The Royal Society OF VICTORIA
Promoting science since 1854

PATRON: The Hon Linda Dessau AC
Governor of Victoria

PRESIDENT: Mr David Zerman

November Events:

14th November: *Art and Life in Earth's Chemical Reactor*

*With **Professor Uta Wille and Dr Caroline Kyi***

21st November: *Gene Tree Project – Music on the Evolution of Species*

A special musical evening to celebrate 160 years since the publication of "The Origin of Species" – and the completion of the RSV's heritage-listed building in 1859.

*With **Gene Tree Project, Ms Elissa Goodrich, Professor Andrew Pask & Dr Amy Coetsee***

28th November: *Epilepsy, Algorithms and AI: Personalised Seizure Forecasting*

*With **Professor David Grayden***

December Advance Notice:

12th December: *Climate Extremes: Present and Future*

*With **Professor Andy Pitman AO***

The RSV Research Medal Lecture & Dinner

25th December 2019 – 3rd January 2020: *End of Year Closure*

November 2019 Newsletter

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The Royal Society of Victoria Inc.
8 La Trobe Street,
Melbourne Victoria 3000
Tel. (03) 9663 5259
rsv.org.au

Science Says! 2019

Wednesday, 6th November at 6:00pm

Science Says! is science with laughter added. Join us as Victoria's brilliant scientists, gifted comedians and talented communicators use their wits and wittiness to uncover the top scientific discoveries of 2019 – and a few of the odder ones, too!

It's an evening in the style of the great panel shows – think mixing *Mock the Week*, *Spicks and Specks*, and just a dash of *QI*. Last years' shows saw physicists miming sticky saliva, professors donning hard hats, and biologists serenading the audience – all in the name of science.

Hosted once again by Dr Joel – scientist, comedian and co-host of *Food Lab* on SBS – you'll be guaranteed a night of entertainment, competition and comedy – and education, too. So secure your tickets early and join us in November to find out what *Science Says!*

Competing in Melbourne for all the glory science has to offer is: reproductive biologist, science communicator and prospective Ig Nobel laureate, **Dr Kiri Beilby**; theoretical physicist and jazz pianist manqué, **Prof Jared Cole**; biomedical engineer who believes diamonds really are a girl's best friend, **Dr Kate Fox**; science educator, boardgame designer and comedian, **Tom Lang**; engineer of novel materials, writer of non/fiction and bow tie enthusiast, **Dr Mohammad Taha**; and immuno-virologist, turning being curious into a profession and wannabe artist, **Dr Carolien van de Sandt**; with another participant to be announced. This event will be hosted by scientist, comedian and TV personality, **Dr Joel Gilmore**.

Tickets: $10 (online, as below), $15 at the door (cash only). Discounts apply to RSV members online (check emails from the RSV for your code).

trybooking

Places limited, bookings essential! Register online now at https://rsv.org.au/events/science-says-2019/.. Fully subscribed **RSV Members** can access discounted tickets by entering a **promotional code** in the online ticketing window, which has been emailed to all members on 18 October – check your inbox, or call the RSV for details on 9663 5259.

Art and Life in Earth's Chemical Reactor

Thursday, 14th November at 7:00pm

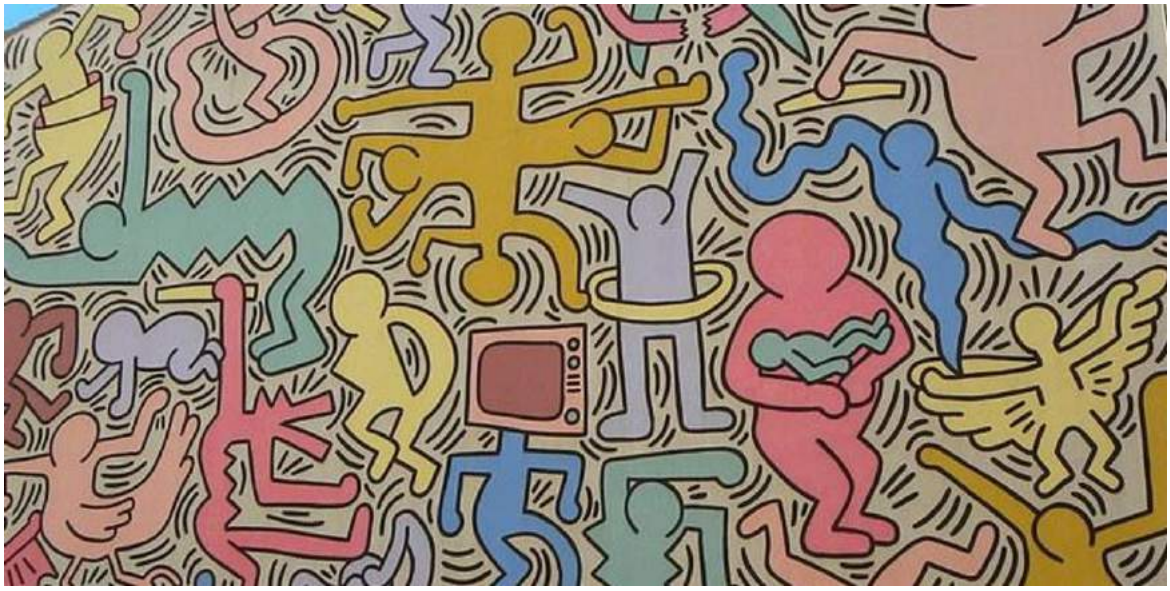


Image: Detail of "Keith Haring en Pisa" by jandresg is licensed under CC BY-NC-SA 2.0

The Earth's environment is a gigantic chemical reactor – chemistry occurs constantly around all of us, fuelled by the sun during the day. Over the past century air pollution, including increasing amounts of greenhouse gas emissions, have become a major concern to society, impacting on humans, other animals, plants - and artwork.

The issues surrounding the conservation of cultural heritage in built environments are complex in their significance, and in their mechanisms. Unfortunately, unlike the conservation of cultural heritage that occupies the vast halls of galleries and museums, the discussion of ways to investigate and address these complexities are rarely held regarding public artworks, most of which are displayed outdoors and in the elements.

Join **Uta Wille** for a brief overview of fundamental principles of atmospheric chemistry and to receive results from recent work on the oxidative damage of biological molecules by environmental pollutants nitrogen dioxide and ozone. Using the conservation of the Keith Haring Mural in Collingwood Melbourne as a case study, **Caroline Kyi** will then examine how an appreciation of the cultural, social and art historical significance of the Mural and an understanding of the free radical-driven mechanisms of paint degradation are expected to combine in responding to the informed, long-term conservation of both the materiality and significance of a public art work.

About the speakers:

Professor Uta Wille graduated with her Ph.D. in Chemistry at the University of Kiel, Germany, which was followed by a Habilitation in Organic Chemistry at the same institution in 1999 and a postdoc in Basel, Switzerland, from 1997-1998. In the same year, she was appointed as Privatdozent at the University of Kiel and was invited in 2000 as a Visiting Fellow in the School of Chemistry at The University of Melbourne. In January 2003, Uta Wille moved permanently to Australia, where she was appointed as a Lecturer in the School of Chemistry at The University of Melbourne. In 2006, she was promoted to Senior Lecturer, in 2011 to Associate Professor and Reader and in 2019 to Professor (the second female Professor in the School of Chemistry at Melbourne University). Her research program targets the chemistry of reactive intermediates by merging radicals of atmospheric importance with organic and bio-organic chemistry.

