



The  
**Royal Society**  
**OF VICTORIA**  
Promoting science since 1854

PATRON: The Hon Linda Dessau AC  
Governor of Victoria

PRESIDENT: Mr David Zerman

### **December Events:**

**12<sup>th</sup> December:** *Climate Extremes: Present and Future*

*With **Professor Andy Pitman AO***

*The RSV Research Medal Lecture & End of Year Dinner*

**25<sup>th</sup> December 2019 – 3<sup>rd</sup> January 2020:** *End of Year Closure*

### **February 2020 Advance Notice:**

**13<sup>th</sup> February:** *The State Control Centre: Forecasting Victoria's Extreme Weather*

**27<sup>th</sup> February:** *Diamonds: an Implant's Best Friend*

# **December 2019 Newsletter**

*Print Post Approved 100009741*

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[rsv.org.au](http://rsv.org.au)

## Climate Extremes: Present and Future

Thursday, 12<sup>th</sup> 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.

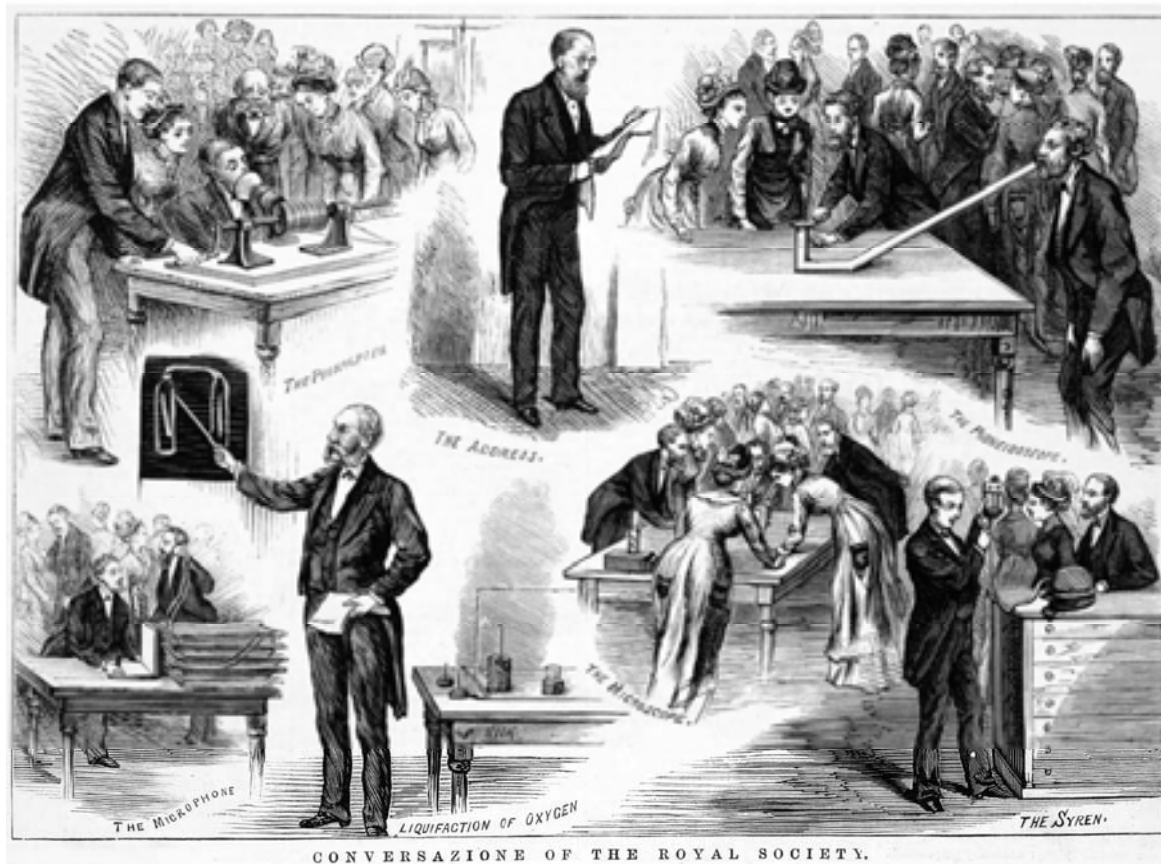
Andy has broad interests extending across climate modelling, climate change, climate extremes and land cover change. He has been a lead author on the Intergovernmental Panel on Climate Change and on the Copenhagen Diagnosis. He won the Priestley Medal in 2004, the AMOS Medal in 2009, the NSW Climate 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](mailto: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.

