The Royal Society of Victoria
Promoting science since 1854

SCIENCE VICTORIA

NEWS FROM THE ROYAL SOCIETY OF VICTORIA RSV.ORG.AU JULY 2022

Will Quantum Computing Save the Planet? 33

THE OFFICIAL NEWSLETTER OF RSV

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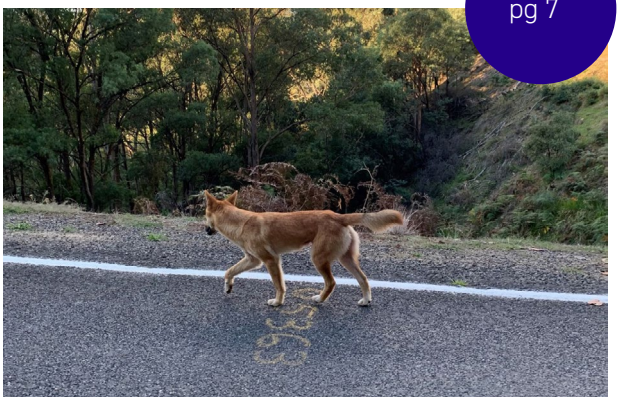

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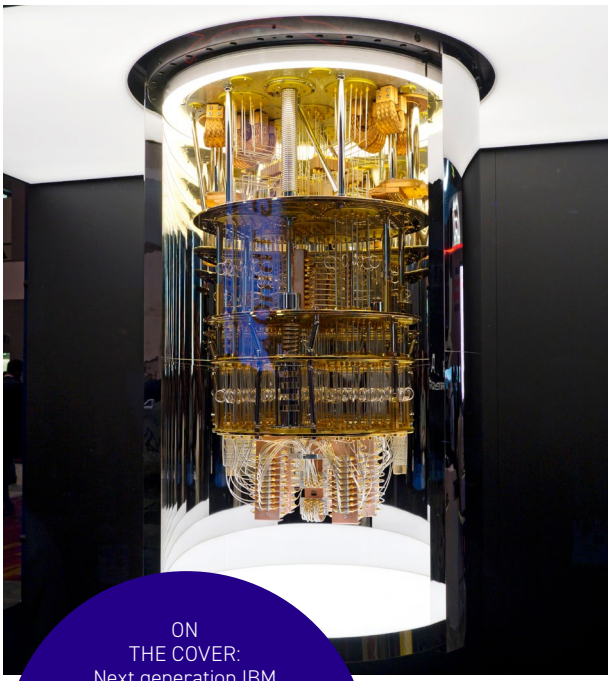
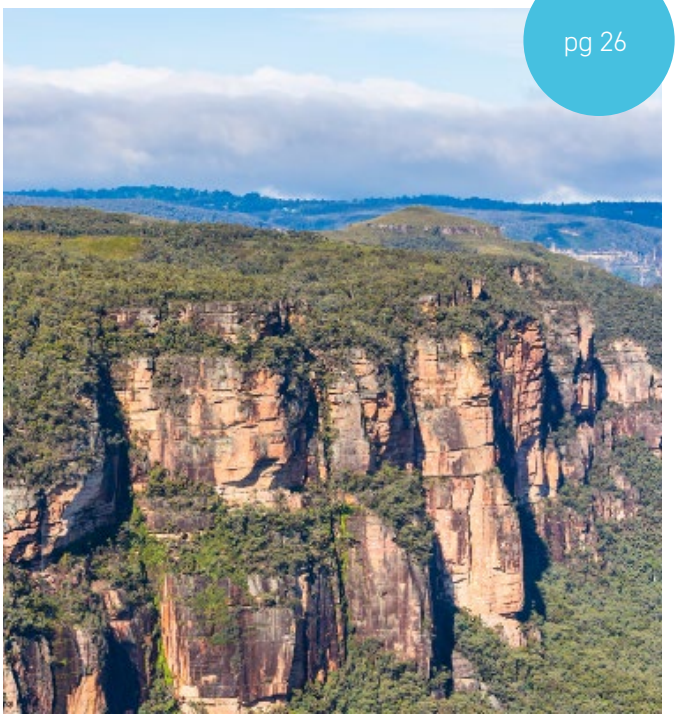


ON THE COVER: Next generation IBM Q System One computer on display at the annual Consumer Electronics Show in Las Vegas, Nevada, USA in January 2020.

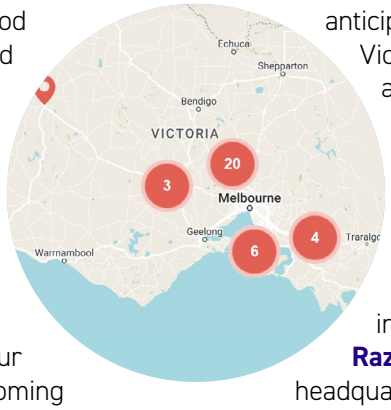


FROM THE CEO

Here comes National Science Week!

Science Week is just six weeks away – it feels like its creeping up on us through a dense thicket, crouching, tensing, poised to leap out when we least expect it and – I don't know, sublimate us? Hit us with an impromptu trivia night? Count the frogs in our bag? Prepare yourself!

We've got a terrific spread of events ready to go – 34 at the last count, but I'd be **very** happy to see a whole lot more, and over a wider distribution across the State – so if you're involved with a Neighbourhood or Community House in Victoria, and need some more incentive to get that science event up and running for your community, get along to **https://www.nhvic.org.au/national-science-week** and apply for one of the $1,500 grants on offer. Otherwise, got to the main Science Week site at **https://www.scienceweek.net.au/** to register your event, or simply check out what's coming up near you this August and get involved.



It's cold and basically everyone is highly infectious with something just awful, so if you're hibernating this month I quite understand - this month we've got a great online presentation coming up titled **Science and Culture on Country**, broadcast from Parliament House for NAIDOC Week, and a much-anticipated hybrid lecture from CSIRO's Chief Scientist, Professor Bronwyn Fox, anticipating a resurgent manufacturing sector for Victoria, based on 21st century know-how. There are articles, book reviews, letters and a last call for nominations for both our Postdoctoral Award and the Research Medal. There's also a heap of new video content being released each week as we piece our recent presentations together; head along to our page at **https://rsv.org.au/video/** to catch the latest short talks, including video footage of some of the **Ockham's Razor** presentations filmed at the Society's headquarters back in April.

Stay warm, stay healthy, and stay sharp!
Have a great month!

Mike Flattley
CEO, The Royal Society of Victoria

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The Monthly Publication of the Royal Society of Victoria – established 1854 for the promotion and advancement of science.

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Acknowledgement of Country:

The Royal Society of Victoria acknowledges the many First Peoples of our continent, their vast history and connection to the lands and waters within and beyond the State of Victoria, and the valuable cultural and scientific knowledge held by Elders to care for Country.

We acknowledge our headquarters are located on Wurundjeri land, never ceded, and convey our respect to Elders past and present.

The RSV welcomes all First Peoples and seeks to support and celebrate their continued contributions to scientific knowledge.

FROM THE PRESIDENT

Biodiversity on the National Agenda

It seems that the RSV's focus on biodiversity is timely and that finally we have a better, broader understanding of the need to reconsider investment in natural systems, address the global biodiversity crisis and to work quickly to develop programmes to re-establish threatened species.

The RSV's first-ever Cross-Sector Forum, on Biodiversity Conservation and Recovery, brought together a wide range of individuals on June 4th to "develop a consensus position and to recommend further work and effective investment programs." The Forum brought together ecologists, Traditional Owner and Landcare representatives, academics, NGO campaigners, public servants, key agencies and biodiversity asset managers, climate scientists and engineers, environmental lawyers, the business and finance people sector, librarians, writers, medicos, bankers, RSV Fellows and members, including two astrophysicists!

> *Building on the draft Position Paper developed for the Forum the RSV is now reforming that document and establishing a suitably resourced Taskforce to develop further solutions to manage Victoria's biodiversity crisis. A short article on the Forum is included in this edition of* Science Victoria.

I have received a number of post-Forum comments and contributions which include:

- compliments on the range of participants, the quality of the discussion and how the day was facilitated
- a reminder that 'biodiversity' doesn't only refer to cute and cuddly animals but to a wide range of vertebrates and invertebrates as well as plant species and microorganisms, managed systems, not only conservation areas, but also agricultural, forestry and reserve land
- the level of political will required to achieve better outcomes and the financial hurdles faced
- how we might positively engage with business and the finance sector through e.g. The Australian Sustainable Finance Roadmap
- the role of ESG (Environmental, Social, Governance) in corporate boardrooms in achieving biodiversity outcomes
- queries about the role of private land covenantors and how they can be involved in our process
- the convergence of biodiversity issues with carbon emissions
- how the RSV continues to respect the scientific process while it seeks to find solutions to resourcing biodiversity conservation.

No doubt there is still a lot to consider and work towards, however, we have already achieved a high level of valuable engagement as we continue our process towards a Position Paper.

We are now considering this work with a new Federal Government; the Hon Ed Husic MP is now Minister for Industry and Science. The government will release the overdue national State of the Environment report that, according to our new Minister for the Environment and Water, the Hon Tanya Plibersek MP, "tells an 'alarming story' of decline, native species extinction and cultural heritage loss." The *Independent Review of the Environment Protection and Biodiversity Conservation Act, Interim Report June 2020* by Professor Graeme Samuel AC found that the Act was failing and that our environment is in unsustainable decline, and the new Minister has indicated she will be moving to act on its recommendations. Minister Plibersek will also review the need for 176 threatened species and ecosystem recovery plans that were abandoned by the previous government.

The United States is also moving on wildlife recovery with new legislation to combat biodiversity loss. The *Recovering America Wildlife Act (RAWA)* has support from high-level environment groups, advocate groups and state wildlife agencies and some Republicans in the Senate. If passed, it will provide $1.39 billion for wildlife conservation and is considered the best chance to combat extinction in the United States since the *1973 Endangered Species Act.* The article in the New York Times[1] discussing the Act makes the point that "we are not apart from nature" and quotes Kameran Onley, the director of North American Policy and Government Relations at the Nature Conservancy, in qualifying that "America's biodiversity loss is not just a crisis for the species that make up the country's unique and iconic wildlife; it's a threat to our future."

> *This point is made clear in Victoria's Protecting Victoria's Environment - Biodiversity 2037 strategy, which aims to have all Victorians 'connecting with nature' and acting to protect the natural environment, while all Victorian Government organisations managing environmental assets will contribute to environmental-economic accounting - by 2037. The RSV's Forum on Biodiversity Conservation and Recovery and our Taskforce will work in concert with all agencies and stakeholders to play our part in the recovery of Victoria's biodiversity.*

Biodiversity is on the agenda, at the RSV and elsewhere.

In others news, RSV Trustee and former Chief Scientist Dr Alan Finkel AC FAA FTSE has recently written in *The Age* that **'this energy revolution is hard - really hard - but it's doable.'** Alan's view is that there are two necessities: investment in long-term storage of renewable energy forms such as hydrogen, and the need for repayment for the capacity to provide electricity on demand rather than short-duration storage in batteries. The challenge facing us all is daunting; it's good to know Alan thinks it can be done.

It is important that the Royal Society of Victoria becomes involved in these critical discussions. We are not an academy; however, we have an important role to play as a facilitator of dialogue that will enhance our community's knowledge and lead to better science-based decision-making. As usual, please write to me at **president@rsv.org.au** with your thoughts and ideas. We'd like to use *Science Victoria* as a forum for new ideas about the promotion and advancement of science in Victoria and to give an additional voice to affiliated organisations.

Rob Gell AM MRSV
President

1 Washington Might Be About to Do Something Right for America's Wildlife, June 20, 2022

LETTERS

Terra Nullius

A legal myth but a persistent, amnesia-like neurological condition

By Dr Ian Mansergh MRSV

Following the extermination of the Gray wolves (*Canis lupus*) in the 1920s, grazing pressure of the unrestrained Rocky Mountain Elk (either *Cervus elaphus* or *Cervus canadensis*, depending on which side you're on in a sustained taxonomic battle – ed.) had changed the vegetation and ecology of Yellowstone National Park (USA). In 1995, 31 gray wolves were re-introduced to the park: predation and predator avoidance suppressed deer numbers and there were massive changes across the landscape (**https://www.youtube.com/watch?v=ysa5OBhXz-Q**).

Subsequent studies revealed a range of ecological phenomena in the terrestrial environment - apex predator regulation of grazers, meso-predator release, and interconnections between predators, prey, grazers and vegetation - initiated wholesale changes down and across ecosystems, described as "trophic level cascades" (Ripple & Beschta 2003). This "new," exciting science achieved worldwide acclaim early this century.