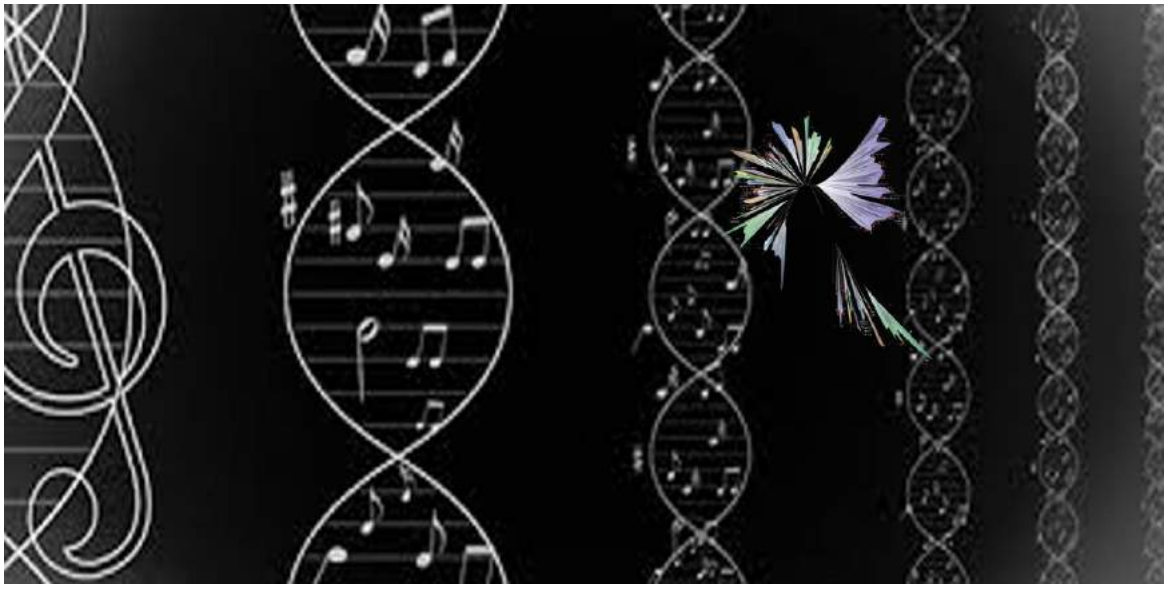
Dr Caroline Kyi is a specialist wall paintings conservator with over 20 years of local and international experience as a conservator and conservation scientist. Caroline has worked in the higher education, cultural and commercial sectors on moveable and immoveable cultural heritage. She trained as a conservator in London and has a PhD in chemistry (the application of free radical chemistry in the control of biodeterioration of cultural heritage). Her practical and technical skills in project management, materials analysis and research and development of conservation interventions have seen her working on wide range of significant local and international sites and objects, including Keith Haring Mural in Collingwood for Creative Victoria and Collingwood Arts Precinct - recently award a Living Heritage grant for conservation works. Specific research interests include the bio-deterioration of cultural materials, the testing of materials for conservation applications and monitoring of cultural heritage as a measure in preventive conservation.

Places limited, bookings essential! *Cocktail function from 6:00pm.* **Register online** now at https://rsv.org.au/events/free-radicals/, call or email the RSV office to secure your place: 9663 5259, rsv@rsv.org.au. Fully subscribed **RSV Members** can access discounted tickets by registering via their online profile, or entering their **promotional code** in the online ticketing window.

Gene Tree Project - Music on the Evolution of Species

Thursday, 21st November at 7:00pm

A special commemorative event



It has been 160 years since Charles Darwin first published *'On the Origin of Species,'* detailing the amazing ability of living things to evolve through natural selection. Today, human actitivies and Earth's rapidly changing climate are demanding that species adapt and evolve at an unprecedented rate in order to survive a great ecological disruption.

What genetic tools are available to enable species to evolve? Which species are most at risk? How can we avoid a collapse in biodiversity, and what can humans do to help?

Join us to celebrate the anniversary of Darwin's accomplishment for this very special participatory event, held in the 160-year old facilities of the Royal Society of Victoria, combining live music performance and discussion on the convergence of science and music, and the potential for species to evolve and adapt in a time of changing climate.

This one-off event showcases the important research conducted by Melbourne scientists, along with cutting edge musicians and new music of artists drawing their inspiration and musical vocabulary from climate science. Comprising a quintet of some of Australia's leading musicians in an idiom-bending mix of live jazz, improvisation and contemporary classical, the Gene Tree Project sonically explore climate change science, and 're-tell' the

story of the peppered moth. The original music draws upon aspects of evolutionary biology and species adaptation in response to changes in climate, and to themes of adaptation, extinction and resilience.

Performers: Gene Tree Project Quintet

Gene Tree Project quintet *are* **Elissa Goodrich** (composer / vibraphone), **Adam Simmons** (saxophones / shakuhachi / bass clarinet), **Gideon Brazil** (saxophones / flute), **Elliott Folvig** (electric guitar) and **Tamara Murphy** (double bass). These critically acclaimed Melbourne-based musicians perform, compose and tour both within Australia and internationally in various contemporary jazz, experimental and ensembles and multi-artform projects.

Gene Tree Project was originally supported by City of Melbourne/Creative Spaces – Artist-in-residency Culture_Lab14, Creative Victoria and Australia Council for the Arts (2016).

Speakers:

Professor Andrew Pask is a geneticist in the School of BioSciences at the University of Melbourne. His research focuses on Evolution, Development and Reproduction, using marsupial, mouse and human models.

Andrew's lab recently sequenced the genome of the extinct thylacine and is using this data to understand more about the biology of this unique marsupial predator. The Pask lab is also developing methods to examine the possibility of de-extinction for this species as well as tools to help preserve and conserve current threatened and endangered marsupial species.

Dr Amy Coetsee is a Threatened Species Biologist at Zoos Victoria, where she works on the Eastern Barred Bandicoot. Focussing on habitat requirements, threat mitigation and island releases, Amy's work has contributed to this marsupial being well on its way to recovery.

Amy is passionate about conservation, actively engaging communities to care for threatened species and fight their extinction, and to inspire students to uphold Zoos Victoria's commitment that no Victorian terrestrial vertebrate species will go extinct.

Ms Elissa Goodrich is a musician (percussionist), sound artist & composer. She records & performs in contemporary classical, jazz & pop groups and also works in independent theatre & dance. A Victorian College of the Arts graduate and University of Melbourne Masters postgraduate, Elissa's sound-art works have played numerous Australian and international festivals.

In 2016 Elissa founded the Gene Tree Project researching and composing new music in collaboration with evolutionary biologist Dr Anna Syme and Nadja Kostich (dramaturg), and is currently composing a large-scale work 'Gene Tree: Listen.Now.Again.' in partnership with St Martin's Youth Performing Arts Centre and with a composer's commission from APRA AMCOS Art Music Fund 2018.

Places limited, bookings essential! Register online now at https://rsv.org.au/events/evolution-music/, call or email the RSV office to secure your place: 9663 5259, rsv@rsv.org.au. Fully subscribed **RSV Members** can access discounted tickets by registering via their online profile, or entering their **promotional code** in the online ticketing window.

Epilepsy, Algorithms and AI: Personalised Seizure Forecasting

Thursday, 28th November at 7:00pm

Image: Frank Dicksee, The crisis, 1891, oil on canvas, 122.4 × 158.1 cm, National Gallery of Victoria, Melbourne

Speaker: Professor David Grayden

Clifford Chair of Neural Engineering, Department of Engineering
The University of Melbourne

Epilepsy is a common and serious neurological disorder, characterised by recurrent seizures, affecting over 60 million people worldwide.

Between 30-40% of sufferers' seizures are not adequately controlled with current therapies. The inherent unpredictability of seizures is a significant factor contributing to the risk of injury, psychosocial disability, and mortality. In these cases, the quality of life impairment compares unfavourably with other chronic illnesses such as hypertension, diabetes or heart disease, and the uncertainty of seizure occurrence is a major component of this impairment. New methods for epilepsy treatments, therapy titration and seizure forecasting are desperately needed.

Join us to explore how Artificial Intelligence technologies offer opportunities to automatically detect and even forecast epileptic seizures, which may allow new management strategies and pre-emptive therapies for seizure control to increase patient safety and quality of life.

