

# SCIENCE VICTORIA

JULY 2023

## CAREERS IN STEMM

22 STEMM Professionals on  
Education to Application  
pg 20

### UP, DOWN, TOP, BOTTOM, CHARM, STRANGE

Flavours of a Career with Physics  
pg 37

### ENABLING EXPERIMENTS

The Role of Research Platforms  
pg 35

**PLUS**

Letters  
Events & Opportunities  
From the Archives

... had married her husband in the Ukraine 22 years ago, and they migrated to Australia in 1949.

During the past few years,

... made for the door leading out of the kitchen on to the porch.

Her husband reached the door first, put his hand over

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offer training for

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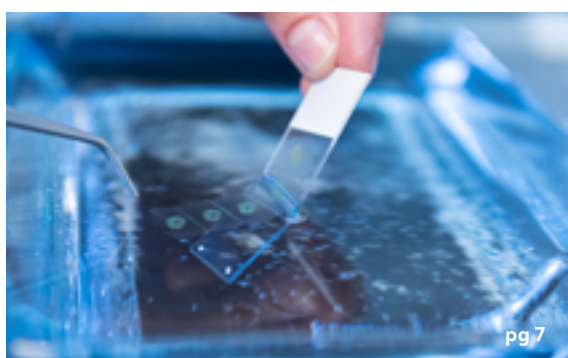
By: December 19, 1962.



**This Edition:** Careers in STEMM

The wide range of subject areas in STEMM is matched with an equally vast range of different roles available in a career in STEMM, whether it be an astrophysicist, anaesthetist, nuclear engineer, nurse, coastal geomorphologist, statistician, botanist, data scientist, chemist, or an aerospace engineer. In this edition, we take a look at a small selection of the many different careers in STEMM fields.

**On the Cover:** Engineering, science, nursing, and other graduates of RMIT University walk down Swanston Street, Melbourne on their graduation day.



pg 7



pg 20



pg 44

- 2 FROM THE CEO**
- 3 FROM THE PRESIDENT**
- 4 LETTERS**
- 4 A Win For Biodiversity and Habitat Preservation
- 5 SNAPSHOTS OF STEMM**
- 8 RSV MEMBERS**
- 12 EVENTS AND OPPORTUNITIES**
- 12 Reinventing the Chemical Industry with Green Chemistry
- 13 Decolonising Fire Science
- 14 Women in Science - Unique Journeys to Different Peaks
- 14 Ockham's Razor: Live from the RSV
- 15 Girls in Physics Breakfasts Program
- 16 The Lost City of Melbourne
- 18 AWARDS, PRIZES, AND FELLOWSHIPS**
- 20 FEATURES AND ARTICLES**
- 20 The Many Different Pathways of STEMM
- 35 Researching Infrastructure
- 37 Where Can Physics Take Me?
- 38 Queers in Science: Science at the Edge
- 42 FROM THE ARCHIVES**
- 43 1973: Victorian Rainforestry
- 45 1923: The Breath of the Wild Flora
- 47 1873: Laying Down the Laws
- 48 INSPIRING VICTORIA**
- 48 Fungi Fascination: In Conversation with a Mycologist
- 50 PROCEEDINGS OF THE RSV**
- 50 Call for Scientific Papers
- 51 ENGAGE VICTORIA**
- 52 GUIDELINES FOR AUTHORS**
- 55 RSV SERVICES AND FACILITIES**
- 56 SUPPORT VICTORIA'S SCIENCE SOCIETY**

Please note that the submission deadline for content to be included in the August 2023 edition of *Science Victoria* is **5pm, Friday 14th of July 2023**.



### SCIENCE AND THE SOCIAL ANIMAL

Mike Flattley  
CEO, The Royal Society of Victoria

Victoria's winter has made its presence well and truly known - frosty mornings, snow on the Alps, and enough respiratory illness to go around for all to enjoy.

To some extent it feels perverse for a science organisation to convene events during "cough, cold, flu and COVID season," yet mid-year is always when our most interesting content seems to emerge on the road to National Science Week in August! So make sure you get your shots, dust off the mask, and get yourself involved in some truly outstanding gatherings over July and August this year. Details are in this issue.

For those who are holding events during National Science Week (officially 12 - 20 August, but "August" is generally fine), please make sure you register your event on the national website at [scienceweek.net.au](http://scienceweek.net.au) so we can count your efforts in the State campaign! With event numbers climbing back up from our years of pandemic lockdowns, we're keen to demonstrate "Victoria's back" with recovered activity numbers.

This month's *Science Victoria* is themed on "Careers in STEM" and reflects the difficulty so many of us have in advocating for the future of scientific practice in Australia - a profession based on skills in scientific work is not a standardised, "paint by the numbers" career path and, as scientific work is by its nature very complex, intellectually challenging and wide open to critical challenge from a global network of peers, it can be a hard sell to those considering their future. "Sustained uncertainty" is absolutely the name of the game, and sitting with that uncertainty is not easy for anyone.

The case studies of diverse STEM careers that we've gathered here for this issue can provide some comfort that anyone, armed with robust training and an excellent professional network, can succeed in a STEM-related profession with the sustained support, guidance and collaboration of colleagues who share a passion for expanding the boundaries of human knowledge. Helping early career scientists navigate the unknown and thrive in unexpected ways within a vast field of endeavour is a core aim of the Royal Society of Victoria, and holding events to share knowledge and network with other members of Victoria's science community remains one of the only tools truly open to us for brokering this continued support.

For those who are variously well-established in their roles or still considering their careers in scientific fields, industries, sectors or professions, please peruse the events on offer and attend something that appeals to you. Not only are these stimulating talks and presentations, but those attending will be prospective employers, employees, mentors, collaborators and partners. Networking is a bit daunting if you're not a naturally sociable person, but it is an essential activity in STEM careers, and we encourage you to give it a red hot go.

I hope to see many of you at an event sometime very soon!

Mike Flattley  
CEO, The Royal Society of Victoria

### SCIENCE VICTORIA, VOLUME 3, NUMBER 6, JULY 2023

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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.



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### 21ST CENTURY SKILLS – A PERSONAL JOURNEY

Rob Gell AM MRSV  
President, The Royal Society of Victoria

The Australian government has predicted that future workers will spend more than twice as much time on job tasks requiring science, maths, and critical thinking than today.<sup>1</sup>

The changing landscape of virtually all job sectors, driven particularly by digital technology, is impacting all workplaces, and driving significant change in education programmes in order to provide the knowledge necessary to maintain high levels of capability across the community.