Dawson (1881: 21) recorded that the *Pirt kopan noot* people of the Hopkins River (now part of the Eastern Maar Traditional Owners) liked the sweet, honey-like *Buumbual* (manna) which they harvested from the white gum trees (likely the Manna Gum, *Eucalyptus viminalis*). "They say that, in consequence of the great increase of opossums, caused by the destruction of the wild dog (= *Canis dingo*), they never get any *Buumbuul* now, as the opossums eat it all." This is a succinct description of apex predator removal and trophic level cascades, a century and a half before "science" uncovered this ecological phenomenon. This is but one of innumerable examples: traditional knowledge was ecologically deep and comprehensive but was and remains disrespected and ignored by "whitefellas." This should not continue.

> *In the 1830s, when Victoria was invaded by squatters from Tasmania (no dingoes) the first public proclamation in Melbourne was a bounty on the dingo - the war began (Boyce 2011, Cahir & Clark 2013)! The dingo would be exterminated over much of its Victorian range,*

Dingo on Jaithmatang Country – Bogong High Plains, 2021. (Photo: Zac Walker). This apex predator had totemic (spirit) status. Despite persecution, this spirit survives – with genetics intact.

but populations survived in the Alps, Gippsland and Big Desert. In 1977, Victoria had 18 doggers trapping dingoes – the attributed sheep loss was 60,000 (Coman & Stevens 1982). Annual effort in the 2010s was similar for an attributed loss of >1,000 sheep, and absurdly in 2015-16 the loss of sheep in the semi-arid zone was only 15! The sheep-wheat zone had become the wheat-only zone, but the madness continued.

In the same period our land management of semi-arid parks spent huge resources on culling over-population of kangaroos and rabbits, which are major dingo food items. In the Alps, a *Draft Alpine Management Plan* reported a Gunaikurnai elder expressing concern over key totems - Dingo, Wedge-tailed Eagle and Goanna – (all apex predators). Everywhere else in the document dingoes "disappeared" to become, conveniently "wild dogs" (but they were, and are, dingoes - see Sykes 1977). Current genetic research on the dingo undertaken by Dr Andrew Weeks at Cesar Australia should clarify this issue.

TRADITIONAL OWNERS LISTENED TO?... BUT NOT HEARD?

Under their various Traditional Owner Country Plans and the *Biodiversity 2037* plan, Traditional Owners want spirits (totems) returned to country – a fantastic step forward. In the case of the dingo – stopping its persecution in regions where park systems are < 1million ha, i.e. the semi-arid zone (beginning in Wergaia country) and alpine East Gippsland (Jaitmatang, Gunaikurnai and Taungurung countries) is a practical first step forward. Traditional Owners should be given the wherewithal to monitor the changes this initiates over their countries – our premier parks. Further, there is now the opportunity to get the full traditional land management knowledge (e.g. mosaic burning) *as a basis* for better land management across our parks. This will be a welcome paradigm shift that will, I suggest, produce better land management science. Traditional Owners understand that "Healthy Country means healthy people". These generous and gracious offers will benefit the land and their communities - but also us all.

This short piece has attempted to show that the disregard of traditional knowledge and a lack of recognition of their ecological agency in land-use and management is a major contributor to where we find ourselves – in ecosystems that continue to decline. This lack of recognition has been widespread and profound, adversely affecting presumptions of scientific studies through to land-use research, policies and practices. Subsequent pieces will consider: threatened species; basic productivity loss; burning and blazing; climate change and ecological cascades.

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Dingo - Bogong High Plains Road about 6 km south of Mount Beauty -2022. Photo Ewen Silvester (La Trobe University).

The Miracle of Science

By Professor Sarah J. Spencer - School of Health and Biomedical Sciences, RMIT University

200 years ago, in 1796, Edward Jenner promulgated the use of vaccination with essentially a weakened version of the active virus to control smallpox on a population scale. Basing his ideas on at least 350 years of similar practise, this breakthrough led the way to a progression of countless scientists, medical practitioners, and health advocates improving on and perfecting the vaccine material, delivery systems, decontamination protocols and storage requirements. Today, no active smallpox exists in the world.

All of these developments, collectively, also meant that in 2019 when a completely novel virus (SARS-CoV-2) hit the global stage, it took only 18 months for the world's scientists to sequence its genome, develop and test an effective vaccine and administer it to more than 65 % of the global adult population.

> *200 years ago, Edward Jenner likely travelled to his medical practice and laboratory by horse and cart. The invention of the car was another 100 years away. However, about the same time as Jenner was working on his vaccine, inventors in France developed the first self-propelled (steam powered) mechanical vehicle. It was capable of carrying a person. Later developments in external and then internal combustion engines led the way for Karl Benz to produce the accredited first car in the late 1880s. Now, in 2022, we not only have hybrid fuel-electric vehicles of every shape and size, but we send them into space.*

We have taken all the cumulative science minds of the last centuries and millennia to achieve the standard of living we have today in so many respects – our medicine, in vitro fertilisation, engineering, textiles, psychology, food... Yet this current standard of living is not the end point of what we can achieve. It is not even necessarily sustainable as it is. The appearance of antibiotic resistant bacteria, climate change, and indeed the emergence of new diseases like COVID-19, puts our current lifestyle at high risk.

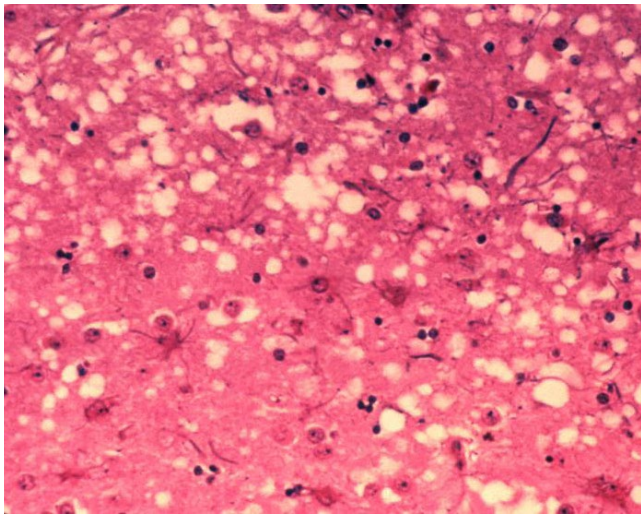
It is clear from our previous achievements, that it is only science that will save us and will pull humanity into a successful, affluent, and interesting next 200 years. With science we have the potential to become a multi-planet species that essentially does not age or die of disease. Without science, we face returning to premature death from toxaemia with the prick of a rose thorn; extinction from novel viruses and other microscopic diseases; a return to a horse-and-cart-style infrastructure when our rare metals and fossil fuels run out; and population depletion from climate incidents. Recent events in Australia suggest this is not something that will be deferred for 200 years, or 25 years. This is happening now.

History and common sense have shown us it is essential to invest deeply in all our futures by investing in science – especially in fundamental discovery projects that allow translation to happen years into the future.

We are currently staring our 2022 Edward Jenners and Nicolas-Joseph Cugnots and Kerl Benzs in the face – and telling them there are no jobs for them. Imagine the 200-year consequences of this.

On the part of current scientists, there is clearly also some onus on us. We definitely need to better communicate our findings and fallibilities to the non-scientific public to help them understand that science is a key investment for them, and to translate our findings into real world solutions.

Edward Jenner (1749-1823).



Prions are misfolded proteins with the ability to transmit their misfolded shape onto normal variants of the same protein. They characterize several fatal and transmissible neurodegenerative diseases in humans and many other animals. It is not known what causes the normal protein to misfold, but the abnormal three-dimensional structure is suspected of conferring infectious properties, collapsing nearby protein molecules into the same shape. The word prion derives from "proteinaceous infectious particle".

The hypothesized role of a protein as an infectious agent stands in contrast to all other known infectious agents such as viroids, viruses, bacteria, fungi, and parasites, all of which contain nucleic acids (DNA, RNA, or both).

Image credit: Dr. Al Jenny - Public Health Image Library, APHIS: *http://www.aphis.usda.gov/lpa/issues/bse/bse_photogallery.html*, Public Domain, *https://commons.wikimedia.org/w/index.php?curid=194978*

- Good science takes a really long time from discovery to solution (there were 181 years from Edward Jenner's discovery to smallpox-zero).
- Good science isn't just a brilliant idea from a brilliant individual (Karl Benz didn't create a car from a cart, he relied on decades of prior work by others). It takes many talented individuals, each putting pieces of knowledge into a complex and often shifting puzzle.
- Sometimes we get things wrong, or don't have all the answers, but this doesn't mean the right answer is impossible to find. The path to discovery is littered with hypotheses that were not supported and eureka moments that could not be translated into practice. This testing, refining, retesting approach is the cornerstone of how we move forward into a complete understanding.

> *200 years ago, when Jenner advocated for the smallpox vaccine, most of us didn't believe in bacteria. Viruses weren't understood until around about the time the first cars were invented (1890s), and prions weren't identified until the 1970s and 1980s. Yes, times in which many of us were actually alive and practising! Without Jenner and his colleagues' investments we would still be dealing with smallpox and the black plague.*

Where will we be 200 years, or even 25 years, from right now if we keep reducing funding and support to fundamental discovery science?

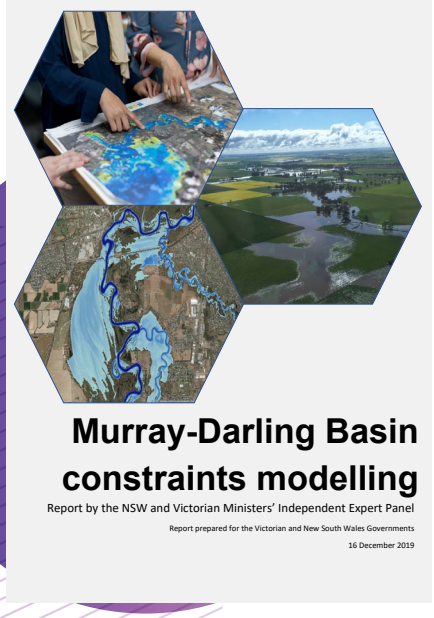
Restoring Rivers in Northern Victoria

To be healthy, wetland ecosystems have to be wet from time to time. This is jeopardized in northern Victoria.

I write to suggest that RSV can play a key role by synthesizing and communicating key scientific knowledge for the costs and benefits of restoration of floodplain wetlands in northern Victoria. This coming summer the Victorian Government will decide whether or not to allow pulses of environmental water from Eildon and Hume reservoirs to water redgum forests and other floodplain wetlands. Currently, managed over bank flows have been stopped by the government for fear of being sued for damages by riparian landholders.

In 2013 the State and Federal governments agreed to water floodplain wetlands as part of reforms to sustain the Murray-Darling Basin's river system. This requires agreements with nearly 3,300 farmers to enable environmental flows to spill from river channels every few years and temporarily inundate already flood-prone paddocks. This is known (bizarrely) as "constraints relaxation", giving rivers room to flood safely.

As climate change reduces river inflows and with extensive water extraction, pulsed environmental releases from dams are crucial to use limited water to maximise wetlands conservation. Overbank environmental flows would directly enable conservation of 375,000 hectares of floodplain forests and other wetlands, plus large areas down the River Murray into South Australia. It would enable conservation of 12,000 of 13,000 hectares of wetlands in the Goulburn River valley. Without managed watering large portions of these wetland ecosystems are dying and becoming degraded dryland ecosystems, negating environmental benefits from the adoption of the Murray-Darling Basin Plan.



The governments have described floodplain restoration as a large cost on land holders, despite allocation of Federal Government funding to pay for a just transition. There has been no consideration of the many socio-economic and environmental benefits of the proposed floodplain restoration. Benefits include reducing damage from floods, recharging aquifers, promoting pasture growth, enhancing tourism and recreation, as well as local infrastructure upgrades (Kahan et al. 2020). Science is needed to inform consideration of these costs and benefits.

The Victorian and NSW governments have done next to nothing to implement their 2013 commitments, but there is now a window of opportunity in Victoria. In April, the outgoing Minister for Water appointed a Committee to "consult community leaders" on the moribund Victorian Constraints Measures Program and report in December 2022. There is are new state and federal water ministers, and there is a state election in November 2022.

RSV is ideally placed to synthesize scientific knowledge on the costs and benefits of floodplain restoration to inform the management options being considered by key stakeholders and the Victorian Government. I propose that RSV hold (in collaboration with the Wentworth Group of Concerned Scientists) a symposium in 2022 to draw together the biophysical and social science knowledge on floodplain restoration options in northern Victoria. This would be an important and timely contribution to community and government decision making on sustainable management of the state's rivers.

