SEPTEMBER 2020
NEWSLETTER
NUMBER 142

Australian Academy of Science

Message from the Chief Executive—September 2020

October 06, 2020

This month the Academy hosted virtual **Falling Walls Lab Australia**[1] in partnership with the German Embassy in Canberra and EURAXESS Australia and New Zealand. Chaired by Academy President Professor John Shine and overseen by Academy Secretary for Education and Public Awareness Professor Hans Bachor, the ten contestants presented their research remotely via livestream. Broadcast across the world, it was an ambitious project. But the new format was no obstacle for the talented Falling Walls participants whose three-minute presentations outlining their unique and innovative research work were fast paced and inspirational. Congratulations to winning finalists Jessica Hamilton, Alan Robertson and Andrew Law, who will represent Australia at the international Falling Walls Remote 2020 in November.

We have again reached the bushfire season. The Academy continues to work with the National Bushfire Recovery Agency and provide evidence-based briefs to decision makers. So far we have released briefs on the impacts of bushfires in relation to wildlife recovery, soil conditions and, most recently, in conjunction with the Australian Academy of Health and Medical Sciences, the **long-term health impacts of bushfire smoke**[2]. With more briefs underway, Academy Fellows and other experts will continue to provide their expert scientific advice to assist in bushfire prevention, preparedness and management.

The success of the SAGE (Science in Australia Gender Equity) three-year pilot has seen the SAGE establish itself as an independent entity, **SAGE Ltd**[3]. Founded by the Academy and the Australian Academy of Technology and Engineering in 2015, SAGE is the only national and transformative gender equity initiative of its

1 science.org.au/news-and-events/news-and-media-releases/three-winning-ideas-australia-falling-walls-lab-goes-digital
2 science.org.au/news-and-events/news-and-media-releases/long-term-health-impacts-bushfires-still-unknown
3 science.org.au/academy-newsletter/september-2020-142/new-direction-sage

kind. I could not be more proud of its success and would like to extend a warm welcome and congratulations to Libby Lyons, who has just been announced as inaugural Chair of SAGE Ltd.

I am equally proud to share that the Academy has partnered with Minderoo Foundation to examine the use of **data in Australian professional sports**[4]. The Expert Working Group will establish current data collection practices and examine issues affecting the rights of athletes, particularly data integrity, privacy and access. With data capture and analytics rapidly accelerating in Australian sports, this project sets the stage for greater oversight of sporting data to ensure it best serves our athletes and wider sporting community.

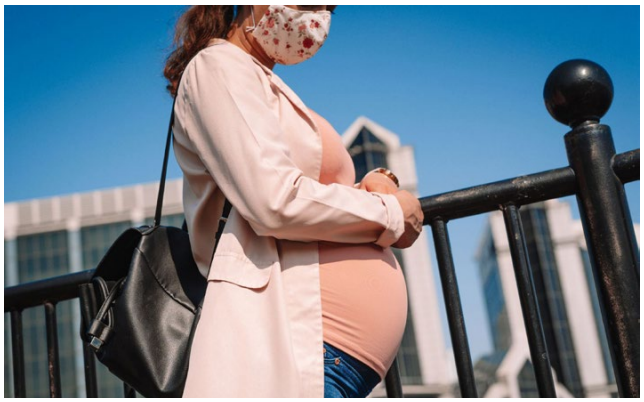
I hope you enjoy catching up with all our news in this month's newsletter.

Wishing you all good health.

Anna-Maria

Long-term health impacts of bushfires still unknown

September 16, 2020



Pregnant women may be one of the groups more vulnerable to bushfire smoke. Image: Shutterstock.

The underlying biological mechanisms for how bushfire smoke causes and exacerbates health issues are poorly understood, which limits our ability to help those affected—including pregnant women, who may be more vulnerable.

With the 2020 bushfire season upcoming and the tragedy of the Black Summer bushfires still fresh, experts have called for knowledge gaps on the adverse effects on people's physical and mental health to be addressed.

The recommendations are part of a bushfire expert brief, **After the bushfires: addressing the health impacts**[5], published today by the Australian Academy of Science and the Australian Academy of Health and Medical Sciences (AAHMS).

The brief was informed by contributions from Fellows from both academies as well as other experts, including through a roundtable organised by AAHMS.

"Pregnant women tend to breathe at a faster rate, which may make them more vulnerable to smoke exposure," said Professor Caroline Homer, Co-Program Director of Maternal, Child and Adolescent Health at Burnet Institute.

"Some research has linked extended exposure to fine particle pollution from fires to unwanted pregnancy outcomes such as pre-term births and lower birth weight, but our understanding of these impacts is currently limited.

"We also do not know whether fine particles and other toxins are transferable through breast milk to babies, or how heat stress or the stress of an emergency may affect infants," Professor Homer said.

> *"We also do not know whether fine particles and other toxins are transferable through breast milk to babies, or how heat stress or the stress of an emergency may affect infants."*

Other groups including children, people with a disability, people who are homeless, people with pre-existing health conditions and Aboriginal and Torres Straits Islands communities are also more vulnerable to the health impacts of bushfire.

It is not just our bodies that are impacted: much is to be learnt about mental health impacts, particularly on first responders and vulnerable communities.

A range of psychological factors results from the processing of trauma following bushfire events, with people located at or near a bushfire and those further away experiencing mental health issues.

4 science.org.au/news-and-events/news-and-media-releases/experts-call-national-conversation-use-data-australian-professional-sport
5 science.org.au/supporting-science/science-policy-and-analysis/evidence-briefs/after-bushfires-addressing-health

Some of the common mental health impacts include anxiety, depression, substance abuse and post-traumatic stress disorder (PTSD). Impacted communities may also see heightened suicidal risk, increased substance abuse and domestic violence. Heightened levels of anxiety may also cause acute stress in the broader population.

“Overseas data suggest that long-term mental health outcomes from trauma can be considerable,” said Scientia Professor Helen Christensen, Director and Chief Scientist at the Black Dog Institute.

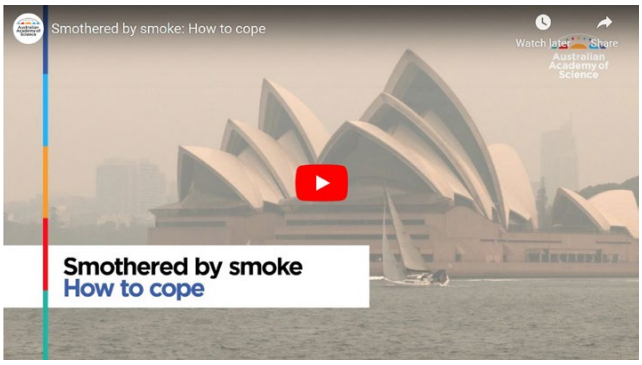
“However, appropriate long-term follow-up of Australian first responders is crucial if we are to provide adequate support through the full range of mental health impacts, some of which may not emerge for many years.”