For this Careers in STEMM edition of *Science Victoria*, our editor Scott Reddiex has encouraged me to examine and share my own story as a science communicator and advocate for science in my role at The Royal Society of Victoria.

I'm not an eminent scientist (as most of our previous Presidents have been), but I have always considered that my basic science degree provided me with an ideal stepping stone to a career that has covered tertiary education, media, scientific research, non-profit sector governance, environmental consulting and – more recently – sustainable technology startups.

My time at the University of Melbourne as an undergraduate was formative. The Vietnam War; the end of the first environment revolution – Rachel Carson, Paul Ehrlich, and Garret Hardin. I became a coastal geomorphologist.

Critical to achieving such a wide range of roles has been opportunity. Opportunities identified, opportunities offered, and opportunities taken. My first role teaching Physical Geography at the Melbourne State College came as a result of an opportunity to be involved as an undergraduate in collaborative research on Westernport Bay. Teaching in a Bachelor of Environmental Science Education degree course in the mid-1970s was game-changing. My head of department, who was later 'head-hunted' by the Blair Government in the United Kingdom to manage that government's education scheme, taught me the value of language in both written and spoken form.

Despite my enjoyment of this work, I had made the decision to take the next job I found. By chance that was presenting the weather forecast on Channel 0 television news in Melbourne. The station argued that they didn't want someone from the Bureau of Meteorology who knew all about the weather but nothing about how to present it, nor did they want someone from show business who knew how to present, but knew nothing about the weather. They were looking for a teacher-type, and found me. I continued that work at three different commercial networks over thirty-one years and included a parallel period on radio.

Unfortunately, weather presenting alone wasn't sufficient to occupy a day so to fulfil earlier objectives I started an environmental consultancy with colleagues I had studied with. This interest continues to this day and provides the opportunity to engage with a wide variety of companies and agencies in developing improved operations and better outcomes for the planet.

My career in television provided new opportunities. In 1987 I travelled to Antarctica with a film crew as part of an Australian Antarctic Division Voyage to Heard Island and Mawson and Davis Stations in Australian Antarctic Territory. At the time Antarctica's oil and minerals resources were being valued, mostly by northern hemisphere nations. My reports and a subsequent book brought me in touch with the Australian Conservation Foundation's campaign. With other NGOs the campaign led to the Hawke government, together with the French government, proclaiming Antarctica as the first World Park and me to the ACF Council for a critical decade. I have also spent time on the boards of Greening Australia, the Western Port Biosphere, the Victorian Coastal Council and Wildlife Victoria.

In business, I am currently engaged as director or advisor with companies providing environmental sensing technology, mine clean-up technology, smart water storage, solar panels materials recovery, and biological antifouling technology.

The acquisition of STEM skills has been critical to me on my journey. By making myself available for conversations that might progress useful ideas, programmes or organisations and providing support where it has been requested, I have been able to integrate learnings across a range of STEM sectors, building positive interrelationships. I hope I have made the most of opportunities, built valuable networks and engaged positively, always applying science-based decision-making, and as much critical-thinking as I can muster.

Importantly, I still very much enjoy the teaching-learning process where I started – it's a very rewarding thing to do.

**Rob Gell**  
President, The Royal Society of Victoria

References:  
1. Clarke, M. (2022). Why is STEM important? Department of Education. [education.gov.au/australian-curriculum/national-stem-education-resources-toolkit/introductory-material-what-stem/why-stem-important](https://www.education.gov.au/australian-curriculum/national-stem-education-resources-toolkit/introductory-material-what-stem/why-stem-important)

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# A WIN FOR BIODIVERSITY AND HABITAT PRESERVATION IN VICTORIA

By Peter Mulherin

President, Land Covenantors Victoria

I am delighted to share some positive news that will greatly benefit our state's environment. Recently, Victoria's state budget announced a significant change: *"The Government will introduce a new land tax exemption for land protected by a conservation covenant with Trust for Nature from 1 January 2024."*

Campaigning for a land tax exemption was the catalyst for the formation of Land Covenantors Victoria: dissatisfaction on this issue had been growing amongst covenantors for years, leading to the Trust for Nature connecting concerned covenantors with each other.

Since forming in 2021 we have grown to over 100 members, many of whom express their frustration with the costs of land tax and council rates on land they actively manage for the benefit of biodiversity and future generations. Our advocacy on a land tax exemption ramped up in 2022 and included corresponding with Minister for Climate Action Lily D'Ambrosio MP, meeting with Biodiversity Division staff from the Department of Energy, Environment and Climate Action (then DELWP), as well as ongoing collaboration with Trust for Nature. Our growing membership has clearly added a strong voice to remove barriers for current and future landholders working in the public interest to manage our conservation estate on private land.

We are celebrating this decision, as will many of our members, once January 2024 comes around. In the meantime, LCV will continue to advocate for the consistent application of rate rebates by local councils, and for more support and resources to be devoted to stewardship programs for both new and existing covenantors.

This decision marks a great victory for all Victorians, contributing to the preservation and enhancement of our natural habitats and biodiversity. It is a pleasure to share this news, and we look forward to keeping you updated on our future successes.



# SNAPSHOTS OF STEMM

Images from everyday science.



Scienceworks Learning Facilitator Tom Lang and his prosthetic design during a Design Sprint. Students learned about assistive and enabling design and were encouraged to build prototypes of disability aids.

Photograph: Dr Catriona Nguyen-Robertson/Museums Victoria.

