The Royal Society OF VICTORIA
Promoting science since 1854

Inspiring AUSTRALIA Victoria

SCIENCE VICTORIA

MARCH 2023

CRACKING THE CODE

Going Beyond Gender to Achieve a Gender Equal Future

pg 22

IN THIS ISSUE

Dr Sarah Garnick, an Ecologist and Senior Policy Officer at the Department of Energy, Environment and Climate Action (DEECA)

SCIENCE VICTORIA

This Edition: Women in STEMM

A significant and persistent gender gap at all levels of the STEMM workforce, both in Victoria and around the world. It is only now showing signs of change, however there is a lot left to do. In this edition, we feature experiences of women working in STEMM in Victoria, and some of the groups supporting the engagement and retention of women as talented scientists, doctors, and engineers.

On the Cover: Dr Youry Kim and Dr Jenny Anderson. Credit: The Peter Doherty Institute for Infection and Immunity.

Please note that the submission deadline for content to be included in the April 2023 edition of *Science Victoria* is **5pm, Tuesday 21st of March 2023.**

ON EQUITY AND INCLUSION IN THE SCIENCES

Mike Flattley
CEO, The Royal Society of Victoria

The start of each year is filled with important prompts. Formally, we observe the International Day of Women and Girls in Science on 11 February, and then International Women's Day on 8 March. You'll find much about the panel session recently held at the Victorian Parliament in this issue, and I record my thanks once again to all who helped us bring the event together as a part of the Inspiring Victoria program.

We also proudly support the efforts of aligned organisations like Queers in Science, who contribute outstanding science lectures for Victoria's annual Midsumma Festival, complementing the culmination of Victoria's Pride activities on 8 February.

When we extend our support to these and other equity initiatives, I often field comments about the appropriateness of our Society "branching out" into social and political issues at the (alleged) expense of scientific objectivity, to which the answer is invariably "science is a human endeavour." If you have any doubt as to how far we have yet to travel to ensure equitable participation in the sciences by the historically marginalised, then I hope you'll take the time to read some of this month's pieces from a range of excellent contributors on the campaign for inclusion of 50% of the planet's much-needed brain power, and the need to bring *everyone* into that future.

I'll also direct anyone with the emotional fortitude to an excellent article published by the ABC on 23 February, retracing the fateful steps of Sydney's first Gay and Lesbian Mardi Gras in 1978. I expected an excellent human interest story, but I did not expect to find myself in tears. The events of that night are a stain on our national character left within living memory, and the sheer, enduring courage of those marching leaves me uncharacteristically speechless.

Finally, for those attending, I'm looking forward to joining an amazing panel at 2pm on 8 March as a part of the online Science Meets Parliament program. Titled "Knowing our Past - Truth Telling in Science," I'll be joining Yawuru epidemiologist and UNSW Scientia Lecturer Dr Kalinda Griffiths, Quandamooka mathematician and Chair of the Aboriginal and Torres Strait Islander Mathematics Alliance Professor Chris Matthews, and the Immediate Past President of our sister society in Tasmania Professor Mary Koolhof, to explore truth telling as a vital component of the reconciliation process between Australia's settler and Indigenous peoples, with particular references to the sciences. To be honest, I'm intimidated, but the conversation needs to begin at both national and local levels within the science community, particularly in light of the Yoorook Justice Commission's important work towards Treaty here in Victoria, and the First Nations' Voice to Parliament at the national level. It's an honour to contribute, and incumbent upon learned societies with origins in the colonial era to shoulder some weight. You can register to attend Science Meets Parliament at **sta.eventsair.com/science-meets-parliament-2023**.

There is always more to be done to repair the impacts of marginalisation and the subjugation of other human beings by those made powerful by the accident of their birth, both historically and contemporaneously. I hope you can help us secure a growing culture of inclusion in Victoria's science community.

Mike Flattley
CEO, The Royal Society of Victoria

Reference:
1. Sydney Mardi Gras: How one night of violence in 1978 forever changed Australia's LGBTQIA+ movement, ABC News, www.abc.net.au/news/2023-02-23/retracing-the-steps-of-the-first-mardi-gras-in-sydney-1978/101881890

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Acknowledgement of Country:
The Royal Society of Victoria acknowledges the many First Peoples of our continent, their vast history and connection to the lands and waters within and beyond the State of Victoria, and the valuable cultural and scientific knowledge held by the Elders to care for Country. We acknowledge our headquarters are located on Wurundjeri land, never ceded, and convey our respect to Elders past and present. The RSV welcomes all First Nations people, and seeks to support and celebrate their continued contributions to scientific knowledge.

WHO ARE WE LEAVING BEHIND?

Dr Catherine de Burgh-Day
Vice President, The Royal Society of Victoria

We recently celebrated the International Day of Women and Girls in Science. In light of this, the story I'm about to tell might seem a little counterintuitive, so bear with me.

My partner Alec and I recently had a very thought-provoking discussion with the young adult son (let's call him Sam) of some friends of ours while visiting them for dinner. The topic of Andrew Tate came up, and since Sam is exactly Andrew Tate's demographic, I asked him what he thought about him and his messages of misogyny.

His response was that while he does not like or follow Tate, he knows many people do. He said he is very supportive of feminism and improving equality amongst men and women, but also feels like girls get a lot of opportunities that he doesn't. While writing this article I reached out to Sam to discuss this more, and he reiterated his perspective:
"I feel that my generation has grown up as equals. We were brought up by people who had fought for equality and thus had raised their children the way they wished to see world work. Throughout my entire life I was raised to see everyone as equal, and therefore in my m
ind they were. However, it began to feel unequal when the girls at school started to get given opportunities that the boys weren't."
Sam emphasized that as he grew into an adult, he came to appreciate the importance of addressing inequality, but that young men don't have the experience to see the bigger picture, and understandably struggle with the inequality they themselves experience:

"Now as an adult with a little more experience and knowledge under my belt I can see why these opportunities are being provided for the girls in my class. Affirmative action is important for equality, but as a young man growing up in a seemingly equal society it can seem like an injustice. And a lot of my male peers would have benefited hugely if they had received the same empowerment and encouragement as our female peers."

> Of course, the real ideal is for anyone to occupy whatever roles and traits they desire, regardless of gender identity.

Another aspect of this issue which Sam raised was that many young men feel that part of the push for gender equality has manifested as an attack on masculinity:

"While toxic masculinity is a very valid issue that needs to be solved, it would seem that all masculinity is lumped into that.... It is no longer 'in' to be strong, brave, stoic and to protect one's friends and families because to be strong is to be dangerous, to be brave is to be stupid, to be stoic is to be emotionless and to be protective is to say that women can't protect themselves."

I would agree with Sam that alongside the fight for women to be able to occupy roles other than stereotypically feminine ones, there has been a backlash against men leaning into stereotypically masculine roles. The emphasis on men occupying roles in society which were traditionally held by women has had the unintended consequence of sending the message that it's no longer ok for men to occupy traditionally male roles. Of course, the real ideal is for anyone to occupy whatever roles and traits they desire, regardless of gender identity.

'Gendered' professions are declining, but this shouldn't restrict a person of any gender choosing a traditional or non-traditional role. (Shutterstock)

Ironically, many men are feeling forced out of the roles they wish to occupy – something us women are all too familiar with – which is contributing to a crisis of identity and sense of purpose in young boys and men.

Our conversation with Sam left Alec and I with a lot to think about on the drive home after dinner. As a woman who has spent much of her life in male dominated fields (farming, physics, software development), I am passionate about promoting gender diversity and am an active volunteer speaking to girls about pursuing STEM careers. I believe that there is a massive underrepresentation of women and gender diverse people in positions of power and leadership, and that we will not have a gender-equitable society until people of any gender identity can freely pursue whatever career and life path they choose without facing discrimination... But that does not detract from the very valid complaints Sam made. Furthermore, in the weeks after this, Alec and I asked a number of other young men we know what they think, and their responses were along the same lines.

> To me, it feels like a genuine threat. It feels like there is a generation of men coming along who will hold misogynistic and violent ideals which will threaten my freedoms, rights, and possibly even personal safety, because I am the object of their ire.

Sam Balye (Unsplash)

As a woman, I am deeply concerned about the number of young men who are following what Tate preaches. To me, it feels like a genuine threat. It feels like there is a generation of men coming along who will hold misogynistic and violent ideals which will threaten my freedoms, rights, and possibly even personal safety, because I am the object of their ire.

So, grifters such as Tate have risen in popularity, and are garnering a following amongst even well educated, well-intentioned young men. And these young men explain this trend by pointing to the ways in which they feel that they are being treated unfairly next to their female peers, and are being stripped of their sense of identity and purpose by society. At the same time, men (especially white, older men) still occupy a profoundly privileged position in society, and toxic masculinity is still a real problem to be overcome.

When you think about this from the perspective of these young men however, it is easy to see how they can feel mistreated; they aren't responsible for the discrimination women and gender-diverse people face. They are good to the women around them and support feminism. They (in fact, almost all young people in my experience) are far more caring, progressive and accepting of differences than many older adults. And yet, they face a challenging period in their lives with less obvious opportunities for growth than the girls around them, fewer scholarships, fewer awards, little to no clarity about their role in society, and a constant stream of messages telling them they are the privileged ones and that they should feel bad about it. Add onto this the messaging they get from more traditional/patriarchal parts of society that they deserve all the privilege they aren't getting, and you can see how this is a very bitter pill to swallow. It would make anyone feel resentful and alienated.

To make matters worse, it is harder than ever for these young men to feel any sense of community where they can explore these challenges in a safe space. It's not something they are going to want to discuss around girls, and if they form groups of boys to discuss it, they risk being branded as anti-feminist. So where can these young men go to find community, purpose, and a safe space to explore these issues?

> To make matters worse, it is harder than ever for these young men to feel any sense of community where they can explore these challenges in a safe space.

Enter men such as Tate. These young men, disfranchised and struggling between the desire to do right by the women they know and bubbling resentment at the opportunities these girls get that they don't, are easy pickings for his gospel of hate and misogyny.

Coming back to the conversations Alec and I have had about this (which continued on weeks after our drive home from dinner with Sam and his family), we started to think about what could be done about it. It struck us that something that was absent from this story was the older non-Tate like men of the world. A big reason that there are a lot of women coming to schools to talk to girls about careers is because there are women in the schools motivated to invite them, and there are women out there motivated to donate their time to come and talk. I am one of those women. The reason we do this is because we struggled as a minority in our careers, or because we faced discrimination or harassment. Similarly, a lot of the girls-only scholarship opportunities come from endowments made by women who want to make things easier for future generations of girls.

I would love to be a role model who could come and talk to young men about careers and about how to embrace their masculinity in a positive way, but I am not who they need – they need a male role model who they can relate to. And for that to happen, men need to start stepping up and being that role model. The reason men like Tate have so much pull is because there are almost no alternatives.

So, this brings me (at last) back to the theme of this piece – the International Day of Women and Girls in Science. The power that misogynists like Tate have scares me, because it threatens the future of girls and women in traditionally male dominated fields like science (not to mention the safety and wellbeing of all women and girls).

To the men reading this: if you care about the future of girls and women in science, then please become more active in mentoring and supporting the young men in your community. Be the positive role model they can turn to. To the women reading this: please go out there and encourage the men in your life to become mentors and role models for young men and boys.

It may seem counterintuitive, but a critical cohort we need to support if we want to achieve equity for all gender identities are young men and boys. They are part of the solution, and we need to listen to them. Right now, we are leaving them behind, and they don't deserve that. *None of us deserve that.*

Dr Catherine de Burgh-Day
Vice President, The Royal Society of Victoria

Catherine is the Vice President of the Royal Society of Victoria. During the day she works as a research scientist at the Australian Bureau of Meteorology, focussing on coupled weather and climate models and machine learning. She has a Masters in physics and a PhD in astrophysics from the University of Melbourne, and has previously done research in astrophysics and economics, and worked as a software developer.

SAVING AUSTRALIA'S TREASURED TROVE

By Wayne Hodges

Trove (**www.trove.nla.gov.au**) is Australia's dedicated online research platform, hosted and maintained by the National Library of Australia, allowing a search gateway to over 6 billion resources. These include library holdings, digitised periodicals, newspapers, Government Gazettes, images and videos, archived websites, research papers, ABC radio program transcriptions, and more. It allows a single access portal to a wealth of material spanning hundreds of years[1].

Unfortunately, there is a cloud hanging over the future funding of Trove, with no certainty set to be revealed until this year's May Federal Budget.

Trove functions as Australia's 'National Union Catalogue'[2], allowing everybody to search the holdings of most libraries in the country who subscribe to Trove – not just their local public, tertiary institute, or State library. An interested researcher can then arrange an interlibrary loan or physically visit the holding library to personally browse or borrow the item from another the library's collection.

Trove has an agreement with OCLC[3], with Australian holdings recorded on Trove being searchable on WorldCat[4] alongside other library holdings from all over the world. Unfortunately, in recent times a new subscription model has been implemented for Trove, which is more expensive than previous years, and some libraries are genuinely considering whether it is of value continuing a subscription to Trove and listing their holdings. The fewer libraries subscribed to Trove the less likely resources can be sourced by researchers and general readers, and the future of the online platform is less reliable.