> *“Long-term follow-up of Australian first responders is crucial if we are to provide adequate support through the full range of mental health impacts.”*

“Climate models anticipate more bushfires in coming decades, and that those fires will be more intense than in the past,” said Professor Tony Capon, Director of the Monash Sustainable Development Institute, who attended the AAHMS roundtable which formed the basis of this brief.

“There is a pressing need to improve the prevention, preparedness for, and management of bushfires. And, to better mitigate and manage the health impacts of increased fire risk, including the provision of appropriate information and support for patients, health professionals and communities,” said Professor Capon.

This joint brief[6] with the Australian Academy of Health and Medical Sciences is part of a series by the Australian Academy of Science. Earlier briefs are **Soil health after bushfires**[7] and **Monitoring wildlife recovery**[8]. Future briefs will cover topics including ecosystem services and remote sensing and data availability.



Watch on YouTube: Smothered by smoke: How to cope[9]

Australian Academy of Science

Australian Academy *of* Health and Medical Sciences

Academy teams with Little Scientists to campaign for Australian STEM education

September 23, 2020

Watch on YouTube: The Latest From Science Episode 28 - Solving tomorrow’s problems starts today[10]

STEM is for everybody—this is the message that prominent Australians in science, technology, engineering and maths are championing as part of a joint campaign by the Australian Academy of Science and **Little Scientists**[11] to promote science education.

6 science.org.au/supporting-science/science-policy-and-analysis/evidence-briefs/after-bushfires-addressing-health
7 science.org.au/supporting-science/science-policy-and-analysis/evidence-briefs/soil-condition-after-bushfires
8 science.org.au/supporting-science/science-policy-and-analysis/evidence-briefs/monitoring-wildlife-recovery
9 youtu.be/pXpuUV7dBh0
10 youtu.be/yKX7IfDhRkc
11 littlescientists.org.au/

The campaign, 'Solving tomorrow's problems starts today', highlights the importance of STEM education in building the problem solving and critical thinking skills that are essential for all Australians.

The Academy and Little Scientists are campaigning for STEM education to remain a key focus for the government. Photographer: Sonia Lear

"We really need to prioritise STEM education because there's absolutely huge challenges facing the world: climate change, the challenge to preserve the environment and now with the pandemic, huge health challenges," said acclaimed mathematician and Academy Fellow Professor Cheryl Praeger, recipient of the 2019 Prime Minister's Prize for Science. "All of this is going to need committed, enthusiastic young people, and they're all going to need strong STEM skills and be passionate problem solvers."

Professor Praeger, along with celebrated mathematician and presenter Adam Spencer, features in the Academy's 'The Latest from Science' webshow this week. The two mathematicians discussed how maths is shaping this century, and how we can help the younger generation fall in love with STEM.

"Even if you don't see yourself being a lifelong scientist … just bringing out more mathematical thinking and skill into the toolkit that you carry around [in your head] will carry you through the rest of your multi-career professional life," enthused Dr Spencer, who is a best-selling author and a self-described "maths geek".

The importance of supporting teachers

The mathematicians highlighted the importance of facilitating excellent STEM learning outcomes by supporting teachers through STEM education and professional development programs, such as the Academy's **education programs**[12] Primary Connections, Science by Doing and reSolve: Maths By Inquiry, as well as Froebel Australia's Little Scientists program. Little Scientists partners with community leaders in early STEM learning and administers the certification program, **Little Scientists House**[13].

A diverse group of Science & Technology Australia STEM ambassadors, awardees of the Prime Minister's Prize for Excellence in Science Teaching, and Little Scientist network partners have also reached out to the Minister for Education and other members of parliament to ensure that investment in STEM education remains a key focus for the government in the upcoming federal budget.

Academy resources invaluable for students

STEM educators Dr Marj Colvill, Dr Ken Silburn and Sarah Chapman, all recipients of the Prime Minister's Prize, said the Academy resources have been invaluable in assisting educators to provide creative, innovative and engaging learning experiences for primary and secondary students.

"In a year in which we face unprecedented national and global challenges, it has never been clearer how important it is to sustain the STEM pipeline," said Dr Silburn. "I have seen the awe and captivation that students have when they are presented with science being taught as a hands-on subject by experienced, well-resourced and trained teachers."

Experts call for a national conversation on the use of data in Australian professional sport

September 23, 2020

Australia has a historic opportunity to set forward-looking data governance standards to anticipate and respond to the largely unchecked acceleration of data capture, aggregation and analytics in Australian professional sport, according to leading experts.

12 science.org.au/education/academy-school-education-programs
13 littlescientists.org.au/certification/

Photo: iStock.

The lack of oversight in how data is being collected has implications for athletes' rights and protections, the organisational practices of sporting organisations and third-party tech vendors, and the state and stakes of fair competition in professional sport.

The issue will be examined by an Expert Working Group announced today by the Australian Academy of Science and supported by **Minderoo Foundation**[14]. The project is being coordinated in collaboration with the newly established **Minderoo Tech & Policy Lab**[15] at the University of Western Australia, which is directed by domain experts in data in health and sport.

The Expert Working Group and associated sub-groups will establish the current baseline of data collection practices and expectations in Australian professional sport, and set the stage for future recommendations regarding standards, regulation and oversight.

It will include distinguished experts in sport science, data science, law, ethics, social sciences and humanities, and include Fellows of the Academy.

Academy Fellow and UNSW Professor Toby Walsh, Chair of the Expert Working Group. Photo: supplied

Academy Fellow and UNSW Professor Toby Walsh is Chair of the Expert Working Group. He said despite the rapid increase in the use of performance and other data in professional sport, integrity, privacy, access and other issues around the use of data weren't being properly analysed.

"While sports data provides many benefits such as improving performance and reducing injury, there are significant risks to the rights of athletes, such as their privacy and the power relationships between athletes and sporting clubs," Professor Walsh said.

"This certainly isn't about hitting the brakes on the use of data in professional sport but ensuring its responsible use. Australia is well-placed to be an international leader in this space."

Co-directors of the Minderoo Tech & Policy Lab are Associate Professor of Law and Technology at UWA's Law School, Julia Powles, and Associate Professor Jacqueline Alderson, a sports biomechanist who leads national and international data and AI/machine learning in sport projects. They said the establishment of the group will initiate a public policy conversation about an issue as significant as the issue of drugs in sport.