## SNAPSHOTS OF STEMM

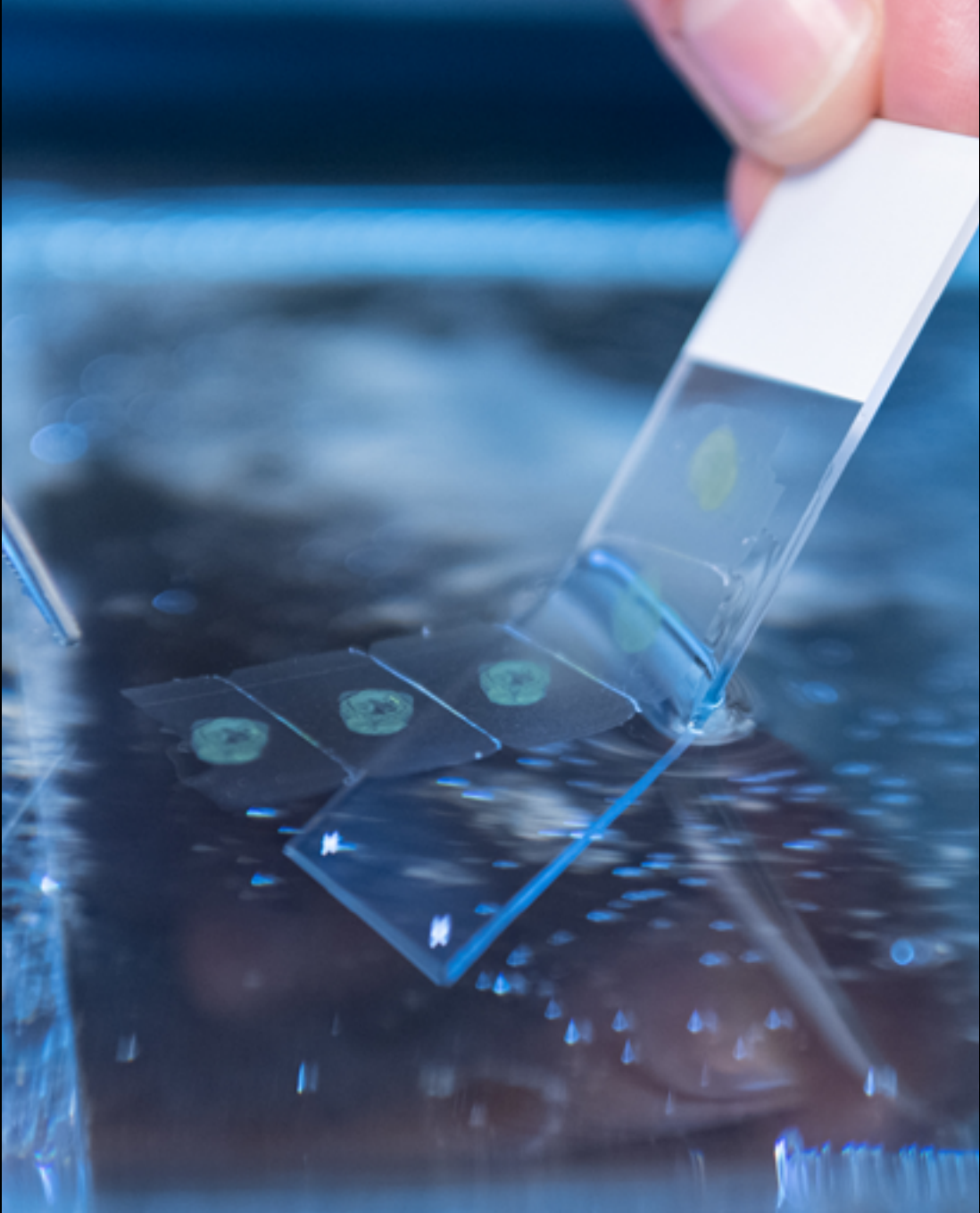


Dr Dee Ninis, Earthquake Geologist at the Seismology Research Centre, taking part in a paleoseismological fault trench investigation (documenting evidence of recent ground-rupturing earthquakes) at the Willunga Fault in South Australia.

Photograph: Dr Jonathan Griffin/Geoscience Australia



# SNAPSHOTS OF STEMM



Thin slices of biological tissue samples being applied to microscope slides for imaging at the Melbourne Histology Platform, the University of Melbourne.

Photograph: Gavan Mitchell/University of Melbourne

# RSV MEMBERS

## NEW RSV MEMBERS

### INDIVIDUAL MEMBERS

*Mr Tony Clemenger*

CEO, Clemenger Consulting & Founder, National Indigenous Cultural Centre

*Dr Joseph Bertolini*

Retired Pharmaceutical Research & Development Director

*Dr Denis Dragovic*

Deputy President, Administrative Appeals Tribunal

*Mr Michael Vanderzee*

Policy Analyst, Wentworth Group of Concerned Scientists

*Professor Jamie Pittock*

Fenner School of Environment & Society, Australian National University

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Elizabeth Vernon Puzey Research Fellow, The University of Melbourne

*Ms Jennifer Wolcott*

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*Mr Robert Hickenbotham*

PhD Candidate, Monash University

*Mr Christopher Williams*

Registered Nurse, Health Care Australia

*Ms Eliza Tree*

Artist & Expeditioner

*Ms Kay Taranto*

Registered Wildlife Carer & Shelter Owner, Wild Days Wildlife Shelter

### ORGANISATIONAL MEMBERS

*Professionals Australia*

Representative: Mr Thomas Green

Professionals Australia is the trade union for scientists and engineers in Victoria. Our members work together to ensure that the standing and status of their professions is maintained, and that as practitioners they receive the reward, respect and recognition that they deserve. We are concerned for the quality and reputation of science, but particularly for the wellbeing and remuneration of our scientists.



## 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.



**\$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 Victoria 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.



To join the Royal Society of Victoria please go to [rsv.org.au/how-to-join](https://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](https://donorbox.org/royal-society-victoria)

The Council of the Royal Society of Victoria records with sadness the passing of the following valued colleagues:



Image: N. J. Rosengren/La Trobe University

## DR ERIC CHARLES FREDERICK BIRD

**2 September 1930 - 8 June 2023**

Principal Fellow, Department of Geography, University of Melbourne.

The Royal Society of Victoria is saddened by the tragic loss of Dr Eric Bird. Eric Bird was a coastal morphologist and geologist, author of the book "Coasts - An Introduction to Coastal Geomorphology" and other insights and whose seminal work on the evolution of the Gippsland Lakes endures to this day.

RSV President Rob Gell - *"Eric was an inspirational teacher who taught me that writing is important, that observation is critical, and encouraged me to join The Royal Society of Victoria in 1978. An era ends."*





# VICTORIA'S SCIENCE COMMUNITY MEMBERS RECOGNISED ON THE 2023 KING'S BIRTHDAY HONOURS LIST

## HONOURS

The Royal Society of Victoria extends warm congratulations to the following people:

Dr Kerry John BREEN AO, for distinguished service to the advancement of ethical medical research, to the development of doctors' health programs, and as an author.

Professor Julie-Anne CONSIDINE AO, for distinguished service to medicine in the field of emergency nursing, to tertiary education, and to professional associations.

Professor Jane GUNN AO, for distinguished service to medical administration in leadership roles, to tertiary education and research, and to the community.

Dr Misty Rayna JENKINS AO, for distinguished service to medical science as an immunologist, to the promotion of women in STEM, and to the Indigenous community.

Professor Grant Alan McARTHUR AO, for distinguished service to medicine as a clinician scientist through melanoma and cancer research, and to leadership roles.

Dr Sandra Penso STAFFIERI AO, for distinguished service to medicine as an orthoptist and vision researcher, and to paediatric ophthalmology.

Mr Gerald Francis WILLIAMS AO, for distinguished service to critical care nursing, to medical education, to professional organisations, and as a mentor.

