns, but has important implications for management of biodiversity into the future, particularly in the face of rapid environmental change.

2018 Ruth Stephens Gani Medal

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

Dr Irina Voineagu
University of New South Wales, Sydney

Dr Irina Voineagu's research has made significant contributions to the genetics of neurodevelopmental disorders, including work on molecular mechanisms of DNA instability, autism genomics and transcriptomics. Among her many research achievements to date, Dr Voineagu has elucidated the role of DNA repeat expansions in neurodevelopmental disorders as well as identified a novel syndrome of intellectual disability caused by mutations in the CCDC22 gene. Most notably, in the first landmark large-scale transcriptome study of autistic brain, she identified networks of genes that showed altered expression in autistic brain tissue.

2018 Gottschalk Medal

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

Associate Professor Alex Fornito
Monash University

Associate Professor Alex Fornito's research aims to understand what the extraordinarily complex network of nerve cells connected by trillions of fibres means for human brain function, and how disruptions of brain connectivity can lead to mental illness. Associate Professor Fornito's innovative research combines brain imaging with techniques from psychology, psychiatry, neuroscience, genetics, physics and mathematics to map and model the brain as an interconnected system. The ultimate aim is to understand how brain network function supports behaviour

and track how disruption to this process causes disease.

2018 Anton Hales Medal

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

Dr Rhodri Davies

Australian National University

Dr Rhodri Davies has made outstanding contributions to understanding solid Earth structure and evolution through the development and implementation of powerful computational tools for simulating geodynamical processes. His work builds on a multi-disciplinary base, combining a keen geological insight with a clear understanding of geophysical processes and exploitation of advances in mineral physics under conditions of high temperature and pressure. Dr Davies has made fundamental contributions by testing controversial hypotheses relating to the nature of the variations in material properties in Earth's mantle and the way in which these interact with the patterns of flow, showing that purely temperature effects can explain more of the behaviour than previously recognised. His recent work on intra-plate volcanism in eastern Australia and the evolution of Pacific hot-spot chains has achieved a very high profile around the world, by its innovative synthesis of careful geodynamic modelling with geophysical and geochemical input.

2018 Christopher Heyde Medal

The Christopher Heyde Medal honours contributions to mathematics by the late Professor Christopher Heyde AM FAA FASSA. In recognition of Professor Heyde's broad interests in the mathematical sciences, the award is offered in one of three fields of mathematics on a rotating basis. In 2018 it recognises outstanding achievement in probability theory and statistical methodology and their applications.

Dr Zdravko Botev

University of New South Wales, Sydney

Dr Zdravko Botev has developed innovative methodologies that aim to understand the probability structures underlying the occurrence of high-cost, hard-to-predict events. The novel rare-event simulation algorithms he has derived have not only advanced the fields of computational statistics and applied probability, but have been applied in multiple domains, including communication and computer network design, digital watermarking, safety assessment of debris collision in space and chemical geology. Dr Botev's well-cited research further demonstrates the significant influence of his work in his field of applied probability, as well as applications in many areas. His work has also had significant influence in the field of computational statistics, where his methods have been used in innovative ways to develop very fast

Inspired by the falling of the Berlin Wall, Falling Walls Lab Australia asks, 'Which are the next walls to fall?' as a result of scientific, technological, economic and sociological breakthroughs. Participants are given three minutes to present their research work, business model or initiative to a broad audience, including a distinguished jury who selects the most innovative and promising idea. Register as an audience member to be part of this event.

Contact: **02 6201 9412** email: **grants@science.org.au**
science.org.au/opportunities/travel/grants-and-exchange/falling-walls-lab-australia

FALLING WALLS
FALLING WALLS LAB

algorithms for fitting flexible, smooth models to noisy data.