Eventbrite

## RSV Research Medal Presentation and 160<sup>th</sup> Anniversary Dinner

Thursday, 12<sup>th</sup> December from 6:30pm



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](mailto:rsv@rsv.org.au).

## Nominations for RSV Membership

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

Mr Nathan Benjamin **DI NOIA**, Student, RMIT University

Mr Tim E **BLOOMFIELD**, Environmental Consultant on Invasive Species

Mr Glen **GOULD**, Retired Communications and Satellite Engineer

Mr Shane **RAMAGE**, Licensed Surveyor, Surveyor General Victoria, Department of Environment, Land, Water and Planning

Mr Grant **MILDWATERS**, Student, RMIT University

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 13<sup>th</sup> February 2020. Recently elected members who have not yet signed the Society's membership book are warmly invited to attend the February 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.**

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### From the President

It has been an amazing year for the Society, stepping up to promote scientific work and seek the engagement and participation of the whole Victorian community in the excitement of endeavour.

Our end of year function is almost upon us and will be a wonderful opportunity to celebrate the Society's many achievements over the course of 2019, thanks to the efforts of our members, volunteers and partners. I hope to see as many members and guests as possible there to enjoy the evening, which features the Research Medal presentation to Professor Andy Pitman AO and his talk on work in climate extremes. Please see the related item earlier in the newsletter for details.

Recently the Council received reports from our hard-working staff on the outcomes of all this work, particularly the outputs of the Inspiring Victoria science engagement program. With hundreds of community

events hosted across the entire state, all year round and during National Science Week, the Society can be very proud of the work we support through our membership. On behalf of all members, I convey my sincere thanks to our team, who undertake program management, governance support, partnership work, event creation, coordination and management, grant program administration and acquittal, volunteer management and generally keep the RSV show on the road in what can sometimes be very trying circumstances. You do wonderful work!

I look forward to sharing the outcomes of our efforts in the 2019 Annual Report. Meanwhile, I wish all our members, supporters and partners all the very best for the holiday season and a prosperous year ahead in 2020.

- **David Zerman, President.**

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## The RSV's Mystery Portrait – Solved!



“Do you know this man?” The RSV's mystery portrait was shared with our last newsletter and the online community to seek help with identification.

As a small, volunteer-led organisation for most of our history, our capacities for record keeping have waxed and waned; the details of our past are most faithfully recorded in the

memories of our members, past and present, and the time for an update to our official histories is most definitely overdue.

We do have plenty of resources to offer the intrepid historian. The Royal Society of Victoria’s long history of convening the science community and promoting science in our state has contributed to a burgeoning archive of documents and some rare books deposited with the State Library of Victoria, who provide public access for the benefit of researchers. Meanwhile, we still maintain quite a few curious documents and objects from our past, squirrelled away in various shelves, cabinets and cupboards, our small archive room and the squeezey spaces beneath the raked seating of the Ellery Theatre.

One such object is this portrait from the mid-20th century, painted in 1961 by Orlando Dutton, depicting a scholar, his medals and a microscope, without any name provided. Current and recent Councillors have not definitively identified the sitter, although there was some speculation about him being **Sir Frank Marfarlane-Burnet** OM AK KBE FRS FAA FRSNZ. Speculation on the medals depicted have ranged from Mac Burnet’s Nobel prize (1960) to his inaugural Australian of the Year trophy (1961).



Stumped, we put out a call to the science community to help us solve the puzzle, and we’ve had an enormously helpful response through email and social media channels.