About the speaker:

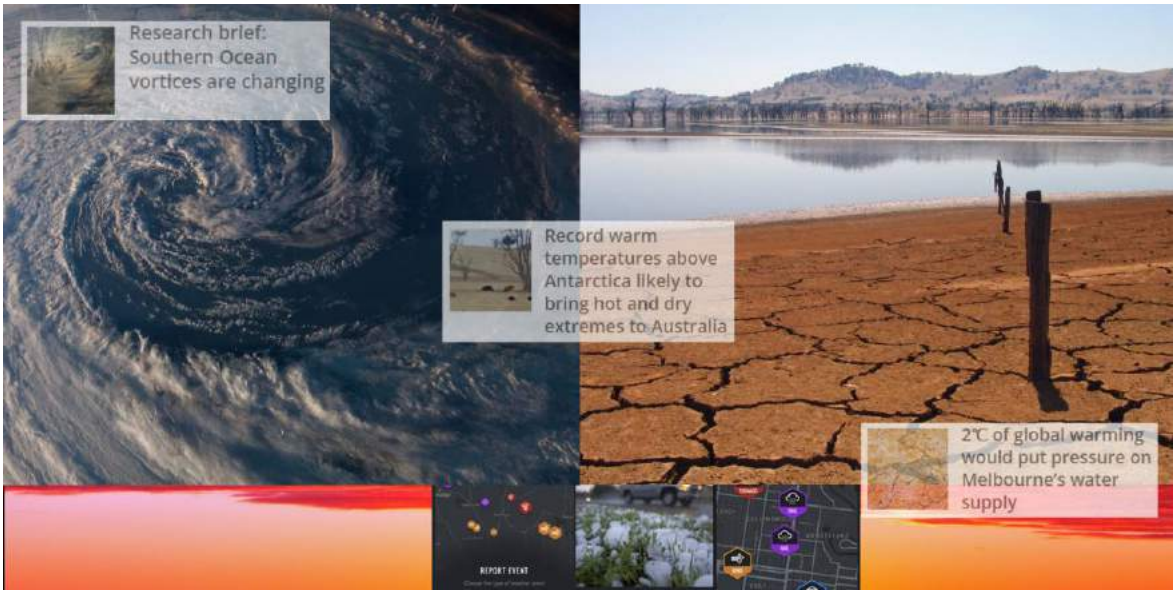
Professor David Grayden is the Clifford Chair of Neural Engineering in the Department of Biomedical Engineering and the Graeme Clark Institute for Biomedical Engineering at The University of Melbourne. Professor Grayden teaches BioDesign Innovation, an exciting hands-on program that has led to many start-up MedTech companies.

Professor Grayden's main research interests are in understanding how the brain processes information, how best to present information to the brain using medical bionics, such as the bionic ear and bionic eye, and how to record information from the brain, such as for brain-computer interfaces. He is also conducting research in epileptic seizure prediction and electrical stimulation to prevent or stop epileptic seizures, and in electrical stimulation of the vagus nerve to control inflammatory bowel disease.

Places limited, bookings essential! *Cocktail function from 6:00pm.* **Register online** now at https://rsv.org.au/events/seizure-forecasting/, call or email the RSV office to secure your place: 9663 5259, rsv@rsv.org.au. Fully subscribed **RSV Members** can access discounted tickets by registering via their online profile, or entering their **promotional code** in the online ticketing window.

Climate Extremes: Present and Future

Thursday, 12th December from 6:30pm



Climate extremes are events such as heatwaves, extreme rainfall, cyclones and drought that affect humans, our natural environment and multiple socio-economic systems.

The evidence is now unambiguous that some climate extremes are responding to increased greenhouse gases in the atmosphere, yet how some other extremes are responding is proving more complex. Join Professor Andy Pitman to explore the evidence for how and why climate extremes are changing, and what we can anticipate about how they will change in the future. The limits to our current capability and how climate science is trying to address those limits via new approaches to modelling will be discussed.

About the speaker:

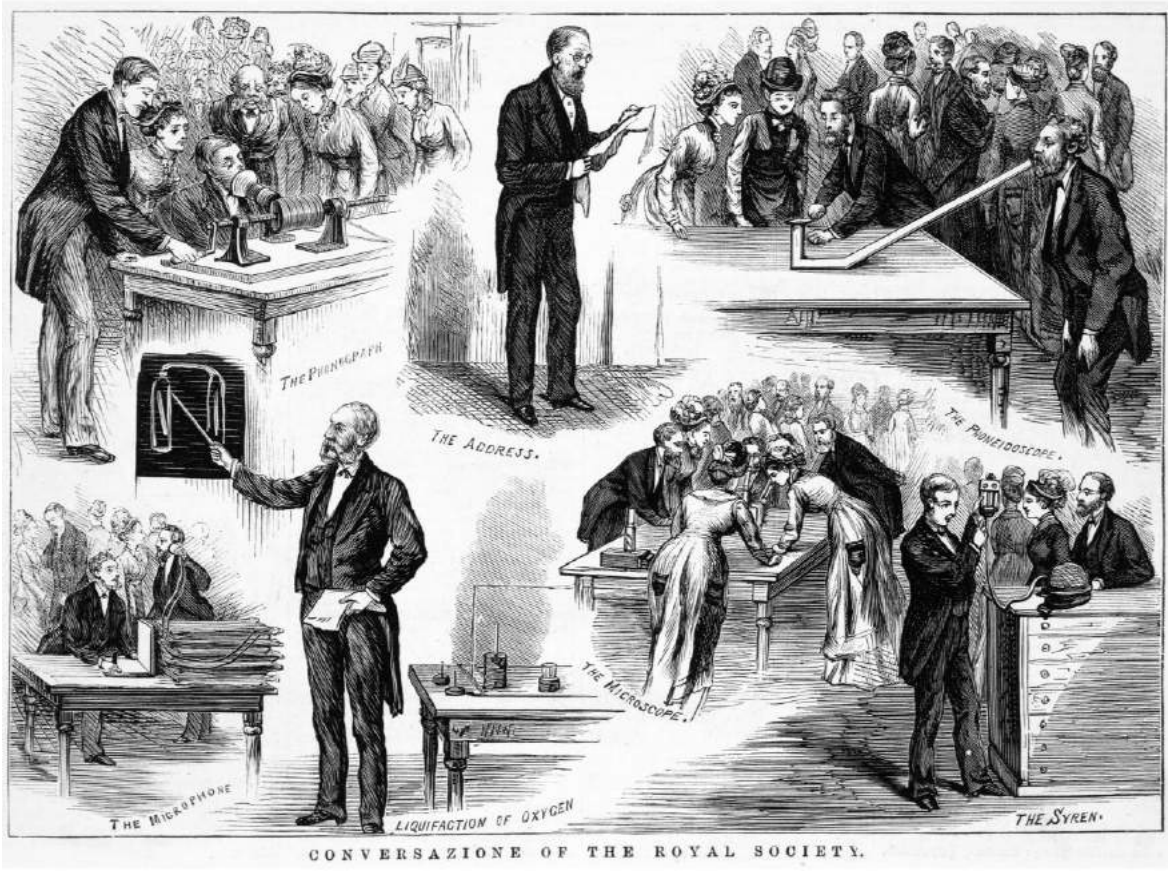
Professor Andy Pitman AO is a Professor in climate science at the University of New South Wales. He is the Director of the ARC Centre of Excellence for Climate Extremes (CLEx), which brings together five Australian universities (including Monash University and the University of Melbourne) and a suite of international partner organisations to understand the behaviour of climate extremes and how they directly affect Australian natural and economic systems.

Andy has broad interests extending across climate modelling, climate change, climate extremes and land cover change. He has been a lead author on the Intergovernmental Panel on Climate Change and on the Copenhagen Diagnosis. He won the Priestley Medal in 2004, the AMOS Medal in 2009, the NSW Climate Scientist of the Year in 2010 and was elected Fellow of the American Meteorological Society in 2016 and is a Fellow of the Australian Meteorological and Oceanographic Society. He has served on multiple federal government reviews. He was awarded an Order of Australia (AO) in 2019. Professor Pitman is the 2019 recipient of the Royal Society of Victoria's Medal for Excellence in Scientific Research.