There has been substantial investment by libraries, galleries, archives, museums, historical societies, and other organisations to improve the amount of digitised material on Trove, including historical newspapers, periodicals, and research papers. Text correctors have also voluntarily corrected nearly 460 million lines to make searching of digitised newspapers, gazettes, and journals more accurate and efficient. Losing all that has been achieved in recent years will be a tremendous blow to the future of humanities and scientific research in Australia into the future.

According to the present Trove Strategy "[the National Library of Australia] has sufficient resources to maintain Trove until June 2023. The future of Trove beyond July 2023 will be dependent upon available funds. To achieve the full strategic vision will require substantial investment. … In a limited funding environment, Trove may reduce to a service focused on the National Library of Australia's collections. Without any additional funds, the Library will need to cease offering the Trove service entirely."[5]

This means that Trove is facing potential reduction of content or discontinuation. This has caused backlash from the academic and general users in the Trove community (including in the past month a formal Federal Parliamentary e-petition, "Fully fund Trove"[6] that received more than 22,000 signatures in only 4 weeks, which will be tabled in Parliament in the future). Hon. Tony Burke MP, the Federal Arts minister, said the outcry was 'justified' and has promised to end the 'culture wars.'[7] He has recently had a one-to-one meeting with the head of the National Library of Australia at Parliament House to establish the funding needs of the institution, including Trove[8]. NLA estimates "$10 million a year is needed to maintain Trove. This does not include a further $1 million annually to maintain cybersecurity, or a budget for digitising new material. For an extra $100 million, Trove could be rebuilt with modern technology incorporating new features."[9]

Wish to help Trove have a thriving future? Write to Hon Tony Burke MP and your local MPs expressing your support for the research platform. You can also request your Municipal Council (like Albury City Council recently did), university or researching body to formally write to the Government expressing support.

While we can hope for perpetual Federal funding for the platform, we must also explore what the Victorian Government can do to improve Trove for Victorians, such as increasing the amount of Victorian historical content searchable via Trove, including the State's newspapers and Government Gazettes.

Unlike NSW and WA, who fund mass digitisation of their respective State's newspapers, Victoria's digitised newspapers on Trove are currently concentrated on World War One years (1914-1918). Yet for an estimated $12 million, all out-of-copyright microfilmed Victorian newspapers held by State Library Victoria can be digitised to Trove[10].

Digitising these newspapers will mean millions of people – irrespective of time, location, or finances – can access thousands of newspapers held by State Library Victoria. Freely, simultaneously, anytime, anywhere, for perpetuity. This would benefit heritage tourism, historical societies, genealogists, galleries, libraries and museums, schools and universities, journalists, and the publishing sector. Major returns, for a small expense. If you wish to support more Victorian newspapers on Trove you can write to your local Victorian MP as well as follow the More Trove for Vic Facebook Page[11].

Wayne Hodges has a Diploma of Library/Information Services from Swinburne University, and has been utilising Trove since its launch for study, employment, as a text corrector, and a digitisation advocate. He has been actively advocating for Trove via the 'More Trove for Vic' campaign, with the hope that more resources become truly accessible to as many people irrespective of time, location, and finances.

References:

1. Trove Content, trove.nla.gov.au/about/what-trove/trove-content
2. National Union Catalogue (NUC), en.wikipedia.org/wiki/National_Union_Catalog
3. OCLC, www.oclc.org
4. WorldCat, www.worldcat.org
5. National Library of Australia, "Trove Strategy", www.nla.gov.au/about-us/corporate-documents/corporate-strategies/trove-strategy
6. Parliament of Australia, "Petition EN4747 – Fully fund Trove", www.aph.gov.au/e-petitions/petition/EN4747
7. Jervis-Brady, Dan. "Institutions outcry 'justified': Burke." The Canberra Times, 31 December 2022.
8. Barlow, Karen. "'How bad': Tony Burke asks national collecting institutions about their funding. The Canberra Times, 14 February 2023.
9. Morris, Linda. "Blue poles at risk in neglected gallery: Exclusive BUDGET CUTS." Sydney Morning Herald, 20 February 2023.
10. There is more than 9,500 years' worth of newspapers yet to be digitised in the out-of-copyright microfilmed collection at SLV alone. Multiplying this by frequency, average pagination recorded in newspaper directories, and allowing for duplicate pages gives this estimated figure.
11. "More Trove for Vic", www.facebook.com/MoreTroveForVic

TIME TO WORK TOGETHER TO CARE FOR VICTORIA'S FORESTS

By Professor Rod Keenan
Chair of the Victorian Branch of Forestry Australia

Victoria's forests are in trouble. Fire, pests, weeds, neglect, exploitation, and the changing climate are taking a huge toll - but if we work together, we can create a better future for our forests. To properly face the future, we need an incoming government that can develop a new vision for forests, one based the integrated, holistic world view of Traditional Owners and embracing the diverse needs and interests of all Victorians.

The bushfires in the summer of 2019-20 were unprecedented in their scale and impact on forests, on wildlife and on people. The previous 20 years saw increasingly intense fires impacting on all types of forests: protected areas, native timber production forests, private native forests and plantations. Under a future climate these threats to forests will increase.

These events should have been a wake-up call for policy makers, government agencies, environmentalists – to all those who depend on, and care about, forests. Instead, we see only more bickering, fighting and division, with arguments in courts over minutae such as wildlife surveys, while ignoring the big threats to our forests and their wildlife. Millions have been spent on lawyers and experts in court cases when that money could have been spent in the forests, addressing future challenges.

The current approach - to partition forests into relatively small, intensively managed areas for timber either in plantations or native forests, and taking a largely passive, hands-off 'protection' strategy to the rest - is not working. It has led to a decline in resources and forest management capacity and to forests with reduced resilience and declining health. Large areas in national parks and state forests are facing complete changes in species composition. Because the forests have changed, wildfires are more difficult to suppress, with subsequent devastating impacts on forests, species, people and assets. These matters are compounded by a lack of information on the overall health of our forests, or the status of species that depend on them.

We now have bureaucratic paralysis, with no-one managing the forests. Policies have simply focused on stopping an industry rather than exploring new approaches.

The 'modernised' Regional Forest Agreements, and the recent Major Event Review, specified the need for ongoing active management of forests. It is time to give serious intent to those objectives. By working in partnerships with, and empowering, Traditional Owners we can look at Country as a whole and use fire and other tools intelligently to protect and care for forests.

Forestry is the science and craft of creating, managing, conserving, using and caring for forests. By using silviculture - the toolkit of forestry, we can work with Traditional Owners to create healthy, more resilient forests. Around the world, new forestry approaches are being used to restore forest health and increase resilience in the face of climate change. Large-scale experiments are used to test alternative approaches and demonstrate their outcomes.

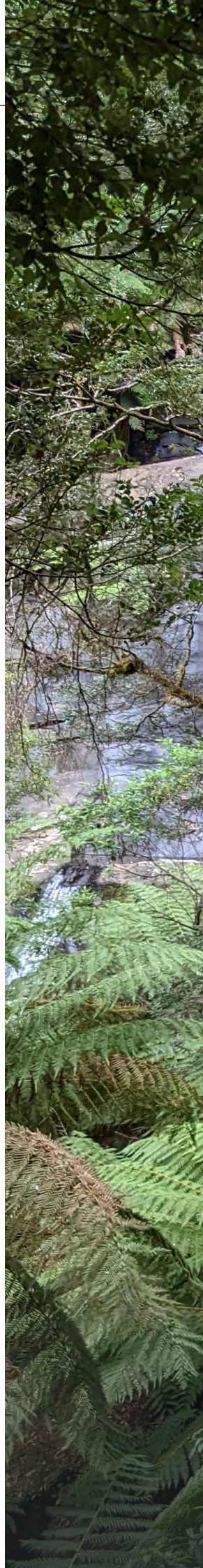
Rather than simply shutting down an industry, we can use our collective wisdom to design a new silviculture for Victorian native forests. With the combined experience and knowledge of Traditional Owners, forest managers, forest scientists and other community members we can develop a blueprint for better ways - the right ways - to care for forests.

Local people living near forests also need a greater say and involvement in caring for these forests. Traditional Owners say - 'Country needs people'. More people working on Country year-round, actively managing forests across all tenures to regularly monitor forest conditions, provide greater flexibility and capacity to use fire when conditions are suitable, and be in place to suppress potentially dangerous fires at an early stage. This could happen by extending Indigenous ranger programs, so successful in northern Australia, to Victoria.

New plantations and farm trees are needed to meet timber needs, to sequester carbon and to provide many on farm benefits. But these depend on surrounding native forests being actively managed to address risks to these assets and ensure they provide desired future benefits.

Current Federal funding in land management and conservation programs is ad-hoc, short-term, poorly integrated and poorly targeted. The incoming Victorian Government needs to encourage the Federal Government from being a passive observer to an active and informed investor in forest and bushfire management. This can ensure we have the capacity and resources to better care for forests.

By putting aside our differences and looking at the big picture, we can work together to develop an Indigenous-led, long-term, 'whole-of-country' approach involving all levels of government, the private sector and community groups, to ensure all our forests, and the communities that depend on them, are healthy, resilient and productive.



Triplet Falls, Great Otway National Park (Scott Reddiex)

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Scientell is a science, environment, and technology communication company. They work to transform technical information into clear text and messages for non-scientific audiences, such as policy-makers and the wider community.

Scientell communicate science via a range of publications, as well as producing content for web sites, creating videos and animations, and facilitating workshops.

BECOME A MEMBER OF THE RSV

The Royal Society of Victoria is the State's oldest scientific society, a part of Australia's intellectual life since 1854. We bring together an independent community of science practitioners, educators, industrialists, and enthusiasts to promote an understanding and utilisation of scientific knowledge for the benefit of the state of Victoria.

MEMBERSHIP BENEFITS

- Learn about developments in a wide range of science disciplines and how these can be applied to issues confronting Victoria through our lecture program and symposia
- Meet and share knowledge with like-minded people
- Collaborate with colleagues to deliver the Society's various programs and projects, using (and developing) your professional skills and experience
- Access discounts to RSV events and forums, and (limited) car parking in the Melbourne CBD.

OUR WORK

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

$40/YEAR

Student Membership

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

$120/YEAR

Full Membership

Open to all adults (18+) with an interest in science! A current membership of the Royal Society of Victorian entitles the use of the professional postnominal 'MRSV.' Those elected as Fellows of the Society are entitled to the postnominal 'FRSV.'

$1000/YEAR

Organisational Membership

For organisations to claim membership of the RSV. Provides a method for general sponsorship of the RSV's programs, along with discounted rates for access to RSV facilities throughout the year.

The Royal Society OF VICTORIA
Promoting science since 1854

To join the Royal Society of Victoria please go to **rsv.org.au/how-to-join**. You can also choose to support science in Victoria by completing the donation form in this edition or visiting **donorbox.org/royal-society-victoria**

INTERNATIONAL SCIENCE SCHOOL 2023

ISS2023
The Professor Harry Messel **International Science School**

The fully residential International Science School returns to the University of Sydney in July 2023.

Join top science students from across Australia and around the world for two weeks of inspiring talks by world-renowned scientists, amazing visits to cutting-edge research facilities, loads of hands-on experiments and activities, and a packed program of social events.

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Best of all, ISS2023 is entirely free, funded by the Physics Foundation at the University of Sydney through support from the NSW DET, the Australian Federal Government, Mulpha Australia, and many generous private and industry donors.
It's going to be fantastic; you don't want to miss this one.

ISS2023 will run from 2-15 July 2023 — science-mad students in years 11 and 12 in 2023 are encouraged to apply.

Applications close 6 April 2023. For more information, visit:
sydney.edu.au/science/iss

THE UNIVERSITY OF SYDNEY

On behalf of the University of Melbourne

David Syme Research Prize

Nominations are now open for the David Syme Research Prize.

The annual prize rewards the best original research in Biology, Physics, Chemistry, or Geology produced in Australia during the two years preceding the closing date for applications. Preference will be given to original research of value to Australia's industrial and commercial interests (i.e., the impact of the research on the discipline and more broadly).

The prize was established following a donation from Mr David Syme in 1904 to the University of Melbourne, and was first awarded in 1906.

Value: ~$10,000AUD, and a medal.
Closing Date: 31 March 2023
Outcomes Announced: 30 April 2023

The prize is made by nomination only. Senior members of the academic or research community such as co-authors or co-researchers, heads of department or deputy vice-chancellors (research) are invited to nominate eligible colleagues. Self-nominations are not accepted.

Researchers associated with any Australian university and researchers without university connections are eligible for nomination, noting that the following are **not** eligible:

- Professors or researchers who will have attained the position of professor at the time the award is made;

- Researchers outside universities who will have attained a level of seniority comparable to a university professor at the time the award is made (LEVEL E);

- Researchers who have not spent the equivalent of at least 5 full years of the last 7 in Australia.

Full details and the nomination form are available at:
scienceunimelb.smartygrants.com.au/DavidSymeResearch2023

All enquiries should be directed to:
science-internalfunding@unimelb.edu.au

On behalf of the University of Melbourne

Grimwade Prize

Applications are now open for the Grimwade Prize for outstanding work in Industrial Chemistry.

Value: $7,500AUD, and a medal.
Closing Date: 31 March 2023
Outcomes Announced: by 28 April 2023

Eligibility

The competition for the Grimwade prize is open to graduates of the University of Melbourne, or any university or tertiary educational institution whose degrees are recognised by the Faculty of Science; and undergraduates of the University, who have spent a period of not fewer than two semesters in study or research in a laboratory or laboratories of the University.