**Not Sir Frank Macfarlane Burnet**



Many have suspected or asserted that the portrait is of Mac Burnet, and we shared the portrait broadly in that context. The closest likeness of Sir Mac to the portrait that we could find is provided to the left, from 1959.

However, a welcome email from RSV Fellow Professor Sir Gustav Nossal puts that hypothesis to rest:

*“I am Sir Frank Macfarlane Burnet’s successor as Director of the Walter and Eliza Hall Institute.*



*As such, I knew Sir Mac very well for over 30 years and also had the chance to view several portraits of him painted down the years.*

*I am quite sure that the Mystery Portrait on page 13 of your November Newsletter is not of Sir Mac.*

*It is obviously a good painting and therefore probably a good likeness of the sitter.*

*It genuinely isn’t at all like Sir Mac (at any age).*

*Is there a possibility that it is Lord Casey?*

*I only knew him as an older man but the faint moustache, forehead and hair suggest the possibility.*

*Best of luck!*

*Yours sincerely,*

*Gus Nossal.”*

Walter + Eliza Hall @WEHI\_research - Oct 30  
Replying to @WEHI\_research @RoyaSocietyVic and 2 others  
And here are two portraits and photos of Burnet from the 1960s: 1961 by Sir William Dargie (@PortraitAu), 1965 photo, 1966 by Clifton Pugh and late 60s photo. No sign of a moustache in the 1950s or 60s!



Further leads on Twitter from our colleagues at WEHI (above) support this position. Sir Mac was not one to cultivate a moustache, plainly, and his features were distinctly emphasised by artists Dargie and Pugh in a manner entirely dissimilar to the Dutton portrait’s subject.

**Orlando Dutton (1894 – 1962)**

So, let’s take a look at the artist. Here’s what **Leonie Kirchmajer** has uncovered for us:

“From what I could find about Orlando Dutton, he was primarily a sculptor who was employed as an assistant to Edwin Sherbon Hills during WWII when he was commissioned by the Australian Army to create a relief model of northern Australia and New Guinea to aid in defence planning. I found the record of a photo (though not the image itself) of staff of the University of Melbourne’s Department of Geology and Mineralogy and the CSIR Mineragraphic Section from 1946. The list of names included Orlando Dutton, as well as the following recipients of the David Syme medal: Frederick Singleton, Edwin Sherbon Hills, Frank Stillwell, and George Baker. I found reference to a portrait of Frank Stillwell by Orlando Dutton that hangs in the Stillwell Room of the Graduate Union of the University of Melbourne. Given he was mainly a sculptor and that the only portrait references I could find were his portrait of Frank Stillwell and a self-portrait, perhaps it’s more likely the subject of this portrait is someone he knew personally.”

Given the year painted (and the artist’s dominant practice of sculpture), this is most likely [Orlando Dutton](#)’s final portrait, as he tragically drowned the following year in 1962. He was an artist of some standing in Victoria and had been the President of the Victorian Arts Society from 1946-47. So as Sir Gus asserts, it’s quite a good painting, and most likely an accurate likeness of the sitter.

**The Robes**



The sitter is wearing University of Melbourne robes  
12:48 AM - Oct 31, 2019 - Twitter for iPhone

Next, let’s consider the sitter’s doctoral cap and gown. Theories abounded about the University of Dublin, as well as both UK and local medical degrees, largely due to the green elements. We put a call out to the [Burgon Society](#) via Twitter – they are a UK-based non-profit founded to “promote the study of academical dress in all its aspects – design, history and practice.”

Very helpfully, the Burgon Society confirms “the sitter is wearing University of Melbourne robes.” Thank you!

**The Medals**

These were shared in as much detail as the portrait could allow us and were subject to broad speculation! The outlying theories were various medical medals conferred overseas, while the dominant contenders were:

- The Nobel Prize (for something) – essentially, related to Marfarlane Burnet.
- The inaugural Australian of the Year Trophy – again, related to Macfarlane Burnet.



The Numismatic Association of Victoria took a shot at the medals, sensationally sharing this gorgeous award from the RSV’s essay competition of 1860 – but obviously, not a contender for those in the portrait.