Professor Jamie Pittock
Fenner School of Environment, The Australian National University, and Wentworth Group of Concerned Scientists

Reference: Kahan, G., M. Colloff, and J. Pittock. 2020. Using an ecosystem services approach to re-frame the management of flow constraints in a major regulated river basin, *Australasian Journal of Water Resources*. DOI: 10.1080/13241583.2020.1832723

RSV NEWS AND NOTICES

New RSV Members

Mr Karamat Subhani
PhD Candidate, Swinburne University of Technology

Ms Emily Scicluna
PhD Candidate, La Trobe University

Ms Vicky Tan,
PhD Candidate, Peter MacCallum Cancer Centre

Ms Kate Barnard,
Science Programs Manager, Museums Victoria

Mr Victor Barichello
Managing Director, Empauer Pty Ltd

Associate Professor Valentina Lorenzetti,
Deputy Director of Healthy Brain and Mind Research Centre, ACU

Dr Elizabeth Finkel AM,
Editor-at-Large, Cosmos Magazine

The Hon Dr Tien Kieu MP,
Member of the Legislative Council for the South Eastern Metropolitan Region, Parliament of Victoria

Ms Joan Phillips,
Executive Officer, Victorian Environmental Assessment Council

Dr Ross Wissing,
Principal, Tabayl

Dr Justin Eastwood,
Postdoctoral Research Fellow, Monash University

Adjunct Professor Gary Jones,
Director, Coliban Water

Vale

Mrs Elaine Muir MRSV 21 June, 1925 – 6 June, 2022

The Council of the Royal Society of Victoria records with sadness the passing of Mrs Elaine Muir. A member of 52 years, Elaine was a fixture at Society gatherings, committed to expanding her own horizons throughout her life. An author, editor and poet, Elaine launched a number of her works at the Society's Hall and is remembered fondly as a highly engaged, supportive and much-valued Member of the Royal Society of Victoria.

Our condolences are extended to Elaine's family, friends and colleagues.

Seeking an Independent Taskforce to Address Victoria's Biodiversity Crisis

Victoria's science society is set to establish an independent Cross-Sector Taskforce for Biodiversity Conservation & Recovery that will develop innovative solutions to Victoria's biodiversity crisis.

Leaders from across Victoria, including Traditional Owners, gathered at the Royal Society of Victoria on Saturday 4th June to discuss the challenges and opportunities for Victoria in biodiversity conservation and recovery, considering the urgent need to establish an independent Taskforce.

RSV President Rob Gell says,

> *"The biodiversity crisis affects all aspects of society and thus requires a whole-of-society response to solve. We are calling on leadership across the four sectors we have identified –*

government, business, community and research – to come together to establish a collaborative approach and build effective solutions that align with sectoral agendas".

RSV CEO Mike Flattley says,

"All sectors of society have been conducting important and productive work; from new impact metrics to ecological system mapping and modelling, through to policymaking, community engagement and social science initiatives to raise awareness and commitment to the natural world across Australia. These various initiatives are not 'joined up' across the business, government, academic and community sectors. We seek to accelerate this crucial integration and mainstreaming of honest, yet positive, dialogue about biodiversity, supporting our First Nations colleagues' efforts in particular."

The Royal Society of Victoria Cross-Sector Forum on Biodiversity Conservation & Recovery heard:

- There are more than 5,000 plants and 1,200 vertebrate animals native to Victoria. More than a third of these species are classified as rare, threatened or near-threatened. Threats to Victoria's biodiversity include habitat loss, weeds, pest animals and changed fire and water regimes – all of which are exacerbated by the unfolding effects of climate change.
- Addressing biodiversity loss is affordable. The cost of stopping species loss and recovering nationally listed threatened species is estimated to be about $1.7 billion per year. Each year Australians spend 18 times that amount, about $30.7 billion, just on cats and dogs.
- Traditional Owners, having lived with Country and managed the environment for tens of thousands of years, have a fundamental role to play. There are opportunities to create partnerships between First Peoples, local community groups, primary industries, landowners and others to revive the health of Country, its plants and animals, and its people.

Guiding Principles for the proposed Taskforce developed by the RSV are to:

- Prioritize First Peoples as land and water managers.
- Use science and research to guide actions.
- Include measurable biodiversity conservation or recovery outcomes from actions.
- Work across biologically relevant geographic scales.
- Collaborate with local communities.
- Work across participant scales, from large organisations taking on broad goals to individuals working locally.
- Connect sectors, disciplines, data, expertise, knowledge systems and actions.
- Demonstrate the value of corporate leadership.
- Build the business case value of biodiversity conservation.
- Develop models for private and public investments in biodiversity.

RSV President Rob Gell says "It is time to move from talk to action. The Royal Society of Victoria is Victoria's 'Switzerland of Science.' Our independence has been critical in the past, including our advocacy for Victoria's first national park, Wilson's Promontory. Addressing Victoria's biodiversity crisis is not only essential for the future of humanity, through partnerships it can be achieved in a way that is affordable and builds the fabric of our society."

Professor Graeme Samuel congratulated the Society on the conduct of the Roundtable, which "gathered together an impressive group of environment experts. The organisation of the day and facilitation of the discussion was exemplary."

> *"This cannot just be another talkfest," emphasises Mr Flattley. "We need real impact from real partnerships that deliver on their promises, without the green-washing and offsetting smokescreens that enable further damage to be done to our natural systems and the species they support. We're looking for joined-up solutions and projects that can help us to demonstrate their efficacy."*

The Royal Society's position paper on biodiversity conservation and recovery is scheduled for release in August 2022. Contact:
Rob Gell: **president@rsv.org.au**
Mike Flattley: **ceo@rsv.org.au**

Position Vacant

Research Manager - Phillip Island Nature Parks

ONGOING

Exciting career opportunity for an experienced Research Manager to lead the science-based strategy for the Nature Parks and shape the development of the Nature Parks 5 year-conservation plan and 30 year-conservation vision, *'Beyond the Horizon'.*

As a strategic and experienced leader, you will lead a dynamic team of research specialists to drive progress, innovation, and results for the Nature Parks research programs in terrestrial and marine ecosystems and will oversee the implementation and monitoring of programs, feasibility and analysis of conservation impact.

You will play a key role in championing the Nature Parks world-class research through strong stakeholder engagement, collaborative partnerships, research linkages, grant opportunities, and supporting fundraising efforts.

Your key roles and responsibilities include:

- Lead the science-based strategy for the Nature Parks
- Provide high-quality scientific and technical advice to inform conservation management for the Nature Parks
- Align business priorities with team plans, organisational values and goals through effective people management
- Achieve target funding to support the Nature Parks conservation priorities
- Build beneficial and respectful relationships with Traditional Owner groups
- Represent the Nature Parks externally, both nationally and internationally, through various meetings, forums and committees

For success in this role you will have:

- Relevant PhD in ecology or equivalent
- Experience in leading and developing high achieving successful teams
- A track record of publications in international peer-reviewed scientific journals
- Skill and experience in strategic planning, analysis and reporting
- Strong understanding of scientific principles and processes including ecological processes, theory and practices
- Effective communication and negotiation skills
- Understanding of budgets, business plans and funding applications

Current driver's license and employee working with children check are also required prior to commencement. Applicants will require valid Australian working rights status.

Hours of employment are full time and in accordance with a five-day roster, with availability to work evenings, weekends, public holidays and across our sites as per business requirements.

For further information on this position, please contact Jessica McKelson, Conservation Manager on 0429 399 047 or visit our website: **https://www.penguins.org.au/about/employment/our-people-our-work/**

Applications are to be submitted with resume and cover letter addressing capabilites on the position description attached to recruitment@penguins.org.au by **5.00pm on Sunday 17th July 2022.**

For further information on this position, please contact Jessica McKelson, Conservation Manager on 0429 399 047 or visit our website: **https://www.penguins.org.au/about/employment/our-people-our-work/**

WHAT I'VE BEEN READING

Thoughts and reflections from Members of the Royal Society of Victoria.

"Sapiens: A Brief History of Humankind"

By David Rees MRSV and Sandra Rees FRSV

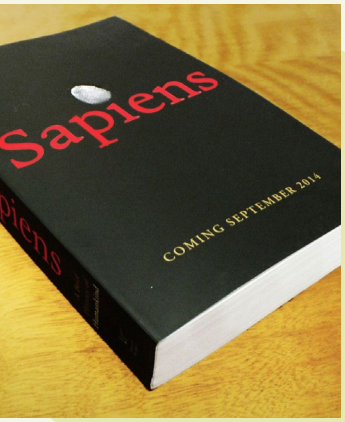
Sapiens: A Brief History of Humankind

Prof Yuval Noah Harari

Vintage, Penguin Random House Group

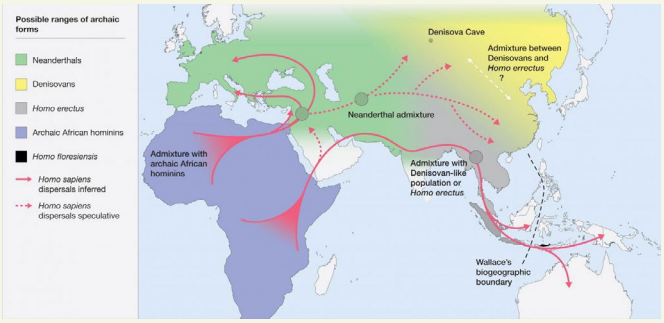
2015 ISBN 9780099590088 498pp

This ambitious and provocative book, *"Sapiens: A Brief History of Humankind"*, by Yuval Harari, was first published in Hebrew in Israel in 2011 and is based on a series of lectures, taught by Harari, at the Hebrew University of Jerusalem. They were fortunate students to have such a witty and erudite teacher.



A book such as this that traverses the wide sweep of history from the evolution of *Homo sapiens* in East Africa 200,000 years ago to the present day, in a forthright manner, was bound to be controversial and ruffle a few feathers.

Other authors such as Bill Bryson (A Short History of Almost Everything) and Daniel Boorstin (The Discoverers) also search for an understanding of the human condition but here Yuval goes more deeply into discussions of biology, evolutionary anthropology, economics and historical trends that shaped Homo sapiens as a species.



Map of the potential distribution of archaic hominins, including H. erectus, H. floresiensis, H. neanderthalenesis, Denisovans and archaic African hominins, in the Old World at the time of the evolution and dispersal of H. sapiens between approximately 300 and 60 thousand years ago. Credit: Roberts and Stewart. 2018. Defining the 'generalist specialist' niche for Pleistocene Homo sapiens. Nature Human Behaviour. 10.1038/s41562-018-0394-4.

Yuval sets the scene by observing that about 100,000 years ago at least six human species (including *Homo denisova, neanderthalensis, soloensis, floresiensis, sapiens)* inhabited the Earth; today there is just one, us, *Homo sapiens*. How did our species succeed in the battle for dominance? Why did our hunter-gatherer ancestors come together to create cities and kingdoms? How did we come to believe in nations, gods and human rights? What is it to be human? What will our world be like in the millennia to come? His arguments and hypotheses are always extremely interesting and engaging with a welcome use of metaphor to render complex concepts more understandable.

Cueva de las Manos, Perito Moreno, Argentina. The art in the cave is dated between 7,300 BC and 700 AD, stencilled, mostly left hands are shown. Photo: Mariano Cecowski (Public Domain)

He poses the view that there were several main revolutions that shaped the course of our history. The first was the **Cognitive revolution,** 70,000 years ago, as sapiens spread out of Africa across the planet, developing a more complex language than other species and using gossip and fictional talk to better collaborate with each other. Next, the **Agricultural revolution,** about 12,000 years ago, with the domestication of plants and animals, the formation of more trusting communities and the development of collective myths and the beneficial unification of tribes. A downside of the development of permanent settlement was the easier transmission of disease. The **Scientific revolution,** beginning 500 years ago, encouraged sapiens to discover new devices and it gave humankind unprecedented power to influence Earth`s environment in both beneficial and deleterious ways. Two hundred years ago, the **Industrial revolution** saw the replacement of the family and community with state and market and the massive extinction of plants and animals. Humans have now transcended the boundaries of planet Earth and we have moved into the **Information** and the **Biotechnology** revolutions. In the future will intelligent design become the basic principle of life? Will Homo sapiens be replaced by superhumans? Will we turn into cyborgs, beings that combine organic and inorganic parts? As our senses and functions are already being supplemented with intraocular lenses, pacemakers and orthotics, we are on the way to becoming bionic these days.