"Currently, there are few formalised processes in place to approve or oversee data collection and use in Australian professional sport," said Dr Powles.

"The exponential increase in invasive, high-resolution data collection and data-informed practices not only on the sporting field but in nearly every aspect of the everyday life of athletes has dramatic implications throughout and beyond sporting careers.

"A national conversation about these issues is long overdue—both for sport itself, and for larger questions of data use in workplace settings," said Dr Powles.

Including the athlete perspective will be crucial to the success of the overall project. AFL player Matt de Boer from the GWS Giants said he was excited to be involved in the initiative.

"Data collection and use in modern sport represents a huge part of our professional careers and needs to be carefully managed taking into account multiple perspectives," said Mr de Boer.

Former Hockeyroo triple Olympian and current AFLW High Performance Manager Kate Starre has

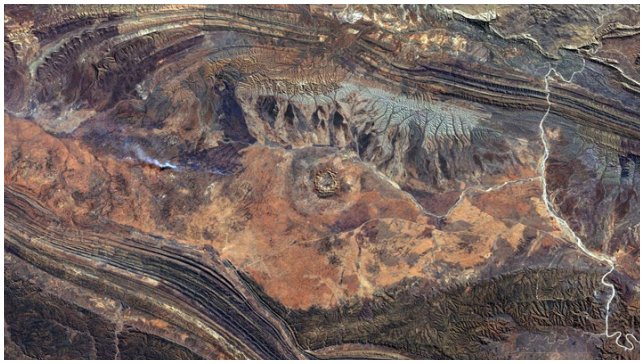
14 minderoo.org/
15 uwa.edu.au/able/research/Minderoo-Tech-and-Policy-Lab

witnessed firsthand the rise of data collection and analytics in sport over the past 25 years. “Data is important, but we need to ensure that it always serves athletes and the performance teams around them.”

Read more about the initiative.[16]

Strong collaboration between scientists and manufacturing industry key to our economic recovery

October 01, 2020



Gosses Bluff Range, Namatjira NT, Australia. Photo by USGS.

With business spending in manufacturing research and development (R&D) falling over the past decade, a new focus on science and R&D in the Morrison Government’s manufacturing strategy has been welcomed by Australia’s leading science body.

The Australian Academy of Science says the strategy’s focus on increased collaboration between manufacturing and Australian scientists is important and plays to our nation’s strengths.

The Academy’s Secretary for Science Policy, Professor David Day FAA, says as a nation we have to look to where we have a comparative advantage, not just a competitive advantage, and the Government’s manufacturing strategy promises to do that.

“Resources technology and critical minerals are key priority areas announced in today’s manufacturing strategy and today in his Press Club speech the Prime Minister highlighted the increasing international demand for critical minerals,” Professor Day says.

“The Academy’s **10 year plan for Australian Geoscience**[17], launched in 2018, highlighted the need to ensure the right infrastructure is in place to know how and where to explore for the critical resources needed for Australia’s future.”

One of the proposals in the Academy plan is to develop a ‘downward-looking telescope’ that could look at least 300 km beneath Earth’s surface to unlock Australia’s hidden mineral wealth.

Professor Day says manufacturing is a major funder of R&D in Australia.

“However, business investment in manufacturing R&D has been declining in the last decade from almost $5.5 billion to $4.6 billion (in current prices), so this new investment into revitalising Australian manufacturing, supported by Australian science and technology, cannot come soon enough.

Professor Day says the current and looming job losses from universities and other research institutes are of great concern and it is imperative that opportunities are created within the manufacturing sector to redeploy the early- and mid-career researchers losing their current positions.

“We have invested heavily in these people and they represent an opportunity to turbo-charge the manufacturing sector with fresh people, ideas and innovation.

“As a nation we invest more than $1 billion a year training PhD graduates so we should grasp this opportunity to enrich and develop a new high-tech industrial workforce,” Professor Day says.

The **Academy’s Federal Budget submission**[18] includes a number measures to take advantage of and complement the Government’s new manufacturing strategy including:

- initiatives to encourage researchers to move into industry, such as internships or investment incentives for the private sector to hire people

16 science.org.au/datainsport
17 science.org.au/news-and-events/news-and-media-releases/downward-looking-telescope-will-unlock-australias-mineral-wealth
18 science.org.au/files/userfiles/support/submissions/2020/supplementary-pre-budget-submission.pdf

with PhDs. This could involve implementing a recommendation of the 2016 Review of the R&D Tax Incentive, which argued that incentive should also apply to the cost of employing new STEM PhD or equivalent graduates in their first three years of employment.

- initiatives to encourage researchers to start up their own companies.
- reforms of intellectual property laws to reduce barriers for researchers starting their own companies and capitalising on their research discoveries and inventions.

"If this strategy is to succeed, as an economy we will need to deepen our investment in STEM skills and research collaboration to provide the scientifically literate workforce and ideas to succeed and prosper in a post pandemic world," Professor Day says.

"A modern, growing, manufacturing sector working hand in hand with Australian science promises to be key to our economic recovery from the recession."

The Academy looks forward to seeing more detail on the Government's manufacturing strategy and working with it to ensure it is underpinned and informed by science.

Three winning ideas for Australia as Falling Walls Lab goes digital

September 09, 2020

Watch the full livestream of Falling Walls Lab Australia 2020 on YouTube [19]

First place winner, Dr Jessica Hamilton. Photo: supplied

Environmental geochemist Dr Jessica Hamilton from ANSTO is the winner of the fifth Falling Walls Lab Australia event, hosted online yesterday by the Australian Academy of Science in partnership with the **Embassy of the Federal Republic of Germany in Canberra** [20] and **EURAXESS Australia and New Zealand** [21].

Second place was awarded to Alan Robertson from ClearSky Genomics, while Andrew Law from the Garvan Institute of Medical Research took third place.

Second place winner, Mr Alan Robertson. Photo: supplied

Third place winner, Mr Andrew Law. Photo: supplied

People's Choice winner, Dr Dashen Dong. Photo: supplied

The People's Choice winner selected via a survey of audience members was Dr Dashen Dong, Research Fellow at RMIT.

The event featured ten contestants from across Australia presenting their ideas, research and initiatives on the theme 'Which walls will fall next?'.

19 youtu.be/JeqbWQ83Pz4
20 german-embassy.com/de/Germany-Mission-Canberra
21 euraxess.ec.europa.eu/worldwide/australia-nz

Three-minute pitch

Each participant had three minutes to make their pitch in front of a jury of eminent academics and leaders from business chaired by the President of the Academy, Professor John Shine.