Places limited, bookings essential! *Formal function to follow from 7:30pm.* **Register online** now at https://rsv.org.au/events/climate-extremes/, call or email the RSV office to secure your place: 9663 5259, rsv@rsv.org.au. Fully subscribed **RSV Members** can access discounted tickets by registering via their online profile, or entering their **promotional code** in the online ticketing window.

RSV Research Medal Presentation and 160th Anniversary Dinner

Thursday, 12th December from 6:30pm



CONVERSAZIONE OF THE ROYAL SOCIETY.

RSV members and their guests are invited to join us to commemorate 160 years since the official opening of the Royal Society of Victoria's Hall on 10th December, 1859 by Sir Henry Barkly, Governor of Victoria.

The evening will begin with the presentation of the Society's Medal for Excellence in Scientific Research, now in its sixtieth year, to the 2019 Medallist Professor Andrew Pitman along with the Medallist's Lecture.

Following the presentation, members and their guests will celebrate an outstanding year of science engagement with Victorian communities at a special cocktail dinner function in the Burke and Wills Room, featuring short presentations from our President and a small selection of the RSV's many wonderful partners and collaborators.

The dress code is for business attire or evening wear. Proceeds from the function will be directed to support the Society's growing science and outreach programs.

Places limited, bookings essential!. **Register online** now at https://rsv.org.au/events/rsv-160/, call or email the RSV office to secure your place: 9663 5259, rsv@rsv.org.au.

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Nominations for RSV Membership

Nominations for membership of the Society have been received on behalf of:

Mr Ebadullah **SALEH**, Civil Engineering Student, Victoria University
Mr Craig Leslie **SANDY**, Surveyor General of Victoria, Department of Environment, Land, Water and Planning
Mr Colin **HALL**, Senior Surveyor, Surveyor General Victoria, Department of Environment, Land, Water and Planning
Mr Shane **RAMAGE**, Licensed Surveyor, Surveyor General Victoria, Department of Environment, Land, Water and Planning
Professor Richard John **ECKARD**, Director, Primary Industries Climate Challenges Centre

Unless Members request a ballot, these will be considered for election by Council and if elected, will be announced at the Ordinary Meeting of the Royal Society of Victoria to be held on 12th December 2019. Recently elected members who have not yet signed the Society's membership book are warmly invited to attend the 14th November meeting to be formally welcomed as members. **Please inform the office if you plan to attend, so we can prepare your membership certificate and welcome pack for collection.**

Vale

The Council of the Royal Society of Victoria marks with sadness the recent passing of:

Dr Joyce Richardson FRSV, 1923 - 2019

Born in New Zealand, Joyce graduated from the University of Otago with a BA in Zoology, and completed a PhD on Cainozoic brachiopods at the University of Melbourne in 1958. In the 1970s she carried out research at the then National Museum of Victoria on an ARC Grant, and in 1976 she was awarded a National Geographic Society Grant at the Smithsonian Institution to study the marine environments of recent brachiopod faunas.

She subsequently worked for the New Zealand Oceanographic Institute, where she studied the abundant brachiopod faunas of the fjords of the South Island. Following her retirement from NZOI she returned to Melbourne where she again worked at the Museum as an Honorary Associate in the 1980s and 1990s. During this time she was actively involved in the Royal Society of Victoria as our Honorary Librarian, and was elected a Fellow of the Society in 2004 in recognition of her services to Australian science.

Joyce was an international authority on brachiopods, especially on their ecology and behaviour. She was the author of numerous papers, including the sections on ecology and biogeography of articulate brachiopods in the *Treatise on Invertebrate Paleontology*, the standard reference work on the subject.

We extend our condolences to family, loved ones and all who grieve the loss of a valued friend and colleague. A grateful Society celebrates Joyce's life and accomplishments.

RSV Speakers 2020: Call for Recommendations

Members of the RSV are warmly invited to submit recommendations for speakers on our 2020 program.

Recommendations may be submitted to Dr Kevin Orrman-Rossiter, Chair of the Science Program Committee, at kevin.orrman@unimelb.edu.au before **14 November.** Please note the decision on the inclusion of any speakers recommended will be made by the Committee.

The CSIRAC 70th Anniversary Celebration

14th November, 2019
The University of Melbourne

Join past, present and future leaders from academia and industry in celebrating the 70th Anniversary of CSIRAC, Australia's first computer, and the world's fourth.

This celebratory event honours the legacy of Australian computer science pioneer **Dr Trevor Pearcey.** Catch a glimpse of what the future holds for Australian innovation, as we toast the spirit of entrepreneurship, collaboration and leadership.

Event details and registrations are available online at:

https://www.eiseverywhere.com/ereg/index.php?eventid=486269&

Deterring Possums with Pyrethrum

by Priya Mohandoss MRSV

After noticing the presence of both brush-tailed and ring-tailed possums foraging around and damaging the plants in her backyard, zoologist and keen gardener Professor Lynne Selwood came up with the idea to develop a substance that could preserve and protect her beloved plants from browsers, i.e., animal species that use trees for their habitat and something that was readily accessible for all to use.

During the first five years, she conducted a series of independent experiments, choosing particular plants from her garden that were inedible to possums, such as jasmine. Then, similar to an herbalist, she made a concoction; diluting the chopped leaves with water in order to form a spray.

However, all the plants that Lynne tested proved to be irritants and had much toxicity. It was only when she used pyrethrum, an organic compound found in *Chrysanthemum cinerariifolium* and *Chrysanthemum coccineum,* to deter pests from her citrus trees that she discovered that possums withdraw from it as well.

Although she had found the active component in pyrethrum acted as a deterrent, the drawbacks were that it deteriorated in sunlight and easily washed off leaves in rain. As a result, it took a further fifteen years to solve how pyrethrum could be fixed in its effective, oily phase. Yet after examining the principles of radial symmetry and diatoms (micro-algae found in oceans), Lynne discovered that diatomaceous earth, a natural occurring mineral made from diatoms and containing silica, resolved the matter.

Her next step was to approach the Commercialisation Unit at the University of Melbourne. After doing more assessments with the product, the spray was then patented and then presented to gardening product manufacturer Yates. As they say, the rest is history!

The spray is now available for commercial use with the patent and a portion of the proceeds going to the University.

Professor Lynne Selwood FRSV with her Possum Repellent spray, produced and distributed by Yates. Photo: Priya Mohandoss

Being a problem solver and having a continued interest in browsing animals, Lynne is now in the early testing phases of determining a substance that has the capability to deter rats from targeting a variety of plant species, particularly tomatoes and citrus trees.

Congratulations Lynne!

Yates Possum Repellent 1 litre spray is available from Bunnings Warehouse.

Call for Nominations – RSV Council Positions, 2020 - 2021

RSV members are hereby notified of the call for nominations for election to our governing Council.

Details and a Nomination Form are provided at the end of this printed newsletter. Nominations must be completed and returned to the Returning Officer by no later than **3.30pm, Monday 16th December 2019**.

Top Climate Scientist Awarded the Royal Society of Victoria's Research Medal

The Royal Society of Victoria is delighted to congratulate the 2019 recipient of the RSV's prestigious Medal for Excellence in Scientific Research **Professor Andy Pitman AO**, Director of the **ARC Centre of Excellence for Climate Extremes** (CLEx), a national centre based at the **University of New South Wales** involving five Australian universities, major Australian research agencies and many international partners.

Inaugurated in 1959, this year the Medal turns 60 and was awarded in Category III – the **Earth Sciences.** The Research Medal recognises peak research career achievements and outstanding leadership in research by Australian scientists, particularly those conducting work in (or about) the State of Victoria. In his leadership of CLEx, Professor Andy Pitman convenes scientists from institutions across the nation; here in Victoria, the Centre's participants are drawn from Monash University and the University of Melbourne. The Centre works to understand the behaviour of climate extremes, such as heatwaves, cold snaps, extreme rainfall, cyclones and drought, and how these directly affect Australian natural and economic systems.