Professor John Raymond ZALCBERG AO, for distinguished service to oncology as a clinician-researcher, and as an advocate for those living with cancer.

Professor Melanie BAHLO AM, for significant service to genetic and infectious disease research, and to public health.

Mrs Jane Fair BELL AM, for significant service to governance in the medical research, healthcare, and not-for-profit sectors.

Associate Professor Ravi Subramanya BHAT AM, for significant service to medicine, and to rural psychiatry.

Dr Marcus Patrick CAREY AM, for significant service to urogynaecology, and to women's health.

Dr Peter Michael DANN AM, for significant service to conservation, and the preservation of sea birds.

Ms Dale Allyson FISHER AM, for significant service to medicine, to health care management, and to nursing.

Professor Maria FORSYTH AM, for significant service to chemistry education, research and scholarship.

Emeritus Professor Raphael Hilary GRZEBIETA AM, for significant service to the transport industry through road safety research and promotion.

Professor Terry HAINES AM, for significant service to medical education and research into fall prevention and mobility.

# HONOURS

Professor Mark HARGREAVES AM, for significant service to tertiary education, to sports administration, and to physiology.

Mr Geoffrey Albert HEAD AM, for significant service to medical research into high blood pressure diagnosis and management.

Professor Rodney John HICKS AM, for significant service to nuclear medicine through a range of international and national roles.

Dr David HILL AM, for significant service to paediatric medicine in the fields of allergy and respiratory biology.

Dr Anna LAVELLE AM, for significant service to science and innovation through a range of roles.

Ms Simone Dorothea LEYDEN AM, for significant service to community health, particularly through neuroendocrine cancer organisations.

Dr William John McKAY AM, for significant service to medical administration in the field of nuclear medicine.

Professor Danielle MAZZA AM, for significant service to medicine and to medical research, particularly to women's health.

Professor Harshal NANDURKAR AM, for significant service to medicine, particularly as a haematologist.

Professor David Glen NEWMAN AM, for significant service to aerospace medicine.

Professor Alice PÉBAY AM, for significant service to science, particularly through stem cell and neuroscience research.

Professor Anna PEETERS AM, for significant service to community health, particularly obesity research.

Professor Joanna ROBINSON AM, for significant service to community health, through suicide prevention awareness and support.

Dr Peter ROGERS AM, for significant service to engineering, to education, and to the community.

Associate Professor Louis ROLLER AM, for significant service to the pharmacy profession through education and governance.

Clinical Associate Professor Magdalena SIMONIS AM, for significant service to medicine through a range of roles, and to women's health.

Emeritus Professor Andrew James SINCLAIR AM, for significant service to community health in the field of nutrition.

Dr Duncan Jake TOPLISS AM, for significant service to endocrinology, and to professional organisations.

Dr Sharonne ZAKS AM, for significant service to dentistry, and to the arts.

Ms Lurline ARCHAY OAM, for service to information technology.

Dr Andrew William BARLING OAM, for service to community health.

Associate Professor Josephine BEATSON OAM, for service to psychiatry.

Dr Sophie BEAUMONT OAM, for service to dentistry.

Dr Margaret Joy BEAVIS OAM, for service to the community through a range of roles.

Dr Julie (Kate) Catherine FITZHERBERT OAM, for service to conservation and the environment.

Mr Gilbert Harold FREEMAN OAM, for service to conservation and the environment.

Dr Meredith Joan FREEMAN OAM, for service to conservation and the environment.

Ms Gaye GADSDEN OAM, for service to conservation and the environment.

Dr Margaret GRIGG OAM, for service to mental health through a range of roles.

Dr Margaret Ellen JAMES OAM, for service to women through higher education.

Ms Dagmar Anne JENKINS OAM, for service to community health.

Dr Philomene JOSHUA TENNI OAM, for service to community health.

Dr Susan Elizabeth LESTER OAM, for service to the community through a range of organisations.

Mr Anthony MACALI OAM, for service to community health.

Dr Forbes McGAIN OAM, for service to medicine.

Ms Ann Marion McGREGOR OAM, for service to conservation and the environment.

Dr Carol NEWNHAM OAM, for service to community health as a neuropsychologist.

Mrs Gayle PORTER OAM, for service to community health as a speech pathologist.

Dr Paul Gerard POWER OAM, for service to psychology.

Mr Donald Gordon RICKERBY OAM, for service to horticulture.

Mrs Jennifer RICKERBY OAM, for service to horticulture.

Dr Noel ROBERTS OAM, for service to anaesthesiology through a range of roles.

Associate Professor Kelly Lee ROGERS OAM, for service to medical research.

Mr John ROGERSON OAM, for service to the community through alcohol and drug awareness groups.

Dr Norman ROTH OAM, for service to sexual health medicine.

Dr Jennifer Wynn SENIOR OAM, for service to medicine.

Mr Peter TYRRELL OAM, for service to surveying, and to professional organisations.

Mr Ross David BROAD PSM, for outstanding public service to health, mental health and drug and alcohol policy development in Victoria.

Ms Melissa Sue HARRIS PSM, for outstanding public service to state and local government, and for transformation in the areas of geospatial, planning and land administration in Victoria

Apologies in advance for any errors or omissions.

If you think a friend, family member or colleague has been overlooked for their distinguished contributions to Australian life and society, you can make a nomination any time at [gg.gov.au/australian-honours-and-awards/nominate-someone-award](https://www.gg.gov.au/australian-honours-and-awards/nominate-someone-award).

# REINVENTING THE CHEMICAL INDUSTRY WITH GREEN CHEMISTRY

A joint presentation by the Royal Society of Victoria and the ARC Training Centre for Green Chemistry in Manufacturing. Featuring Professors John Warner & Paul Anastas (USA), co-authors of "Green Chemistry: Theory & Practice" (1998).

Green chemistry involves the design of chemical products and processes that reduce or eliminate the use or generation of hazardous substances, eliminates waste, uses renewable feedstock and minimises energy requirements.

Green chemistry applies across the life cycle of a chemical product, including its design, manufacture, use, and ultimate disposal – it can be considered as essential to move toward the circular economy.

Big changes are currently underway. Following a second round of talks in Nairobi in March 2023, the world moved closer to a global agreement to better manage chemicals and waste to protect the environment and human health. Goals and guiding principles of a new chemical and waste management framework have been agreed to under the United Nations' Environment Programme, refining essential targets related to the sustainable production and use of chemicals. The guidelines are expected to be adopted during the fifth session of the International Conference on Chemicals Management, scheduled for September this year in Bonn, Germany.