Dr Hamilton's winning pitch was on breaking the wall of recycling CO2 in mining. She has developed a relatively low-cost, low-energy-input process to make valuable products from mining wastes. This process could help lead to carbon-neutral mining operations.

Alan Robertson spoke about breaking the wall of genomics for doctors. His pitch was for a doctor/patient-focused genome browser, to help make genomics and its advantages accessible to all patients.

Andrew Law, third place winner, spoke on breaking the wall of ineffective cancer treatments. His pitch, a human-body analogue called ALTEN, helps doctors know in advance the effectiveness of cancer treatments, allowing for personalised healthcare and better outcomes for cancer patients.

People's Choice winner, Dr Dashen Dong, pitched an idea to break the wall of aged care monitoring using soft electronic sensors. This aims to improve the quality of life in aged care and reduce anxiety of families.

Winners to compete internationally

The top three ranked presenters of the Lab will each receive $1000 prize money, high-quality online science communication training led by European experts and provided by EURAXESS Researchers in Motion, and a professional video created by the Academy's own production team.

The video will be shared with the influential audience of judges and participants of Falling Walls Berlin and on the Academy's social media platforms which have more than 2.4 million followers.

These winners' videos will then compete against 90 others selected by international Labs and the Falling Walls nomination process, and a panel of judges will decide on 10 finalists who will take part in the digital live event 'Emerging Talents Category Day' on 4 November as part of **Falling Walls Remote 2020: The Breakthroughs of the Year**[22].

The Emerging Talents winner will pitch their breakthrough project on the grand stage during the virtual live Falling Walls Day of 9 November in front of an audience of industry leaders, decision-makers, investors and international media.

Jury members

The event organising partners are grateful for the involvement of the jury members for Falling Walls Lab Australia:

- Professor John Shine AC PresAA FRS—President, Australian Academy of Science
- Mr Balbir Blassey—Head of Corporate R&D Operations, 3M Australia
- Ms Kate Hart—Partner ANZ, A.T. Kearney Australia
- Ms Rosie Hicks—Chief Executive Officer, Australian Research Data Commons
- Ms Sue MacLeman FAICD FATSE FACPP — Chair, MTPConnect
- Professor Michael Schuetz—Director, Jamieson Trauma Institute
- Dr Jack Steele—Director Science Impact and Policy, CSIRO.

Read the event program booklet (PDF).[23]

The jury for Falling Walls Lab Australia 2020.

About Falling Walls Lab

Each year, the Falling Walls Foundation supports scientific organisations around the world to host

22 falling-walls.com/breakthroughyear/
23 science.org.au/files/userfiles/events/documents/program-booklet-fwl2020.pdf

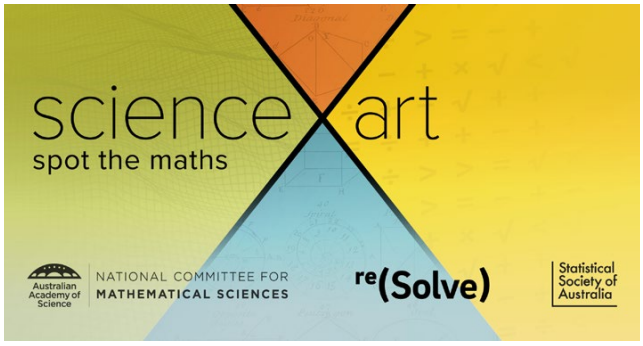
a **Falling Walls Lab**[24]. This international forum promotes interdisciplinary connections between aspiring academics, innovators, entrepreneurs, investors and professionals known for their excellent work.

Falling Walls Lab is a challenging and inspiring format for emerging bright minds, giving them a unique chance to become the next big success story in innovation. In 2019, Australian researcher Rhys Pirie **took out first place at the Falling Walls Lab Finale in Berlin**[25] and was named 2019 Young Innovator of the Year. Read **a follow-up interview**[26] with Mr Pyrie six months after winning the competition.

The Falling Walls Foundation is a non-profit organisation in Berlin dedicated to the support of science and the humanities. It was established in 2009, 20 years after the fall of the Berlin Wall. At its heart is the question 'Which are the next walls to fall?' as a result of scientific, technological, economic and sociological breakthroughs.

scienceXart: spot the maths judging panel announced

September 24, 2020



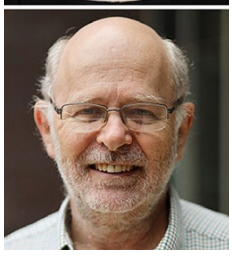
The judges of the scienceXart: spot the maths photographic competition have been announced, with a diverse mix of experts from maths, education and the arts sectors set to bring their complementary perspectives to the panel.

The panel includes representatives of the National Committee for Mathematical Sciences, national mathematics and statistics organisations, the Academy's education program reSolve, and the National Portrait Gallery.

Nearly 1,000 entries were received for this year's scienceXArt competition. It was developed in consultation with the Academy's National Committee for Mathematical Sciences, and tailored to align with Australian curriculum learning outcomes under expert guidance from the Academy's reSolve education program. The 2020 competition marks the centennial anniversary of the **International Mathematical Union**[27] with its mathematical and statistics theme. **More information about scienceXart: spot the maths**[28].

The judges are:

- Karen Quinlan AM, Director of the National Portrait Gallery
- Professor Alan Welsh FAA, Chair, National Committee for Mathematical Sciences
- Rebecca Herbst, Statistical Society of Australia
- Dr Julia Collins, Australian Mathematical Society
- Ruqiyah Patel and Dr Kristen Tripet, reSolve.



Karen Quinlan and Professor Alan Welsh, two members of the scienceXart judging panel.

Three of the panel members are professional mathematicians or statisticians. **Professor Alan Welsh**[29] is based at the Australian National University within the Research School of Finance, Actuarial Studies and Statistics. His statistical modelling research has a wide variety of application, including ecological monitoring and sports science. Professor Welsh is Chair of the **National Committee for**

24 falling-walls.com/lab/about
25 science.org.au/news-and-events/news-and-media-releases/australian-scientist-claims-young-innovator-year-falling-walls-berlin
26 science.org.au/opportunities/travel/grants-and-exchange/falling-walls-lab-australia/rhys-pirie-six-months-after-breaking-wall-broken-glass
27 mathunion.org/
28 science.org.au/sciencexart/spot-the-maths
29 science.org.au/profile/alan-welsh

Mathematical Sciences[30], which supports the Australian mathematics community and serves as a link between Australian and overseas mathematical scientists.

Representing the arts and cultural sector, **Karen Quinlan**[31], Director of the National Portrait Gallery, is bringing an artistic perspective to the judging panel. The renowned art curator is the Director of the National Portrait Gallery. Before moving to the ACT, Ms Quinlan was the Director of the Bendigo Art Gallery and Professor of Practice at the La Trobe Arts Institute.