A candidate for the Grimwade Prize (in any year) must submit an original thesis or papers embodying the results of an investigation pursued by the candidate in Victoria within five years of the competition in connection with some branch of industrial chemistry. The subject of the investigation must be approved by the Faculty of Science.

Application Process

Applications for the Grimwade Prize are submitted through SmartyGrants.

If a joint entry is being submitted, relevant information about all candidates should be supplied. If the work has been carried out in collaboration with other persons, candidates (except in the case of a joint entry) should state their own share in the work.

Full details and the nomination form are available at:
scienceunimelb.smartygrants.com.au/GrimwadePrize2023

All enquiries should be directed to:
science-internalfunding@unimelb.edu.au

The Field Naturalists Club of Victoria
Est. 1880

On behalf of the Field Naturalists Club of Victoria Inc

Australian Natural History Medallion

Nominations for the 2023 Australian Natural History Medallion are now open.

The Australian Natural History Medallion is awarded annually in recognition of services to Australian natural history, and is administered by the Field Naturalists Club of Victoria Inc. Previous medallion winners include mycologist Dr Genevieve Gates (2022), botanist Peter Latz (2021), and ornithologist Craig Morley (2020).

Eligibility:
Nominations are open for anyone who has increased popular and/or scientific knowledge of Australian natural history (biological or physical) in the preceding 10 years.

Nominees may have:
- Assisted notably in the protection and understanding of Australian native flora and/or fauna;
- Discovered and and/or described new Australian species of plants or animals; or
- Devoted considerable time and care to the study of any branch of Australian natural history, including palaeontology and geology, and the dissemination of knowledge through the publication of articles or books or by photography or pictorial art or any other means accepted by the Award Committee.

NB. Information pertaining to the nominee's activities prior to the preceding ten years may be included in the nomination if the nominating Society judge it to be pertinent.

If you would like to nominate a candidate for the Australian Natural History Medallion, please contact Maxwell Campbell, Secretary of the Field Naturalists Club of Victoria, for more information on **0409 143 538** or by email at **mcam7307@bigpond.net.au**.

Nominations must be received by 1st May 2023.

AIPS TALL POPPY campaign

On behalf of the Australian Institute of Policy and Science

Young Tall Poppy Awards 2023 Prize

Applications for the 2023 Young Tall Poppy Awards will open soon on the 14th February and close on 14th April.

The Tall Poppy Campaign was created in 1998 by the Australian Institute of Policy and Science (AIPS) to recognise and celebrate Australian intellectual and scientific excellence and to encourage younger Australians to follow in the footsteps of our outstanding achievers. It has made significant achievements towards building a more publicly engaged scientific leadership in Australia.

The Tall Poppy Campaign recognises the achievements of Australian scientists through the prestigious annual Young Tall Poppy Science Awards.

The Campaign's Tall Poppies engages the winners of Young Tall Poppy Science Awards ('Tall Poppies') in activities to promote interest in science among school students and teachers, as well as an understanding and appreciation of science in the broader community.

All applications should be made via the online application form, which will be available from 14th February 2023.

All applicants will be advised of the outcome of the respective State Selection Panels, which generally meet between June and September as arranged.

For further information, and to apply, go to the Tall Poppy Campaign website:

aips.net.au/tall-poppy-campaign

AUSTRALIAN MUSEUM EUREKA PRIZES

AUSTRALIAN MUSEUM

Applications are now open for the 2023 Australian Museum Eureka Prizes.

Established in 1990, the Australian Museum Eureka Prizes is the nation's most comprehensive science award program.

This year, there are 18 prizes on offer across four categories: categories: Research and Innovation (10 prizes), Leadership (3 prizes), Science Engagement (4 prizes), and School Science (1 prize). The program includes three new prizes, which reward botanical science, research software and innovative research in sustainability.

The prizes seek to recognise the achievements of scientists, researchers, and science communicators at all career stages.

There are prizes available for both individuals and teams, and entrants can either enter themselves or be nominated. The Eureka Prizes are open, but not limited to, those who work in research institutes, government departments, media, corporations and universities.

It's free to enter and there's a prize pool of $180,000 to be shared between the winners. Entries open Monday 13 February and close Friday 14 April, 7pm AEST.

Learn more and enter at: **australian.museum/eureka**

Group image: L-R Dr Tim Read (Parliamentarians for STEM), Dr Marguerite (Maggie) Evans-Galea (Australian Academy for Technology & Engineering), Dr Gillian Sparkes (Commissioner for Environmental Sustainability), Associate Professor Sophie Adams (Austin Health), Professor Madhu Bhaskaran (Women in STEMM Australia), Natasha Mitchell (ABC Radio National), Dr Isabelle Kingsley (Office of the Women in STEM Ambassador).

STEM & SOCIETY: WOMEN AND GIRLS IN SCIENCE

by Dr. Catriona Nguyen-Robertson MRSV

Global challenges like tackling climate change, fighting infectious diseases, and ending poverty are just that: global. They affect every one of us. And we need every single idea on the table. The different hurdles that women overcome in society and the lives they live mean that they have something unique to bring to the table - different approaches to solving global challenges.

Yet ongoing institutional gender barriers continue to get in the way. The poor attraction and retention of girls and women in STEMM is often referred to as a "leaky pipeline". It is one that begins from an early age, and the issue compounds as women progress through their careers. The result is a system with low representation of women in STEMM industries - especially in senior positions.

How do we encourage more girls to pursue STEMM, and importantly, how do we keep them there?

On the International Day of Women and Girls in Science, four leading female scientists discussed these two questions. Facilitated by ABC science journalist Natasha Mitchell, Dr Isabelle Kingsley, Professor Madhu Bhaskaran, Dr Marguerite (Maggie) Evans-Galea, and Associate Professor Sophie Adams shared their eye-opening insights in the Legislative Council Chamber at Parliament House.

Several key factors perpetuate the STEM gender gap. Gender stereotypes portray certain STEM fields as masculine, girls have fewer role models to inspire their interest in these fields, and subsequently, because fewer women study and work in STEM, these fields tend to sustain exclusionary, male-dominated cultures that are not supportive of or attractive to women and other minority groups - it is a perpetual cycle that we need to break. Growing up, we see limited examples of female scientists and engineers in books, media and popular culture.

That is why we need to smash these stereotypes. A scientist is not just a man with crazy hair in a lab coat, nor is an engineer a man in a hard hat. Madhu spoke about how she is tired of seeing these stereotypes for engineering, and wonders why we are not shining the same spotlight on the diverse pool of excellent scientists as we tend to shine on sports stars.

> Studying science becomes less of a creative endeavour, and more of a memorisation chore.

Even in the absence of role models, there are many reasons why young girls are initially attracted to science. Sophie's desire to understand everything about the world led her naturally to science. Maggie similarly constantly asked her mother questions that began "Why...?", and in response was encouraged to find the answers herself. In contrast, for Mahdu it was expected that she would become either a doctor or an engineer, due to societal and parental pressure.

Isabelle's research shows that women only occupy 20-25% of leadership positions within STEMM industries. The question is: where did they all go?

Natasha hope to see more of the women and non-binary people completing degrees in STEM to then work in many of the different STEM careers available.

These five women alone demonstrate how varied a "STEM career" can be: a researcher, an engineer, a medical director, a radio science journalist, and a STEM career strategist. There are so many possibilities, but they can be hard to access - especially if you cannot see them.
If we can be successful in attracting more girls into STEM fields, we desperately need systemic change to create an environment that they would then want to stay in. Women face many and varied cultural and systemic barriers to success; not all women are the same in what they experience, but it is not necessarily easy for any of them. All four panellists have caring responsibilities as mothers in addition to successful careers, and Madhu, in particular, arrived in Australia as a migrant with no friends or family to support her growing family.

Women also face biases when it comes to applying for promotions, grants, resources, etc. - whether they are overt or unconscious. We all have a range of unconscious biases to varying degrees, which form throughout life as the result of our brain performing 'mental shortcuts'. While these shortcuts can sometimes result in favourable or helpful biases, they can also negatively influence our thoughts and decisions. The more that people recognise their own unconscious biases - especially regarding gender and age - the easier it is to keep these biases in check.
While unconscious biases tend to lead to greater rejection for women in STEMM, this bias can be reduced when information divulging gender or age are hidden from applications for jobs or resources.

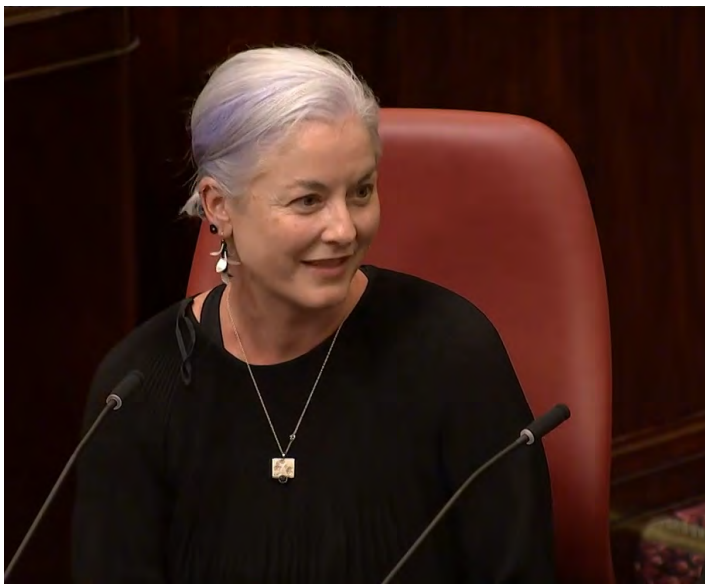
For example, NASA levelled the playing field for women and other marginalised groups when they removed names on applications for Hubble Space Telescope observation time. The gap between women and men's success rates shrank to 1% and, for the first time ever, women were more successful than men in scoring observation

Women comprise only 36% of enrolments in STEM courses, and this percentage drops even lower by the time women reach the workforce across all STEM industries[1]. The panellists and Natasha hope to see more of the women and non-binary people completing degrees in STEM to then work in many of the different STEM careers available.

There is a lot of enthusiasm for scientific inquiry among young girls, but there are also many reasons that the enthusiasm dwindles. As a Research Associate for the Office of the Women in STEM Ambassador, Isabelle tracks where in the 'pipeline' girls begin to slip through the cracks.

By the time they reach high school, girls begin to lose their confidence and/or interest in STEM. Studying science becomes less of a creative endeavour, and more of a memorisation chore. Isabelle proposes that rather than focusing on standardised tests, which only determine how well students can remember facts from textbooks, the education system should encourage students to learn with hands-on science. Young scientists should be out in the field, or getting their hands dirty. Sophie has witnessed how life-changing 'experiences of awe' are for the women scientists who voyage to Antarctica as part of the Homeward Bound program. These experiences inspire creativity and curiosity - key elements of science - and may perhaps keep students' passion for science alive.

Back to the STEM 'pipeline', and we see even more women are lost at university. Women comprise only 36% of enrolments in STEM courses, and this percentage drops even lower by the time women reach the workforce across all STEM industries[1]. The panellists and



'You can change,' says Sophie. Once you acknowledge the problems, it is possible to fix them.

'For women in STEMM in Victoria, we're leading the way,' says Maggie.

time - a highly coveted resource[2]. Based on this promising data, the Office of the Women in STEM Ambassador is now leading a national trial to study the effects of anonymising grant applications for in-demand scientific equipment such as telescopes, synchrotrons, and supercomputers.[3]

Things are slowly getting better: people are more conscious of the unconscious bias phenomenon, microaggressions towards women in the STEM workforce are becoming less common, initiatives to support women are being put in place, and there has been a culture shift. Everyone needs to be involved in making these improvements and shaping the future of STEM.

We are starting to patch up the cracks in the leaky pipeline. However, what once looked like a straight, narrow pipe (especially to an early career researcher who had only ever been exposed to academia) is quite different. It is more like a funnel, as women with STEM qualifications spread out into more areas and types of jobs: research, commercialisation, communication, education, policy, and more. It would be great to one day have the chambers of Parliament House filled with women policymakers with a STEM education. Anything is possible.

Working together, we can create change. To all the girls in science, support yourself with the right people who can propel or push you in the right direction. While women such as Sophie, Maggie, Madhu, Isabelle, and Natasha faced many challenges, they are developing powerful ways to change the situation so that the next generation of women scientists can fully flourish. Thinking about their bright future, 'it's so exciting what's coming,' says Natasha.