Following our own frustrating and ultimately fruitless search through online archives, our colleagues at WEHI were able to help us out with an image of the inaugural Australian of the Year Medallion awarded to Sir Mac in 1960 (below). An amazing, historic artefact, it's quite clearly not the medallions captured in the portrait. Images of Nobel prizes from this era also bear scant resemblance. Given the earlier deliberation about ruling out Sir Mac, we likewise rule out the Nobel and the Australian of the Year.

**The Case for Dr George Baker  
(1908 – 1975)**

Anne Donald No. not Macfarlane Burnet. The medal is a David Syme Research Prize, which Burnet never won. Also never seen him sporting a mustache. My favourite likely candidate is George Baker 1908-1975, awarded the medal in 1944. Here's a link to a bio with a photo [http://www.minsocam.org/admin/AM51/AM51\\_519.pdf](http://www.minsocam.org/admin/AM51/AM51_519.pdf)



Like Reply Message 3w Edited

Anne Donald first established the link between the medals and Dr George Baker in a Facebook post, referencing a document from the Mineralogical Society of America. She identifies the bronze medallion as the University of Melbourne's David Syme Research Prize, which correlates with Leonie Kirchmajer's findings concerning the artist, Orlando Dutton, and his associations with the University's mineralogists and Prize winners. Certainly, the Syme medallion aligns favourably with the bronze medallion in the portrait.

This photo is of Dr George Baker, sourced from Anne's linked document. It offers a pleasing likeness to the portrait.

George Baker shared the Syme Prize for Scientific Research in 1944. In 1956 the University of



Melbourne conferred on him the degree of D.Sc., its most prestigious degree in science. George was a Fellow of the Mineralogical Society of America and the Meteoritical Society, a Life Member of the American Geophysical Union, the Mineralogical Society of Great Britain, and the Royal Society of Victoria, and a Foundation Member of the Geological Society of Australia. He was Commissioner for Australia of the International Committee on Meteorites of the International Geological Commission.



The silver medallion to the left of the David Syme Prize medal is revealed to be the Royal Society of Victoria's own Medal for Excellence in Scientific Research – the first ever awarded, in 1959, to Dr George Baker. Leonie further observes:

*"It seems a bit sad that there is hardly any information about him from Australian sites. The best information I found online was the memorial in American Mineralogist. Yet he spent most of his life in Victoria, with much of it at University of Melbourne going from junior assistant to student, to graduate, then to academic. He was Senior Principal Research Scientist of CSIRO Mineragraphic section. He donated a sizeable collection of mineral specimens to the National Museum of Victoria where he was Honorary Associate in Mineralogy. Aside from the David Syme Research Prize and inaugural Royal Society of Victoria medallist, he was also a founding member of the Geological Society of Australia."*

*"Perhaps the unearthing and identification of this portrait provides a good opportunity to publish a piece about his life and contribution to science. There are probably still people alive today who worked with him. I'd suggest contacting the institutions he was closely associated with to see if they can assist."*

### Confirmation!

As it turns out, help was indeed close at hand in the form of another RSV Fellow, **Dr Thomas Darragh**, a Curator Emeritus with Museums Victoria and a life member of the Royal Society of Victoria.

*“The portrait is of Dr George Baker, former member of the Society. In his will, he left the portrait to the Society and his collection to the Museum. I picked up the collection from his home a few days after he died in 1975 and*

*also I think the portrait... I think you will find the medal is the RSV research medal. The portrait used to hang on one of the walls but must have been taken down during renovations. I thought it was labelled. The portrait was painted after he received his DSc from Melbourne Uni, hence the doctoral robes.”*



The RSV Medal for Excellence in Scientific Research

So - congratulations are in order to **Anne Donald** and **Leonie Kirchmajer**, who between them cracked the case!

In line with Leonie’s recommendation, we will look to how the Society can celebrate Dr Baker’s contributions to science in Victoria as an early achiever in our post-war research era.

### 1 Victoria Street – an Update for Members

While it is at times frustrating to “hasten slowly” on this project, our program of engagement with decision makers and supporters continues, with positive progress to date.