In this ambitious, vividly written book, Harari concludes by suggesting that "*sapiens* have become self-made gods, accountable to no-one, wreaking havoc on our fellow animals and on the surrounding eco-system seeking little more than our own comfort and amusement, yet never finding satisfaction. Is there anything more dangerous than dissatisfied and irresponsible gods who don't know what they want?" We thoroughly recommend this book as a fascinating account of the extraordinary and continuing history of *Homo sapiens*, guiding us to understand the past, confront the present and prepare for the future. It certainly helped us endure the long, confined months of the pandemic!

EVENTS

Engineering Your Heart's Health

Tuesday, 12 July, 2022 from 6pm

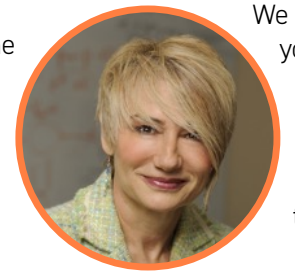
Melbourne Convention and Exhibition Centre, South Wharf, Melbourne 2022 from 6:00pm

THE BIONICS INSTITUTE 2022 GRAEME CLARK ORATION

Cardiovascular disease is the single biggest cause of mortality in Australia and worldwide. Sudden cardiac death from irregular heartbeats, or arrhythmia, accounts for 15-20 per cent of all deaths. Clinical criteria for risk assessment only capture about 20 per cent of all arrhythmic sudden deaths.

In a major advance for the promise of precision medicine, it is now possible to predict the risk of sudden death from arrhythmia in patients with heart disease. This development will be the focus of the Bionics Institute 2022 Graeme Clark Oration, to be delivered at 6.00pm AEST on Tuesday, 12 July, at the Melbourne Convention and Exhibition Centre.

In ***Engineering your heart's health,*** Dr Natalia Trayanova will discuss how the convergence of Machine Learning, engineering and personalised clinical data offers for the first time accurate and personalised probabilities of sudden cardiac death at all times up to 10 years. Included in such an assessment is the level of uncertainty associated with that prediction. Dr Trayanova will discuss how heart "digital twins", or a virtual replica of your heart's performance, enables clinicians to access hidden personal information to decide the exact treatment.



Dr Trayanova's results were recently featured on **NBC TV** in the U.S.

Dr Trayanova is the Murray B. Sachs Professor of Biomedical Engineering, and a Professor in the Faculty of Medicine, at Johns Hopkins University. She directs the Alliance for Cardiovascular Diagnostic Treatment Innovation, which applies predictive data-driven approaches, computational modelling and innovations in cardiac imaging to the diagnosis and treatment of cardiovascular disease.

Since 2008, the Graeme Clark Oration has been sharing advances in the biomedical sciences with the public. Attendance is free however registration is essential. Dr Trayanova will also be the guest of honour at the Oration's Women in STEMM Lunch, also on 12 July. Learn more and register for these events at the **Oration website**. Attendees are also encouraged to arrive early and tour the Biomedical Innovation Showcase, where local innovations shaping the future of healthcare will be on display.

The Graeme Clark Oration is the initiative of the **Convergence Science Network.**

We look forward to welcoming you the Bionics Institute 2022 Graeme Clark Oration to hear Dr Trayanova share with us her revolutionary approach to understanding the treatment of the human heart.

Bionics Institute

Convergence Science Network
Biomedical Sciences Delivered

Let's Torque SciComm Workshop: "Design, Delivery, and Display"

Monday, 11 July (6-8pm)

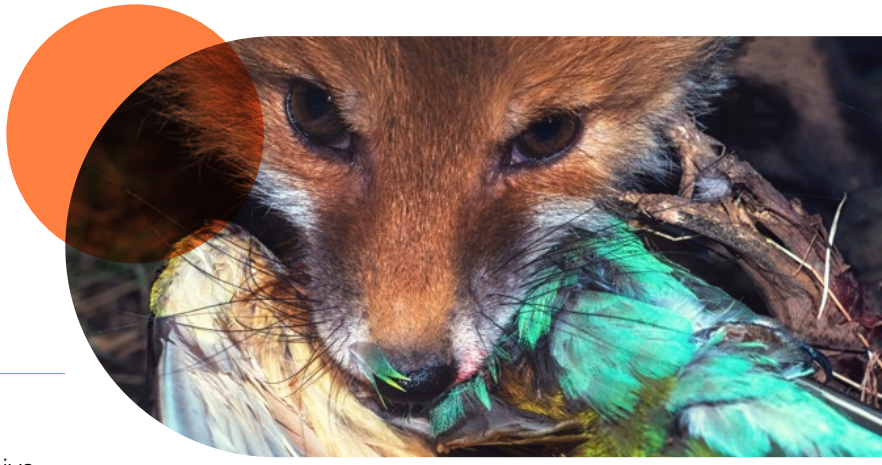
Royal Society of Victoria
(8 La Trobe St Melbourne).

Undergraduate students are invited to improve their presentation techniques by applying design psychology, learning how to complement spoken content with visual materials while avoiding presenting "off' the slides," and brainstorming STEM ideas! Come along to the **Let's Torque's** SciComm workshop from 6-8pm on Tuesday, 5 July, with networking from 8pm onwards. Please bring a laptop with you.

Light refreshments will be provided during the workshop.

$5 to register. Book your tickets at **https://www.trybooking.com/events/landing/920635**

RSV Symposium: Next-Generation Biocontrol of Invasive Vertebrate Pests



Friday,16th September (8:30am -3:30pm)

A one-day symposium to canvass the impact of invasive vertebrate species on ecosystems and agricultural activities throughout Australia, explore new and emerging biological control strategies for invasive vertebrates, and consider the ethical, social, technological, and decision-making challenges posed by these technologies for governments, industries, and land managers.

WHO SHOULD ATTEND?

We welcome all audiences, including researchers, land managers, First Peoples, government policy leads, industry groups, conservation groups and any other parties with a stake in the challenges posed by invasive vertebrate species and an interest in emerging research that can offer new and effective tools for biocontrol in the years to come.

BENEFITS OF PARTICIPATION

The symposium presents an opportunity to share insights and access expertise in identifying and responding to some of the most pressing challenges facing the Australian continent's ecological health from the impacts of invasive vertebrate species.

FEATURED TOPICS:

Session 1: The Problem

- The broad-scale ecological impacts of invasive species
- The economic costs of invasive vertebrate species management
- The agricultural impacts of invasive species in Australia
- Indigenous land management and the impacts of invasive vertebrate species on Country
- Priorities for management of invasive species from a threatened species perspective

Session 2: The Technologies

- Rodent genetic biocontrol
- Gene drives for foxes, rabbits, pigs etc
- Genetic biocontrol of invasive fish species
- Herpesvirus biocontrol for the management of carp
- Immuno-contraceptives for feral cat management
- Viral biological control strategies for rabbit population control
- Convened in partnership with the Invasive Species Council and the Victoria State Government's Department of Environment, Land, Water and Planning.

Session 3: The Caveats

- Attitudes in New Zealand towards gene editing for invasive species management
- The problems and perils of biotechnology
- Social challenges of invasive vertebrate management
- First Nations perspectives on invasive species management
- Animal welfare considerations for new invasive species management tools
- Modelling genetic biocontrol

Tickets are available from to either attend in person or participate in the webinar via Zoom. RSV Members are prompted to enter their "promo code" to access a member's ticket. Please register online at **https://rsv.org.au/events/invasive-pests-biocontrol**.

invasive species council | VICTORIA State Government | Environment, Land, Water and Planning

Convened in partnership with the **Invasive Species Council** and the Victorian **Department of Environment, Land, Water & Planning**.

Creating a World Leading Manufacturing Sector in Victoria

Thursday, 7 July, 2022 from 6:00pm

PRESENTED IN PARTNERSHIP WITH THE AUSTRALIAN ACADEMY OF TECHNOLOGY & ENGINEERING (VICTORIA DIVISION).

Australia's mining sector is incredibly advanced in its use of digitisation, automation, and control. What are the success stories, and how can we apply this technology in our manufacturing sector to create something that is world leading?

Join CSIRO's Chief Scientist, **Professor Bronwyn Fox** to explore the reapplication of engineering know-how, as well as opportunities for Victoria at the intersection of manufacturing and hydrogen, followed by a panel discussion with **Dr Amanda Caples**, Victoria's Lead Scientist, and **Mr Rob Gell AM**, President of the Royal Society of Victoria.

ABOUT THE SPEAKER

Professor Bronwyn Fox is Chief Scientist of CSIRO, Australia's national science agency and innovation catalyst.

Professor Bronwyn Fox joined CSIRO in October 2021 and became CSIRO's fourth female Chief Scientist. She is known globally as a leader in advanced manufacturing, materials science, and industry 4.0 technologies, and is passionate about bringing together multidisciplinary teams for collaborative research.

She was formerly Deputy Vice-Chancellor (Research and Enterprise) at Swinburne University of Technology and founding Director of Swinburne's Manufacturing Futures Research Institute. During that time, she established a world first Industry 4.0 Testlab for the additive manufacturing of carbon fibre composites, in collaboration with CSIRO.

Bronwyn has demonstrated a sustained commitment to support the growth of the carbon fibre and composite industry in Australia through targeted research and was previously a co-founder of the Carbon Nexus facility at Deakin University.

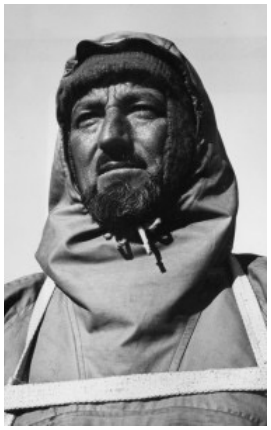
In 2018 she was awarded the Global Congress on Manufacturing and Management Research Leadership Award, and in 2020 she was awarded the Royal Society of Victoria's **Medal for Excellence** in Scientific Research.

Tickets are available from **https://rsv.org.au/events/manufacturing-sector/** to either attend in person (first window) or participate in the webinar via Zoom and/or Eventbrite (second window). RSV and ATSE Members are prompted to enter their "promo code" to access a member's ticket. Alternatively, you can just watch along via our **YouTube channel** at the appointed time without buying a ticket. Streamed online as part of the **Inspiring Victoria** initiative in 2022.

Inspiring AUSTRALIA Victoria

AWARDS, PRIZES AND FELLOWSHIPS

Call for Nominations - The Phillip Law Postdoctoral Award



This award was made possible from the generous bequest to the Society from the estate of the late Dr Phillip Garth Law AC. Recognising excellence in scientific research by an Early Career Researcher and initially awarded exclusively in the physical sciences, from 2021 this award has commenced a cycle through four different categories of science each year.

In 2022, the award is open to suitably qualified post-doctoral candidates in **Category III: Earth Sciences**. This category incorporates Geology, Geochemistry, Geochronology, Geophysics, Planetary Physics, Meteorology, Oceanography, Physical Geography, Palaeontology and related sciences.

ELIGIBILITY:

Application is open to candidates within seven years (at the deadline of application) of the awarding of their doctorate from a university in the State of Victoria, Australia. Applicants must either be an Australian Citizen or have Australian Resident Status. The Society will consider adjusting the seven year window for candidates who have spent time working as primary carers following their PhD – if this applies to you, please contact the Society to discuss eligibility.

APPLICATIONS:

Open on **1 June, 2022** and close at **5pm** on **31 July, 2022.** Candidates should nominate themselves. The application should consist of:

- A brief **Curriculum Vitae** (no more than four A4 pages) including full contact details of the applicant.
- **Proof of citizenship or residency status** (a copy of the applicant's birth certificate, citizenship certificate or certificate of permanent residency status).
- A statement (up to three A4 pages) summarising the applicant's **research contribution** and including the names and contact details of two referees.
- **A list of publications in peer reviewed journals.** For multi-authored publications, the contribution of each author should be indicated.

SUBMISSION:

Should be in the form of a single PDF file sent via email and marked for the attention of the Chief Executive Officer at rsv@rsv.org.au .

CONDITIONS:

The Royal Society of Victoria reserves the right not to consider applications which do not comply with the above requirements and the right not to make an award if no suitable candidate applies.

THE AWARD:

The successful candidate will receive an award certificate and a prize of $3000.

THE PHILLIP LAW POSTDOCTORAL LECTURE:

The winner will be required to present their work to a special meeting of the Royal Society of Victoria at a public lecture scheduled for the evening **Thursday, 27 October 2022.** This will be professionally filmed and shared online. If COVID-19 conditions prevent the event from proceeding, then prize winner will deliver a pre-recorded, 45 minute talk on their research, ideally to be professionally filmed at the RSV's headquarters, then join an online meeting of the Royal Society of Victoria and guests for the screening and subsequent discussion.

Please note that the Society does not pay travel expenses to Melbourne for the purpose of filming or presenting the lecture.