You can watch the full forum on the Parliament of Victoria website: **www.youtube.com/watch?v=TXT7RWXVx9w**

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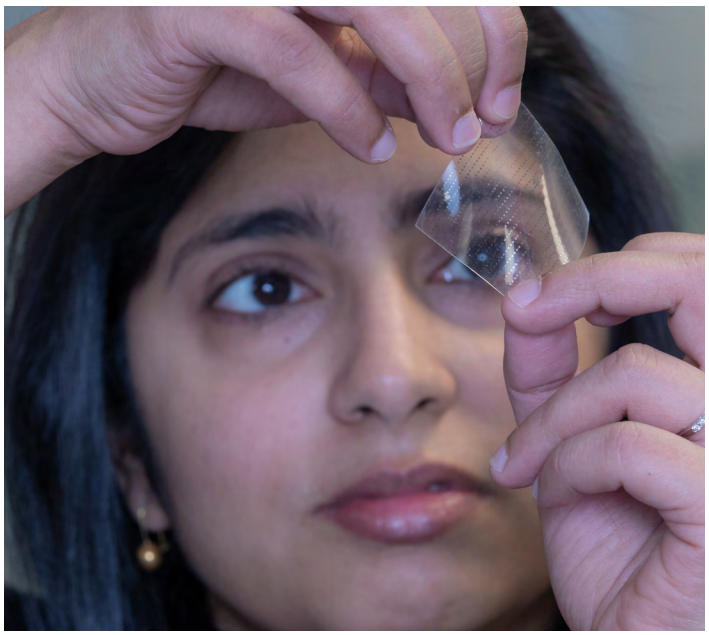

Challenges faced by women in STEMM 'is a people's problem,' says Madhu. 'It is not a women's problem.' And it is certainly not up to women alone to address them.

Museums Victoria Collection manager Di Bray with ichthyology specimens. (Source: Museum Victoria / Photographer: David Paul)

INVESTING IN WOMEN IN STEMM

By Dr Jessica Borger

Victoria is rapidly developing a name for itself as a leader in medical and clinical research, exemplified during the COVID-19 pandemic, with prominent researchers taking the global stage. The pandemic highlighted and exacerbated gender disparity within medical research, where there is a historical, and continuing, lack of representation of women.

IIn recent years, there has been a growth amongst broad stakeholders investing in gender equity initiatives to achieve a diverse and equitable research and innovation landscape for Victoria to remain internationally competitive.

In 2022, Research.com analysts created a list of the world's best women scientists1 to counteract the Matilda effect2 and bring attention to ongoing gender bias and misrepresentation by promoting the achievements of women in science. The women were chosen based on their publication and citation numbers as well as the impact that they have on others. Of all the women selected, 36 were Australian, with 14 from Victoria. One eminent Victorian on the list, Prof Sharon Lewin, the inaugural Director of the Peter Doherty Institute for Infection and Immunity, was instrumental in directing COVID-19 research and its dissemination to the public3. In 2020, she was duly awarded the Committee for Melbourne's highest honour, the Melbourne Achiever Award, which honours Melburnians who have made significant contributions to the city that will have a lasting impact.

Recognition of women researcher scientific excellence can create role models and provide opportunities. The award of the 2017 Prime Minister's Prize for Science4 to its first female recipient, Prof Jenny Graves AO, drew recognition of her as a scientist and champion of change in gender equality. This award brought recognition of excellence by a female scientist to the public. Yet, despite the increasing visibility and recognition of women researchers in the public forum, the scientific field as a whole, remains a deeply unequal field of education and research. As of 2021, despite the relatively high number of STEM graduates, women were less likely than men to consider a technical career5 resulting in only 33% of scientists being women6.

Bias and stereotyping shape girls' views of STEMM from as early as primary school. While girls comprise over 50% of enrolments in science subjects, in year 12 boys outnumber girls three-to-one in Physics and almost two-to-one in Advanced Mathematics7. Underrepresentation continues in Information and Communications Technology and Design Technology, with girls making up just 26% of students - a trend that continues at the tertiary level, with women representing only 15% of domestic engineering undergraduate course completions. The successful Trades Fit Expo8, to be held again in 2023, provides the opportunity for female and non-binary students in Years 9-12 to explore careers in STEMM, especially in those traditionally held male-dominated fields, to provide exciting new career opportunities, and to help break the perceptions of gendered professional roles.

At the core of the gendered imbalance is systemic bias, encompassing broad factors including gender bias, unconscious bias, harassment, and social norms, found both within education and the workplace, and which make it difficult to attract and retain women in STEMM careers. In academia, women remain underrepresented among senior scientists, with studies showing they are awarded less research grant funding than men9 and stand less chance of being promoted. Many Victorian universities and medical research institutes (MRIs) are starting to invest in initiatives to promote gender equity and reduce the attrition of women with increasing seniority and leadership capabilities. Within the Melbourne Biomedical Precinct, The Walter Eliza Hall Institute (WEHI) has been investing in initiatives such as the development of a gender equity plan10 to have family friendly meeting times and equal representation of women and men presenting at Institute symposia, and was the first MRI in Australia to establish its own onsite early learning centre. Demonstrating the growing commitment of research to Science in Australia Gender Equity (SAGE) in Victoria, WEHI, along with the University of Melbourne,Monash University, and nine other Victorian universities and MRIs, were recipients of the Athena Swan Bronze Award from SAGE11, a charter with 10 key principles organisations must follow to address gender equity. Women scientists employed in Athena Swan accredited organisations have experienced greater career satisfaction, fairness in workload and increased opportunities.

> Real change and attainment of gender equity will only be fulfilled when government, academia – including its societies and colleges, and industry work together as a collective to drive systemic change directed by grassroots advocacy and initiatives.

There are growing demands for comparable statistics on the representation of women in STEMM as many explanations for the gender imbalances rely on anecdotal evidence. One such group, Women in Science Parkville Precinct (WiSPP)12, developed an agreed set of metrics to share and gather information. This baseline data was established, and confirmed that women are still underrepresented at senior levels. WiSPP work as a grassroots collective, led by early and mid-career researchers (EMCRs) working in partnership to drive organisational cultural change. Recognised by the Victorian Government that full utilisation of the medical research sector workforce was key to post pandemic economic recovery, WiSPP received seed funding to form the Equity in Medical Research Alliance, which led advocacy efforts to support those at risk during the pandemic13, EMCR women.

A recent COVID-19 impact survey by the Australian Academy of Science's Early and Mid-Career Researcher (EMCR) forum14 illustrated that female EMCR'S with carer responsibilities reported the highest level of detrimental career impacts and mental stress. This was as a consequence of the juggling act created by an accumulative full year of home-schooling, extended work hours, increased pastoral care, disturbed work time, and job/financial

insecurity through part-time employment. To retain women in STEMM, the Victorian Endowment for Science, Knowledge and Innovation (veski)15 has created the veski inspiring women program including fellowships16, career recovery grants17, and bridging the funding gap18 awards in which awardees are recognised based on their career achievements, challenges, aspirations and passion to communicate the role of women in STEM. Graduate Women Victoria19 similarly provides scholarships at the tertiary level to support equity to participate in education, to enable women and girls in academia to reach their full potential. Although not full scholarships awarded by government funding bodies or tertiary scholarship schemes, these are grassroots measures which provide much needed stop-gap funding for women to attain academic qualifications and progress their research.

Real change and attainment of gender equity will only be fulfilled when government, academia – including its societies and colleges, and industry work together as a collective to drive systemic change directed by grassroots advocacy and initiatives. Solutions cannot be about fixing women, but instead need to focus on shifting the barriers and changing the fundamental ways things are done, such as adopting new recruitment strategies, changing promotion and employment metrics and importantly expanding our ideas of what traits valuable leaders possess. Women's unique lived-experiences, including those extra diverse hurdles they have had to overcome, have given women a unique leadership style poised to influence rather than emulate the highly entrenched command-and-control leadership style. With more women in leadership roles in Victoria's universities and MRIs, this will open doors for others and help to drive systemic change from within by those that have lived it.

With momentum visibly growing across Victoria's medical research sector, amplified by the Victorian Government's recent gender equality act 202020, significant efforts will only continue to eliminate gender stereotypes in science; provide equal access to education in technical and STEM subjects; establish supportive workplace culture to attract and support women scientists to fully participate in the workforce; and implement processes and pathways to ensure a greater proportion of women researchers are retained and promoted such that as leaders, women's unique perspectives and diversity will be reflected in Victorian innovation and scientific discovery.

Dr Jessica Borger is the Scientific Education Team Leader at the Walter and Eliza Hall Institute of Medical Research.

Professor Sharon Lewin AO FRACP FAHMS, received the Melbourne Achiever Award in 2020.

Professor Jenny Graves AO FAA, the 2017 recipient of the Prime Minister's Prize for Science

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Dr Catriona Nguyen-Robertson, a Learning Facilitator at Scienceworks (Source: Museums Victoria / Photographer: Joel Checkley, Tiny Empire Collective)

THE POWERFUL FORCE THAT IS WOMEN IN STEMM

By Dr Catriona Nguyen-Robertson MRSV

'When women help women, we're a powerful force.' So says a mug that my mentor, colleague, and friend Jen Martin gave me. It is fact #28 of "28 cold hard facts impacting women in leadership" compiled by Homeward Bound[1]. Most of the facts speak to the gender gap and under-representation of women in STEMM, but this one is more positive. In all that we face, we are much stronger if we face it together.

Throughout history, women have faced numerous barriers in the male-dominated field of science. Women scientists often have to navigate a complex and challenging career path if they are overlooked for promotions and opportunities, have to juggle caring duties or pastoral care at work, take maternity leave in a system that continuously requires results, or change fields because they feel unsupported. It is encouraging to see that more women are pursuing STEM, however, as a scientist and mentor, I only want to encourage girls down that path if the whole system improves.

> Science is for everyone, regardless of gender or background.

The proportion of women studying at universities has risen, but gender disparity in STEMM is far from being achieved. Women comprise greater than half the student population[2] at Australian universities and the gender ratio of full-time academics is close to equal[3]. Albeit, while the overall numbers of men and women are not very different - it is the seniority of the positions they hold that differs starkly.

As a young student in the university system, I did not see anything outside of what looked like a very narrow tunnel leading straight towards an academic career. For the most part, that is the only thing that early career researchers are exposed to given that they are surrounded by other academics. For women and non-binary people, that tunnel can look daunting: men dominate the upper levels of Australian (and global) academia, with 70% more men than women at associate professor and professor levels[4]. There are not too many options that young women scientists can see besides academia and within academia, there are fewer senior women to look up to.

I certainly feel empowered knowing that other women have my back. For many people, including myself, success depends not only on our own hard work and dedication but also on having a support system that includes mentors and role models. In a male dominated industry - and having been in male-dominated research groups for the entirety of my academic career - I would not be where I am today without the role models and mentors. But how many women are around to guide younger generations?

INSPIRING WOMEN IN STEMM

There are many notable women scientists in history whose achievements and contributions have had a significant impact on their fields, and they inspire young women (like myself) to pursue careers in science. They show that intelligence, perseverance, and passion can lead to groundbreaking discoveries and significant contributions to science. They also challenge stereotypes: not all scientists are like those I grew up seeing like Dr Emmet Brown from Back to the Future, Dexter from Dexter's Laboratory, or the trope of the mad scientist. Science is for everyone, regardless of gender or background.

Working with A/Prof Jen Martin and Dr Linden Ashcroft has completely changed my life - personally and professionally. We're there for each other through all the ups and downs, and I absolutely adore these two women.

> I admire her because she stood her ground, proved that she was to be taken seriously, and ended up staying with the Board of Works for twenty years.

Discussing trailblazing women in science usually draws mention of Marie Curie. She was the first woman to win a Nobel Prize, but even after being awarded her second Nobel Prize, she was still refused membership of the French Académie de Sciences. In addition, a notorious example of an unrecognised female scientist is Rosalind Franklin, who was only recognised posthumously for identifying the double helical structure of DNA - a fundamental biological discovery for which her male colleagues, James Watson and Francis Crick, were awarded the Nobel Prize.

Closer to home, one of my favourite local heroes is the late microbiologist Lucey Alford. As the lowest spot in Melbourne, the Spotswood Pumping Station was the heart of Melbourne's sewerage system. In all 68 years of its operation, only three women worked there: Lucey and, later, her two assistants. In 1941, after

Peer support networks of women scientists provide a sense of community and belonging, as well as a forum for discussing shared experiences and challenges.

investigations revealed that bacteria were causing decay of the concrete sewerage pipes, the Melbourne and Metropolitan Board of Works advertised for a bacteriologist. Because of the war, no men were available for the job, and Lucey was therefore offered the position as the only one qualified and available. She was more than qualified, with a Bachelor of Science (Honours), several years in the pathology department at the Royal Perth Hospital and a stint with the CSIRO under her belt, but she was only employed on a temporary basis. She certainly proved herself though: she investigated bacteria passing through the sewage and could even narrow down the causative bacteria of a typhoid outbreak and the dairy farm from where it came.

As the first women employed at the Pumping Station, a toilet had to be built just for Lucey - so they built it right opposite her laboratory. She became a strong role model to a younger generation of female employees who came on board, having learnt early on of the importance of standing up for herself. On one occasion when male colleagues complained about the way female staff were pouring cups of tea, she encouraged them to refuse to fill the teapot the next day and the men soon learnt to be appreciative or make their own tea. I admire her because she stood her ground, proved that she was to be taken seriously, and ended up staying with the Board of Works for twenty years.
Have things improved for women in science since then? There is certainly a growing list of incredible women in STEMM role models. Jennifer Doudna and Emmanuelle Charpentier's ground-breaking work in gene editing earned them the 2020 Nobel Prize in Chemistry. Their win - only three years ago - marked the first time a science-related Nobel Prize was shared by women without a man. While there are more women in STEMM than before, there is still a great exodus of accomplished women from academic research. As more penetrate the upper echelons of academia, perhaps things will change.