Join the world renowned "founders" of Green Chemistry – Professors Paul Anastas and John Warner – who will explain why our world needs green chemistry and the vital transitions our industries must make to remove chemical hazards and waste from supply chains and product life cycles.



### ABOUT THE SPEAKERS

#### Paul T. Anastas

Paul T. Anastas is the Teresa and H. John Heinz III Professor in the Practice of Chemistry for the Environment at Yale University. He serves as the Director of the Center for Green Chemistry and

Green Engineering at Yale, where he also holds appointments in the School of the Environment, Department of Chemistry, and Department of Chemical Engineering. He was previously the Assistant Director for the Environment in the White House Office of Science and Technology Policy, where he worked from 1999-2004. Trained as a synthetic organic chemist, Dr. Anastas received his Ph.D. from Brandeis University and worked as an industrial consultant.

He is credited with establishing the field of green chemistry during his time working for the U.S. Environmental Protection Agency as the Chief of the Industrial Chemistry Branch and as the Director of the U.S. Green Chemistry Program. Dr Anastas has published widely on topics of science through sustainability including eleven books, such as Benign by Design, Designing Safer Polymers, Green Engineering, and his seminal work with co-author John Warner, Green Chemistry: Theory and Practice.



#### John Warner

John Warner received his PhD in Chemistry from Princeton University. After working at the Polaroid Corporation for nearly a decade, he then served as tenured full professor at UMASS Boston and Lowell (Chemistry and Plastics Engineering). In 2007 he founded the

Warner Babcock Institute for Green Chemistry with Jim Babcock, and Beyond Benign with Amy Cannon. He is one of the cofounders of the field of green chemistry, co-authoring the defining text "Green Chemistry: Theory and Practice" and articulating the 12 principles of green chemistry with Paul Anastas.

Dr Warner has over 100 publications providing foundational work in the fields of noncovalent derivatization, polymer photochemistry, metal oxide semiconductors and synthetic organic chemistry. As a 2014 Perkin Medal recipient, John has over 300 patents in various fields of chemistry. He serves as Distinguished Professor of Green Chemistry at Monash University in Australia and was named an Honorary Professor at the Technical University of Berlin. He served as the 2020 and 2021 Global Chair for the Center for Sustainable and Circular Technologies at the University of Bath. He serves as strategic advisor for the Science, Engineering and Health Committee of EPA Victoria in Australia.



Presented on behalf of the ARC Training Centre for Green Chemistry in Manufacturing.

### REINVENTING THE CHEMICAL INDUSTRY WITH GREEN CHEMISTRY

#### Date/Time:

Friday 7 July 2023, 6pm

#### Price:

In-Person: \$10 (non-members) / \$5 (RSV members)  
Online: \$5 (non-members) / Free for RSV members

#### Location:

The Royal Society of Victoria  
Wurundjeri Country  
8 La Trobe Street, Melbourne  
(Simulcast on Zoom)

Reserve your spot at:

[rsv.org.au/events/green-chemistry/](https://rsv.org.au/events/green-chemistry/)

# DECOLONISING FIRE SCIENCE

Presented by Dr Philip Zylstra, Curtin University.

We can expect that the science of fire should intersect with fire use by First Peoples, because an understanding of fire that enabled cultures to coexist with it for at least 65,000 years must have its roots in scientific reality. Our understanding of that relationship is, however, deeply troubled.

The predominant concepts of modern fire science arise from a paradigm that valorises the role of human agency, dismissing and even demonising natural ecological processes. The result is that fire science has become a tool with which Indigenous fire knowledge is reinterpreted to support the colonial narrative and reinforce pseudo-science in a loop of circular reasoning. The implications of this are far-reaching, and poor fire science now drives management that decimates carbon storage, threatens the existence of numerous species, and drives much of the impact of bushfire on human society.

Join ecologist and environmental scientist Dr Philip Zylstra, who will examine the roots of this dilemma and give examples of it in the current context, then demonstrate how the narrative is reversed when we adopt an understanding of fire that is informed by ecological processes, interpreted within a sound mechanistic framework. Using the Fire Research and Modelling Environment (FRaME), Philip will introduce Ecological Control Theory, showing how forests limited the impacts of fire and maintained thriving populations of fire-sensitive species long before the arrival of humans.

Finally, he will demonstrate how a paradigm of cooperation rather than domination allowed for the long-term coexistence with fire demonstrated by First Peoples, and the ways that we can adjust our current approaches to cooperate with Country.



### ABOUT THE SPEAKER

Dr Philip Zylstra came into bushfire research from a background in fire management and remote area firefighting. Since that time he has developed the first and only peer-reviewed fire behaviour model

for most Australian forests, as well as the first model globally to calculate the direct effects of fire on flora, fauna and soils. His work focuses on understanding the ways that our interaction with forests affect fire risk. Using fire history analysis and state-of-the-art modelling, Phil's work reconciles deep knowledge from First Peoples with forest ecology and a complex understanding of fire behaviour to provide critically-needed guidance in fire management.

Phil is an Adjunct Associate Professor with Curtin University's School of Molecular and Life Sciences (Perth), and a Research Associate of the University of New South Wales (Sydney).



*Presented as part of the Inspiring Victoria program in 2023*

### DECOLONISING FIRE SCIENCE

#### Date/Time:

Thursday, 13 July 2023, 6pm

#### Price:

In-Person: \$10 (non-members)/\$5 (RSV/GSAV members)  
Online: \$5 (non-members)/Free for (RSV/GSAV members)

#### Location:

The Royal Society of Victoria  
Wurundjeri Country  
8 La Trobe Street, Melbourne  
(Simulcast on Zoom)

Reserve your spot at:

[rsv.org.au/events/decolonising-fire-science/](https://rsv.org.au/events/decolonising-fire-science/)



## EVENTS AND OPPORTUNITIES

### WOMEN IN SCIENCE - UNIQUE JOURNEYS TO DIFFERENT PEAKS

As part of the 2023 International Congress of Genetics, join us at the Melbourne Convention and Exhibition Centre for an engaging moderated conversation with extraordinary women who are leaders in scientific research and communication. We will hear of their journeys, achievements and interests outside of science.

#### SPEAKERS WILL INCLUDE:

**Professor Doctor Christiane Nüsslein-Volhard** (Germany) who shared the Nobel Prize in Physiology or Medicine 1995 for "discoveries concerning the genetic control of early embryonic development".

**Professor Anne Muigai** (Kenya) who is the joint leader of the African Biogenome Project that aims to sequence the genomes of 100,000 species of plants and animals endemic to Africa.