2018 Dorothy Hill Medal

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

Associate Professor Tracy Ainsworth
University of New South Wales, Sydney (formerly from James Cook University)

Associate Professor Tracy Ainsworth's research aims to determine the impact of environmental stress on reef-building corals, their host-microbe interactions, symbioses and disease outbreaks. Her studies on the bacterial associates of corals have improved understanding of how coral diseases occur and progress. She has also identified a variety of novel intracellular bacteria that appear to play a key role in the success of corals. She has found that the same bacteria can be found within the tissues of corals in Hawaii and Australia, from the shallows to depths of over 100 metres. Associate Professor Ainsworth has also extensively researched how increased temperatures affect coral now and will into the future. She has discovered that while small increases in sea temperatures can negatively impact the health of corals, under the right circumstances some corals appear to be able to acclimate to higher temperatures.

2018 Pawsey Medal

The Pawsey Medal recognises distinguished research in physics and commemorates the work of the late Dr Joseph Pawsey FAA FRS.

Dr Paul Lasky
Monash University

Dr Paul Lasky has dedicated his career to furthering our understanding of the most exotic regions of the universe. He is an active member of the LIGO Scientific Collaboration that, in 2016, transformed the very foundations of astrophysics by announcing the first detection of gravitational waves—tiny ripples in the fabric of spacetime—coming from two colliding black holes over one billion light years from Earth. Dr Lasky has identified new ways of studying the interiors of neutron stars using their gravitational-wave signatures, as well as new ways of testing Einstein's theory of gravity in regions of the universe where new physics is most likely to occur—at the surfaces of black holes. He has also recruited and led an international team that provided direct, empirical measurements that deepen our understanding of the universe from when it was less than one second old.

2018 Frederick White Medal

The Frederick White Medal honours the contributions to Australian science of the late 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 Alex Sen Gupta
University of New South Wales, Sydney

Dr Alex Sen Gupta is one of Australia's foremost experts in large-scale climate variability and change with a particular focus on the Southern Hemisphere ocean and atmosphere. His work spans a large array of areas and has led to a greater understanding of large-scale climate variability and change. Dr Sen Gupta's world-class research achievements have provided new insights into improving seasonal forecasts, identifying and correcting errors in modern climate models, improving climate projections, and improving our understanding of how physical changes to our oceans affect marine biology and important fisheries.

2018 Max Day Environmental Science Fellowship Award: recipients

The Max Day Award provides up to $20,000 to support early-career researchers working on the conservation of Australia's flora and fauna, ecologically sustainable use of resources, protection of the environment and ecosystem services. The award is named in honour of the late 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 Melissa Houghton
University of Queensland

Application titled: Invertebrate monitoring and community ecology as a measure of change in island ecosystems to inform conservation decision-making.

Ms Melissa Houghton takes a keen interest in eradication programs and biosecurity, with a particular focus on invertebrates. She worked previously as dog handler removing rodents and rabbits on Macquarie Island, and became inspired to understand ecosystem recovery processes. Ms Houghton's PhD project investigates the use of invertebrates as bioindicators of ecosystem change following conservation action on islands. Her research will inform meaningful and efficient ecosystem monitoring and identify the risks of non-native invertebrates to the region.

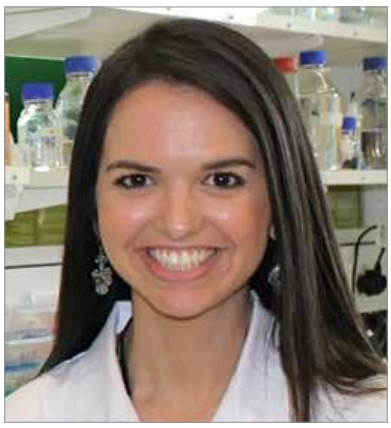
Mrs Charlie Phelps
Edith Cowan University

Application titled: Determining the cumulative effect of putative pathogenic microbes, increased temperature and herbivory on the ecologically important kelp, *Ecklonia radiata*.

Mrs Charlie Phelps is a PhD student at Edith Cowan University in WA. Her research involves looking at the cumulative effects of bacterial pathogens, temperature and grazing on the ecologically important kelp, *Ecklonia radiata*.