"Andy has conducted extensive climate science research on land surface models, looking at the impact of terrestrial changes in Australia's climate and the moderation of climate extremes," explains Dr William Birch AM, a member of the assessment panel and Editor in Chief of the Society's scientific journal, the *Proceedings of the Royal Society of Victoria.* "He has produced 99 papers of exceptional quality and impact in the ten years up to 2018, and most significantly has led two ARC Centres of Excellence with extensive participation in key international, national and government committees. Andy's remarkable output is reflected in his numerous awards - he is an outstanding scientist, and a significant science leader."

In receiving the recommendation of the assessment panel, the Society's Executive Committee was faced with a very close outcome between some remarkably competitive nominations. "To be almost overwhelmed with a field of globally significant scientists is a wonderful problem to have, and it's a testament to Professor Pitman that he was selected ahead of some truly outstanding colleagues," reflects David Zerman, the Society's President. "We hope to see these names in the mix again next time."

"For me, it's particularly pleasing to see Professor Pitman's strong record of participation in discussion with mainstream

media, government panels and public speaking engagements to share this important knowledge base beyond the scientific community. Leadership requires many personal qualities, and courage is one of the most important. In the public realm of climate science, scientists regularly encounter political and cultural conflict, and Professor Pitman is plainly capable of negotiating this volatile space with the rigour of his research at his back."

RSV CEO Mike Flattley reflects on awarding this Victorian research medal to a scientist located in New South Wales: "The RSV's Medal is an Australian award; we do emphasise work conducted in or about Victoria, and certainly Professor Pitman leads a centre that takes in the work of our state's two leading research institutions, so we're quite satisfied on that point. Ultimately, we balance the quality and impact of work conducted in Australia with our focus on promoting science in Victoria, and I think it speaks very highly of Andy's national work that he comes out ahead of the pack despite his interstate base."

The Royal Society of Victoria congratulates Professor Andrew Pitman, the 2019 recipient of the RSV Medal for Excellence in Scientific Research. Andy will be presenting his work to the Society at a public lecture titled *Climate Extremes: Present and Future* on the evening of 12th December 2019, where he will be presented with the 2019 Medal. Event details are provided earlier in the newsletter.

About the Medallist:

Professor Andy Pitman AO

Professor Pitman's research focus is on terrestrial processes in global and regional climate modelling, model evaluation and earth systems approaches to understanding climate change. His leadership, collaboration and research experience is extensive both nationally and internationally.

He is currently the Director of the ARC Centre of Excellence for Climate Extremes (2017 - current) and was previously the Director of the ARC Centre of Excellence for Climate System Science (2011-2017) and Co-Director of the Climate Change Research Centre (2007-11). He is a Professor of Climate Science at the University of New South Wales.

His leadership, collaboration and research experience is extensive both nationally and internationally. Between 2004 and 2010 he convened the ARC Research Network for Earth System Science, which facilitated interaction between individuals and groups involved in climate system science. He is a member of the Australian Community Climate and Earth System Simulator initiative, the Academy of Science's National Committee for Earth System Science, the NSW Minister for Climate Change's Science Advisory Committee and the Department of Climate Change Advisory Committee. In 2007 he was appointed to the Prime Minister's Science, Engineering and Innovation Council on Regional Climate Change.

Internationally, Professor Pitman is closely affiliated with the World Climate Research Programme (WCRP). He was chair of the WCRP's Land Committee for the Global Land Atmosphere System Study from 2006 to 2008 and is now on its Science Steering Committee. As Co-chair, he jointly led one of the first major international intercomparison exercises; the Project for the Intercomparison of Land Surface Parameterization Schemes, which is supported by WCRP and the International Geosphere Biosphere Programme. He also sat on the Science Steering Committee of the Integrated Land Ecosystem-Atmosphere Processes Study and is currently co-coordinator for the project Land Use Change: identification of Robust Impacts.

Professor Pitman is a regular invitee for keynote presentations and is a passionate communicator about science, contributing regularly to the media on the science of climate change. He was a Lead Author for Intergovernmental Panel on Climate Change (IPCC) Assessment Reports 3 and 4, contributing to the award of the Nobel Peace Prize to the IPCC in 2007. He has also contributed to the Copenhagen Diagnosis, an

Australia-led update of the science of climate change. He has held editorial positions with the *Journal of Climate* and the Annals of the Association of American Geographers' *Journal of Geophysical Research-Atmospheres* and is currently an editor for the *International Journal of Climatology.*

Earlier awards and accolades received by Professor Pitman include: NSW Scientist of the Year Award (2010), the Australian Meteorological and Oceanographical Medal (2009), the Dean's Award for Science Leadership at Macquarie University (2005), the Priestly Medal for Excellence in Atmospheric Science Research (2004) and the Geoff Conolly Memorial Award (2004). He jointly won the International Justice Prize for the Copenhagen Diagnosis (2010) and was among Sydney Magazine's list of the 100 most influential people (2010).

Professor Pitman has a long track record of nurturing early career researchers and has supervised 10 PhD students through to successful completion, plus five master's and a significant number of honours students. He has published more than 150 papers in peer-reviewed journals and has authored 20 book chapters.

Do you Know this Man?

The RSV's Mystery Portrait

It's not Florey. It's not any of our Presidents. Who does this puzzling portrait depict?

Painted by Orlando Dutton (a one-time President of the Victoria Artists Society) in 1961 and stored in the fusty depths of our archive room, this painting has perplexed us for years. Do you know who this is?

We think – but are not entirely sure - that this is a portrait of Sir Frank Macfarlane Burnet OM, AK, KBE, FRS, FAA, FRSNZ. The photo to the left (1957) suggests an aspect that correlates with the portrait,

whereas others portray a very different aspect, such as the photo to the right.

Intriguing hints include a focus on microscopy and what appears to be a prize or medal in the background (detail below). It doesn't seem to be a Nobel, but it might be Mac Burnet's trophy awarded to him as the inaugural Australian of the Year (1961), which correlates with the year of the painting, and may explain why a Victorian institution has it squirrelled away in a cupboard; the Australia Day Committee (later Council) was, in its first decades, a Victorian initiative, and some of our members were likely involved.

By all accounts Macfarlane Burnet was not an RSV member – he does not appear in our lists from the early 60s (when he was, in fact, helping establish the Academy of Science in Canberra), and was either working overseas or busy running WEHI in earlier periods. So we're not sure why we have this painting!

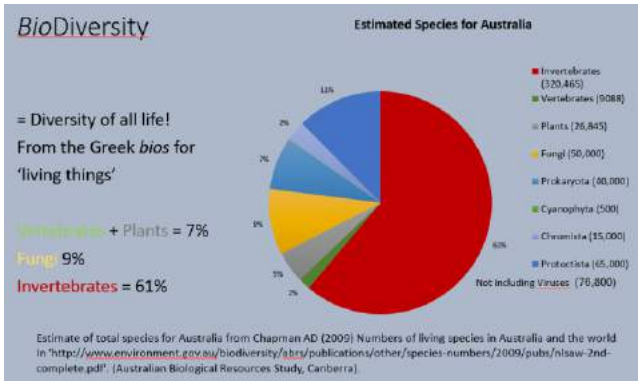
Any leads gratefully received! Please let our utterly stumped CEO know: you can reach Mike at ceo@rsv.org.au or on 9663 5259.