ENQUIRIES:

Chief Executive Officer, The Royal Society of Victoria, 8 La Trobe Street, Melbourne 3000 Telephone: (03) 9663 5259. Email: **rsv@rsv.org.au .**

Call for Nominations - RSV Medal for Excellence in Scientific Research 2022

Our 2021 Research Medal Winner, Professor Andy Ball, with the Victorian Minister for Energy, Environment and Climate Change, The Hon. Lily D'Ambrosio MP

Nominations are invited for the Royal Society of Victoria Medal for Excellence in Scientific Research 2022 in **Category II: Biomedical & Health Sciences.**

This category includes research in the disciplines of Genetics, Immunology, Human Physiology, Human Anatomy, Pathology, Neurology, Epidemiology, Endocrinology, Radiology, Microbiology, Medical Parasitology, Nuclear Medicine, and related human sciences.

The last Medal recipients in this category were Professors Anthony Burkitt and Jamie Rossjohn (2018).

AWARD CRITERIA:

The award of the Medal is based on demonstration of the candidate's excellence and leadership in scientific research. The candidate's research work shall have been carried out in Australia (including its territories), or on Australia, with preference for work done in Victoria, or on Victoria.

NOMINATIONS:

Nominations open on 31 March, 2022 and close at 5pm on 31 July, 2022.

- Candidates cannot nominate themselves.
- Scientific Societies, Academies, Universities, Research Institutes, CSIRO, and Members of the Royal Society of Victoria are invited to make nominations.
- The nomination statement should demonstrate the candidate's:

1. **Exemplary publication track record** during the ten-year period from 1st January 2012 to 31st December 2021. The track record will be judged on papers published and/or accepted for publication in refereed international journals. Work outside the ten-year period will not be considered, subject to due consideration of career breaks for primary care responsibilities.
2. **Consistent excellence** in innovation or ground-breaking research and patents, incorporating novel scientific techniques and methods – described in plain language.
3. **Exemplary leadership in science** incorporating evidence of a major contribution to the public promotion of science, advocacy for science, partnership building, collaborations, role modelling and influence across the scientific community.

SUBMISSIONS:

The submission should consist of:

- The nomination statement, signed by the nominator, covering points 1 to 3 above. This must be in Times New Roman, 11 point, and no more than three A4 pages please.
- A brief (no more than five A4 pages) Curriculum Vitae of the candidate. A list of publications, attached in supplement, should be constrained to the ten year period from **1st January 2012 to 31st December 2021.**

The nomination submission should in the form of a single PDF file sent via email, attention to the Chief Executive Officer, at **rsv@rsv.org.au**

CONDITIONS:

The Royal Society of Victoria reserves the right to seek independent referees in considering the nominations received, and not to consider nominations that do not comply with the nomination format or do not address the award criteria.

If no candidate of sufficient merit is nominated, no award need be made in a particular year.

No posthumous award will be made.

THE AWARD:

The successful candidate will receive an engraved silver medal which is presented by the Society's patron, the Governor of Victoria or, in the event of Her Excellency's unavailability, a senior leader of Victoria's government or science community.

The medallist will be required to present a lecture to the Society Members and guests on the evening of Thursday, 8th December 2022 at which the Medal will be presented.

ENQUIRIES:

CEO, The Royal Society of Victoria, 8 La Trobe Street, Melbourne 3000 Telephone: (03) 9663 5259, or via **rsv@rsv.org.au.**

2018 RSV Medallists Professor Anthony Burkitt (left) and Professor Jamie Rossjohn (right) with Her Excellency the Honourable Linda Dessau AC, Governor of Victoria (centre)

Science Awards & Fellowships from the Victorian Government

VICTORIA PRIZE FOR SCIENCE & INNOVATION

The Victoria Prize for Science and Innovation celebrates leadership, determination and creativity. It also highlights the many ways in which research and development of international significance are conducted in Victoria.

These prestigious prizes are for a scientific discovery or technological innovation, or a series of such achievements that significantly advances knowledge. The clear potential to produce a commercial outcome or other substantial benefit to the community will be highly regarded.

Each prize is worth $25,000 and is awarded to a Victorian Scientist, Innovator, Entrepreneur and Researcher in the following categories:

Life Sciences

The Life Sciences category comprises the fields of science that involve the scientific study of living organisms and their life processes and ecosystems, covering fields such as biology, medicine or anthropology.

Physical Sciences

The Physical Sciences category encompasses the branches of science that study non-living systems, including but not limited to fields such as physics, chemistry, earth sciences, engineering, ICT, mathematics and statistics, or astronomy.

The Victoria Prize for Science and Innovation is typically awarded to an individual. It is recognised, however, that outstanding achievement is often the result of long-term collaboration between individuals making equivalent and complementary contributions. The Prize, therefore, may be awarded to a maximum of two individuals in each category if the outstanding achievement can be clearly shown to be the outcome of a long-term collaboration. The total value of each Prize will be $25,000 and will be evenly apportioned between joint recipients.

Full details on the nomination process, including eligibility, are available at **https://www.veski.org.au/victoria-prize-fellowships/victoria-prize-for-science-and-innovation-criteria-application-process/**. Submissions are due by **12:00pm on Monday, 18 July 2022.**

2021 Victoria Prize and Victoria Fellowship recipients celebrate with the Hon Matt Fregon MP, Member for Mount Waverley

VICTORIA FELLOWSHIPS

In recognition of the important role of innovation to Victoria's economic future and the need for Victorians to be skilled in science, technology, engineering and mathematics the Victorian Government is proud to support the Victoria Fellowship program.

Each Fellow receives a travel grant of up to $18,000 to undertake a short-term overseas study mission to assist in developing a commercial idea; undertaking specialist training; or career development not available in Australia.

veski will deliver 10 Victoria Fellowships on behalf of the Victorian Government comprising:

- Five fellowships in the Life Sciences
- Five fellowships in the Physical Sciences

Additionally, applicants can apply for one of up to three Australian-French Association for Research and Innovation [AFRAN] Associate Awards valued at up to $5,000 to support study missions in France.

Full details on the application process, including eligibility, are available at https://www.veski.org.au/victoria-prize-fellowships/victoria-fellowships-eligibility/ . Submissions are due by 12:00pm on Monday, 18 July 2022.

VICTORIA State Government Australia

veski

TRANSACTIONS

FEATURES AND ARTICLES

ABC Radio National's Tegan Tayor, host of Ockham's Razor and MC for the evening.

Ockham's Razor at the Royal Society of Victoria

by Catriona Nguyen-Robertson MRSV

The simplest explanation is often the best. ABC Radio National's Ockham's Razor has returned to the Royal Society of Victoria. Seven incredible tales of science and endeavour were presented at the podcast and recorded for the podcast live. Hosted by Tegan Taylor and produced by James Bullen, Ockham's Razor is a soap box for all things scientific. The following articles are a teaser for the episodes that are to come. While they are based on the presentations delivered and recorded for the program, they do not cover all points from the speakers but do provide additional information. Stay tuned for each presentation that will be released as a podcast episode in the coming weeks: **https://www.abc.net.au/radionational/programs/ockhamsrazor/**

THE PROBLEM WITH 'WILDERNESS'

Associate Professor Michael-Shawn Fletcher (The University of Melbourne)

Is the idea of wilderness destroying our continent? Michael-Shawn Fletcher is a geographer and Wiradjuri man – and challenges the idea that pristine, untouched environments are a good thing.

First Nations people in Australia view "Wild Country" as sick country. It is land that has not been cared for and has hence degraded over time.

Human impacts on the environment are mostly viewed as negative. While it is true that many human activities can be detrimental to ecological health, this view ignores the fact that Indigenous peoples have been actively creating, managing, and maintaining most of the Earth's landscapes for tens of thousands of years.

Aboriginal rock art dates the arrival of humans on this continent to at least 65,000 years ago. In the context of human history, that is a remarkably long time. For example, it is long before humans arrived in the Americas 14,000 years ago.

For millennia, land-use and cultural practices of First Nations Australians have shaped the environment. In turn, their environment heavily influences their way of life. Their landscape management creates a predictable, bountiful, safe environment. It fosters nature's ability to provide resources and to provide a secure place to live. This is scientific knowledge, accumulated by more than 3,000 generations of people who have passed on how to live on Country based on observation.

> And then Invasion changed everything. People were removed from Country.

Australia is facing several environmental crises. We are known for our abysmal, accelerating extinction rate that shows no signs of slowing. We are also experiencing an alarming number of catastrophic bushfires that are becoming more frequent, more intense, and covering more ground. We are also constantly traumatised by environmental tragedies such as the bleaching of the Great Barrier Reef and mass deaths of fish in the Murray-Darling system.

Many of the environmental problems that Australia now faces can be traced to the devastating and continuing effects of the British invasion and subsequent colonisation. With the arrival of Europeans, the rate of environmental change increased at an unprecedented rate and scale. There was widespread land clearing for agriculture and urban development, mining and timber harvesting consumed resources like never before, non-native species were introduced to the land, and Indigenous land management was disrupted.

> The removal of Traditional Owners from Country – their homes – had catastrophic impacts. Pests and weeds have grown out of control, damaging wildfires rage through, and there is substantial biodiversity loss. Since Invasion, at least 110 of Australia's unique flora and fauna have been wiped off the planet.

But changes to the Australian environment have not been uniform across the continent. Some Australian landscapes drastically changed as they were converted to towns, cities, or farms. Other areas remained unscathed. They now seem to be viewed with a romantic notion of pristine 'wilderness' – and it can be detrimental to regard them this way when it comes to conservation.

More than 40% of Australia is regarded as undisturbed wilderness. But these regions should not be locked up.

The areas of the central deserts in Australia that are mapped as "wilderness" are the ancestral homes of several Aboriginal groups who have actively managed the land for tens of thousands of years.

These areas need constant upkeep, and integral to that is Indigenous Knowledge and land management. That it how it was looked after for over 65,000 years.

Indigenous and local peoples struggle constantly against the conversation on maintaining wilderness that seeks to deny them access to their homelands and the livelihoods that it sustains.

Unsurprisingly, a return of Aboriginal management has seen a reduction in wildfires, an increase in biodiversity, and even healthier people. The Western Desert and parts of the Kimberly have remained relatively healthy due to the almost continuous management of the lands by their Traditional Owners, the Martu people and Nyikina Mangala people respectively.

Michael challenges us to change our view. Converting the lands of Traditional Owners into 'wilderness' only hastens their demise. We need to engage and embed multiple ways of viewing the world if we are to survive on this planet.

RE-THINKING AND DIAGNOSING AUTISM

Dr Josephine Barbaro (La Trobe University)

Autism: It's a word parents often want to avoid hearing at all costs,' says Josephine.

When Josephine tells parents that their child has autism, she sees them coming to terms with the diagnosis. She sees their emotions: the stress, the strain, the confusion, the anxiety, and the fear of what their child will face – all valid feelings.

These feelings should not be repressed. But they do arise from a misunderstanding of what autism is. It is simply a neurobiology difference – one that nearly one in every 50 people has.

With the brain a bustling hub of communication, differences stem from variations in how the brain is "wired" together. Approximately 86 billion neurons are housed in the brain with each connected to up to ten thousand others. The thousand trillion connections between them all lend themselves to so many possible permutations. Within this inherent diversity, people with autism interact with and interpret the world in unique ways from what neurotypical people might expect.

> People with autism engage in social and communication behaviours differently to neurotypical people. While they certainly face challenges such as sensory aversions (e.g. to bright lights or crowds), they also have strengths. These assets vary, but include logical or visual thinking, persistence, strong focus, eye for detail, and memory for facts and figures.

The difficulties associated with autism can be obvious, such difficulty developing language skills and communicating non-verbally. Some deficits can be more subtle, like an aversion to initiating conversation. However, many of the disabling challenges associated with autism come about when individuals do not receive the respect, understanding and support that allow them to be comfortable in a non-autistic world.

Being autistic and not diagnosed can especially lead to a lifetime of struggles and being misunderstood. Autism is now diagnosed in three boys for every one girl. Girls often slip through the cracks or are diagnosed later than boys, therefore missing out on opportunities for early support. Girls who have undiagnosed autism grow up not understanding why they are sometimes confused in social situations. This can lead to lifelong mental health issues and thinking they have character deficits – or being told they do.

> Positive outcomes for autism are irrevocably tied to early and accurate diagnosis, and support. Unfortunately, this is a mark that Australia is far from meeting.

How can we help people with autism live happy and healthy lives?

Early diagnosis is key – and the focus of Josephine's research. Children who receive an autism diagnosis and support in the early and critical years (aged 18-36 months) have better school-age developmental outcomes. Not only does it mean that we can capitalise on their brain plasticity, but it also gives time for people around them to learn their preferred communication style early on. And yet, the average age of autism diagnosis in children remains at about 3-4 years.