Rebecca Herbst represents the **Statistical Society of Australia**[32], the peak national body for statisticians. The society provides a vibrant network for those working in statistical research and teaching and aims to further the study, application and good practice of statistical theory and methods in all branches of learning and enterprise.

Dr Julia Collins[33] is a lecturer in mathematics at Edith Cowan University and the coordinator of the **CHOOSEMATHS**[34] Women in Maths Network. She represents the **Australian Mathematical Society**[35], the national society of the mathematics profession. Representing all professional mathematicians in Australia, both pure and applied, the mission of the society is to promote and extend mathematical knowledge and its applications.

Kristen Tripet and Ruqiyah Patel bring their expertise in maths education to the scienceXart panel. **reSolve: Mathematics by Inquiry**[36] is a national program designed to promote relevant, rigorous and engaging mathematics from Foundation to Year 10. A program of the Academy, reSolve produces resources for classroom use and professional learning resources for teachers.

Prizes for the winning entries have been curated by the reSolve team, supported by the Australian Mathematical Society and the Statistical Society of Australia (for the statistics category). Entries for the competition closed on 25 September.

A new direction for SAGE

September 28, 2020

The SAGE Ltd leadership team—Board and CEO: (left to right, top to bottom) Libby Lyons, Dr Rosalind Dubs, Professor James Angus, Professor Marilyn Anderson, Dr Bruce Godfrey, Dr Wafa El-Adhami.

Science in Australia Gender Equity (**SAGE**[37]) is in the process of an exciting transition from a pilot program to a newly independent not-for-profit public company, SAGE Ltd.

The **new Chair of SAGE Ltd, Libby Lyons**[38], says despite the economic recession and the hardships many institutions face during the COVID-19 crisis and recovery period, now is not the time to abandon investment in gender equity and diversity.

"SAGE is all about boosting women's leadership roles in the higher education and research (HER) sector," says Ms Lyons, who is also the director of the Workplace Gender Equity Agency (WGEA).

"The **BCEC 2020 Gender Equity Insights report**[39] found company profitability, performance and productivity improve when the representation of women in leadership roles increases … If HER institutions stay the course on gender equality and diversity, there are not only financial benefits for individual institutions but a real likelihood that

30 science.org.au/supporting-science/national-committees-science/national-committee-mathematical-sciences
31 portrait.gov.au/people/karen-quinlan
32 statsoc.org.au/About-us
33 www.ecu.edu.au/schools/science/staff/profiles/lecturers/dr-julia-collins
34 schools.amsi.org.au/choosemaths/
35 austms.org.au/
36 science.org.au/education/academy-school-education-programs/resolve-mathematics-inquiry
37 sciencegenderequity.org.au/
38 sciencegenderequity.org.au/libby-lyons-announced-as-sage-inaugural-chair-and-says-investment-in-gender-equality-and-diversity-is-essential-to-our-economic-recovery/
39 bcec.edu.au/publications/gender-equity-insights-2020-delivering-the-business-outcomes/

our country will claw its way out of recession and recover more quickly."

Founded by the Australian Academy of Science and the Australian Academy of Technology and Engineering (ATSE) in 2015, **SAGE's vision**[40] is to improve gender equity in the Australian higher education and research (HER) sector. The organisation **administers the Athena SWAN**[41] program in Australia, a national accreditation framework that was established in the UK by Advance HE.

During the four-year SAGE pilot program, 45 institutions signed up to eliminate gender bias, including 87% of Australia's universities. "**Those institutions who have already pledged**[42] to preserve gender equity as a higher education priority during the crisis and recovery period must be congratulated for their leadership and ongoing commitment," says Ms Lyons.

"I am honoured to be taking on this new role and look forward to working with the Board, CEO and SAGE subscribers as we begin our national rollout."

Chief Executive of the Australian Academy of Science, Anna-Maria Arabia, says she is proud of the critical role played by the Academy as a founding partner of SAGE.

"SAGE has been transformative for the STEMM sector and it's easy to see why other countries are now following in Australia's footsteps to adopt the Athena SWAN charter for themselves. The experience the new Board brings to SAGE Ltd will set the foundations for its continuing success," says Ms Arabia.

The SAGE Ltd Board

The **Chair and the four Non-Executive Board of Directors**[43] were **announced on 29 September 2020**[44] and include two Fellows of the Academy of Science and ATSE, respectively

- Professor Marilyn Anderson AO FAA FSTE
- Professor James Angus AO FAA
- Dr Rosalind Dubs FTSE FAICD
- Dr Bruce Godfrey FTSE

SAGE CEO Dr Wafa El-Adhami welcomed the appointment of Ms Lyons and the new Board. "I look forward to working closely with the new leadership team to achieve our vision of reaching the entire high education and research sector," says Dr El-Adhami. "This goal remains unchanged despite the circumstances we find ourselves in."

SAGE Ltd CEO Dr Wafa El-Adhami features in episode five of the SAGE podcast, Think Difference.

Innovating during a pandemic

SAGE CEO Dr Wafa El-Adhami recently featured in episode five of the SAGE Think Difference podcast **'Innovating during a pandemic'**[45]. In conversation with Academy Media Manager Dan Wheelahan, Dr El-Adhami discusses the impact and future of SAGE as it transitions to a national program. She also reflects on her own upbringing and career in STEMM.

Born and raised in Kuwait, Dr El-Adhami's passion for science was nurtured by her parents, who wanted to give their six children the education that they had missed out on.

Dr El-Adhami believes that despite the challenges posed by COVID-19, the pandemic is demonstrating how SAGE and Australia's HER sector are continuing to innovate in their approaches to addressing gender equity and diversity.

40 sciencegenderequity.org.au/what-is-sage-2/
41 sciencegenderequity.org.au/what-sage-does/
42 sciencegenderequity.org.au/higher-education-sector-commits-to-preserve-gender-equity-during-and-after-covid-19/
43 sciencegenderequity.org.au/sage-board-directors/
44 sciencegenderequity.org.au/libby-lyons-announced-as-sage-inaugural-chair-and-says-investment-in-gender-equality-and-diversity-is-essential-to-our-economic-recovery/
45 sciencegenderequity.org.au/innovating-during-a-pandemic-sage-releases-new-podcast-episode-with-ceo-dr-wafa-el-adhami/

"We've got this international dimension in the next twelve months to really make sure gender equity, diversity and inclusion stay front and centre, especially in the current circumstances. Of course it's challenging, but it could not be more exciting."