The Mysterious World of Fungi

by Kate Bongiovanni

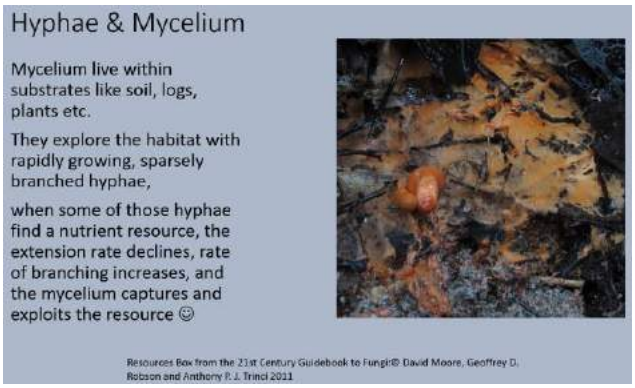
*This article follows a presentation to the Royal Society of Victoria on 10 October 2019, by mycologist Dr **Sapphire McMullan-Fisher**.*

We've all eaten mushrooms, read harrowing tales of poisonous fungi or seen toadstools growing in parklands, but how much do we really know about fungi? **Dr Sapphire McMullan-Fisher** is a mycologist (an ecologist specialising in fungi) working with the Royal Botanic Gardens Victoria to uncover the remarkable secrets of these everyday organisms.



The kingdom of fungi is an important, though often underappreciated, family of organisms which include yeasts, rusts, moulds, smuts, mildews and mushrooms. Of the vast range of living things on the Earth, fungi make up an impressive 9% of all biodiversity. The immensity of the mighty fungi kingdom and the diversity of fungal organisms and functions means we can't fit everything into this brief exploration. However, Sapphire gave us some interesting insights to the mysterious world of fungi to share.

We think of fungi as the toadstools and mushrooms that pop up out of the ground. However, hidden to our eyes is a vast web of elongated fungi "strings" called mycelium, spreading on and throughout the soil, giving these organisms interesting and unfamiliar properties. Animal bodies cannot pass through each other or occupy the same space. However, fungal bodies are dispersed, and their web-like mycelium can intertwine. This means different fungi species can occupy the same space, just like different coloured spaghetti in a pot.



The network of mycelium, affectionately known as the Wood Wide Web, links plants via their root systems, mediating the exchange of resources between plants and fungi. Plants share sugars with fungi and in turn, the fungi assist plants in collecting water and nutrients, while provide a means for relaying chemical signals, such as warnings about predators.

As well as assisting plants to survive and prosper, fungi can assist in cleansing our environment. For example, 70% more carbon can be stored in the soil when trees are planted together with their fungal partners. Together, plants and their fungi are healthier and more resilient. Furthermore, fungi are useful in decontaminating land after mining or nuclear disasters. Fungi absorb and concentrate minerals and heavy metals which means they can be used to amass heavy metals from an affected area so they can easily be collected.

As mentioned above, fungi organisms include moulds and yeasts, so it is thanks to fungi that we have delicious foods such as cheese, bread, chocolate and beer. These foods all undergo a fermentation process where fungi break down complex chemical chains to improve taste and nutrition. Further, fungi assist our bodies to process the meals as part of the microbiota in our gut,

competing with our bacteria to break down food and deliver nutrients.

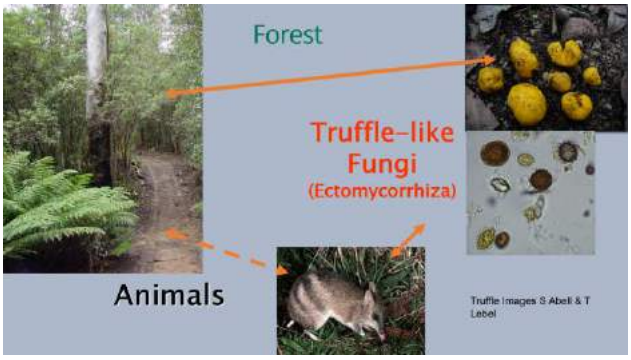
In addition to digesting their own food, fungi are key to creating food for many birds and animals. These animals rely on hollows in trees for survival, and these don't develop spontaneously when a tree reaches a certain age; they are produced by fungi. Helminths (parasitic worms), protozoans (single celled parasites) and pathogenic fungi start hollows by rotting the wood. Invertebrates then digest the wood-rot fungi and make the hollow bigger.

In the last five years, there has been a colossal invertebrate collapse which has restricted the creation of hollows. This is devastating for the animals that depend on hollows as a habitat. While human-made habitat boxes are made to replace hollows, they are an inadequate substitute, requiring resources to produce and maintain so they don't fall down or fall apart over decades.

Our climate is changing, challenging all ecosystems. Changes in fire patterns and fire ecology are being observed in Australia and the world and are the subject of an increasing focus of research. In the aftermath of fires, there is a rapid and expansive reproduction of fire-sensitive fungi. These "fungi flushes" help prevent erosion by holding soil together and are important for the reproduction of plants such as eucalypts. Amid dramatic changes to fire patterns, it is imperative for us to research and understand the connections between fungi and fire, especially since some species of fungi require fire periodically in order to survive.

Aside, from climate change, one of the biggest threats to ecology in Australia is myrtle rust. Myrtle rust is a pathogen which affects the myrtle family, affecting species such as eucalypts, tea tree, bottlebrush and paper bark. So far Australia has been quite lucky, with only one strain of myrtle rust infecting our bushlands. Other regions have not been so fortunate. South African and Hawaiian forests have suffered at the hands of multiple strains of myrtle rust which has been annihilating eucalypts. Australia needs to take more action. In preparation for a possible outbreak of myrtle rust, a contingency plan for Australia was commissioned and produced in 2009. Unfortunately, this plan was not activated in 2010 when myrtle rust was discovered here, and subsequent planned interventions are yet to be enacted. We can compare Australia's inadequate response to that of New Zealand, which looked for the disease, discovered it in 2017 and within six months had a group established and funding allocated to contain the spread of myrtle rust.

A further challenge to our Australian bushlands is the massive extinction of small ground dwelling marsupials. Marsupials eat truffle like fungi and spread the fungal spores through their scats. These fungi are effective in building drought resistance and resilience, which is increasingly important in our drying climate. We need to protect and reintroduce marsupials to help our native fungi to flourish and support their native plant partners. Currently, the only group taking action to save the fungal partners of plants are orchid growers.



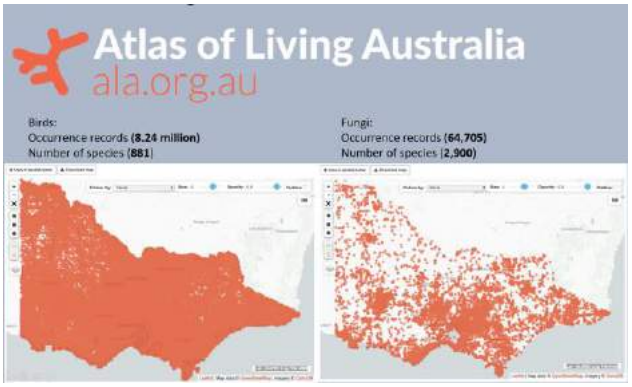
From a management perspective, we need to do more to promote the health of our environment and to fix the things we have broken. Restoration is being pushed as a management strategy for our ecosystems and it often works; however, preventing the destruction of our ecosystems is better than trying to restore them after the damage is done. In many areas, native plants and animals are struggling to endure. For instance, around 30% of acacias and spinifex in the surrounds of Broome are dead. We should strive to implement local solutions that foster the growth of native fungi, their native plant partners and, ultimately, the animals who depend on them.

Meanwhile, we need to be wary of promoting the wrong kind of fungi, such as those adapted to European pine forests. Northern hemisphere practices are not suitable for Australian fungi. Northern hemisphere mushrooms grow quite quickly and in large quantities compared to Australian fungi, which only grow fruit occasionally. Australia cannot mass harvest native fungi as in the northern hemisphere without endangering the persistence of the fungi or the health of our soils.

The current gold standard practice for managing ecosystems is known as “adaptive management”. The idea is that management practices are regularly assessed and then refined based on evidence. However, we aren’t currently gathering any evidence, so sadly there is still a lack of data and “adaptive management” is not functioning as intended. Expanding our knowledge base of local Australian fungi and its range of ecological functions, then educating the public about ways to help fungi persist is important to creating a healthier environment and ensuring we don’t mistakenly destroy species vital to the health of the entire ecosystem.