2018 Max Day Environmental Science Fellowship Award: highly commended

Dr Tatiana Soares da Costa
La Trobe University



Application titled: Development of New Herbicide Cocktails for Effective Weed Management.

Dr Tatiana Soares da Costa began her career at the University of Canterbury in New Zealand, with a focus on science and biochemistry. In 2010, Dr da Costa moved to Australia to complete her PhD in biochemistry at the University of Adelaide. She was then appointed as a lecturer in medical science at Charles Sturt University. In 2015, she was awarded an NHMRC Early Career Fellowship and relocated to the La Trobe Institute for Molecular Science, where she is developing novel classes of antibiotics and herbicides to avert resistance.

Early- and mid-career researcher workshops

Topic 1: Getting the story right: writing the first draft

Many people find a blank page (or screen) daunting and rush to fill it with text they wrote for other documents. Other people are so focused on the word count that they end up with thousands of words that they then have to ruthlessly edit to find the story that they were trying to tell. Poor structure results from a lack of planning about who the document is for and what its purpose is. In this workshop, you will learn how to get it right from the start, by planning the content and creating text that flows logically. During the workshop, you will create an outline for your document and then start writing. And you will learn an efficient process for writing the first draft of any document. By the end of the workshop, you will be able to analyse a document's audience and purpose, create a detailed document plan, and write a draft that follows a logical structure.

Presented by Dr Malini Devadas

Dr Malini Devadas completed a PhD in neuroscience at ANU and then worked in medical research in Japan. After realising she had chosen the wrong career, in 2004 Malini started working as a science writer and editor. She went on to complete a Graduate Certificate in Editing and Publishing and, in 2009, passed the accreditation exam of the Australian Institute of Professional Editors. She now runs her own business, MD Writing and Editing, providing editing, training and writing coaching services to help scientists and medical professionals get published faster.

Topic 2: Contributing to change: developing good policy in science

Are you interested in diversity in science and gaining experience in policy? Working with the ideas and output from the EMCR Forum's recent conference 'Science Pathways 2018: Diversify your thinking', this workshop will plan the next steps in making a difference in issues relating to diversity within the science sector. It is a hands-on opportunity to learn about policy and advocacy in science alongside EMCR Forum Executive members and policy analysts from the Australian Academy of Science. The EMCR Forum is the national voice of Australia's emerging research leaders. The EMCR Forum examines critical issues for early- and mid-career researchers and champions improvement in the national research environment through advocacy.

emcrforum

Our mission is to be the voice of Australia's EMCRs, championing improvement in the national research environment through engagement and advocacy.

Become a member Add your voice to EMCRs around the country and help create change. **www.science.org.au/emcrmembership-registration**

The EMCR Forum will keep you updated on the work we are doing and how you can contribute, as well as informing you about opportunities for professional development, networking, funding and awards. Membership is free.

JOIN THE EMCR FORUM

www.science.org.au/emcr-forum
emcr@science.org.au
@EMCRForum

Presented by Dr Justine Shaw and Dr Vanessa Wong

Dr Justine Shaw is a member of the EMCR Forum Executive. She is a Research Fellow at the Centre for Biodiversity and Conservation Science, the University of Queensland. Her research focus is on the conservation of threatened species, island ecosystems and terrestrial Antarctica, and she has been undertaking field work in the sub-Antarctic for 20 years. Her current research investigates interactions between indigenous and non-native species, and risks posed by non-native species to Antarctic ecosystems. She leads a research project with the National Environmental Science Programme, Threatened Species Recovery Hub (UQ) on island conservation. She is passionate about gender equity is science, and is a co-founder of Women in Polar Science and Homeward Bound, a global women scientists leadership program.