The Social Attention and Communication Surveillance (SACS) tool, developed by Josephine, is the world's most effective screening tool for early autism detection.

In a life-changing program, Josephine provided almost 1,500 Victorian maternal and child health nurses with specialist training to detect the early signs of autism in young children. Most children who show early behavioural signs of autism at their routine health checks are indeed on the autism spectrum. Not to mention, 50 per cent of parents voice their suspicions before 12 months. This training therefore closes the gap between parents' first concerns and a definitive diagnosis, and empowers nurses to provide referral pathways and support.

It is also important for everyone to be involved in re-framing the way we think about autism and to structure our environment in a way that supports neurodivergent people. This may involve considering the need for organisation and predictability, or taking specific sensory needs into account. 'Just as we build ramps for wheelchair users, we need to build the world in a way that accommodates autistic people's sensory differences,' Josephine says.

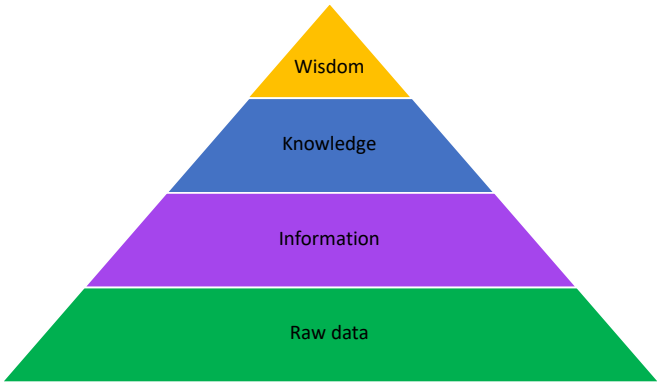
> If everyone understands what autism means, offering support and respect, we can regard it as a positive difference and people can be proud of their autistic identity. With the right supports in place, neurodivergent people can thrive.

FEEDING DATA UP A PYRAMID TO INFORM PANDEMIC PREPAREDNESS

Priyanka Pillai (The Peter Doherty Institute for Infection and Immunity)

How do we get from scientific data to any inferences that then inform policy? Priyanka Pillai tackles complex challenges in health data to ensure that we are prepared for pandemics.

Imagine a pyramid:



Researchers and clinicians collect raw data. Then that data needs some sort of context to become information. Experts can distil the subsequent information and add meaning to obtain knowledge. Finally, they can derive insights for wisdom that informs policy and decision-making.

Priyanka works in the bottom layer as a data specialist. She works with clinicians, researchers, and epidemiologists to ensure that, within the healthcare system, the different layers are connected and seamlessly feed from one to the next. Each part distils information from the one below. As part of an interdisciplinary team, she solves biomedical problems using her computer science skills.

This information feeds into our preparation and response to infectious diseases. Just in case we need them...

Every infectious disease emergency presents a new set of unknowns. And while we cannot know everything in advance of an emergency, we can prepare multiple capabilities and tools in advance. Establishing a network of data sharing and putting protocols in place to fast-track new diagnostic tests, treatments and/or vaccines ensures the best possible outcomes for our health.

Early in the COVID-19 pandemic, countries were struggling to meet the demand to for SARS-CoV-2 testing as case numbers rapidly rose. Without knowing the true number of people who had COVID-19, officials were left to respond to the pandemic without knowing how quickly it was spreading and what interventions minimised risks.

At the beginning, for example, we were told that masks did not help prevent disease transmission – and then months later, as we accumulated more data and gained knowledge, we realised how wrong that was.

If it was not already evident, the pandemic highlighted how critical accurate and abundant health data is acquire information that advises policies that minimise disease burden.

> Priyanka leverages public health surveillance to support the pyramid so that health experts can monitor the spread of disease, assess disease severity, and know what public health measures are needed to control the spread.

When any of us get an infection and develop symptoms, we go to the doctor for tests. This is important as we want to avoid gaps in the reporting of mild cases. If our symptoms are severe, we present to the hospital, kicking off a chain of data collection: risk factors, co-morbidities, and more tests. A patient's condition, if admitted to hospital, is monitored daily, both informing treatment and providing a rich resource for data specialists like Priyanka.

The COVID-19 pandemic also brought a specific test into the spotlight: genetic sequencing. Pre-pandemic, this kind of surveillance was reserved mainly for investigating outbreaks of antibiotic-resistant bacteria and monitoring influenza strains. Unlike a standard COVID-19 test that simply diagnoses infection, genetic sequencing decodes the genome of the SARS-CoV-2 virus infecting patients. This allows researchers to understand how the virus is mutating into variants and how it travels from person to person.

But not everyone is impacted by infectious diseases equally. There are certain contextual risk factors in populations that make them more vulnerable, such socioeconomic, cultural or lifestyle factors, genetic predisposition, age, and population density. Collecting this information is imperative but needs to be collected ethically and in a way that helps people rather than stigmatising.

> Data from diagnostic and genomics laboratories, clinical settings, public health surveillance, and contextual setting information all feed into the big bottom layer of the pyramid. The data pours in from different places and different systems, which Priyanka has the task of aggregating.

Priyanka has been involved with creating a virtual biobank of COVID-19 swab samples. From this, she and her colleagues developed a national real-time information system that links data on cases and deaths, clusters, risk factors, clinical presentations, laboratory results and more.

The data pyramid continually accumulates more and more data. Priyanka ensures that it is understood by experts so that it can be turned into knowledge and wisdom that informs Australia's response to infectious diseases.

WEARABLES AND NEARABLES – REVOLUTIONISING HEALTHCARE WITH FLEXIBLE TECHNOLOGY

Professor Madhu Bhaskaran

Madhu's work turns science fiction a reality. She is transforming the way we use and interact with electronic devices and sensors.

> When asked 'what can these do for you?', her response is 'well, what can't they do for you?'.

From tiny wearables to mattress-sized sensors, Madhu's research journey has been as flexible as her technology is. She does not believe in one-size-fits-all, but rather, is designing her technology to be appropriate for all ages, ethnicities, and genders.

Starting out with fundamental research, Madhu is now commercialising transparent, stretchable and wearable electronic devices. Her sensors have the potential to improve prosthetics, help the fight against skin cancer, detect dangerous gases in mines, and monitor health. These sensors can then be integrated into wearables as devices that people wear, or "nearables" – devices that are close-by.

Originally, Madhu and her colleagues were working on designing stretchable electronics. They wanted to create electronics that would not break when they're dropped, bent, stretched, or worn. This developed into a quest to create artificial skin, but the idea of engineered skin that can feel sensation has long seemed out of reach.

Her team invented electronic artificial skin that senses pain like real skin. While that may not sound appealing to those who dislike pain, it paves the way for better prosthetics, smarter robotics, and non-invasive alternatives to skin grafts. Pain is a useful way for our bodies to alert our brains to a threat. The device mimics our near-instant response to painful sensations such as touching a burning stove and quickly pulling away.

But to make skin, you need more than simply a device that senses pain. Madhu's team has pioneered three technologies: stretchable electronics made of a thin film of silicon rubber with the texture of real skin, a coating that reacts to heat, and electronic memory cells that imitate the way the brain uses to recall and retain previous information. Together, they replicate key features of the body's complex skin responses.

> Then, three years ago, the CEO of Sleepeezee came to Madhu with a problem. Carers were having to constantly check in on age care residents to monitor their health. Could she adapt her micro- and nano-sized technology for the aged care and assisted living sectors? Her team rose to the challenge.

Healthcare workers monitor residents' health and wellbeing throughout the night, but this can be a tedious and disruptive task. Madhu's team integrated their tiny flexible, electronic sensors into large bedding products for real-time monitoring. By alerting health care workers to movements of potential areas for concern while minimising night-time disruptions by having to constantly check-in in person.

When it came to thinking about function and useability, however, Madhu's team had to consider the users on both ends: the aged care or assisted living residents and the younger healthcare workers. Potentially with decades in between their ages, they would interact with the technology very differently.

Madhu's vision is to develop wearables that people want to wear, and nearables that are user-friendly.

When she takes her products from lab to market, Madhu always considers the end users. While this may seem like a no-brainer, all users are not always considered. Crash-test dummies are only based on the average male, there is racial discrimination in face recognition technology, artificial intelligence Smart Assistants struggle to recognise different accents...

As a technologist, Madhu wants to set this right.

One of Madhu's more recent projects is a collaboration with other RMIT University researchers to develop wearable ultraviolet (UV) sensors for protection against UV damage. The basis is a UV active ink that changes colour when exposed to different types of UV rays and can be printed and worn as a wrist band.

Importantly, the team developed six variations of these sensors to reflect the range in human skin tone. While humans do need some sun exposure to maintain healthy levels of Vitamin D, excessive exposure can lead to sunburn, skin cancer, blindness, skin wrinkling and premature signs of aging. Knowing what a healthy amount is for you depends on your skin tone – and that is why it is important to not provide blanket or blunt tools for everyone when it comes to innovative, new technologies.

Not only are Madhu's electronic devices and sensors physically flexible to be embedded in all sorts of wearables and nearables, but they are also flexible and adaptable to different user needs. As Co-Director of the Functional Materials and Microsystems research group, she wants to ensure that her micro-sized sensors are be just that: functional. For all.

Will Quantum Computing Save the Planet?

By Dr Viktor Perunicic MRSV

*One of the biggest consulting companies in the world asserts that "**Quantum computing just might save the planet**". So, if you want to make sense of such a statement and discover why a major consultancy is so excited about quantum computers, read on. First, I will give you a shockingly short intro to quantum computers, and then we will look at why they are relevant to the environmental challenges we face.*

It all comes down to how you represent information and what physical devices you use to process it. For example, the information in this text is represented using the alphabet. Still, you can also represent the same information using morse code. At the same time, the device you're using to read this text utilises binary representation. The letter "A" will be mapped onto the binary code as 01000001, "B" as 01000010 etc. This is because classical computer chips employ transistors to process information.

Transistors are nothing more than miniature electrical current switches. It means the physical mechanism used to process information is the simple act of switching on and off the currents in connections between transistors. Your computer is an interconnected network of billions of switches because, at any given time, each transistor can process either a single 0 (by being off) or a single 1 (by being on).

Quantum computers employ different electronic devices to process information, called qubits. Instead of switching the state of current from on to off, qubits process information by mapping it onto quantum states of matter. For example, qubits can use the spin state of a single electron (for those who remember their physics undergrad classes). Intuitively, each qubit can be in two states simultaneously, in the same way a guitar string can vibrate with multiple harmonics at the same time. It means that if a classical computer with N transistors can process some piece of information, a quantum computer with N qubits can, in principle, process 2^N pieces of the same information at once. Since N would ideally be a big number, the difference in performance has a chance to be colossal.

> However, using different physical principles also means that quantum computers process information very differently from classical computers. Think of their use as analogous to that of a graphics card. Graphic cards can solve specific problems much better than standard CPUs (i.e. rendering graphics) but will struggle badly with other problems. Quantum processors

> are similar. They can solve some very specific problems exponentially faster than classical computers.

One class of the problems quantum computers can solve well are scientific in nature. Those are the problems highlighted the most in the article above. Issues concerning optimisation of catalytic processes, solar cells' function, batteries, carbon sequestration, fertiliser production and other problems of exceptional relevance to climate change. Look below the surface, and you will notice that most of them are at the intersection of quantum mechanics and chemical engineering or material science.

> It should come as no surprise that quantum computers are inherently good at solving problems in quantum mechanics. It's their native problem set. So, it turns out that precisely the types of technological issues critical to climate change and power generation are among the first to benefit from quantum computers as their power increases.

Therefore, we can now legitimately say that quantum computers could save the planet. The remaining question is can they do it in time?

Well, the technological development and transition to the next generation of green technologies are happening on a multidecadal scale. On the other hand, big businesses and consultancies are interested in quantum computing because of the progression that occurred over the past decade. In that period, quantum technology has expanded beyond academic research and is taking a similar trajectory to semiconductors in the 60s and even early 70s. The timeframe tells that we will likely see a trickle of the first practical solutions by the decade's end. Those initial solutions will be very humble and specific, yet still better than what we would get from classical computers.

So, what can we conclude? Is the answer to our ambitious title yes, or no? Let us have your thoughts, and I will intend to follow up in the next issue.

Dr Viktor Perunicic MRSV is an expert in quantum technology, a Staff Engineer at Q-CTRL, and formerly a researcher with the ARC Centre of Excellence for Quantum Computation and Communication Technology at the University of Melbourne.

National Tree Day

By Priya Mohandoss MRSV

This year, on July 31st, we celebrate National Tree Day.