SAGE is **now accepting new subscribers**[46] from Australian universities, medical research institutes and publicly funded research agencies.

Travel grant awards announced for three early-career geoscientists

September 15, 2020

Image: Brent Kane via Pexels CC-0

Three geoscientists working in tectonics, water flow of aquifers and the evolution of the lithosphere and mantle are the recipients of the 2019 round of the 34th International Geological Congress Travel Grant Scheme announced recently.

The researchers will use the travel grant to attend international conferences and conduct field and laboratory work in collaboration with researchers in the UK, US and Canada. They will share a funding pool of around $15,000.

The recipients announced by the Australian Geoscience Council (AGC) and the Academy are:

- **Dr Derya Gürer**[47]—Lecturer, University of Queensland, whose research relates to tectonics and the evolution of Earth's lithosphere at various spatio-temporal scales.
- **Dr Dylan Irvine**[48]—Senior Lecturer, Flinders University, whose research involves measurements of water temperature to determine water flow, including flow in aquifers and the interaction between groundwater and surface water.
- **Dr Timothy Chapman**[49]—Postdoctoral Research Fellow, University of New England, who investigates the formation and evolution of the lithosphere and mantle using a mix of igneous and metamorphic petrology.

2020 round now open

The next round for this travel grant funding is now open for Australian and New Zealand geoscientists in the early stages of their careers.

Opportunities the grant may allow include undertaking field work in appropriate areas, visiting and working with appropriate international experts, inspecting appropriate mines or other geoscientific features such as type localities, and contributing to professionally organised geoscientific conferences or conventions. To find out more, read about **previously awarded Travel Grants**[50].

In acknowledgement that travel restrictions brought about by the COVID19 pandemic have affected plans, the closing date for which the proposed travel must be taken has been extended. In addition to travel delay, 2020 applicants for the grants are encouraged to detail innovative ways they can conduct their international research, laboratory and field work as part of their applications.

The travel grants are made possible through a trust fund administered by the AGC and the Academy, which was initiated after the 34th International Geological Congress in Brisbane in August 2012.

Apply or find out more about this opportunity[51].

46 sciencegenderequity.org.au/sage-is-accepting-new-subscribers-apply-now/
47 sees.uq.edu.au/profile/12032/derya-guerer
48 researchnow.flinders.edu.au/en/persons/dylan-irvine-2
49 une.edu.au/staff-profiles/ers/timothy-chapman
50 agc.org.au/resources/geoscience-grants/previously-awarded-travel-grants
51 science.org.au/supporting-science/awards-and-opportunities/international-geological-congress-travel-grant-scheme

Science policy update—September 2020

September 25, 2020

Call for input to Data in Professional Sport questionnaire and white paper submission

The first round of public consultation for the **Data in Professional Sport project**[52] is now open.

We invite **white paper submissions**[53] from all interested parties based on any question or questions in the proposed contents of the **project description**[54].

In addition to welcoming submissions, we have developed a **questionnaire**[55] for those operating in the professional sports ecosystem, including athletes, organisations and sports technology vendors.

If you have any questions regarding the project, please email **Dr Hayley Teasdale**[56].

Submissions close on Friday 16 October.

Bushfire expert brief on human health

The latest expert brief presents the scientific evidence on how bushfires impact human physical and mental health. Image: HighExposure; CC BY-NC-ND 2.0

The Academy recently published an expert brief that presents the scientific evidence on how bushfires impact human physical and mental health. The brief also highlights the knowledge gaps in how individuals and communities identify, manage and treat health impacts caused by bushfires such as those Australians experienced last summer, and wildfires currently burning on the west coast of the USA. **Read the media release about the brief**[57].

This is the third in a series that aims to aid decision-makers, members of parliament, the bushfire royal commission and the Australian community with the delivery of scientific evidence. The briefs published so far are:

- **Bushfire and human health**[58]
- **Soil condition after bushfires**[59]
- **Monitoring Australia's wildlife**[60].

Submissions and government engagement

Opportunities for strengthening Australia's relations with the Republic of France

In April this year, the Academy made a **submission**[61] to the Senate Standing Committees on Foreign Affairs, Defence and Trade on the opportunities for strengthening Australia's relations with the Republic of France. The Committee has released its **report**[62] that includes multiple references to the Academy's submission and recommendations.

Pre-budget submission

On 24 August, the Academy made an additional **submission to the 2020–21 federal budget**[63]. This submission is supplementary to the **2020–21 Pre-budget submission**[64] the Academy provided in January 2020 and includes recommendations on how to support the research workforce which is impacted by COVID-19.

52 science.org.au/news-and-events/news-and-media-releases/experts-call-national-conversation-use-data-australian-professional-sport
53 science.org.au/datainsport/submit-white-paper
54 science.org.au/files/userfiles/support/documents/project-description-data-in-professional-sport.pdf
55 science.org.au/datainsport/professional-sport-ecosystem-questionnaire
56 hayley.teasdale@science.org.au
57 science.org.au/news-and-events/news-and-media-releases/long-term-health-impacts-bushfires-still-unknown
58 science.org.au/supporting-science/science-policy-and-analysis/evidence-briefs/after-bushfires-addressing-health
59 science.org.au/supporting-science/science-policy-and-analysis/evidence-briefs/soil-condition-after-bushfires
60 science.org.au/supporting-science/science-policy-and-analysis/evidence-briefs/monitoring-wildlife-recovery
61 science.org.au/supporting-science/science-policy-and-analysis/submissions-government/opportunities-australias-relations-france
62 aph.gov.au/Parliamentary_Business/Committees/Senate/Foreign_Affairs_Defence_and_Trade/France/Report
63 science.org.au/supporting-science/science-policy-and-analysis/submissions-government/supplementary-pre-budget
64 science.org.au/supporting-science/science-policy-and-analysis/submissions-government/submission-2020-21-pre-budget

Technology roadmap

On 20 June, the Academy made a **submission**[65] to the Department of Industry, Science, Energy and Resources' **discussion paper on Australia's Technology Investment Roadmap**[66]. The Academy supports the goal of placing Australia on a low and zero emissions energy trajectory and the submission also highlighted the need to continue investment in fundamental research as part of the low emissions technology value chain.

Higher Education Support Amendment (Job-ready Graduates and Supporting Regional and Remote Students) Bill

On 10 September, the Academy made a **submission**[67] to the Senate Standing Committee for Education and Employment's inquiry into the Higher Education Support Amendment (Job-ready Graduates and Supporting Regional and Remote Students) Bill 2020. The submission highlights the implications of reducing public funding for undergraduate education and Australian universities.

The EMCR Forum also made a **submission**[68] to the inquiry.