**Ida Vinson** (USA) with a research background in Chemistry and Biochemistry, Valda is the Executive Editor of the Science journals published by AAAS.

The International Congress of Genetics features a large public program, touching on a wide range of topics that impact, fascinate, or concern our society. Details of this and other events can be found at [icg2023.com.au/public-program](https://icg2023.com.au/public-program)

#### WOMEN IN SCIENCE - UNIQUE JOURNEYS TO DIFFERENT PEAKS

##### Date/Time:

Monday, 17 July 2023, 6.00 - 7.30pm

##### Price:

Free

##### Location:

Melbourne Exhibition and Convention Centre  
Wurundjeri Country  
1 Convention Centre Place,  
South Wharf VIC 3006

Reserve your spot at:

[trybooking.com/events/landing/1073532](https://trybooking.com/events/landing/1073532)

### OCKHAM'S RAZOR: LIVE FROM THE ROYAL SOCIETY OF VICTORIA

Got ten minutes? Let us tell you a story...

ABC Science returns to the Royal Society of Victoria for a special podcast recording event. Ockham's Razor is the ABC's soapbox for all things scientific: stories, insights, arguments or tributes – anything that can grip an audience by the ears for 10 straight minutes.

You'll hear from a hand-picked roster of superb speakers on a range of compelling topics. Expect a jam-packed evening of short talks that will intrigue, excite and inspire. Details on this year's speakers will be coming soon. Meanwhile, book now to ensure your seat at this popular annual event!

You can listen to Ockham's Razor now via ABC Radio National ([abc.net.au/radionational/programs/ockhamsrazor](https://abc.net.au/radionational/programs/ockhamsrazor)), iTunes or wherever you get your favourite podcasts.

#### OCKHAM'S RAZOR: LIVE FROM THE ROYAL SOCIETY OF VICTORIA

##### Date/Time:

Thursday 20 July 2023, 6pm

##### Price:

In-Person: \$10 (non-members)/\$5 (RSV members)

##### Location:

The Royal Society of Victoria  
Wurundjeri Country  
8 La Trobe Street, Melbourne

Reserve your spot at:

[rsv.org.au/events/ockhams-razor-2023/](https://rsv.org.au/events/ockhams-razor-2023/)





# GIRLS IN PHYSICS BREAKFASTS PROGRAM

The Royal Society of Victoria is an auspice for the Laby Foundation to fund the Girls in Physics Breakfasts program, organised by the Vicphysics Teachers' Network, and run across Victoria each year.

The Girls in Physics Breakfasts Program invites girls in years 10-12 to share a table with two or three women who either have a career in physics or engineering, or who are at university studying in either of these areas.

Over breakfast, the students are encouraged to ask questions about what the physicists and engineers do in their roles, how they found their job, what studying at university is like, and more. This is followed by a speaker, who talks about her research and her career.

After a Q&A session, there are a few careers-based activities, which are of value to students and guests alike to finish the event.

The Girls in Physics Breakfasts Program started in 2016, and already this year there have been two Breakfasts held in central Melbourne and Mildura. The remaining breakfasts for 2023 are listed below.

Vicphysics is always seeking more women to attend a breakfast. The more women who attend, the more school bookings we can take.



All breakfasts run from 7:30 am until 10:00 am, and are free for all guests.

Reserve your spot at:  
[vicphysics.org/events/girls/breakfast/](https://vicphysics.org/events/girls/breakfast/)

### 21st July, Monash University

**Speaker:** Dr Karen Livesey, AIP Women in Physics Lecturer for 2023.

**Topic:** Nanomagnets: New materials to address biomedical and technological problems.

### 2nd August, Geelong

**Speaker:** A/Prof Elizabeth Hinde, the University of Melbourne.

**Topic:** Glow in the dark – Using fluorescence to observe DNA in a living cell.

### 11th August, Wodonga

**Speaker:** Emma Dyce, Medical radiation physicist.

**Topic:** Treating skin cancer with radiotherapy.

### 16th August, Traralgon

**Speaker:** Prof Rachel Webster, the University of Melbourne.

**Topic:** Geothermal: vast energy reserves beneath our feet

### 25th August, Ballarat

**Speaker:** Dr Taissa Danilovich, Monash University.

**Topic:** Nanomagnets: New materials to address biomedical and technological problems.

### 1st September, Bendigo

**Speaker:** Dr Amanda Karakas, Monash University.

**Topic:** Stars as chemical element factories.



### THE LOST CITY OF MELBOURNE

An event organised by Geography Victoria –  
auspiced by The Royal Society of Victoria

Geography Victoria events are open to everyone. Our recent events at the Port of Melbourne and the coastal field trip at Sandringham and Beaumaris have sold out quickly. Following on from the successful Geography Victoria's Christmas Treasure Hunts in December 2022, we are off in search of more treasures of Melbourne. This time we will be inside, discovering...

#### THE LOST CITY OF MELBOURNE

In the 1850s, Melbourne was the fastest growing city in the world. "They dreamt big, they built big....it was a city jumping out of its skin".

Melbourne became an epicentre of film and culture, and its hotels, restaurants, and cafes became world renowned. However, the attempted 'modernisation' of Melbourne in the 1950s destroyed much of the city, including its elegant cinemas and picture palaces. Buildings were deemed too Victorian, the opposite of a modern metropolis, and Whelan the Wrecker's ([en.wikipedia.org/wiki/Whelan\\_the\\_Wrecker](https://en.wikipedia.org/wiki/Whelan_the_Wrecker)) demolition blitz began.

Featuring rare archival film & photography, this film is a revelatory work that allows its audience to reimagine the former glory of the lost city of Melbourne.

Director & Producer Gus Berger is a Melbourne based filmmaker and owner/operator of Thornbury Picture House, a lively independent art-house venue.

Watch the trailer at: [www.thelostcityofmelbourne.org](http://www.thelostcityofmelbourne.org)

#### THE LOST CITY OF MELBOURNE

**Date/Time:**

Sunday 23 July 2023, 3pm - 5.30pm (screening from 3pm, light refreshments from 4.40pm)

**Price:**

\$25 ( + booking fee)

**Location:**

Thornbury Picture House  
802 High Street  
Thornbury

Book your ticket at:

[rsv.org.au/events/lost-city-of-melbourne/](http://rsv.org.au/events/lost-city-of-melbourne/)





## NATIONAL YOUTH SCIENCE FORUM 2024

Are you a Year 11 student passionate about science, technology, engineering and maths (STEM)?

Do you want to meet like-minded young people from across Australia? Do you want to learn more about your study and career options?

Apply for the 2024 National Youth Science Forum (NYSF) Year 12 Program!