Following the members’ forum at the start of 2019, our partners have developed a design proposal that aims to deliver the world’s most sustainable tall building and a global benchmark for engineering in our science precinct.

We have also been working on the governance instrument for the proposed Science Engagement Fund that the project aims to create for the State of Victoria, with further work on a second fund to support the upkeep and activation of the Royal Exhibition Building area as a public knowledge precinct that unites the public programs of the RSV with those of the Melbourne Museum, the College of Surgeons and St Vincent’s Hospital. The vision is very exciting for both the precinct and the state, and we are building the case for support with our partners and champions.

We aim to arrive at a position to share more widely by mid 2020.



## Research Spotlight

by Priya Mohandoss, MRSV

**Avanthi Isaka Badulla Liyanage**

**MRSV**

**2019 YSRP Prize Winner for Physical Sciences**

Department of Civil Engineering, Monash University

**“Application of supercritical carbon dioxide in enhanced geothermal systems.”**



After completing her Bachelor of Civil Engineering in Sri Lanka, Avanthi was interested to pursue a PhD at Monash University in the areas of geothermal energy and heat extraction processes.

Current methodologies that are used to obtain geothermal energy involve injecting fluid into the earth, which then gets warmed through extraction of heat from deep Earth (the innermost layer of the planet). This heated fluid is then recovered and flows to the surface of the Earth to produce electricity. So far, the working fluid generally used for this process has been water. However, Avanthi’s project evaluated the concept of

using supercritical CO<sub>2</sub> as a substitute to investigate whether it had a greater potential in comparison to extract geothermal energy more efficiently.

Through her research, Avanthi discovered that when supercritical CO<sub>2</sub> is used as a working fluid, it has the capacity of developing and generating underground reservoir stimulation. Furthermore, she found that this substance proved to be more promising in terms of flow behaviour and its ability to extract energy from a simulated deep Earth environment of both high pressure and high temperature.

As a result of this finding, countries with geothermal potential and shallow waters can benefit from using these systems to extract their geothermal energy; for example, Iceland, US or Mexico and areas such as Coober Pedy in South Australia.

After completing her PhD, Avanthi would like to pursue a postdoctorate position. Although her research proved to be quite challenging to undertake, her efforts have imparted a source of inspiration to further her knowledge in this field, whether it be abroad or in Australia.

### Journal Articles

Isaka, B. A., Ranjith, P. G., Rathnaweera, T. D., Wanniarachchi, W. A. M., Kumari, W. G. P., & Haque, A. (2019). Testing the frackability of granite using supercritical carbon dioxide: Insights into geothermal energy systems. *Journal of CO<sub>2</sub> Utilization*, 34, 180-197. <https://www.sciencedirect.com/science/article/pii/S2212982019304354>

Isaka, B. A., Ranjith, P. G., Rathnaweera, T. D., Perera, M. S. A., & Kumari, W. G. P. (2019). Influence of long-term operation of supercritical carbon dioxide based enhanced geothermal system on mineralogical and microstructurally-induced mechanical alteration of surrounding rock mass. *Renewable energy*, 136, 428-441. <https://www.sciencedirect.com/science/article/abs/pii/S0960148118315581>

Isaka, B. A., Ranjith, P. G., Rathnaweera, T. D., Perera, M. S. A., & De Silva, V. R. S. (2019). Quantification of thermally-induced microcracks in granite using X-ray CT imaging and analysis. *Geothermics*, 81, 152-167. <https://www.sciencedirect.com/science/article/pii/S0375650518303778>

Isaka, B., Gamage, R., Rathnaweera, T., Perera, M., Chandrasekharam, D., & Kumari, W. (2018). An influence of thermally-induced micro-cracking under cooling treatments: Mechanical characteristics of Australian granite. *Energies*, 11(6), 1338. <https://www.mdpi.com/1996-1073/11/6/1338>

### **Annie Cox MRSV**

#### **2019 YSRP Prize Winner for Biomedical & Health Sciences**

The Ritchie Centre, Department of Obstetrics and Gynaecology, Monash University

***“Protecting women with preeclampsia and their babies: Could sulforaphane, a broccoli sprout extract, be the answer?”***



When completing the fourth year of her medical degree at Monash University, Annie's decision to take a year off and focus on a research component was resolved with a coin flip. As a result of this, she began her exploration and soon became so captivated that she decided to further her studies and undertake a PhD, in particular in the area of preeclampsia, a condition that causes high blood pressure during pregnancy and generally leads to early foetal delivery and the removal of the placenta.