UN submission

On 11 September, the Academy made a submission to the United Nation's Consultation on a Research Roadmap for the COVID-19 Recovery. The submission showcases the Academy's specific COVID-19 work, including the Rapid Research Information Forum's findings on the **impact of COVID-19**[69] on Australia's research workforce.

Health and Medical Research Inquiry

On behalf of the Academy, President Professor John Shine contributed to a submission to the South Australian Productivity Commission's inquiry into health and medical research in South Australia. A **draft report**[70] has now been published by the South Australian Government.

National Committees update—September 2020

September 25, 2020

Decadal plans for science: order printed copies

Decadal plans[71] are 10-year strategic plans for science disciplines, and are developed by the Academy's **National Committees for Science**[72].

The diversity of each discipline makes the production of decadal plans exciting and unique projects. Decadal plans are produced by the research community, but the audiences for the documents are, to a large extent, policy makers and funding bodies.

Printed copies of decadal plans can be **ordered online**[73]. Booklets are free and standard delivery is also free within Australia.

Seeking photos for the space science strategic plan, 'Australia's Future in Space'

Do you have photos that represent space science?

The National Committee for Space and Radio Science is currently writing the Australia's Future in Space strategic plan and is seeking images to feature in the final publication. The committee is looking for images that encompass and represent Australian space science, as well as demonstrating the diversity of the people and the field. Submissions from all fields of space science are encouraged. **Submit images via our website**[74] by Monday 5 October.

65 science.org.au/supporting-science/science-policy-and-analysis/submissions-government/discussion-paper-australias
66 consult.industry.gov.au/climate-change/technology-investment-roadmap/
67 science.org.au/supporting-science/science-policy-and-analysis/submissions-government/submission-higher-education
68 science.org.au/supporting-science/science-policy-and-analysis/submissions-government/senate-submission-inquiry
69 science.org.au/covid19/research-workforce
70 sapc.sa.gov.au/inquiries/inquiries/health-and-medical-research/draft-report
71 science.org.au/supporting-science/science-policy-and-analysis/decadal-plans-science
72 science.org.au/supporting-science/national-committees-science
73 science.org.au/order-physical-copies
74 science.org.au/space-science-photo-submission

Astronomy mid-term review leads to Nature Astronomy series of papers

One of the white papers written as part of the **Decadal plan for Australian astronomy 2016–2025: Mid-term review**[75] has led to a publication in the prestigious journal, Nature Astronomy.

The white paper on carbon emissions and sustainability was authored by researchers at the International Centre for Radio Astronomy Research (ICRAR), the University of Western Australia and Swinburne University of Technology. The mid-term review's call for the commissioning of a carbon footprint survey led to a series of recent papers published in Nature Astronomy on the topic of improving the carbon footprint of astronomical research, including **The imperative to reduce carbon emissions in astronomy**[76].

The publication has prompted major astronomy research centres and organisations including ICRAR, CSIRO and the Square Kilometre Array Observatory to create sustainability information pages.

Lead authors Adam Stevens and Sabine Bellstedt have also published an article in The Conversation on the **importance of sustainability**[77] in astronomy.

Opportunities for scientists—September 2020

September 25, 2020

Academy opportunity

Japan Society for the Promotion of Science fellowships

The Japan Society for the Promotion of Science Postdoctoral Fellowships for Foreign Researchers provides opportunities for Australian postdoctoral researchers to conduct, under the guidance of their Japanese hosts, cooperative research with leading research groups in universities and other Japanese institutions.

Applications for JSPS Fellowships for 2021 are invited from researchers in any field of the physical sciences, life sciences, engineering, technology and medicine. Priority will be given to applications from areas of research that support the response to the COVID-19 emergency or pandemic support.

Fellowships are awarded for a period of 12–24 months and include flights, a monthly maintenance allowance, a settling-in allowance and insurance coverage.

Applications close 9 November 2020

More information on the JSPS Fellowships[78]

External awards

Danone International Prize for Alimentation

The purpose of the Danone International Prize for Alimentation is to encourage and support cutting edge, innovative and multidisciplinary scientific research in alimentation—€100,000.

Applications close 16 October 2020

More information on the Danone International Prize for Alimentation[79]

Dan David Award

The Dan David Award presents three prizes annually of US$1 million each to represent three time dimensions—past, present and future—that represent realms of human achievement.

The prizes are granted to individuals or institutions with proven, exceptional, distinct excellence in the sciences, arts, humanities, public service and business. The recipients are awarded for their outstanding contribution to humanity on the basis of merit, without discrimination of gender, race, religion, nationality or political affiliation.

Applications close 30 November 2020

75 science.org.au/supporting-science/science-policy-and-analysis/decadal-plans-science/decadal-plan-australian-astronomy-2016-25-mid-term-review

76 nature.com/articles/s41550-020-1169-1

77 theconversation.com/astronomers-create-40-more-carbon-emissions-than-the-average-australian-heres-how-they-can-be-more-environmentally-friendly-145643

78 science.org.au/supporting-science/awards-and-opportunities/japan-society-promotion-science-fellowships

79 danoneinstitute.org/nutrition-science-support/dipa

More information on the Dan David Award[80]

See more external awards[81]

Fellows update—September 2020

September 25, 2020

Honours and awards to Fellows

(from left) Hugh Possingham has been appointed Queensland Chief Scientist, while Lidia Morawska, Dacheng Tao, Adele Green and Ben Eggleton are among 23 Fellows featured in the top 250 Australian researchers of 2020.

Professor Hugh Possingham FAA—Appointed Queensland Chief Scientist

Top 250 Australian researchers of 2020, published by The Australian

The Australian has published its **Research 2020 magazine**[82] featuring the top 250 Australian researchers across 255 fields. The following Academy Fellows were featured.

Lifetime achievers leaderboard

Among Australia's top 40 researchers, measured by their performance over their career.

Professor Benjamin Eggleton FAA FTSE, University of Sydney—Optics and photonics

Professor Ping Koy Lam FAA, Australian National University—Physics and mathematics

Professor William Laurance FAA, James Cook University— Biodiversity and conservation biology

Professor Lidia Morawska FAA, Queensland University of Technology—Environmental sciences

Professor Ian Paulsen FAA, Macquarie University—Life sciences and Earth sciences

Professor Dacheng Tao FAA, University of Sydney—Computer vision and pattern recognition

Research field leaders

Researchers with the highest number of citations from papers published in the last five years in the 20 top journals in their field.