The NYSF Year 12 Program is designed to give students a broader understanding of the diverse study and career options available in science, technology, engineering and mathematics (STEM) and to encourage continued studies in these fields.

The NYSF Year 12 Program runs two summer sessions. Participants stay at university colleges and are immersed in science and technology.

Delivered by youth for youth, past participants are selected to return each year to participate in the Student Staff Leadership Program and help run the program the year after they first attend. More information about the program, including the application process, fees, and financial support, can be found on our website.

If you have any questions at all, please don't hesitate to contact us at [nysf@nysf.edu.au](mailto:nysf@nysf.edu.au).

We are excited to welcome students from Victoria to the National Youth Science Forum in January 2024!

Locations:

The Australian National University, Canberra (5-13 January 2024) & The University of Queensland, Brisbane (12-20 January 2024)

Applications are open now at [nysf.edu.au/programs/year-12-program/](https://nysf.edu.au/programs/year-12-program/)

Applications close **31 July 2023**.

## UPCOMING RSV EVENTS

The RSV hosts many STEM-related events, public lectures, and meetings throughout the year. These are predominantly held at the RSV Building at 8 Latrobe St, Melbourne (unless otherwise indicated), and simulcast online via YouTube/Facebook Live. Our public lectures comprise the "Scientists in Focus" component of the Inspiring Victoria program in 2023.

### 7 JULY

#### SEMINAR: CREATING A SUSTAINABLE FUTURE WITH GREEN CHEMISTRY

Join Professors John Warner & Paul Anastas (USA), the "founders" of Green Chemistry and co-authors of "Green Chemistry: Theory & Practice" (ISBN: 9780198506980), as they explain the need for green chemistry & and the vital transitions our industries must make.

Join us in person or via Zoom webinar on Friday, **7 July** from 6:00pm.

Reserve your spot at: [rsv.org.au/events/green-chemistry/](https://rsv.org.au/events/green-chemistry/)

### 13 JULY

#### SEMINAR: DECOLONISING FIRE SCIENCE

Dr. Philip Zylstra from Curtin University will discuss the problems of modern fire science, which is dismissive of Indigenous fire knowledge and ecological processes, resulting in detrimental management practices. Dr. Zylstra proposes an alternative approach that embraces cooperation and ecological understanding to coexist with fire in a sustainable manner.

Join us in person or via Zoom webinar on Thursday, **13 July** from 6:00pm.

Reserve your spot at: [rsv.org.au/events/decolonising-fire-science/](https://rsv.org.au/events/decolonising-fire-science/).

### 20 JULY

#### OCKHAM'S RAZOR LIVE

ABC Science returns to the Royal Society of Victoria for a special podcast recording event. Ockham's Razor is the ABC's soapbox for all things scientific: stories, insights, arguments or tributes – anything that can grip an audience by the ears for 10 straight minutes.

Join us in person on Thursday, **20 July** from 6:00pm.

For more information, visit [rsv.org.au/events/ockhams-razor-2023/](https://rsv.org.au/events/ockhams-razor-2023/)

### 17 AUGUST

#### YOUNG SCIENTIST RESEARCH PRIZES

Finalists of the RSV's annual Young Scientist Research Prizes will present their work and the winners announced at this event in August.

For more information, visit [rsv.org.au/awards-and-prizes/young-scientist-research-prizes/](https://rsv.org.au/awards-and-prizes/young-scientist-research-prizes/)

### 12 OCTOBER

#### RSV + AATE MEETING & PUBLIC LECTURE

Joint Meeting and Public Lecture with the Australian Academy of Technology and Engineering

### 23 NOVEMBER

#### PHILLIP LAW POSTDOCTORAL AWARD LECTURE

The winner of the RSV's Phillip Law Postdoctoral Award will present their work to a special meeting of the RSV at a public lecture scheduled for the evening of Thursday, **23 November 2023**. This will be professionally filmed and shared online.

For more information, visit [rsv.org.au/awards-and-prizes/phillip-law-award/](https://rsv.org.au/awards-and-prizes/phillip-law-award/)

### 7 DECEMBER

#### RSV RESEARCH MEDALLIST LECTURE

The winner of the annual RSV Medal for Excellence in Scientific Research will present a lecture to RSV members and guests on the evening of **Thursday, 7th December 2023**, at which the Medal will be presented.

For more information visit [rsv.org.au/awards-and-prizes/research-medal/](https://rsv.org.au/awards-and-prizes/research-medal/)

# THE PHILLIP LAW POSTDOCTORAL AWARD

This award was made possible from the generous bequest to the Society from the estate of the late Dr Phillip Garth Law AC, recognising excellence in scientific research by an Early Career Researcher within seven years of attaining a doctoral qualification from a university in the State of Victoria, Australia.

In 2023, the award is open to suitably qualified post-doctoral candidates in Category IV: Biological Sciences (non-human). This category incorporates Agriculture, Biochemistry, Botany, Cell Biology, Ecology, Forestry, Zoology, and related areas of non-human biological science.

### ELIGIBILITY:

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

### APPLICATIONS:

Open on **1 June 2023** and close at **5pm, 31 July 2023**.

Candidates should nominate themselves. The application should consist of:

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

### SUBMISSION:

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

### CONDITIONS:

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

### THE AWARD:

The successful candidate will receive an award certificate and a prize of AUD\$3,000.

### THE PHILLIP LAW POSTDOCTORAL LECTURE:

The winner will be required to present their work to a special meeting of the Royal Society of Victoria at a public lecture

scheduled for the evening **Thursday, 23 November 2023**. This will be professionally filmed and shared online. If COVID-19 conditions prevent the event from proceeding, then the prize winner will deliver a pre-recorded, 45 minute talk on their research, ideally to be professionally filmed at the RSV's headquarters, then join an online meeting of the Royal Society of Victoria and guests for the screening and subsequent discussion.

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

### ENQUIRIES:

Chief Executive Officer, The Royal Society of Victoria, 8 La Trobe Street, Melbourne 3000

Telephone: (03) 9663 5259. Email: [rsv@rsv.org.au](mailto:rsv@rsv.org.au).



Dr Phillip Garth Law, Leader of the Australian National Antarctic Research Expeditions from 1949, pictured circa 1956 in Antarctica. Dr Law was the President of the Royal Society of Victoria from 1967-69, during which time he led the Society's efforts to establish the Victorian Institute of Marine Sciences.

### RSV MEDAL FOR EXCELLENCE IN SCIENTIFIC RESEARCH 2023

Nominations are invited for the RSV Medal for Excellence in Scientific Research. In 2023, this award will recognise excellence in Category III: Earth Sciences.