Annie concentrated her efforts on evaluating the use of sulforaphane, an active compound in broccoli sprouts as an anti-oxidant to remove oxidative stress (due to an insufficient supply of oxygen to the mitochondria), and to decrease the effects of inflammation and high blood pressure.

So far from a mechanistic view, Annie discovered that sulforaphane has proven to work well on mitochondria and also function as a vasodilator. Furthermore, after performing a dosage study on populations of non-pregnant individuals and those having preeclampsia, she noticed that in both cases, the absorption and metabolism of sulforaphane changed so much that high levels of the compound would be necessary to gain satisfactory results. This component on dosage intake will be a significant factor of a larger clinical study and any other potential value from her intervention that she plans to achieve within the boundaries of her research.

After this, Annie intends to complete her medical degree and training in the area of Gynaecology and Obstetrics. She would also like to advance her clinical research career.

#### **Journal articles**

Cox, A. G., Gurusinge, S., Rahman, R. A., Leaw, B., Chan, S. T., Mockler, J. C., ... & Wallace, E. M. (2019). Sulforaphane improves endothelial function and reduces placental oxidative stress in vitro. *Pregnancy hypertension*, 16, 1-10. <https://doi.org/10.1016/j.preghy.2019.02.002>

Cox, A. G., Marshall, S. A., Palmer, K. R., & Wallace, E. M. (2019). Current and emerging pharmacotherapy for emergency management of preeclampsia. *Expert opinion on pharmacotherapy*, 20(6), 701-712. <https://doi.org/10.1080/14656566.2019.1570134>

### **Dr Emily Roycroft MRSV**

#### **2019 YSRP Prize Winner for the Biological (Non-human) Sciences**

School of BioSciences, The University of Melbourne & Museums Victoria

***“Phylogenomics, adaptation and extinction in the evolution of native rodents.”***



After being interested in books on evolution such as Charles Darwin's 'On the Origin of Species' at a young age, Emily knew that she wanted to pursue a scientific career within the interface of evolutionary biology, zoology and genetics.

Currently, she is interested in evaluating the evolution of Papua New Guinean and Australian rodents. At the moment, there are approximately 180 species in total with around 65 of those species inhabiting Australia. Through the use of phylogenomics, she is generating a database of these species to determine how these species and others that are extinct due to European settlement in the past 200 years are related to or divergent from each other. This is of more significance to the extinct ones as there are only a few specimens that are readily available for analysis.

Her project encompasses a part of a larger study called the Oz Mammals Genomics Frameworks Data Initiative through Bioplatforms Australia. The intent of this study is to sequence genomics scale data to establish a detailed evolutionary framework of all Australian mammalian species incorporating rodents, bats and marsupials.

One of the highlights of Emily's research has been the discovery of the Gould's mouse that was thought to be extinct. It has now been found to be the same as the species that habitats off the Western Australian coast of Shark Bay, a group of islands that preserve much of the Australian biodiversity in species lost on the mainland.

In terms of application, the genomic data from her study can be used in conservation and decision-making processes to provide details of how to induce gene flow between

populations, particularly those that reside in highly fragmented habitats.

After completing her research in this area, Emily plans to do a post-doctorate preferably in the fields of biodiversity, genomics and evolutionary biology, employing the concepts she has already learnt to further her studies whether it be on rodents, mammals or other types of native Australian species.