To close the knowledge gap of fungi and equip people with a reliable guide on local fungi, Dr McMullan-Fisher, along with colleague Roz Hart and other supporters, is writing a much-needed handbook on Australian fungi functions, conservation and restoration. (Find out more at *Fungi4Land*.)

Moreover, there are some wonderful citizen science initiatives that are building up a store of knowledge of fungi. *Fungimap* has been collecting records since 1995 showing the biological distribution of fungi organisms. *iNaturalist* is a global site which uses an algorithm in partnership with mycology experts to identify fungi species from photos that people submit from the field. You can try sending in your own fungi photos!



Yet, there is still a long way to go, and so much more to find out. This is evident if we compare fungi records to bird records. There are 8 million records for birds and 881 known species, whereas fungi have only 100,000 records and there are approximately 3000 known species (and lots more to discover)!

As well as participating in citizen science initiatives, we can help fungi by minimising the use of chemicals in our gardens and farms and watching our soil hygiene. For instance, always ensure your boots and hiking equipment is clean before you enter native parklands.

It is imperative for us to encourage diversity in approach; we can't do the same management everywhere. For instance, spreading mulch over a garden or park may not seem to have any downsides. However, mulch is a low diversity fungi food, much like takeaway food for humans. When mulch is all chopped to the same size, it reduces the variety of fungi organisms that will grow, subsequently limiting the diversity of plants and animals in the environment. In order to foster a balanced and diverse ecosystem, we need to adopt different practices in different regions, and perhaps use different kinds of mulch. We should also limit mass plantings of the same species in one area.

Similar diversity promoting practices could be introduced on a large scale in the agricultural industry to promote better crop growth. The phenomenon of growing multiple crops simultaneously in one region is known as polyculture where, rather than having fields and fields of, say, potatoes next to each other, small patches of different crops are established to foster resilience to pests and disease without recourse to chemical pesticides. This kind of agriculture would better emulate the diversity seen in nature where we have a multitude of plant and animal species in one small area. We still have a way to go before we fully understand and adopt these kinds of practices.

From left: Professor Sandra Rees FRSV (vote of thanks), Dr Sapphire McMullan-Fisher MRSV, Mrs Nicola Williams MRSV (Vice-President).

Our understanding of the fungi realm is as yet limited - there is a whole kingdom to discover and we have only skimmed the surface of understanding the mysterious world of fungi.

Meanwhile, if you would like to support this vital research and conservation work, get along to https://funi4land.com/help-us/ and check out their crowd funding campaign.

Our thanks to Sapphire for a wonderful presentation! Livestream video of her talk is available from our Facebook page at https://www.facebook.com/royalsocietyvictoria/videos/1120868264970961/

Pyrocumulonimbus Clouds

by Priya Mohandoss MRSV

Although weather conditions determine the intensity of a bushfire's blaze, a large fire can also influence the weather in turn. Smoke

plumes are large quantities of smoke that ascend into the air in the shape of a column and can self-generate thunderstorms. The same scenario can also happen with volcanic ash or a nuclear blast; in Australia, the key sources of smoke plumes are bushfires.

Pyrocumulonimbus clouds take shape when extreme heat from the fire forms into a plume and rises into the atmosphere. As a result of turbulence, cooler air is churned upward, widening the plume and cooling as it elevates. When the plume reaches its zenith, low atmospheric pressure again causes the air to coo further and a cloud can form from the moisture in the atmosphere. If the atmosphere is volatile in nature, a thunderstorm can result.

Pyrocumulonimbus cloud over the Bunyip State Forest, 2018

This then allows for precipitation from the cloud to vaporise and decrease in temperature with dry air, causing a downburst. Once this hits the ground and erupts, it produces strong gales that can force the fire in every direction and continue for more than 20 minutes. Furthermore, the impact from ice particles at the top of the cloud structure can trigger a stockpile of electricity and as a consequence, can emit lightning and ignite additional fires.

While there has been advances in our knowledge on pyrocumulonimbus clouds, we still need to gain further insight in terms of their formation, behaviour and overall danger in order to predict them so that flames can be fought at a lower intensity.

The Universe and Its Dark Materials

By Catriona Nguyen-Robertson MRSV

This article follows a presentation to the Royal Society of Victoria on 12 September 2019 titled "Darkness Visible Down Under" by astrophysicist Associate Professor ***Alan Duffy*** *from Swinburne University.*

> *"Beyond the shoreline exists this whole new world out there…how could you not want to explore it?" – Professor Alan Duffy, Swinburne University.*

If you look through the Hubble Space Telescope at a patch of sky the size of your thumb nail, you will find stars, clouds, gas and dust, distributed across 6,000 individual galaxies. The Universe is massive, but the Universe that we see is merely the tip of the iceberg – there is an invisible Dark Universe that outweighs everything we can see five times over.

Growing up in Northern Ireland, Alan Duffy would often press his face to the window to stare out at the stars. He has always been fascinated by the world around him. After reading Stephen Hawking's *A Brief History of Time*, he was inspired to channel his curiosity into studying physics. Driven by his desire to want to know more, he undertook a PhD in astrophysics at the University of Manchester. Wanting to explore the unknown, he felt the pull of the Dark Universe. Now as an astrophysicist at Swinburne University of Technology's Centre for Astrophysics and Supercomputing, he has led a 10-year curiosity-driven research project into uncovering the nature of dark matter and the

formation of galaxies, and the acceleration of the Universe caused by dark energy.

Alan Duffy: "We have never known so little about our universe. Science is not done."

Dark energy makes up approximately 68% of the Universe and dark matter makes up another 27%. Despite their dominance in the Universe, we still are not sure of what they actually are. The rest – everything we can observe with all of our instruments – makes up less than 5%. For astrophysicists such as Alan, it seems a nearly impossible task to study something currently undetectable, however we can learn by studying their effects on other things. For example, while we cannot see wind, we can see its effect on the objects that it moves, such as swaying branches. Similarly, dark matter is composed of particles that cannot be seen directly, but we know that it exists because of the effect it has on objects that we can observe.

Like the orbit of planets, spiral galaxies spin slowly over time. The Milky Way, for example, takes 250 million years to complete a full turn. When astronomers examined spiral galaxies in the 1970s, they expected to see material in the centre of the galaxies moving faster than material at the outer edges (as Mercury orbits the sun faster than planets further out in the Solar System). But inner and outer stars travelled at the same pace. This hinted that there is more mass within the galaxy than meets the eye.

We don't know much about the vast invisible clouds dark matter, but whatever it is, by providing extra mass to galaxies, it generates the extra gravity needed to hold them together. They are rotating at such high speeds that the gravity generated by their observable matter could not possibly be enough to hold them together – they should have torn themselves apart long ago.

Alan investigates how dark matter helps galaxies form and keeps them intact. He uses supercomputers to simulate this process. But the more we learn about the visible parts of the Universe, the bigger the gap becomes between what we predict about the unknown and what we see. He and other astrophysicists are therefore constantly under pressure to gain a better understanding of dark matter and dark energy. Alan does this by testing his simulations of our galaxy formation and dark matter theories and comparing them to observations from telescopes to see if they match up.

Alan and his team are also devising ways of detecting dark matter in the laboratory. He is a Chief Investigator of SABRE, the world's first dark matter detector in the Southern Hemisphere, based at the bottom of a gold mine at Stawell in Victoria. The team built a sodium iodide crystal (rock salt) detector doped in thallium. When dark matter particles stream through the mine and collide with crystals in the detector, they will produce a flash of light. Dark matter is thought to rarely interact with 'normal' matter, and so when they do, the atoms recoil – a reaction that becomes visible.