Chemical and material sciences

Professor Maria Forsyth FAA, Deakin University—Electrochemistry

Professor Yiu-Wing Mai AM FAA FRS FTSE, University of Sydney—Composite materials

Physics and mathematics

Professor Joss Bland-Hawthorn FAA, University of Sydney—Astronomy and astrophysics

Professor Ivan Marusic FAA, University of Melbourne—Fluid mechanics

Professor Dietmar Müller FAA, University of Sydney—Geophysics

Engineering and Computer Science

Professor Dacheng Tao FAA, University of Sydney—Computer vision and pattern recognition

Health and medical sciences

Professor Adele Green AC FAA FAHMS, QIMR Berghofer—Dermatology

Professor James McCluskey AO FAA, University of Melbourne—Immunology

Professor Patrick McGorry AO FAA, University of Melbourne—Psychiatry

Professor Peter Visscher FAA FRS, University of Queensland—Genetics and genomics

Life sciences and Earth sciences

Professor Peter Cawood FAA, Monash University—Geology

Professor Chris Dickman FAA, University of Sydney—Zoology

Professor Jane Elith FAA, University of Melbourne—Ecology

Professor Phil Hugenholtz FAA, University of Queensland—Microbiology

80 dandavidprize.org/prize/prize-nominations
81 science.org.au/supporting-science/recognition/external-sources-recognition
82 specialreports.theaustralian.com.au/1540291/

Professor Terry Hughes FAA, James Cook University—Life sciences and Earth sciences (general)

Professor David Lindenmeyer AO FAA, Australian National University—Biodiversity and conservation biology

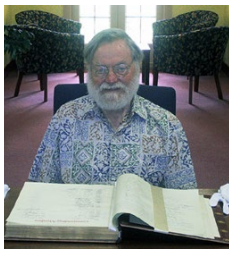
Professor Robert Parton FAA, University of Queensland—Cell biology

Professor Leigh Simmons FAA, University of Western Australia—Animal behaviour and ethology

Obituaries

Professor Joseph (Joe) Hurd Connell FAA

5 October 1923 to 1 September 2020



Professor Joseph Connell FAA signed the charter book in 2002.

Professor Joe Connell was admitted a Corresponding Member of the Academy in 2002. He was Emeritus Professor at the University of California, Santa Barbara, since 1956.

Professor Connell was born in Indiana and studied at the universities of Chicago, California and Glasgow. It was in Scotland that he conducted his experimental ecological studies on different species of barnacle, becoming a pioneer of the school of ecology that advocates manipulative field experimentation.

Professor Connell later focused on the determinants of biodiversity, particularly in Australian coral reefs and rainforests. He tested hypotheses on tropical diversity and was a proponent of the idea that disturbance can maintain the diversity of ecological communities.

Read a report from a 2010 symposium that **celebrated and explored Professor Connell's influence and impact**[83].

Professor Sir Vaughan Frederick Randal Jones KNZM FAA FRS NAS Hon FRSNZ

31 December 1952 to 6 September 2020

Professor Sir Vaughan Jones KNZM FAA FRS NAS Hon FRSNZ in New Zealand in 2010. Photo: Søren Fuglede Jørgensen / CC BY-SA

Sir Vaughan was admitted a Corresponding Member of the Academy in 1992. He was Stevenson Distinguished Professor of Mathematics at Vanderbilt University and Professor Emeritus at University of California, Berkeley.

A celebrated mathematician, Sir Vaughan was the only New Zealander to be awarded the maths equivalent of the Nobel Prize, the Fields Medal, in 1990.

Sir Vaughan was born in New Zealand and always remained a proud New Zealander. He obtained his BSc and MSc from the University of Auckland. After graduation he was awarded with a Swiss government scholarship and completed his Docteur ès Sciences at the University of Geneva, for which he was awarded the Vacheron Constantin Prize.

His most celebrated work was on knot polynomials. In 1983 Sir Vaughan made a startling discovery in the theory of von Neumann algebras. This breakthrough in theoretical mathematics had direct and significant applications in a range of scientific fields. Sir Vaughan's findings had a profound effect on such disparate fields as knot theory, statistical mechanics, quantum field theory and the prediction of DNA configurations in certain biological interactions.

Although he spent the majority of his career in the United States, Sir Vaughan contributed generously to New Zealand mathematics. Every summer he offered courses and lecturers at the University of Auckland to encourage and mentor students and early-career mathematicians. He co-founded and led the NZ Mathematics Research Institute (NZMRI) to promote and foster high quality mathematics.

Sir Vaughan was elected a Fellow of the Royal Society in 1990, an Honorary Fellow of the

83 esajournals.onlinelibrary.wiley.com/doi/epdf/10.1890/0012-9623-91.4.464

Royal Society Te Apārangi in 1991, a member of the American Academy of Arts and Sciences in 1993, and a member of the National Academy of Sciences (USA) in 1999. In 1991 the Royal Society Te Apārangi awarded Sir Vaughan their highest award, the Rutherford Medal and in 1992 he received an honorary DSc from the University of Auckland.

See the tribute to Sir Vaughan in the **New Zealand Herald**[84].

Upcoming Events

#CitSciOnline EMCR Symposium

1:00 PM October 07 - 5:00 PM October 07, 2020

The EMCR half-day Citizen Science Research Symposium aims to unite citizen science-aligned researchers in Australia to interrogate and explore research and practice in citizen science across the country. The event will be hosted online on Wednesday 7 October 2020, from 1.00 to 5.00 pm AEDT.

The event features talks from citizen scientists, perspectives of researchers, a Q&A, and networking opportunities. This event is a starting point for a community of practice in citizen science research, uniting interdisciplinary researchers, citizens and others from outside of institutional settings.

The event is part of an series of #CitSciOnline community events happening in October, which will cover disaster response, innovation in citizen science and connections and partnerships.

Whether you are an aspiring citizen scientist, researcher, program leader or interested community member, CitSciOzOnline has you covered and will hopefully inspire and invigorate you as we head towards the end of this most challenging year.

Carer and accessibility grants

Through the Theo Murphy Initiative (Australia), the Australian Academy of Science is offering a number of grants to support participants with caring responsibilities and those who might require accessibility support to participate in the #CitSciOnline EMCR Symposium on 7 October 2020.

The grants are designed to reduce participation barriers for those attendees who may not be able to attend the symposium without support.

The funds from the grant can be used to cover costs that would enable your attendance, for example:

- securing childcare access for the day
- hiring a nanny
- covering the cost of a carer
- renting a co-working space if you don't have reliable internet access*

Applications are open to registered attendees only. Once you register you will receive information on how to apply. All applications will be subject to a competitive selection process and grants will be awarded based on need.

If you have any questions, contact Laura Navarro at laura.navarro@science.org.au

*Please refer to the COVID-19 guidelines and restrictions in your state to see if this option is safely available in your city.

84 nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=12363385