### Journal Articles

Roycroft, E. J., Moussalli, A., & Rowe, K. C. (2019). Phylogenomics Uncovers Confidence and Conflict in the Rapid Radiation of Australo-Papuan Rodents. *Systematic Biology*. <https://doi.org/10.1093/sysbio/syz044>

Roycroft, E. J., Nations, J. A., & Rowe, K. C. (2019). Environment predicts repeated body size shifts in a recent radiation of Australian mammals. *Evolution*. <https://onlinelibrary.wiley.com/doi/10.1111/evo.13859>

## Christmas Beetles

by Priya Mohandoss MRSV

Throughout late December, clusters of Christmas beetles tread around the coastal and damp regions of Australia. These lustrous creatures with their coatings of reflectors built into their exoskeletons come in tinges of golden brown, green, black, pink, violet or opal overtones. Belonging to the genus *Anoplognathus* within the family Scarabaeidae, there are about 35 species in total.



They are called Christmas beetles because they emerge and are most active during the dry summer spell. While they have the capacity to fly long distances with their dainty wings, during the festive season, they have the tendency to

become drawn to the light displays that adorn many dwellings, especially at nightfall. As a consequence, they can be found scurrying along the ground in a state of disarray the next day.

Due to farming, clearing and the availability of greater areas of grassland, the larvae have been able to graze on decaying organic supplies such as roots of native grasses and crop species and in turn, sustain their population. However in other traditional habitats, their numbers have been dwindling on account of urban development and habitat loss.

During their beetle phase, they like to chew on eucalypts, where they have the capacity to create much deterioration to the leaves. Most of their feeding frenzy goes on during the night where they congregate in groups to devour much of the mature green leaves within the tree. As a result, one tree can be left empty while the one adjacent can still carry an abundance of food source. While all this can cause much havoc, photosynthesis is still able to take effect for the tree to rejuvenate the subsequent year.

With their charming prism of colours, these creatures are a constant reminder that Christmas is approaching.

and [genetic rescue-based conservation efforts](#) have allowed some populations to rebound, but the possum is facing new threats, and the species remains Critically Endangered on the IUCN Red List of Threatened Species. The Bogong moth, a key food source in the mountain pygmy possum diet, has declined in recent years. Efforts to understand Bogong moth biology are underway.

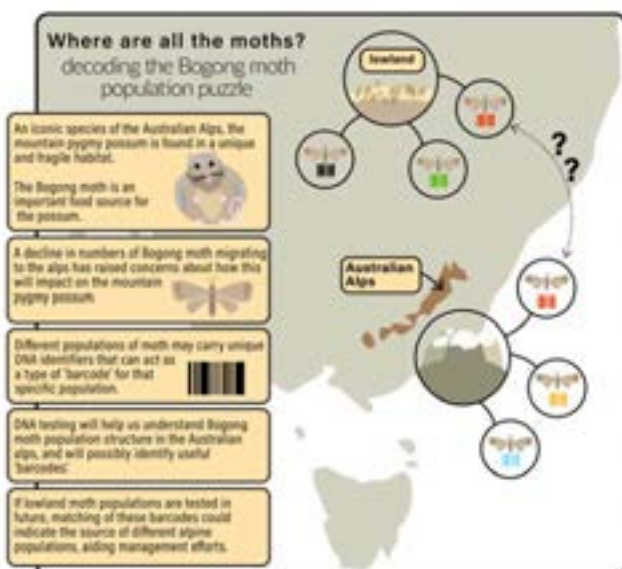


**Mountain pygmy-possum - *Burrmys parvus***  
 "Mountain pygmy-possum - *Burrmys parvus*" by [Australian Alps](#) is licensed under [CC BY-NC-ND 2.0](#)

## The Bogong Moth Population Puzzle

by Dr Jessica Lye

Team Lead - Extension & Communication  
[cesar Australia](#)



An iconic species of the Australian Alps, the **mountain pygmy possum** (*Burrmys parvus*) is found in a unique and fragile habitat that is highly sensitive to environmental change. Habitat conservation

Anyone who has been to the Australian Alps, whether for winter sports, snowshoeing, hiking, or for summer wildflower appreciation will understand what a unique bioregion it is. The mountain pygmy possum – a product of this environment – is no different. Weighing in at a tiny 35-80 grams and being the only Australian marsupial restricted to alpine and sub-alpine environments, it is a fascinating animal indeed.