Dr Vanessa Wong is a member of the EMCR Forum Executive. She is a soil scientist and Senior Lecturer in the School of Earth, Atmosphere and Environment at Monash University. Her research broadly focuses on soil chemistry, and looks at the interactions between soils, sediments and water. She works in both agricultural environments, assessing the effects of land degradation, and potential remediation options, and natural environments, seeking to understand biogeochemical cycling in wetland soils. She is keen to communicate the importance of soils to society, and regularly organises outreach events and gives talks to the general public on this topic. She is a Certified Professional Soil Scientist (CPSS) and has been involved in the executive committees in Soil Science Australia and the Australian Regolith Geoscientists Association.

Topic 3: Career planning for research academics

During this workshop you will be provided with strategic, practical and sector-specific career planning advice, following a proven methodology, and designed to enable your academic career path. This presentation will demonstrate the importance of career planning and help you clarify the impact your research has or might have. It will focus on research, funding, engagement, outputs, environment and skills development, using tools such as goal setting, funding needs analysis, planning for impact, engagement mapping, and development planning.

Presented by Lyn Airey and Kirsten Bartlett

Ms Kirsten Bartlett and Ms Lyn Airey are the Directors of The GrantEd Group, an Australian company with offices in Melbourne and Brisbane. Ms Bartlett has over 20 years' experience leading multi-million dollar bids in the financial services, technology, professional services and tertiary sectors. Ms Airey spent 13 years as a medical research scientist in Australia and the UK before branching out into project, contract, grant and tender management. In the research management domain, The GrantEd Group has helped small and large research organisations achieve grant and tender success by equipping their researchers with the knowledge and skills required to successfully navigate the funding environment. The company consists of a team of seven permanent employees delivering services to over 60 faculties or central research offices across Australia.

Topic 4: Building your online profile and getting your head around social media

As the lines blur between traditional media and social media, there has never been a more important time to make sure your digital profile is up to scratch. There is extensive evidence to suggest that social media sharing of research has huge benefits for researchers, including an increase in citations. This session will help you get your digital profile in shape. Topics will include why does your online profile matter, and what does your online profile say about you? How can you raise your online profile (exploring new avenues such as The Conversation and Scimex)? The power of images/footage (how to make the most of the online thirst for vision). To tweet or not to tweet? This is social media for researchers.

Presented by Lyndal Byford

Lyndal is the Director of News and Partnerships at the Australian Science Media Centre. She spends her days turning complex science papers into tasty tabloid morsels to help news journalists cover science. Lyndal has an Honours Degree in Biotechnology from Flinders University and a Graduate Diploma in Science Communication from the Australian National University. She has spent the last 20 years communicating science in a range of settings including science museums, within the pharmaceutical industry and in media relations both here and in the UK. Lyndal regularly speaks at public forums and on ABC Radio National and 2CC in Canberra. Lyndal was also a member of Inspiring Australia's Science and the Media Expert Working Group for the then Australian Government Department of Innovation, Industry, Science and Research.

The Lindau Nobel Laureates Meetings

Once every year, 30 to 40 Nobel Laureates convene for a week in Lindau, Germany, to meet the next generation of leading scientists. The Lindau Nobel Laureates Meetings foster the exchange between scientists of different generations, cultures and disciplines.

With funding from the Science and Industry Endowment Fund, the Academy manages the annual *Science and Industry Endowment Fund–Australian Academy of Science Fellowships to the Lindau Nobel Laureates Meetings*.

Applications for the 2019 meeting, specialising in physics, open in August 2018. Email **lindau@science.org.au** to register your interest.

www.seif.org.au **www.lindau-nobel.org** **www.science.org.au** **lindau@science.org.au**

LINDAU NOBEL LAUREATE MEETINGS

SCIENCE AND INDUSTRY ENDOWMENT FUND

Australian Academy of Science

Everything you need to plan and teach Primary Science

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PrimaryConnections is an innovative program developed by the Australian Academy of Science, which links the teaching of science with the teaching of literacy in primary schools. The program provides quality curriculum resources and a professional learning program.

The PrimaryConnections – Linking Science with Literacy project is supported by the Australian Government Department of Education and Training through the Maths and Science Participation Program.