Australian environmental organisation Planet Ark is the host of this event, with more than 300,000 participants who either have an interest in the environment, or who just want to contribute in general through locally based activities associated with tree planting. It is also a day where many can take the initiative to learn about how to care for our environment and discover the benefits associated with trees, including their ability to capture carbon and also be used as a renewable resource.

National Tree Day started in 1594 when a Spanish mayor held an arbour plantation fiesta in the town of Mondedo. Years after this, in 1805, a Spanish priest named Don Juan Abern living in an area called Villanueva de la Sierra came up with the idea of planting trees and held a three-day fiesta in order to make the area more pleasing, asking other towns in the area to follow suit. While this day was first known as Carnival Tuesday, it later became Arbor Day.

Later in 1872, Arbor Day was first honoured in the US state of Nebraska. However, in 1883, it was in Birdsey Northrop from Connecticut who called for other countries such as Japan, Australia, Canada, and parts of Europe to also recognise a day such as this.

As a result, Australia's first Arbor Day was celebrated on June 20th 1889. Although most states in Australia now have a designated National Arbour Day, Victoria took one step further and created Arbor Week. It was Premier Rupert Hamer who was accountable for this initiative during his time in government in the 1970s and early 1980s. *(Editor's note – you can also visit the R.J. Hamer Arboretum in the Dandenongs, named for the tree-loving Premier, with around 200 species of exotic and deciduous trees and shrubs.)*

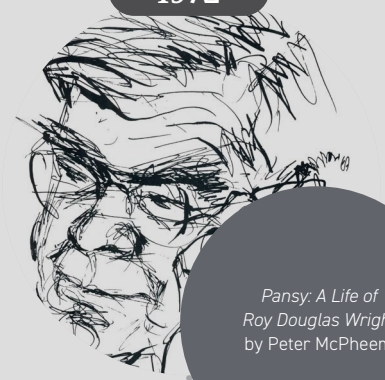
> However, since 1996 Planet Ark has implemented National Tree Day. Thanks to the efforts of many, approximately 26 million trees have been planted across the country. Since 2019, Planet Ark have also formed "The Seedling Bank", a scheme to assist schools and other groups on a financial basis to plant and grow seedlings in areas where they are most required.

Although in Australia we are fortunate to have a rich biodiversity of native tree species to support our existing population and store carbon reserves, there are still a number of factors of much concern, such as extensive amounts of logging unaccounted for in forests, the loss of vital plant species and the growth of invasive weeds.

While days such as this provide us with a wealth of opportunity to protect much of our natural flora from devastation, they also allow us to reflect on the past in order to focus on better outcomes in future years.

FROM THE ARCHIVES

1972



Pansy: A Life of Roy Douglas Wright by Peter McPheem

R.D. WRIGHT

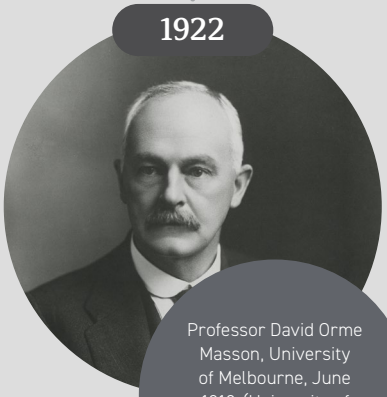
10th of August 1972: Sir Roy Douglas Wright gave a lecture to the RSV entitled, "*New Findings in Medical Science*".

Roy Douglas 'Pansy' Wright was a scientist and physician, with a particular focus on education, who contributed to the foundation of the *Howard Flory Institute, the Peter MacCallum Cancer Centre, and the Australian National University (ANU)*. From humble beginnings on a Tasmanian farm, he became a professor of physiology with the University of Melbourne at age 32, and had recently been appointed deputy chancellor when he presented to the RSV.

Several scholarships, fellowships, and prizes for outstanding researchers in science or justice – such as the R.D. Wright Research Fellowship – are named in his honour.

Learn more about the story of R.D. Wright in *Pansy: A Life of Roy Douglas Wright* by Peter McPhee (Melbourne University Publishing, ISBN: 9780522862959)

1922



Professor David Orme Masson, University of Melbourne, June 1919. (University of Melbourne Archives, ref# 2017.0071.00586).

DAVID ORME MASSON AND ATOMIC STRUCTURE

14th of September 1922: A lecture was given by Professor Sir David Orme Masson entitled:*"The Structure of the Atom in its Chemical Aspect."*

Atomic structure was a hot topic that year, as May of 1922 had seen the publication of physicist Niels Bohr's *The Theory of Spectra and Atomic Constitution*. Referred to as 'the trilogy', it contained three essays: "On the spectrum of hydrogen", "On the series spectra of the elements" and "The structure of the atom and the physical and chemical properties of the elements". For these and his earlier work on a model of atomic structure, he was awarded a Nobel Prize in Physics in December of 1922.

Prof. Sir David Orme Masson (1858-1937) was a truly notable figure in the history of science in Victoria. Obtaining his doctorate at the University of Edinburgh in 1884 on the composition of nitroglycerine, he emigrated to Melbourne in 1886 to became Professor of Chemistry at the University of Melbourne.

Throughout his life, he was central in the foundation and running of many scientific societies: he founded the *Melbourne University Chemical Society*, the Society of *Chemical Industry of Victoria*, co-founded the *Australian National Research Council* (replaced by the *Australian Academy of Science* in 1954), was inaugural president of the Australian Chemical Institute, president of the *Australian Association for the Advancement of Science*, and was involved in organising Mawson's 1911 Antarctic expedition. Additionally, Orme Masson was central in the establishment of what would become the *Council for Scientific and Industrial Research (CSIR)* – which in 1949 was renamed the *Commonwealth Scientific and Industrial Research Organisation (CSIRO). O*rme Masson became a member of the RSV shortly after arriving in Melbourne in 1887, was elected a Fellow of the Royal Society in 1903, and knighted (K.B.E.) in 1923.

Outside of his scientific pursuits, Orme Masson had a love of sport and physical activity: upon arriving in Melbourne from Edinburgh and noting a distinct lack of golf, he became one of 100 foundation members of the (Royal) Melbourne Gold Club. His wife, Mary Orme Masson, provided the prize of three custom-made golf balls for the winner of one of the first competitions held in 1893.

Orme Masson died in August of 1937 from cancer, aged 79. The historic Masson Lecture Theatre (with its unforgettably steep stairs) and Masson Road at the

University of Melbourne are named in his honour.

For more on the life of Sir David Orme Masson, his obituary was published by the Royal Society and is available to read at: **https://royalsocietypublishing.org/doi/epdf/10.1098/rsbm.1939.0004**

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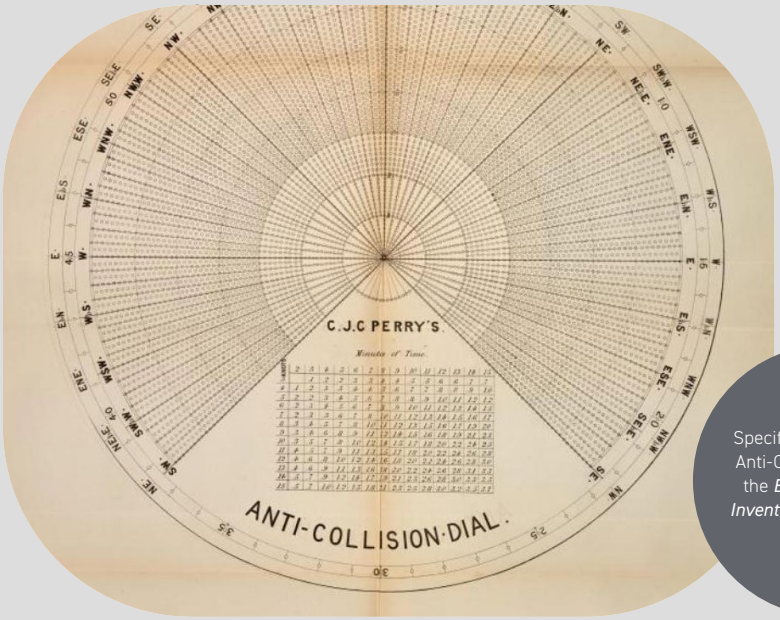
- L. W. Weickhardt, 'Masson, Sir David Orme (1858–1937)', Australian Dictionary of Biography, National Centre of Biography, Australian National University, **https://adb.anu.edu.au/biography/masson-sir-david-orme-7511/text13099**, published first in hardcopy 1986, accessed online June 2022. This article was published in hardcopy in Australian Dictionary of Biography, Volume 10, (Melbourne University Press), 1986
- Richardson, S., Richardson, S. (2016). Family Experiments: Middle-class, professional families in Australiaw and New Zealand c. 1880–1920. Australia: ANU Press

1872

SHIPS IN THE NIGHT (OR DAY)

14th of October 1872: The Proceedings of the Royal Society of Victoria note that during a meeting at the RSV, "*Captain C.J. Perry (by permission of the meeting, he not being a member of the Society) read a paper "On an easy and expeditious method of verifying a ship's position on a coast where only one object on shore can be seen, either in the day or night," by the use of Perry's Anti-Collision Dial, and illustrated it with diagrams. After discussion, a vote of thanks was accorded to Captain Perry for his paper, on the motion of the President and Dr. Barker.*"

Captain Charles J.C. Perry was formerly a master mariner, and briefly a member of the Victorian Legislative Assembly. It appears he first patented his design in 1858 through the UK Patent Office, and over the following years submitted patents in Victoria and New South Wales.



Specifications of Perry's Anti-Collision Dial, from the *English Patents of Inventions, Specifications 1858.*

INSPIRING VICTORIA

RARE - Our Major Event for National Science Week

Earth is that rarest of all things - a blue-green planet teeming with activity in a cosmos that has, thus far, proven overwhelmingly devoid of and hostile to life. But we're not the only rarity in this vast universe! Join us to explore the world of the RARE - from astronomical and cosmological events to unusual minerals and elements, and especially the remarkable plants and animals with whom we share our home.

Featuring scientists from Victoria's major public scientific and cultural institutions with a strong broadcast focus for our regional audiences, we reveal the innate value of the unique and unusual in nature and seek your involvement in protecting the RARE. Join us during National Science Week (13 – 21 August 2022) to explore everything rare in nature, with special events and programs from Royal Botanic Gardens Victoria, Scienceworks, Melbourne Museum and the Parliament of Victoria.

RARE @ MUSEUMS VICTORIA

From scarce species to supernovae to special specimens you can't see anywhere else, Museums Victoria is exploring all things rare and precious on Earth...and beyond!

Planetarium Nights

Date: Friday 5, 12, 19 and 26 August
Time: Ticket to the Universe at 7:30-8:30pm and Particle/Wave at 9-10pm **Audience:** Adults

Join Scienceworks' popular **Planetarium Nights** programs to explore rare and rarely seen events such as a total solar eclipse, supernovae, and gravitational waves. Astronomers have a strange relationship to the idea of 'rare'; something we seldom see on Earth may be commonplace at a universal scale. Museums Victoria astronomer Dr Tanya Hill has carefully curated a special selection of rare (or maybe not-so-rare) astronomical events for the show Ticket to the Universe. Or go on a poetic journey into the rarely detected phenomena of gravitational waves with the full-dome feature show *Particle/Wave*.

Science on Show

Date: Saturday 13 and Sunday 21 August **Time:** 11am-2pm **Audience**: All ages

Museums Victoria has more than 17 million collection objects, and we're bringing out some of our rarest and most fascinating samples and specimens at Melbourne Museum for **Science on Show**. This event will feature curators and scientists delivering pop-up talks on their research, rare artefacts, and the stories behind them, and one of the rarest dinosaur fossils in the world – the most complete Triceratops skeleton ever unearthed, on display for your palaeontological pleasure.

Snap, Scan, Model, Predict!

Date: Wednesday 17 August **Time:** 6-7:15pm **Audience:** best for 12+

For a deep dive into some fascinating science, come to our National Science Week edition of **MV Lectures** to hear about how cutting-edge technology is helping to detect and study rare species. This lecture gives you the opportunity to hear from scientists at Museums Victoria on contemporary research happening right here in Victoria.

RARE @ PARLIAMENT OF VICTORIA

Champions of conservation and biodiversity will gather at Parliament House for this vital Science Week discussion about the extinction crisis facing thousands of Australia's native species, and what we can do about it.

Care for the RARE

Date: Sunday 21 August 2022
Time: 3pm – 4.30pm
Duration: 90min
Location: Online via Facebook Live from the pages maintained by Parliament, the Royal Society of Victoria, the Royal Botanic Gardens Victoria, Museums Victoria and Zoos Victoria.