The mountain pygmy possum is found in three regions of the Australian Alps: Kosciusko National Park, the Mt Bogong-Mt Higginbotham region, and Mt Buller. The total area of the alps estimated to be occupied by the possum is no more than 6 km<sup>2</sup> and populations are generally not found below the winter snowline (1200-1400m in Victoria).

Breeding occurs at snow melt (late September/early October) and weaning of young occurs between late December to late January. Very occasionally a female can have a second litter in late summer, but this is often risky for the female and her offspring. As winter approaches and they begin their

hibernation, fat reserves are crucially important for survival.

In spring, when female possums awake from hibernation hungry and male possums need energy to run the gauntlet to female territory in order to breed, the possum diet relies heavily on insects. There is one insect in particular that arrives in the alps at this time and forms a large and important part of the possum diet: the migratory Bogong moth (*Agrotis infusa*). These moths are particularly rich in fat and, therefore, have been considered an important food source for females and their developing young.

Recently, an apparent large decline in numbers of Bogong moth migrating to the alps has raised concerns about how this will impact on mountain pygmy possum numbers. So, the question is *where are all the moths?* It is a puzzle that **cesar** researchers Dr Andrew Weeks, Dr Anthony van Rooyen, and Dr Peter Kriesner are currently trying to decipher, funded through the DELWP Icon Species Recovery Program.



**Bogong moth,  
*Agrotis infusa***

["Day 5 - Photo 5: Bogong Moth"](#) by [Atlas of Living Australia](#) is licensed under [CC BY 2.0](#)

Despite the importance of Bogong moths as a key food source for the mountain pygmy possum, very little is known about the ecology and biology of this lepidopteran. A useful piece in

the puzzle will be uncovering the link between lowland moth populations and their migratory route to alpine areas. As the moth potentially migrates from multiple regions over a broad area of eastern Australia, understanding Bogong moth migration will be a challenge.

While you may be thinking that the perfect solution could be teeny radio trackers, like the type [used on honeybees](#), there is actually

no need to develop moth sized transmitter backpacks to paint a picture of Bogong moth migratory routes. We can do this from the comfort of the laboratory (after collecting moth specimens of course).

Like any species, different populations of Bogong moth are likely to carry unique genetic identifiers that can act as a type of barcode for that specific population. When you buy an item from your local shop, let's take a pot of yoghurt for instance, the container will have a barcode that allows the product to be traced back to the packhouse, or even the farm from where the milk was sourced. We can use DNA in the same way!

In short, we can identify certain combinations of DNA bases (A, T, G, and C) that act like barcodes and allow identification of distinct moth populations, which is extremely useful for undertaking future investigations. For instance, if we can understand Bogong moth population structure in the alps at the genetic level, future testing of lowland moth populations could identify the source of different alpine populations through matching of those DNA barcodes. But, how does this help the mountain pygmy possum?

If we can identify where Bogong moths are travelling from each season, we can then investigate why moth numbers have declined in the alps and make informed management decisions based on this knowledge. For instance, the current drought in inland eastern Australia has been implicated as a likely cause of the low moth numbers. Fortunately, moth collections have already begun, with Dr Peter Kriesner having recently returned from the first trapping field trip in the alps, and we will soon begin a genetic analysis that will investigate Bogong moth population structure.

Mountain pygmy possum population health is a precarious thing, as the species exists in a fragile and contracting habitat, and populations remain very small. Slight environmental changes could tip the balance towards irreversible decline. In a country infamous for an extremely high rate of mammal species extinctions, solving the puzzle of the Bogong moth may be crucial in maintaining the health of this iconic marsupial species. .



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 **2<sup>nd</sup> March 2020**. The elected Councillors will take up office from the Annual General Meeting to be held 14<sup>th</sup> 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, 16<sup>th</sup> 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.

*The Royal Society of Victoria – Call for Nominations, Council Election 2020-21*

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](mailto: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 16<sup>th</sup> 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/>.**