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Australian Academy of Science

Science by Doing

Engaging students with science

Science by Doing invites Fellows and early- and mid-career scientists to assist in improving and refining the online secondary science program. Your feedback and suggestions about any of the curriculum units is most welcome.

www.sciencebydoing.edu.au

PROMOTING A SPIRIT OF INQUIRY IN SCHOOL MATHS

re(Solve) MATHS BY INQUIRY

Join us www.resolve.edu.au mbi@science.org.au

reSolve: Maths by Inquiry is a national program to promote a spirit of inquiry in school mathematics. It provides teachers with classroom resources and professional learning modules that focus on mathematics that is purposeful, tasks that are challenging yet accessible, and classrooms that have a knowledge-building culture. More than 300 teachers are engaging in a 12-month program to become Champions of reSolve.

reSolve is funded by the Australian Government Department of Education and Training, and managed by the Australian Academy of Science in collaboration with the Australian Association of Mathematics Teachers.

Event information

Colour coding

- Symposium speakers
- New Fellows
- Fellows
- Awardees
- EMCRs/Lindau participants

Photo sessions

Please meet in the foyer where you will be directed.

Tuesday Morning tea

EMCRs group photo, EMCR awardee and Lindau participants group photos

Tuesday Lunch

Symposium speakers and chairs group photo

Wednesday Morning tea

New Fellows group and individual photos

Wednesday Lunch

New Fellows individual photos continued

Thursday Morning tea

Honorific Awardees (early morning session) individual photos

Thursday Lunch

Awardee group and individual photos

Information Desk

The main foyer Information Desk will be staffed at all times for your assistance.

Luggage

Luggage can be left with staff at the Information Desk to be stored as required.

Taxi

Canberra Elite **13 22 27**
Quote **Taxi Spot 59** as pick-up location

Bus routes

These routes drop off within walking distance of the Dome: 3, 4, 5, 7.
www.action.act.gov.au/timetables_and_maps

Parking

Limited free car parking is available in the Academy's Gordon St carpark.

The forecourt area of the Shine Dome is 'set down and pick up' only.

Additional pay parking areas are marked on the Academy map on the inside front cover of this program.

Disabled access

Two disabled parking spaces are available within the Academy car park. Wheelchair access is available—please see the Information Desk for help.

Hearing loop

The entire Ian Wark Theatre is equipped with an infrared hearing loop. Please see Information Desk to obtain a device.

First aid

In case of emergencies or first aid please see an Academy staff member or the Information Desk.

Child minding

Child minding is located in Ian Potter House ie the opposite side of the Academy car park. Please see Information Desk for drop-off and pick-up.

Parents' room

A parents' room is available in the office next to the Events Management Office. Please see the Information Desk if other facilities are required (water, microwave etc).

Wi-fi

Network: **SHINEDOME**
Password: **5hinedome**

Please disable personal mobile hotspots as this slows down the network for all delegates.

Social media

Twitter

@Science_Academy
#ShineDome18
@ShineDome

Instagram

@theshinedome

Facebook

@AustralianAcademyofScience

Coach timetable

Wednesday gala dinner shuttle

6.25 pm
From QT and University House to NGA

10.00 pm – 10.30 pm
From NGA to QT and University House

Thursday airport shuttle

4.30 pm
From the Shine Dome to the airport

Contacts

The following Academy staff will be available to assist you. Please don't hesitate to call them.

General enquiries
Lisa Crocker 0488 044 186

Lindau delegates
Hayley Teasdale 0432 822 191

Early- and mid-career researchers
Sandra Gardam 0488 400 119

New Fellows
Karen Holt 02 6201 9406

Awardees
Dominic Burton 02 6201 9407

Media
Dan Wheelahan 0435 930 465

Event partners

PLATINUM PARTNER

Australian Government
Department of Defence
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GOLD PARTNERS

THE UNIVERSITY OF MELBOURNE

Australian National University

SILVER PARTNERS

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ARC Centre of Excellence for Electromaterials Science

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- Curtin University