Our State's remarkable botanical and zoological collections are carefully managed by Royal Botanic Gardens Victoria and Zoos Victoria, while Museums Victoria maintains significant collections related to the natural history of our region and the wider world. These familiar institutions do more than offer an interesting place for Victorians to visit - they are also engines of research and field work, helping the State of Victoria to future-proof the unique plants and animals of our region against bushfires, floods, the ongoing impacts from our spreading towns and cities, our intensive farming practices, and our changing climate.

Our public science institutions all Care for the Rare - through the Seed Bank maintained at the National Herbarium, through activating the amazing network of community botanic gardens across metropolitan and regional Victoria, through the tissue and DNA samples cryogenically stored by Museums Victoria in a BioBank to safeguard the genetic diversity of threatened species, and through the captive breeding programs for species on the brink of extinction, diligently nurtured back to population health by biologists and ecologists at Zoos Victoria.

MUSEUMS VICTORIA

ZOOS VICTORIA *Fighting Extinction*

ROYAL BOTANIC GARDENS VICTORIA

Join us for this RARE panel conversation, streamed live from Parliament House, to learn from the botanists, zoologists and collection managers leading this important work. Find out some of the ways they are planning to help our plants and animals adapt and persist through the multiple challenges in our immediate future.

Presented in partnership with the Royal Society of Victoria, Parliament of Victoria, and Victorian Parliamentarians for STEM for National Science Week 2022.

For #RARE program updates and details on making bookings, please visit **https://inspiringvictoria.org.au/programs/national-science-week-victoria/rare/**.

National Science Week - Neighbourhood Houses Victoria

Since 2021, we have established a partnership with the Royal Society of Victoria to have Neighbourhood Houses deliver fun and interactive events and activities during National Science Week.

This partnership is continuing into 2022 with small grants being made available to Neighbourhood Houses in Victoria.

National Science Week is Australia's annual celebration of science and technology and thousands of individuals get involved and take part in science events across the nation. Science Week aims to encourage an interest in the community of science pursuits and to encourage people to become fascinated by the world we live in.

National Science Week 2022 takes place 13 to 21 August.

2022 FUNDING NOW OPEN

Neighbourhood Houses across Victoria can apply for $1,500 grants. There are 18 grants available in this grant program.

Applications open: Monday 20 June

Applications close: 3pm, Monday 11 July

More details and applications: https://www.nhvic.org.au/national-science-week

NEIGHBOURHOOD HOUSES VICTORIA

PROCEEDINGS

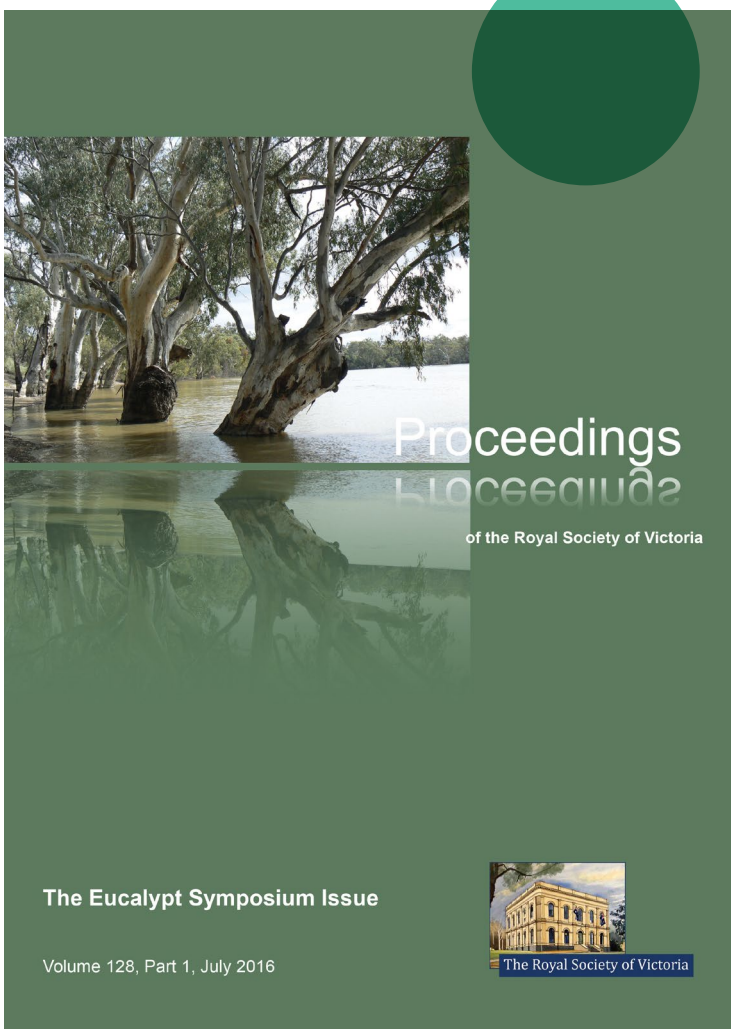
Call for Papers

The *Proceedings of the Royal Society of Victoria* is our refereed journal, published twice annually by CSIRO Publishing. Current and recent editions are available online in open access format from http://www.publish.csiro.au/rs.

The *Proceedings* is one of Australia's oldest and longest-running science journals, a terrific platform for establishing an individual research presence, grouping papers derived from symposia on specific subjects, or simply joining a distinguished tradition of science published in or about our region that stretches back to the 1850s. We are always interested in hearing from authors.

Papers, Reviews and Reports of experimental or descriptive research, submitted for publication by the Royal Society of Victoria, should not have been published hitherto, nor should they be under consideration for publication elsewhere. Published papers are typically concerned with natural history, encompassing the biological and earth sciences, in the Oceania region.

Those interested in submitting papers should review the **Instructions for Authors**. All enquiries and manuscript submissions should be forwarded via email to **editor@rsv.org.au**.



ENGAGE VICTORIA

Current Government Consultations of Interest to Victoria's Science Community

Dog Beach Coastal Adaptation Plan – Point Lonsdale

DELWP and the Borough of Queenscliffe are seeking feedback on the Dog Beach Coastal Adaptation Options to address erosion occurring at Dog Beach, Queenscliff.

Consultation closes 10 July.
https://engage.vic.gov.au/dog-beach-coastal-adaptation-plan-point-lonsdale

Voltage Management in Distribution Networks Consultation Paper

Have your say about the opportunities and challenges associated with voltage in Victoria's distributed energy network for community, industry and the electricity grid

Consultation closes 1 August.
https://engage.vic.gov.au/voltage-management-in-distribution-networks-consultation-paper

Planning for Environment Protection

Do you deal with land which is potentially contaminated in your role as developer, consultant or planner? Then we'd like to hear from you.

Consultation closes 29 July.
https://engage.vic.gov.au/planning-for-environment-protection

RSV Membership

Become a Member of The Royal Society of Victoria

OUR PURPOSE

The Royal Society of Victoria is the State's oldest scientific society, a part of Australia's intellectual life since 1854.

We bring together an independent community of science practitioners, educators, industrialists, and enthusiasts to promote an understanding and utilisation of scientific knowledge for the benefit of the state of Victoria.

OUR WORK

- Fostering, recognising, and rewarding excellent Victorian scientists across their career trajectory through awards and prizes
- Promoting understanding of science in the community
- Promoting science literacy and education so that people of all ages discover and understand the value of science
- Assisting and lobbying governments on issues relating to science and evidence-based decision making

MEMBERSHIP BENEFITS

- Learn about developments in a wide range of science disciplines through our lecture program and symposia, and how this knowledge can be applied to issues confronting Victoria
- Connect and share knowledge with like-minded people, bringing together expertise and learnings from all backgrounds and fields.
- Collaborate with colleagues to deliver the Society's various programs and projects, using (and developing) your professional skills and experience
- Support the translation of science into action through development of policy and science education initiatives
- Access discounts to RSV events and forums, and car parking in the Melbourne CBD

MEMBERSHIP OPTIONS

Full Membership

Open to all adults (18+) with an interest in science! **$120/year**

Student Membership

For students enrolled full-time at a recognised Victorian education and/or research institution (proof of current, full-time enrolment required for Student Membership commencement/renewal) **$40/year**

Organisational Membership

For organisations to claim membership of the Royal Society of Victoria. Provides a method for general sponsorship of the RSV's programs, along with discounted rates for access to RSV facilities throughout the year. **$1000/year**

Contact us with any questions about membership
Email: **james.mcarthur@rsv.org.au**
Phone: **+61 3 9663 5259**
Or visit us at 8 La Trobe St, Melbourne VIC

RSV Services and Facilities

The RSV engages communities with scientific knowledge through aligned partnerships, special events, festivals, conferences, and education programs. Email rsv@rsv.org.au to discuss your needs and ideas!

We provide services in **event management**, meeting **venues**, grants and awards **administration**, broadcasting and video **production**, social media c**ampaign management**, **recruitment** of scientific panels, and **convening** community engagement and deliberation processes where scientific work contributes to social, environmental, and economic impacts and benefits.

We are registered as a **Certified Social Trader** working for the benefit of Victorian communities, which makes our services eligible under the **Victorian Government's Social Procurement Framework**, as well as the social procurement guidelines of the governments of New South Wales and Queensland. Our certification also assures **industries** of our authenticity in building social procurement into services and supply chains.

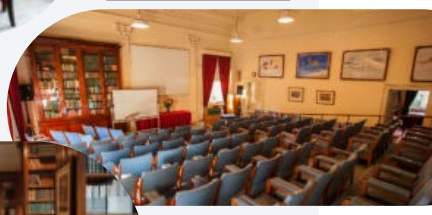
For more information and bookings please contact our Business Manager at **james@rsv.org.au** or on +61 3 9663 5259

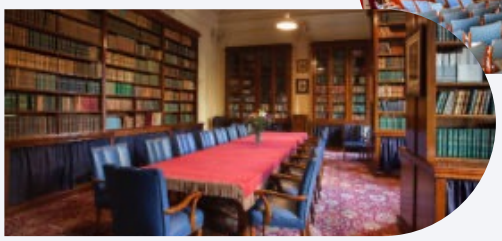
SERVICES AVAILABLE

The Burke and Wills Room
Multi-functional space with adjoining kitchen, suitable for: Workshops ‹*30 people; Dinners ‹60 people; Seminars, functions, catering, etc., ‹80 people.*

The Von Mueller Room
Seminar room for ‹*15 people.*

The Ellery Lecture Theatre
Raked seating for ‹*110 people.*





The Cudmore Library
Capacity for ‹*24 people*

FACILITIES FOR HIRE

The Royal Society of Victoria's facilities are available for hire to organisations, companies, or private groups. This heritage-listed building opposite the Carlton Gardens is suitable for a wide range of events, including conferences, seminars, meetings, and private functions.
Limited parking is available on-site and a commercial parking operator is adjacent on La Trobe Street.

The RSV has audio visual and seminar equipment available for use, including videoconferencing facilities. There is a commercial kitchen on the ground floor, suitable for your own use or by a caterer.

Support Victoria's Science Society

To support our programs with your donation, please fill out this form and return it to the Royal Society of Victoria, 8 La Trobe Street, Melbourne VIC 3000. You can also support our efforts through online donations and bequests at **https://rsv.org.au/support-the-rsv/**

RSV 2020 FUNDRAISING CAMPAIGN AMOUNT	*AMOUNT*
The Area of Greatest Need, as identified by the Society's Council	$
Inspiring Victoria – Community Science Engagement Program	$
Science Awards & Prizes	$
Science History & Heritage	$
Science for All - Citizen Science Programs	$
BioQuisitive Community Lab	$
The Phoenix School Program	$
The BrainSTEM Innovation Challenge	$
Australian Indigenous Astronomy	$
TOTAL	**$**

Personal Details

Family name: _____

Given names (in full):_____

Payment Details

Title (circle one): Prof Dr Mr Mrs Ms Miss Other

Method of payment (select one below):

☐ **Credit Card** WE DO NOT ACCEPT DINERS OR AMERICAN EXPRESS

VISA ☐ **MasterCard** ☐ **PLEASE CHARGE THE AMOUNT ENTERED AGAINST 'TOTAL' DONATIONS ABOVE TO MY CREDIT CARD.**

Card No.: ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ **Expiry Date:** ☐☐ / ☐☐☐☐

Name on Card: _____ **Signature of Card Holder:**_____

☐ **Cheque or Money Order**

I enclose my cheque or money order made out to **The Royal Society of Victoria**.

Electronic Funds Transfer (EFT)

I have transferred my donation to the Royal Society of Victoria as follows:

BSB: 083-019
Account No: 51-515-2492
Account Name: The Royal Society of Victoria
Reference: Your Surname and "donation"

The Royal Society of Victoria