Having role models inspires and motivates women in science to pursue their ambitions. Seeing other successful women in science is incredibly empowering, as it demonstrates that it is possible to achieve success in a male-dominated field.

WOMEN ARE STRONGER TOGETHER

The 'Women in STEMM' community is the most supportive, inspiring and encouraging group of women I have ever been privileged enough to be a part of. Women in STEMM may face discrimination, unconscious bias, and other barriers, but these are easier to face together.

Peer support networks of women scientists provide a sense of community and belonging, as well as a forum for discussing shared experiences and challenges. As a university student, I stumbled across Women in Science and Engineering (WISE) at the University of Melbourne. The first time I attended an event, I felt so at home in a room full of other female and non-binary STEM students. We shared our experiences and discussed the future. Through WISE, I met people in varied and interesting jobs, and my tunnel vision grew wider: academia wasn't the only option as there were jobs available in "industry" too.

The Women in STEMM community is full of people cheering each other on. I would have likely gone down a very different path had it not been for all the women who have been my mentors and cheerleaders along the way; ppeople who have celebrated my wins, provided guidance, and encouraged me to never give up.

Some of the outstanding women I had the pleasure of working on the 2018 WISE Committee.

For me, Associate Professor Jen Martin and Dr Linden Ashcroft are two such people. As I moved further into the science communication space, Jen and Linden became my go-to people for advice and feedback on my work, and it is a privilege to be working in a team with them.

My list of mentors has grown over the years as I dipped my toes in more waters: from immunologists to leaders in science communication. I have been formally paired with mentors, such as with the Industry Mentoring Network in STEM (IMNIS), and I have sought mentorship from other people I respected. Furthermore, I work with a bright, incredible bunch of women at Scienceworks. In fact, many of the senior positions are occupied by women who have shown me that it is possible to do something that you love, be great at it, and maintain a work-life balance. Perhaps I will get there too one day.

When women support and uplift each other, they can overcome the isolation and discouragement that can hinder their success and pave the way for future generations of women in science. As I took the incredibly scary step of moving away from the research trajectory and swapping my lab coat for science communication, it was made much easier knowing how many people were cheering me on. We truly empower one another. When women help women, we certainly are a powerful force.

Dr Catriona Nguyen-Robertson is a Senior Tutor in Science Communication at The University of Melbourne, a Learning Facilitator at Museums Victoria, and RSV's Science Engagement Officer.

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CRACKING THE CODE AND GOING BEYOND GENDER TO ACHIEVE A GENDER EQUAL FUTURE

By Dr. Morley Muse

International Women's Day (IWD) is celebrated on March 8th each year to commemorate the social, economic, cultural, and political achievements of women worldwide.

This year's theme is *Cracking the Code: Innovation for a gender equal future*. One of the areas where women are underrepresented is science, technology, engineering, and mathematics (STEM). The underrepresentation of women in STEM fields can be attributed to many factors, including societal expectations, lack of role models, discrimination, and a lack of support in the workplace. Gender bias is one such factor that greatly contributes to the issues women face in trying to secure a STEM job in STEM fields.

In Australia, there are more than 200,000 vacant STEM jobs[1] - a number that has continued to grow by more than 2.5% annually since 2019 - and the demand for STEM workers is predicted to increase to 1.9 million by 2024[2]. This shows how important the sector is for our economic growth and global competition.

According to Australia's STEM Workforce Report produced by the Office of the Chief Scientist (2020), women comprise only 29% of the STEM labour force3. The report also revealed that 56% of tertiary educated females in STEM are Australian women born overseas, and that this particular group is more than four times as likely to be unemployed (when compared to those born in Australia)[3].

The underrepresentation of women in STEM fields can be attributed to many factors, including societal expectations, lack of role models, discrimination, and a lack of support in the workplace.

While initiatives to increase the number of women studying STEM are important, it is equally important to create employment opportunities where these women can apply their learning in real-life environments. The importance of a precedent for success is summarised by the expression, "You can't be what you can't see". If we encourage our girls to study STEM but they cannot see their mothers or other female role models working as scientists, technologists, engineers, or mathematicians, then what exactly is the point?

This year's theme is *Cracking the Code: Innovation for a gender equal future*. One of the areas where women are underrepresented is science, technology, engineering, and mathematics (STEM). The underrepresentation of women in STEM fields can be attributed to many factors, including societal expectations, lack of role models, discrimination, and a lack of support in the workplace. Gender bias is one such factor that greatly contributes to the issues women face in trying to secure a STEM job in STEM fields.

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While initiatives to increase the number of women studying STEM are important, it is equally important to create employment opportunities where these women can apply their learning in real-life environments. The importance of a precedent for success is summarised by the expression, "You can't be what you can't see". If we encourage our girls to study STEM but they cannot see their mothers or other female role models working as scientists, technologists, engineers, or mathematicians, then what exactly is the point?

> While initiatives to increase the number of women studying STEM are important, it is equally important to create employment opportunities where these women can apply their learning in real-life environments.

Having women in STEM workplaces should not solely be seen as a social cause, but also as an economic one. A 2013 report from the Grattan Institute showed that the Australian economy will improve by $25 billion if more women are supported into work[4]. At the 2022 Prime Minister of Australia's Jobs and Skills Summit, there was greater emphasis on the STEM skills shortage, with a focus on increasing the number of immigrant workers[5]. However it is important that a call for skilled migrants is supported by opportunities for these individuals to apply their skills and qualifications - if we bring scientists and engineers to Australia, jobs need to be available for them. If not, the risks include an absence of any economic return, the dissatisfaction of skilled migrants, and a consequent impact on Australia's reputation as a destination for skilled STEM workers.

Discussions around diversity and inclusion have gained momentum in recent times. Businesses are pushing hard for diversity without proper spaces of inclusion, which will eventually lead to high attrition rates and lack of retention. Furthermore, the dial has barely shifted for women in STEM, particularly for women of colour and women from culturally and linguistically diverse (CALD) backgrounds. In order for us to address the STEM skills shortage that we currently have in the country, all hands need to be on deck. Hence, the necessity of having women from all backgrounds regardless of race, ethnicity, disability contribute their skills to the STEM sector.

To help address these issues, Dr Ruwangi Fernando and I founded iSTEM Co. - a research, consulting and talent-sourcing company that aids the employment and retention of women in STEM including

> In Australia, there are more than 200,000 vacant STEM jobs[1] - a number that has continued to grow by more than 2.5% annually since 2019 - and the demand for STEM workers is predicted to increase to 1.9 million by 2024[2]

women of colour and women from CALD backgrounds. Since its establishment in April 2022, iSTEM Co. has made significant strides, hosting the first-ever in-person career fair for women in STEM.

As part of our efforts to improve employment of women in STEM, we are producing a recruitment-tech platform, DEIR (Diversity, Equity, Inclusion, and Retention), to provide women with STEM job opportunities in a safe and inclusive environment. DEIR will launch in March 2023, and aims to eliminate recruitment bias through anonymous recruitment, ethical job posting, standardised interview process, mentoring retention program, and an endorsement badge for ethical and inclusive employers.

Following this year's IWD theme, to crack the code in STEM, we need to address issues around gender bias and intersectionality. First, we need to challenge gender stereotypes and societal expectations. Girls need to see that they can succeed in STEM fields and that there are female role models in these fields. We need to provide girls with the tools and resources they need to pursue their interests in STEM, including access to STEM programs, scholarships, and mentorship opportunities.

Second, we need to create a more supportive workplace environment. Women in STEM face unique challenges, including gender bias, discrimination, and a lack of opportunities for advancement. We need to ensure that women have equal opportunities for professional development and advancement, including access to leadership positions, mentorship programs, and networking opportunities.

Finally, we need to promote diversity and inclusion in STEM fields. We need to celebrate the contributions of women and other underrepresented groups in STEM and provide them with the support they need to succeed. This includes developing policies and practices that promote diversity and inclusion in STEM, such as hiring practices that prioritise diversity, creating inclusive workplaces, and promoting STEM programs that are accessible to all.

In conclusion, cracking the code in STEM requires a collective effort from individuals, organisations, and governments. We need to challenge gender stereotypes, create more supportive workplace environments, and promote greater diversity and inclusion in STEM fields. In doing so, we can ensure that women and other underrepresented groups have the opportunities and support they need to succeed and make significant contributions to STEM. Let us all choose to challenge and break down the barriers that prevent women from pursuing their dreams in STEM.

Dr Morley Muse is a co-founder of iSTEM Co. and a Board Director of Women in STEMM Australia.

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5. "Outcomes Of The Jobs And Skills Summit." Office of the Prime Minister of Australia, 2 September 2022, https://www.pm.gov.au/media/outcomes-jobs-and-skills-summit.

RESOURCES FOR WOMEN IN STEMM IN VICTORIA

Compiled by Dr Catriona Nguyen-Roberson MRSV

There are many organisations doing fantastic work in supporting and advocating for women* studying and working in STEMM-related fields. Some you may have heard of, some you may have engaged with, and others may be new to you. All of these organisations are passionate about increasing participation and retention of women in both studying and working in STEMM-related fields, and removing gender gaps in pay and opportunities at all levels.

*cis- and trans-gender women, and intersex and non-binary individuals

SUPERSTARS OF STEM

scienceandtechnologyaustralia.org.au/what-we-do/superstars-of-stem

Superstars of STEM is a Science & Technology Australia initiative to smash gender assumptions about who can work in STEM. The program equips brilliant diverse STEM experts with advanced communication skills and opportunities - in the media, on stage and in schools. They aim to grow a critical mass of more diverse celebrity scientists appearing regularly in the Australian media to inspire our next generations of young Australians into STEM study and careers.

WOMEN IN STEMM AUSTRALIA

womeninscienceaust.org

Women in STEMM Australia advocates for gender equity and equality in Australia's STEMM sectors, and support initiatives that drive change in the workplace and learning space, engage in gender equity in STEMM, whilst upholding core values such as respect and scientific excellence. Their role is to ensure women in STEMM with the capacity and capability to contribute to the innovation agenda are equally included, recognised and rewarded for their experience and expertise. Their activities welcome and aim to benefit all women in STEMM regardless of their discipline and profession. Their blog is our cornerstone feature, where STEMM thought leaders at all levels share their career experiences, their views on gender equity and diversity, best practices and policies, and their experiences of the changing nature of work in the STEMM sector.

WOMEN IN SCIENCE PARKVILLE PRECINCT (WISPP)

wispp.org.au

Formed in 2014, WiSPP is a grassroots-driven Australian not-for-profit organisation based in the Parkville Precinct in Victoria. WiSPP brings together a community of advocates and enhances their capabilities to lead and support cultural change in medical research.They are passionately committed to improving workplaces and transforming the systems that limit the diversity of leadership in medical research.

HOMEWARD BOUND

homewardboundprojects.com.au

Homeward Bound is a global leadership initiative, set against the backdrop of Antarctica, which aims to heighten the influence and impact of women with a STEMM background in making decisions that shape our planet.

Its goal is to give 10,000 women by 2036 the skill and will to lead with impact and influence for the greater good. By connecting influential women in STEMM, and engaging them with this leadership initiative, Homeward Bound will ensure that there is greater diversity at the global leadership table.

Each graduating cohort becomes part of a global network of like-minded women committed to demonstrating a model of leadership (collaborative, inclusive, legacy-minded, trustworthy with assets – people and money) that will influence outcomes for men and women towards a healthier planet, and a sustainable future for us all.

ELEVATE

atse.org.au/career-pathways/elevate

The Elevate: Boosting Women in STEM program was established by the Australian Academy of Technology and Engineering (ATSE), and aims to address gender inequities in STEM. Elevate achieves this by encouraging women to pursue education and careers in STEM, fostering more women-led industry-academia collaborations in applied research and business, growing professional skills of women in STEM, and by propelling women into leadership.

ATSE will award up to 500 undergraduate and postgraduate scholarships to women in STEM over seven years to commence their tertiary education, or to extend their qualifications and professional skills in STEM and business.

IGNITE
igniteworldwide.org/program

IGNITE works directly with educators to connect girls with STEM opportunities during the school day. They work directly with teachers to provide programming that promotes STEM education and career advancement for girls and nonbinary youth from historically marginalised communities. Through hands-on events that connect students with role models who live and work in their communities, students recognize new possibilities for their futures.

STEM WOMEN
stemwomen.org.au

STEM Women is an online directory of women in Australia working in STEM. It aims to promote gender equity in STEM by showcasing the breadth of scientific talent in Australia, by raising the profile and providing opportunities to those who may experience barriers throughout their STEM career. It thus enables a diverse range of women to be offered exciting opportunities to progress their careers and personal capabilities.

FOR WOMEN IN SCIENCE
forwomeninscience.com.au

L'Oréal and UNESCO founded the For Women in Science program to promote and highlight the critical importance of ensuring greater participation of women in science. Each year, the program recognises the achievements of exceptional female scientists at different stages of their careers and awards them with Fellowships to help further their research. The L'Oréal-UNESCO For Women in Science Australia & New Zealand Fellowships provide $25,000 for a one year project to support local scientists to continue their research and help them rise to leadership positions in their field of expertise.

ISTEM CO.
istemco.com

iSTEM Co. is a research, consulting and talent sourcing company that enables employment of women in STEM, including women of colour and women from culturally and linguistically diverse (CALD) backgrounds.