Thus, Alan Duffy and his team are turning the impossible into something possible. In their endeavour to learn more about our Universe, they explore the unknown and the unobservable. Like the expansion of the Universe, they are accelerating their ability to detect and study the matter that holds our galaxy together and makes up 95% of everything that exists.

Our thanks to A/Prof Alan Duffy for a fantastic exploration of the universe! You can view a high-quality video of his talk at our YouTube channel: https://youtu.be/6O7XSLhDy28 .

Support the Royal Society of Victoria

Donations to the Royal Society of Victoria can be made at any time via the following methods:

Online: we can accept contributions through credit card and PayPal transactions on our website at https://rsv.org.au/about-us/support/

Via mail: the form **below** can assist you in allocating your donation to your preferred activity area, using either your credit card details (Visa or Mastercard), a cheque/money order made out to the Royal Society of Victoria, or notification of a direct Electronic Funds Transfer (EFT) transaction to the Society's bank account.

In person: we can accept donations at the Society's office in cash, cheque/money order or via credit card.

Donation Form

Please allocate my donation to the following program areas:

Highest Priorities	**Donation Amount**
The Area of Greatest Need, as Identified by the Society's Council	**$**
Science Program	
Area of Greatest Need	$
Filming RSV Events for Sharing with Audiences Online	$
Upgrading Audio-Visual Equipment in the Ellery Theatre	$
Awards & Prizes for Victorian Scientists	$
Regional & Interstate Travel for RSV Speakers/Presenters	$
Science Program Total:	**$**
Science Outreach	
Area of Greatest Need	$
Kids' Science Clubs	$
Girls in Physics (with VicPhysics Teachers' Network)	$
Citizen Science Programs (with Science for All)	$
Gender & Cultural Diversity in STEMM Initiatives	$
Community Lifelong Learning Programs	$
National Science Week Community Grants Program	$
Victorian Teachers' Professional Development & Extension	$
Science Outreach Total:	**$**
Science Heritage	
Area of Greatest Need	$
Repair & Refurbishment of the RSV's Heritage-Listed Buildings	$
Conservation & Curation of the RSV's Heritage Journal Collection	$
Victorian Science History Research Projects & Papers	$
Science Heritage Total:	**$**

Support the Royal Society of Victoria

Science Advocacy	
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Convene Senior Government & Industry Forums with Leading Scientists	$
Convene Community Forums with Leading Scientists	$
Publish the Evidence Base Produced by Victorian Scientists	$
Advocate on Issues Related to Science & Scientific Findings with Government	$
Science Advocacy Total:	**$**

Aboriginal Astronomy	
Area of Greatest Need	$
Indigenous Community Science Engagement	$
Tertiary Scholarships for Indigenous Students	$
Workshops with Indigenous Community Members and Educators	$
Indigenous Astronomy Research & Education Programs	$
Aboriginal Astronomy Total:	**$**
Total Donation:	**$**

Personal Details

Family name: ……

Given names (in full): ……

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

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I am paying by (select one):

☐ **Credit Card** Please note we do not accept Diners or American Express

VISA ☐ Mastercard ☐ ***Please charge the amount entered against "Total Donation," above, to my credit card.***

Card No. ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ Date: ☐☐/☐☐

Name on Card ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐ Signature of Cardholder ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

☐ **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"

Please detach this page and return with your preferred payment method to: The Royal Society of Victoria, 8 La Trobe Street, Melbourne, VIC 3000. ABN: 62 145 872 663. Grateful thanks for your generous support for our many endeavours!

We will provide a tax receipt for all donations received over $2.

The Royal Society OF VICTORIA
Promoting science since 1854

CALL FOR NOMINATIONS:
RSV COUNCIL ELECTION FOR 2020-2021

Nominations are hereby called for the election of the following positions for the 2020-21 Council:

Five Ordinary Councillors

Up to five Ordinary Members of Council for 2020 and 2021 will be elected by postal ballot closing at 3.30pm on **2nd March 2020**. The elected Councillors will take up office from the Annual General Meeting to be held 14th May, 2020. All current 2018-19 Councillors will continue until that date.

Note: *the following Ordinary Councillors are required to re-nominate to continue on Council:* Dr Gavin Smith, Dr Kevin Orrman-Rossiter, Dr Sophia Frentz, Dr Julie Boyce, Dr Catherine de Burgh-Day.

Note: *Rule 22 (3) Council shall consist of no more than ten ordinary members of Council, five of whom shall be elected to take office in odd-numbered and five in even-numbered years, from whose number Council shall appoint persons to such Special Positions as shall be determined by Council from time to time to be necessary for the proper conduct of the Society's business.*

Note: *In 2020-21 the Special Positions will be the Chairs of the following Council Committees: Membership & Mentoring; Publications, Collections & Records; Science Program; Science Outreach & Partnerships; Science Policy & Advocacy.*

Note: *The Returning Officer for the 2020-21 RSV Council Election will be Emeritus Professor James Warren (Deputy: Dr Douglas McCann),*

The Nomination Form is distributed with this Notice. It must be returned, attention to the Returning Officer, along with the nominee's 200 word statement by **3.30 pm, Monday, 16th December 2019.**

Nomination criteria & guidelines:

1 Nominees for Officer or Councillor Positions must be Financial Members of the Royal Society of Victoria at the closing date of nominations and, in accepting nomination, undertake to maintain their RSV membership status throughout the election process and any subsequent tenure on the RSV Council.

2. Nominations may only be made and seconded by Members of the Society who are financial at the closing date of nominations.

3. A member may be nominated for only one Officer or Councillor position.

4. The nomination, including the consent of the candidate, must be accompanied by a statement of not more than 200 words in length prepared by the candidate or the nominator. Any statement exceeding 200 words will render the nomination invalid.

5. Each statement must be submitted on plain paper; company or business letterhead will not be accepted. **An electronic copy as a Word document must also be lodged with the Returning Officer via:** rsv@rsv.org.au

6. All nomination forms and statements must reach the Returning Officer, c/o The Royal Society of Victoria, 8 La Trobe Street, Melbourne 3000 **by 3.30 pm on 16th December 2019**, this being the closing time and date for nominations.

7. A candidate may withdraw from the election for any of the positions for which he or she has been nominated.

8. In the event of uncontested positions, the Returning Officer will declare the results for those positions immediately; and state that an election for these positions is not required. Results will be published on the Society website and in the Newsletter distributed at the end of January 2020.

9. If more than one nomination is received for any Officer, the Returning Officer must conduct an election for that position.

10. If there are more nominations than the number of vacant Ordinary positions of Council, the Returning Officer must conduct an election for all of the vacant positions.

11. A notice of the calling of an election and ballot papers will be circulated to financial members with the Newsletter in late January 2020. The Notice will be placed on the Society's website and on the notice board in the Society's premises displaying the nomination forms.

12 The notice of the election and Ballot Paper sent to members will be accompanied by the nominee's 200 word statement. These will be the only election materials authorised by the Society.

Nomination Form Overleaf

NOMINATION FOR ELECTION TO RSV COUNCIL 2020-2021

We hereby nominate _____

of _____

who is a member of the Society, for the position of **Ordinary Councillor**.

I consent to the above nomination.

Signature of Candidate _____ Date _____

I submit with this nomination form a Statement not exceeding 200 words in length to be displayed on the Notice Board in the Society's premises and website and if a ballot is necessary, circulated to the members. This Statement is a mandatory part of the nomination requirement.

Nominated by:

Name _____Signature _____Date_____

Address _____

Seconded by:

Name _____Signature _____Date_____

Address _____

This nomination must reach the Returning Officer by 3.30pm on the third Monday of December, care of the Royal Society of Victoria, 8 La Trobe Street, Melbourne, Victoria 3000. **Please check the nomination criteria and guidelines to ensure your submission complies with all requirements.**

Please use a separate form if nominating more than one member for a position. Only one nomination per officer position and five nominations for the ordinary councillor positions will be accepted per nominating member. Further forms are available online from https://rsv.org.au/rsv-council-nomination-form-2020-21/.