Their network of employers and partners are vetted and endorsed with badges to show their commitment and genuinely in providing safe spaces for women in STEM. iSTEM Co. prescreen employers using selected criteria ranging from their commitment to diversity, race, ethnicity, parental leave policy, flexible/remote work, community engagement, professional development opportunities including upskill programs and mentoring, gender pay, employee support and feedback system etc to ensure you are valued and visible as an employee.

STEM SISTERS
stemsisters.org.au

STEM Sisters was first initiated at Victoria University in 2017, to attract and celebrate women in STEM at Victoria University. It has since expanded to support STEM women of colour and especially, migrated STEM women or international female students who are studying STEM related courses in Australia.

VESKI INSPIRING WOMEN PROGRAM
veski.org.au/veski-inspiring-women-program

veski was established to enhance Victoria's intellectual capital through a program of fellowships, awards, and international networks. Its Inspiring Women program offers fellowships, and grants specifically for career recovery and for bridging the funding gap.

A number of the universities in Victoria that offer STEMM qualifications also have initiatives to support the female students studying STEMM. These are some of the groups, clubs, and initiatives that we are aware of:

WOMEN IN SCIENCE AND ENGINEERING (@ THE UNIVERSITY OF MELBOURNE)
wiseunimelb.com

WOMEN IN TECH (@ THE UNIVERSITY OF MELBOURNE)
witunimelb.org.au

WOMEN IN SCIENCE AND ENGINEERING (@ VICTORIA UNIVERSITY)
vu.edu.au/about-vu/our-teaching-colleges-schools/college-of-engineering-science/women-in-science-engineering-wise

WOMEN IN STEMM (@ RMIT UNIVERSITY)
rmit.edu.au/about/our-values/diversity-and-inclusion/gender-equality/women-in-stemm

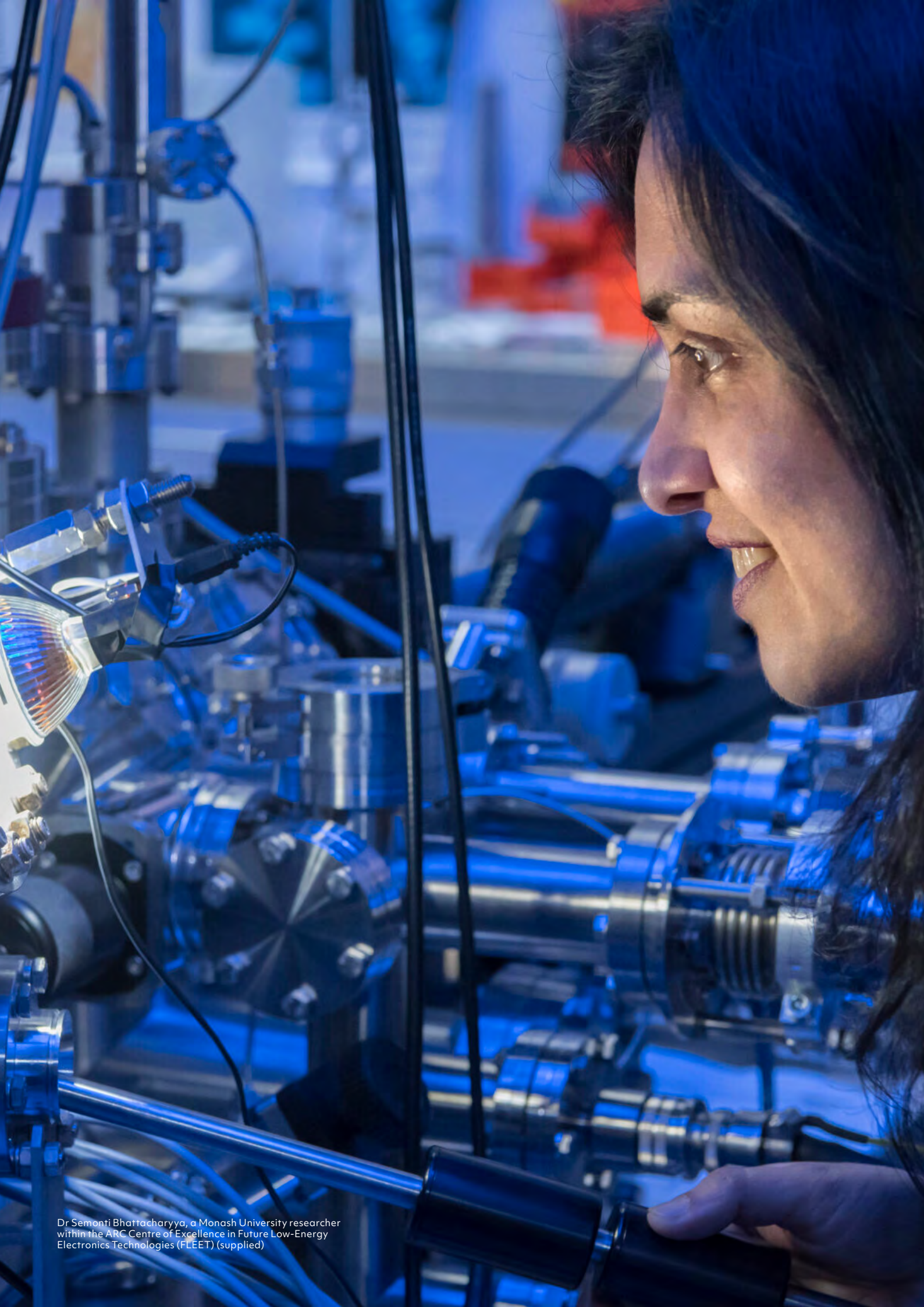
WOMEN OF EARTH, ATMOSPHERE AND ENVIRONMENT (@ MONASH UNIVERSITY)
monash.edu/science/schools/earth-atmosphere-environment/about/eae-gender-equity,-diversity-and-inclusion-committee/women-of-eae-network

WOMEN IN ENGINEERING AT MONASH (@ MONASH UNIVERSITY)
connectedcommunities.monash.edu/Clubs/FEM

FEMBOTS: WOMEN IN BOTANY AND ECOLOGY (@ LA TROBE UNIVERSITY)
fembotsltu@gmail.com

WOMEN IN SCIENCE, TECHNOLOGY, ENGINEERING & MATHEMATICS (WISTEM) (@ SWINBURNE UNIVERSITY)
studentlife.swinburne.edu.au/Clubs/WISTEM

Did you know about any of these resources? Did we leave out any groups you could tell us more about? Have you used one or more of them during your time in STEMM? We'd love to hear from you! Please send your letters to editor@sciencevictoria.org.au.



Dr Semonti Bhattacharyya, a Monash University researcher within the ARC Centre of Excellence in Future Low-Energy Electronics Technologies (FLEET) (supplied)

Fossilised Brachiopods (Spinella buchanensis), uncovered near Buchan, Victoria (Museums Victoria Specimen P331037)

Source: Museums Victoria (CC BY 4.0)

1973

AN OPEN AND SHUT CASE: COMPREHENSIVE STUDIES ON BRACHIOPODS

By Scott Reddiex MRSV

The 1973-74 Proceedings featured three Studies on Australian Cainozoic Brachiopods, by Society Fellow Dr Joyce R. Richardson.

Across her comprehensive pieces, Dr Richardson reviewed brachiopod species from several genera, defined a new genus (Paraldingia) and re-defined many others, and described the growth stages of the species Frenulina sanguinolenta.

Looking like clams (although unrelated) and with a name that sounds like a dinosaur, brachiopoda is an ancient phylum, and very common in the fossil record from the Palaeozoic Era (542 million to 251 million years ago). Their numbers significantly declined following the Permian-Triassic extinction event, and the 330 currently extant species are dwarfed by the more than 12,000 that are extinct (1). Their decline sits in stark contrast to the success of the phylum Mollusca, which currently boasts around 85,000 extant species (2).

Dr Joyce R. Richardson FRSV (1923-2019)

Born in New Zealand and graduating from the University of Otago with a BA in Zoology, Joyce went on to complete a PhD on Cainozoic brachiopods at the University of Melbourne in 1958.

In the 1970s she undertook research at what was then the National Museum of Victoria on an ARC Grant, and in 1976 she was awarded a National Geographic Society Grant at the Smithsonian Institution in Washington DC, to study the marine environments of recent brachiopod faunas. Dr Richardson subsequently worked for the New Zealand Oceanographic Institute (NZOI), 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 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 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.

From:
Proceedings of the Royal Society of Victoria, Volume 86 (New Series), 1974. Articles 10, 11, 12 - Studies on Australian Cainozoic Brachiopods.

RSV Newsletter, November 2019. Vale Dr. Joyce Richardson FRSV.

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Glass negative of "Hotel Kosciusko (in Summer) N.S.W." The Hotel Kosciusko, located in Kosciuszko National Park, NSW, was likely the site of Ashton's entomological adventure. Source: Berckelman collection of glass plate negatives, 1920-1935. (University of Sydney Library)

1923

A LESS TRADITIONAL FURRY FRIEND

By Scott Reddiex MRSV

Some species have common names that are particularly poetic, such as the Walnut Orb-Weaver spider (Nuctenea umbratical), or the Bird of Paradise flower (Strelitzia reginae). However, on the 13th of December 1923, Julian Howard Ashton presented to the RSV his notes on a species named more like a playground insult – the Hairy Cicada (Tettigareta crinita).

"Whilst visiting Mount Kosciuszko in February, I found emerging a specimen of Cicada which, from the shape of the nymph, I took to be the Gippsland hairy Cicada, not previously recorded in New South Wales. Upon taking it to the hotel, several specimens flew into the room in which I had it, possibly attracted, as some insects are known to be, by emanations of scent which attract the opposite sex."

Ashton – a Sydney-based journalist and amateur entomologist – didn't let the opportunity for further investigation pass him by: "I concluded that the species could not be uncommon in the district, and set out to find it. I was successful in taking seven specimens, most of them females, in their natural habitat."

"The pupae emerge upon the "Snow Gums" and stunted "Mountain Ash" of the district. The Cicada, instead of perching on the bare stems of trees and rejoicing in the sunlight, would appear to be nocturnal, for I only saw the insects fly in the dusk, and all the specimens I took were under the bark of trees, hiding like moths."

He goes on to make further observations of the species, and contrasts them with those made by the incredibly accomplished entomologist, William L. Distant.

"I find that Distant's description fails lamentably in respect of colour. The insect is not "all reddish brown" without spots. It is very variable, the body tints being yellow grey with large black streak and patches."
"I can only conclude that Distant's type must have been an old and stained specimen. I had seen such in the various Museums, and had one in my own collection, all yellowish brown, but the living specimens are entirely different."

Ashton concludes his piece by noting that: "Judging from the number of pupal cases I found on trees, the species is not so uncommon as its infrequent appearance in Museum collections would indicate."

This final observation on the content of museum collections would prove to not be hollow – he went on to donate his personal collection of cicada specimens to the Australian Museum.

From:
Proceedings of the Royal Society of Victoria, Volume XXXVI (New Series), 1924. Article XII. - Notes on the "Hairy Cicada" (Tettigareta crinita).

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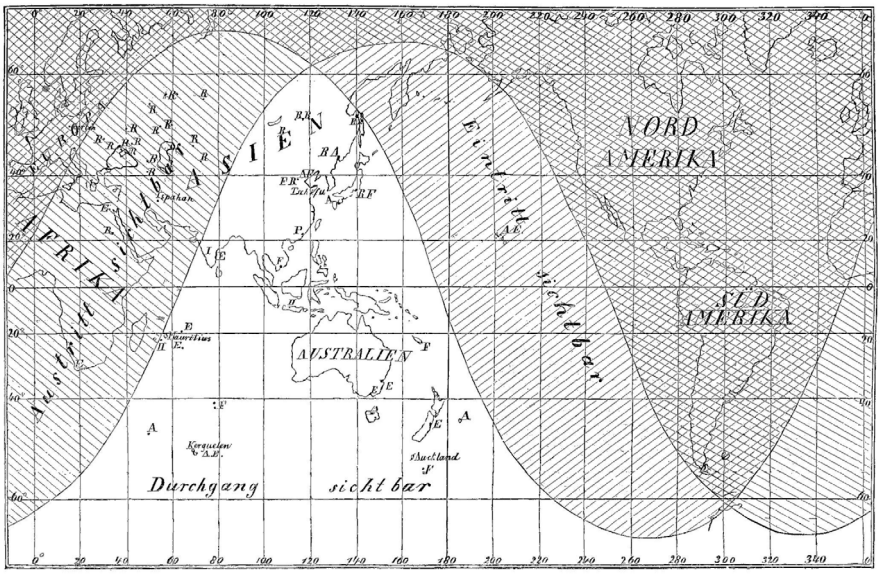
Harper, K (1979). Ashton, Julian Howard (1877–1964), Australian Dictionary of Biography, Volume 7. Melbourne University Press.

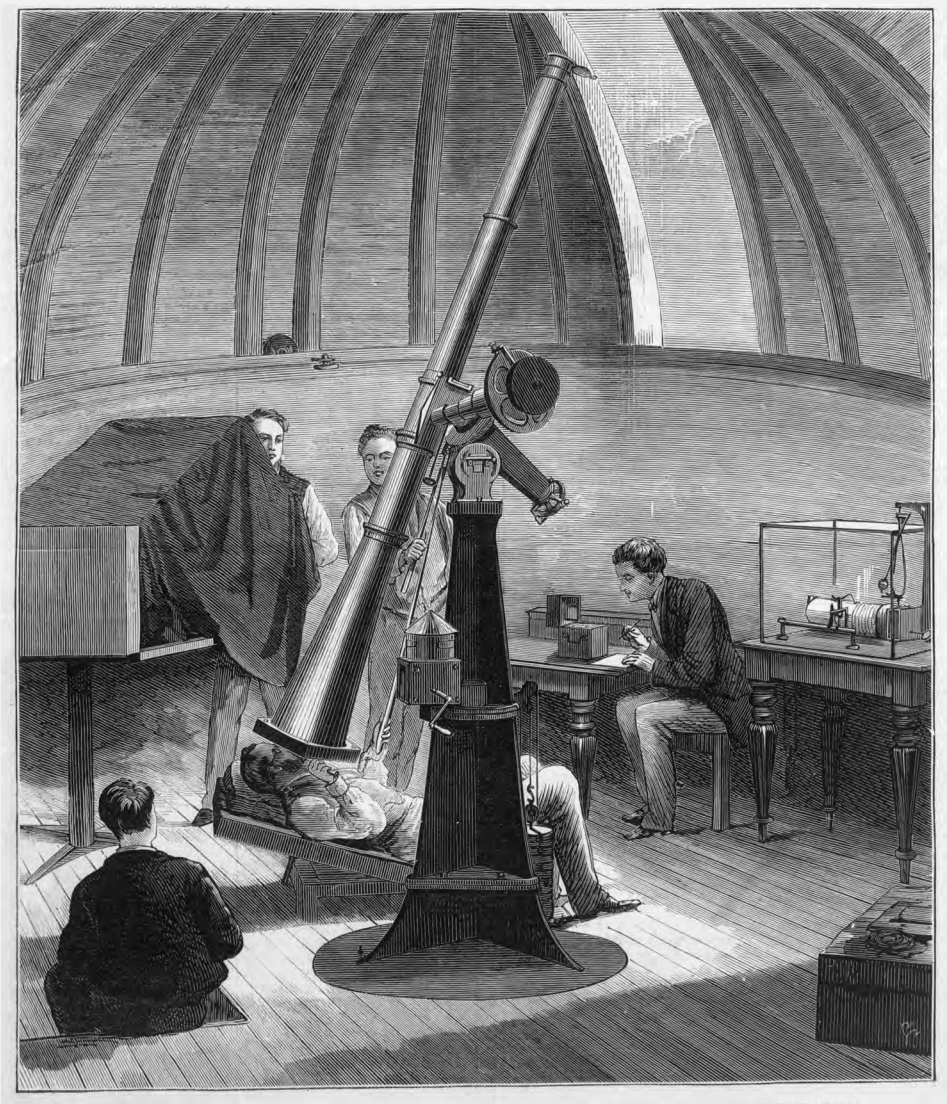
A German Weltkarte ("World Map") depicting the many observation locations, the origin of the expeditions (England, France, America, etc.), and the section of the Earth in daylight during the 1874 transit.

Source: Die Gartenlaube – Illustriertes Familienblatt (1874) Ernst Keil



The Transit of Venus - Operating With the Photo-heliograph at the Melbourne Observatory, by Samuel Calvert (1874). This engraving depicts RSV President W. C. Kernot observing the transit of Venus using the Dallmeyer Photoheliograph at Melbourne Observatory

Source: State Library of Victoria (Public Domain)



1873

THE GREAT ASTRONOMICAL MEASURING ROD: PLANNING FOR THE 1874 TRANSIT OF VENUS

By Scott Reddiex MRSV

On the 8th of August 1873, RSV President Mr. R. L. J. Ellery delivered his Anniversary Address to members at their annual Conversazione. As Government Astronomer, Ellery always spoke passionately about astronomical topics, and this address was no different:

"One of the most important of all astronomical occurrences will take place in December, 1874 – the Transit of Venus across the Sun's disc. This phenomenon, as is well known, presents one of the best means by which to determine the length of the "great astronomical measuring rod," the distance between the earth and the sun…"
Observing the movement of Venus across the sun from different points on the Earth, astronomers would note the local times of the different transit stages, the duration of the transit, and the distance between observers. With this data, they could then use the principle of parallax to determine the distance between the Earth and the Sun.

In Ellery's words, the plan would be to "get two observing points as nearly as possible the earth's diameter distant from one another, so that the apparent paths of Venus across the Sun's disc shall be as widely separated as possible, such separation being due to the difference of distance between the Sun and Venus, Venus and the Earth, as well as to the widely separated position of the observers."

This distance – referred to as one Astronomical Unit (AU) – was critical for astronomers to calculate the scale of the solar system, utilising the geometric relationships of the distances between the Sun and the planets calculated by Johannes Kepler and his Third Law of Planetary Motion.

It would be the first time in 104 years since Venus had danced across the Sun's disc: "Two transits of Venus will now come together with an interval of only eight years; the first takes place on December 8th, 1874, the second on December 6th, 1882, but no other will happen till June 7th, 2004."

It was to be a global event of scientific collaboration (and competition), with astronomers from Australia, Britain, France, the United States, The Netherlands, India, Mexico, and more, traversing the globe to find the best spot to observe the occurrence. Considering the transit could only be seen from places that would be in daylight as Venus passed between the Earth and the Sun, ideal observation locations were limited to the 'Eastern hemisphere'. Particularly for the European and American astronomers, Ellery foreshadowed that "the undertaking will in most cases involve costly expeditions."

With this Presidential Address coming 16 months before the event, much planning was already underway, and there was even more yet to do.

From:
Transactions and Proceedings of the Royal Society of Victoria, Volume XI, 1874. President's Address for the year 1873.

The **Inspiring Australia strategy** was developed by the Australian Government to increase engagement and interest in the sciences. The **Inspiring Victoria** program is jointly funded by the Australian and Victorian governments with the Royal Society of Victoria.

Inspiring Victoria encourages involvement in STEM through initiatives (such as **National Science Week Victoria**) that are delivered by the RSV's program partners:

- Public Libraries Victoria
- Neighbourhood Houses Victoria
- Parliament of Victoria
- Museums Victoria
- Royal Botanic Gardens Victoria
- The Commissioner for Environmental Sustainability
- Questacon
- The Arthur Rylah Institute for Environmental Research.

Inspiring AUSTRALIA Victoria

ELEVATING SCIENCE THROUGH INCLUSION

By Ellie Claringbold

This piece originally appeared online at **parliament.vic.gov.au/news/general-news/women-in-science**

Leading female scientists have discussed the joys and challenges of working and studying in their fields of endeavour during a fascinating forum at Parliament House.

Held on International Day of Women and Girls in Science, the event canvassed women's participation in science, technology, engineering and mathematics (STEM).

Presented as a joint initiative by the Parliament of Victoria, the Royal Society of Victoria, Victorian Parliamentarians for STEM, the Commissioner for Environmental Sustainability Victoria, and Inspiring Victoria, the discussion was also live streamed to an online audience who, together with the audience in the Legislative Council chamber, asked plenty of thought-provoking questions.

Hosted by science journalist Natasha Mitchell, the panel tackled a variety of topics including the gender disparities impacting STEM, the barriers to leadership women commonly face, and the ways Victoria's education system can evolve to further foster interest for the sciences in young girls.

Professor Madhu Bhaskaran, a research leader at RMIT University, said the task of addressing gender disparity shouldn't 'rest on the shoulders of women'.

'I know we're fighting for representation, and we're fighting to be on the right tables and for the right decisions to be made, but this is a people's problem. It is not a women's problem,' she said.

The panel spoke at length about the need for greater diversity of ideas within STEM and the 'leaky pipeline' that sees women and girls leave the sciences at an increasing rate as they progress through their study and into the workforce.

Dr Marguerite Evans-Galea, director of the STEM Careers Strategy with the Australian Academy of Technological Sciences and Engineering, said the decision to leave the field is often influenced by ongoing barriers including sexism, unconscious bias, and career disruptions due to childcare.

'It's about shifting those barriers and it's not about fixing women,' she said.

> ‘It’s about fixing science itself.’

The key to breaking down these barriers to retain more female scientists is systemic change, said Dr Isabelle Kingsley, research associate for the office of the Women in STEM Ambassador.

‘Systemic change is essentially just changing the fundamental ways that things are done…so that the way we work, or the way things are, benefit everyone and not just a small select group of people,’ she said.

Examples, Kingsley said, include adopting new recruitment strategies, changing how employees are managed and promoted, and expanding our idea of what traits valuable leaders possess.

Associate Professor Sophie Adams, medical director for Austin Health’s mental health division, said STEM also stands to benefit from the unique lived experiences of women, particularly when they are promoted to leadership roles.

‘I think women have certain leadership advantages…that can create more diverse teams, be more inclusive, be more future-focused, and be a bit more collaborative,’ she said.

‘Our lived experience and the extra hurdles that we’ve overcome have forced us to learn some of these skills, and the skills of influence rather than a command-and-control kind of leadership style.’

Adams believes this approach to leadership, and the diversity injection that results from ensuring women from different backgrounds are involved in STEM, will allow us to better solve the complex problems of our time.

For exciting examples of women in leadership, Dr Evans-Galea points to parliament and Victoria’s universities, where an increasing number of women have taken on leadership roles. She says it ‘opens doors’ for others.

‘Victoria’s inspiring, I think. It’s really leading the way on gender equality,’ Evans-Galea said.

‘Now we just need to get the industry sector onboard and doing the same thing, which I believe they will.’

She said STEM has already begun to see the positive effects of cultural change.

‘What’s inspiring is that we have shifted where the bottleneck is starting to come… so now we’re hanging onto more women already,’ she said.

‘That gives the whole sector the hope because it is possible – if they can do it, we can do it.’

The panel also called on parliament to increase support for science teachers by providing more opportunities for professional development, and to alter the science curriculum to inspire curiosity by exposing children to ‘experiences of awe’.

‘When we have awe, we open that curiosity and creativity and we think differently about who we are, and we see ourselves in a different perspective, and we want to dedicate our life to something bigger,’ Adams said.

Speaking to the event’s audience, host Natasha Mitchell encouraged students to continue pursuing STEM pathways and to persevere despite the challenges that remain.

‘Just know that there are incredible people that are there to back you every step of your way, and there are networks of incredible women and girls who have each other’s back,’ she said.

‘That’s where the power lies.’

Ellie Claringbold

A freelance writer, Ellie was a participant in the inaugural Parliament Express program conducted by the Victorian Parliament and Express Media to provide opportunities for young writers to get published on parliament’s website.

Australian Government | Business
business.gov.au

Student Science Engagement and International Competitions 2023

Applications are now open for Sponsorship Grants for Student Science Engagement and International Competitions 2023.

This grant opportunity provides organisations, such as schools and community groups, with funds to sponsor a student or group of students to participate in STEM initiatives. This includes engagement events, activities and competitions that are hosted in-person or online, within Australia or overseas.

The intended outcomes of the grant opportunity is to:

- support Australian students to develop STEM skills increase the number of students applying to participate in domestic and international STEM competitions and events
- increase the number of students participating in STEM education and going on to a career in STEM
- increase engagement and participation in groups under-represented in STEM.

Successful grant applications will be awarded $1,500 - $15,000 towards eligible project costs.

You may submit multiple applications for the same STEM event, activity or competition, noting the combined total amount of those applications cannot exceed $15,000.

Applications close 5 April 2023 at 5:00 pm

For more details, and to apply, visit: **business.gov.au/2023SGSEIC**

Dr Mina Barzegaramiriolya, a University of Melbourne researcher within the ARC Centre of Excellence in Exciton Science.

CALL FOR SCIENTIFIC PAPERS

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

The Society invites contributions for the Proceedings from authors across the various disciplines of biological, physical and earth sciences, including multidisciplinary research, and on issues concerning technology and the applied sciences.

Contributions on topics that are relevant to Victoria and the south-eastern Australian region are encouraged. The journal also publishes Special Issues and themed collections of papers commissioned by the Council of the Royal Society of Victoria. It is published online in May and November, with two issues constituting a volume.

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

The journal began in 1855 as an irregular publication under the title Transactions of the Philosophical Society of Victoria, the present name being adopted in 1889.

The journal began in 1855 as an irregular publication under the title Transactions of the Philosophical Society of Victoria, the present name being adopted in 1889. Since then, the journal has appeared on a regular basis, at first annually but varying from one, two or four parts per year. Since 1889, the parts issued each year were deemed to make up a volume. The online content extends back to Volume 118, Number 1, 2006.

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

Please note copies of the Proceedings 1854 to 2006 are freely available online at the State Library of Victoria website in their 'Digitised Collections.'

SOCIAL MEDIA
Follow the journal on social media using the hashtag *#ProceedingsRSV*

THE BOTANY OF THE STONY HEAD TRAINING AREA: NEW RECORDS FOR A BIODIVERSE REMNANT IN NORTHERN TASMANIA, AUSTRALIA

Miguel F. de Salas, Matthew L. Baker, Lynette Cave and Gintaras Kantvilas
Proceedings of the Royal Society of Victoria 134(2) 85 - 107

Abstract:

A flora survey of the Stony Head Training Area, northern Tasmania, was conducted in 2020–2021 as a collaboration between the Tasmanian Museum and Art Gallery's Expeditions of Discovery and the Australian Biological Resources Study Bush Blitz programs. With a long historical use as an artillery range, the 5000-ha area contains a range of geologies, has a low profile with average elevations under 100 m asl, and its vegetation consists largely of heathy woodlands and coastal heathlands. It contains a range of relatively undisturbed, high-quality native habitats and populations of several threatened species. The survey targeted vascular plants, bryophytes and lichens, and recorded a total of 575 taxa. Nine lichens are new records for Tasmania — Buellia hypostictella, Caloplaca gilfillaniorum, Cladonia subradiata, Graphis geraensis, Lecanora intumescens and Opegrapha diaphoriza — all previously also known from mainland Australia, and Micarea rhabdogena, M. xanthonica and Pseudothelomma ocellatum, which represent first records for the Southern Hemisphere. Biogeographical and ecological patterns in the flora, the contribution of vegetation remnants to flora conservation, and the ongoing importance of surveys and alpha-taxonomy for documenting biodiversity are discussed. Our findings are consistent with a body of research showing a trend of healthy populations of threatened taxa within military training areas.

https://doi.org/10.1071/RS22003

EVIDENCE-BASED CONSERVATION OF THE NORTHERN VICTORIAN FLOODPLAINS

Jamie Pittock, Kate Auty, C. Max Finlayson, Kate Lyons, John Koehn, Richard Loyn and Matthew J. Colloff
Proceedings of the Royal Society of Victoria 134(2) 108 - 115

Abstract:

The floodplain wetlands of northern Victoria are crucial for conservation of biodiversity and the livelihoods of people. Extensive ecosystem degradation and recent extreme floods and droughts have highlighted the urgent need for more sustainable management. We draw on expertise in ecology, hydrology, climatology and governance to synthesise key knowledge and options for enhanced conservation of the floodplains. A key finding is the need for more flexible mechanisms for delivering water to the diverse array of wetlands. A key option is 'relaxing constraints' that involves agreements with selected landholders to enable pulses of environmental water to fill river channels and safely spill onto low-lying floodplain wetlands. This should improve conservation of biodiversity, better manage flood risk and support a diverse range of local agricultural and recreational industries. These options may aid Victorians to find better ways of managing the rich lands, waters and biota of the floodplains in the southern part of the Murray–Darling Basin.

https://doi.org/10.1071/RS22004

CURRENT GOVERNMENT CONSULTATIONS OF INTEREST TO VICTORIA'S SCIENCE COMMUNITY

*Projects open for consultation from **engage.vic.gov.au/project***

Victorian Murray Floodplain Restoration Inquiry and Advisory Committee.

Have your say on the Standing Inquiry and Advisory Committee appointed to advise on the proposed Victorian Murray Floodplain Restoration Projects and their potential effects.

Ongoing:
engage.vic.gov.au/VMFRP-SIAC

ER Central package – submissions close 10 March 2023:
engage.vic.gov.au/VMFRP-SIAC-ER-Central

Making a Land Access Code of Practice

Have your say if you have had your land accessed by an energy company and/or if you were involved in the consultation on the Electricity Transmission Company Land Access Statement of Expectations

Consultation closes 3 March 2023:
engage.vic.gov.au/making-a-land-access-code-of-practice

Yarra Valley Water Corp Development Licence

Have your say about the construction of a waste to energy facility at the Lilydale Treatment Plant

Consultation closes 8 March 2023:
engage.vic.gov.au/yarra-valley-water-corporation

Water Price Review 2023

The Essential Services Commission is reviewing 14 Water businesses proposed pricing and key outcomes for 2023-28 and wants to hear what you think.

Consultation closes 10 March 2023
engage.vic.gov.au/water-price-review-2023

Waste to Energy Facility Proposal

EPA invites anyone who feels they may be affected by the proposed development activities to submit their comments by the survey or by email to permissioning.engagement@epa.vic.gov.au

Consultation closes 10 March 2023
engage.vic.gov.au/water-price-review-2023

Government Land Standing Advisory Committee

Have your say on changes to planning provisions for surplus government land to be sold or land proposed to be acquired for priority projects by the Victorian Government.

Ongoing:
engage.vic.gov.au/glsac

PITCHING AND WRITING FOR SCIENCE VICTORIA

Science Victoria seeks the discussion and promotion of scientific topics of relevance to people living in the State of Victoria. We are particularly interested in new research, in-depth articles, or exploration of subjects where scientific work and thinking can directly address or deepen our understanding of environmental and socioeconomic challenges.

We welcome your pitches and pieces for news, features, opinion, and analysis articles on current scientific research in Victoria, recent scientific discoveries, related social and policy issues, technical innovations, and overviews of impactful research. We cover a broad range of topics around Science, Technology, Engineering, Mathematics, Medicine/health (STEMM) under an overarching theme of "science and society."

Science Victoria's articles are written in plain, non-academic language, pitched at an intelligent and naturally curious audience that does not necessarily hold subject-matter expertise. This is not a platform for scientific journal articles nor media pieces. For more information on what we're looking for, please read our article submission guidelines below.

HAVE AN IDEA FOR AN ARTICLE?
PITCH YOUR IDEA TO US!
Send your idea to **editor@sciencevictoria.org.au,**
along with any questions you have regarding your pitch.

In your email, please outline:
- In one sentence, what is your key message? (No more than 50 words)
- Why should this key message be shared with the readers of Science Victoria? (No more than 100 words)
- Which style of article are you proposing to write? (See below for a guide to article types)

Article pitches can be submitted at any time, but please keep in mind the article submission deadlines for the next month's issue. Note that we may accept your pitch, but suggest it is more suitable for another style of article.

ARTICLE SUBMISSION
Once your pitch has been accepted, you can submit completed pieces that comply with the style guide below. Completed articles to be published in the next issue of Science Victoria must typically be submitted 2 weeks prior to the beginning of the next month.

All pieces will be reviewed prior to publishing and may be edited for length and clarity (although we will be sure not to alter the message or context of your work). We will also endeavour to fact-check and confirm any grey areas with you ahead of publishing in the interests of accuracy.

All published pieces will be accompanied by a by-line, and a short (<50 word) biography of the author (title, institution, qualifications, current projects, contact email) to be submitted with your piece.

Images and figures to accompany your piece are strongly encouraged, however please ensure that you only provide original images produced by yourself or those that already exist in the Public Domain. Images must include details of the source and any relevant descriptions. If you do not provide any images, and any relevant descriptions. If you do not provide any images, we may include Public Domain or stock images that we deem suitable for visual communication of your content.

REFERENCES
References for all articles should follow the Vancouver referencing style, however News Articles and Columns can either use a reference list either at the bottom of each page or grouped at the end of the article – whichever you prefer.

WRITING FOR SCIENCE VICTORIA: ARTICLE FORMATS

READABILITY

To successfully engage the largest audience, all pieces should have readability in mind. Readability can be determined using a Flesch-Kincaid readability test, aiming for a score between 50-60. This score means that your piece should be easily understood by an educated 16-year-old (a year 10 student). If drafting your piece in Microsoft Word, you can easily view your document's readability statistics. Alternatively, you can use one of the many free online calculators.

FEATURE ARTICLES

Recommended word count (600 - 1,800)

Feature articles are more in-depth pieces on a specific topic related to STEMM. A key aspect of feature articles is the narrative – this isn't a journal article, so think about the story that your article is trying to tell.

Your audience is intelligent members of the general public, who share an enthusiasm for scientific topics, or who are members of the scientific community outside of your particular field.

Avoid using jargon, as it will quickly alienate anyone who isn't an expert in that field. Explaining one or two otherwise irreplaceable terms is fine.

Please reference primary sources/journal articles for any non-trivial scientific claims, or for publications that prompted your writing of the article.

Feature articles typically run between 600 and 1,800 words (including references). Use of sub-headings and figures to break up longer pieces is strongly encouraged.

Not quite sure about the tone for your piece? Have a look at articles published in previous editions of Science Victoria, or in other scientific magazines for a general audience, like The Conversation, Cosmos, New Scientist or Scientific American. A good litmus test is knowing that most of us have read a piece or been to a presentation that managed to make the most interesting topics incredibly boring. This is what you want to avoid.

LETTERS AND ARTICLES

Recommended word count (400 - 1,000)

Letters have minimal restrictions on style, structure, or subject matter. You are encouraged to submit your thoughts/questions/comments that broadly relate to STEMM in Victoria and/or the Royal Society of Victoria. Potential subject areas include responses to articles in previous editions of Science Victoria, seminars at scientific events, science-related issues and policies, or topics you'd like to see in future editions.

Where a specific question is asked, we will endeavour to have the appropriate person respond to your letter.

WHAT I'VE BEEN READING

Recommended word count (400 - 1,000)

This is a column for you to tell us about a book broadly relating to science that you've read. These pieces are typically between 400 – 1,000 words and include a summary of the book and its ideas, as well as your interpretations or conclusions.

Possible questions to consider when writing this column:

- Do you think the author was correct in any assumptions?
- Was the author's style of writing approachable?
- Did they do the subject matter justice?
- Who would you recommend this particular book to?
- What did it mean to you?
- What did you learn?

OPINION ARTICLES

Recommended word count (600 - 1,000)

In contrast to an unbiased news or feature article, an opinion piece conveys your informed opinion on, or experiences with a particular topic. This is where your expertise on a subject can shine. Clearly state your argument, outlining the details of the problem you are addressing, and build to a strong conclusion.

For greatest impact, your choice of topic should be one that is broadly relevant to STEMM-related fields in Victoria. Examples of possible topics include:

- how to address a climate-change related problem in Victoria, successes and failures common to STEMM engagement initiatives,
- changes in your particular field of expertise
- your experiences of a career in STEMM and thoughts on how to better support the next generation of researchers,
- existing STEMM-related studies or approaches that you believe could be applied in Victoria,
- ethical problems related to scientific projects or careers in STEMM.

Please reference primary sources/journal articles for any non-trivial scientific claims, or for publications that prompted your writing of the article.

Opinion pieces should aim to be 600-1000 words. For anything shorter, consider submitting it as a Letter instead. We welcome well-informed opinion articles from all authors, particularly from those with significant expertise in a given area. Articles may reference your own work; however these are not promotional fluff pieces.

NEWS AND ARTICLES

Recommended word count (400 - 1,000)

News Articles are for the discussion of current or recent news relating to science, with an emphasis on science in Victoria or news that impacts Victoria's scientific community.

These articles should be concise, avoid use of jargon and personal opinion, and be referenced as appropriate. News pieces should be between 400-1,000 words in length.

Reports could relate to funding announcements/grant outcomes, new STEMM-related projects, high-impact publications relevant to Victoria, successes of Victorian scientists, or relevant STEMM-related policy news.


THE ROYAL SOCIETY OF VICTORIA
Promotion and Advancement of Science

HOLD YOUR NEXT EVENT AT THE ROYAL SOCIETY OF VICTORIA

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

FACILITIES FOR HIRE

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

Limited parking is available on-site and a commercial parking operator is adjacent on La Trobe Street.

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

SERVICES AVAILABLE

We provide a number of services to ensure your event is a success. Some of the services we provide are:

- Event management
- Meeting venues
- Grants and awards administration
- Social media campaign management
- Broadcasting and video production
- Campaign management
- Recruitment of scientific panels
- Convening community engagement and deliberation processes where scientific work contributes to social, environmental, and economic impacts and benefits.

The Burke and Wills Room

Multi-functional space with adjoining kitchen.

Capacity:

Workshops	≤30 people
Dinners	≤60 people
Seminars, functions, catering, etc	≤80 people

The Von Mueller Room

Seminar room great for smaller meetings and seminars.

Capacity:

Meetings, seminars, etc	≤15 people

The Ellery Lecture Theatre

Raked seating great for lectures, presentations, and conferences.

Capacity:

Raked seating	≤110 people.

The Cudmore Library

A picturesque room great for larger meetings and seminars.

Capacity:

Meetings, seminars, etc	≤24 people

Social Traders CERTIFIED SOCIAL ENTERPRISE
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We are registered as a Certified Social Trader working for the benefit of Victorian communities, which makes our services eligible under the Victorian Government's Social Procurement Framework, as well as the social procurement guidelines of the governments of New South Wales and Queensland. Our certification also assures industries of our authenticity in building social procurement into services and supply chains. For more information and bookings please contact our Business Manager at **james@rsv.org.au** or on +61 3 9663 5259

SUPPORT VICTORIA'S SCIENCE SOCIETY

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

RSV 2023 FUNDRAISING CAMPAIGNS	RSV 2023 FUNDRAISING
The Area of Greatest Need, as identified by the Society's Council	$
Inspiring Victoria – Community Science Engagement Program	$
Science Awards & Prizes	$
Science History & Heritage	$
The Australian Science & Engineering Fair (AUSSEF)	$
Science for All - Citizen Science Programs	$
BioQuisitive Community Lab	$
The Phoenix School Program	$
The BrainSTEM Innovation Challenge	$
Australian Indigenous Astronomy	$
Science Victoria - Magazine and Web Content Production	$
TOTAL	**$**

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Melanie MacKenzie, Collection Manager (Marine Invertebrates) at Museums Victoria, showing land snails to a young child. (Source: Museums Victoria / Photographer: Robert Zugaro)

Science Victoria

The Royal Society of Victoria
8 La Trobe Street, Melbourne,
VIC 3000