The Earth Science Category includes research undertaken in the disciplines of Geology, Geochemistry, Geochronology, Geophysics, Planetary Physics, Meteorology, Oceanography, Physical Geography, Palaeontology and related sciences.

In its centenary year (1959), the Royal Society of Victoria instituted a Medal for Excellence in Scientific Research. The Award consists of a Silver Medal, which is awarded annually for scientific research in one of four categories (rotating each year).

The award of the Medal is based on demonstration of the candidate's excellence and leadership in scientific research.

The candidate's research work shall have been carried out in or on Australia (including its territories), with preference for work done in or on Victoria.

Nominations close **31 July 2023**

For more information, including criteria and details on how to nominate, visit [rsv.org.au/awards-and-prizes/research-medal/](https://rsv.org.au/awards-and-prizes/research-medal/)

**Below:** 2022 RSV Medallist Prof Rachele Buchbinder accepting the prize from Nobel Laureate Prof Peter Doherty AC



# THE MANY DIFFERENT PATHWAYS OF STEMM

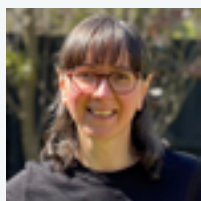
Embarking on a career in STEMM often involves dealing with uncertainties when it comes to progressing from education and training to professional employment and expertise.

Even with training in one subject - whether it be astrophysics, IT, civil engineering, statistics, nursing or something else - you are not limited to working in only that area for your entire career, nor limited from further studying in other areas that complement your skillset.

Their stories highlight a selection of the many different pathways that exist through science, technology, engineering, maths, and medicine.

As part of *Science Victoria's* Careers in STEMM edition, we asked 22 different people who have taken an interesting path from their studies to their current role five questions:

- 1 **What is your current role title, and what do you do in this role?**
- 2 **What are your qualifications and what was your experience of STEMM education and training?**
- 3 **Did you have a firm idea about what you wanted to do next?**
- 4 **How did you find your way to your current job, and is your training still relevant?**
- 5 **What advice would you give to an undergraduate student considering a career in STEMM fields?**



Dr Dee Ninis

## 1. What is your current role title, and what do you do in this role?

I am an Earthquake Scientist at the Seismology Research Centre (SRC). I am responsible for assessing fault structures, particularly determining whether they are active or show evidence of geologically recent ground-rupturing earthquakes. This information is incorporated in seismic hazard studies to estimate the expected intensity and frequency of earthquake-related ground-shaking at a given site over a given time period.

## 2. What are your qualifications and what was your experience of STEMM education and training?

I undertook a BSc (Hons) in geology/geophysics because of my interest in earthquakes. Unfortunately, I did not learn very much about earthquakes here in Melbourne. There is a general perception that, because of its location within a tectonic plate, Australia does not experience earthquakes. However, it does – in fact, in the last ~70 years, there has been an earthquake >M6.0 every ~10 years. Nonetheless, I was unable to find a suitable earthquake geology postgraduate project here in Australia, so I relocated to New Zealand to undertake my PhD.

## 3. Did you have a firm idea about what you wanted to do next?

I've been fascinated by earthquakes and have wanted to study them for as long as I can remember. But, due partly to the lack of earthquake-related research and job opportunities in Melbourne, my career path was not straightforward. When I finished my undergraduate degree, I contacted the only organisation I knew of who worked with earthquakes, but I never heard back. While considering my options, I was offered a short-term job with the State Government's Minerals & Petroleum Division. My position became ongoing - in total, I was there for almost 6 years.

## 4. How did you find your way to your current job, and is your training still relevant?

After ~6 years of loosely applying my geological knowledge in the workforce, I considered going back to university to obtain a PhD in earthquake science. I applied for a position at the Seismology Research Centre (SRC) and – even though I'd missed the deadline, it so happened that none of the original applicants for the position were suitable and I was offered an interview. It was hard to curb my enthusiasm for earthquakes, which obviously worked in my favour, as I was offered the position about an hour later. At the SRC, I trained as a seismologist and earthquake hazard analyst. I loved working there, but I still wanted to formalise my qualification, so I left to complete a PhD. It was always my hope to return to the SRC, and I'm happy to, again, be working for them - this time with a PhD under my belt.

## 5. What advice would you give to an undergraduate student considering a career in STEMM fields?

We spend a lot of our waking hours at work, so I think it's important that work makes us happy. I consider myself lucky to be working on something that fascinates me. So, my advice is to first determine what it is that you enjoy most. Speak to those who work in that field - social media is great for seeing what other experts around the world are working on, too. Attend seminars and, if possible, conferences. And remember that academia is not the only option!



### 1. What is your current role title, and what do you do in this role?

I am a frontline paramedic for Ambulance Victoria. I also hold adjunct positions as Associate Professor (Paramedicine) in Griffith University's School of Medicine, and as Senior Research Fellow at Monash University in Translational Medicine and Public Health.

My role is the provision of emergency health care to the community of Victoria. This involves maintaining a high level of clinical skills, engaging in research trials of new therapies, and ensuring health systems function for the benefit of the patient.

### 2. What are your qualifications and what was your experience of STEMM education and training?

Originally, my employment required a TAFE-issued Associate Diploma, but I engaged in the Bachelor of Paramedic Studies when it became available. I followed with a Grad Cert in Emergency Health, Master of Emergency Health, and culminated my studies with a PhD (one of only a handful in Australia at the time).

As a mature-age student engaging in tertiary education for the first time, I looked forward to both the theoretical and practical aspects of learning, and sought every opportunity to experience life as a student. As I was older with significant encumbrances (a family, mortgage, etc.), I knew I could not live from grant to grant in research, but rather I could enjoy the learning experience and use it to create opportunity within my own field.

### 3. Did you have a firm idea about what you wanted to do next?

While I had no specific plan for my degrees, I knew that the field was a blank page and there were opportunities to evolve it. I gravitated toward education, as this was evolving rapidly and required senior experienced paramedics with academic qualifications who could provide practical application and research understanding. This enabled me to develop local and international networks that expanded my understanding of potential future directions and what specific obstacles may lie ahead. While still engaging in mentoring, publication, supervision, and examination, I have returned to clinical operations as I feel very comfortable in this space, witnessing and contributing to the effect of systems and therapies in real time and having a direct influence into positive patient outcomes.

### 4. How did you find your way to your current job, and is your training still relevant?

As both a frontline clinician and an academic, my current roles are surprisingly compatible in providing fertile ground for translational work to evolve the field. The health field is challenged more now than ever, and in this post-pandemic world where money is short and resource demand high, service providers are scrambling to find efficiencies in care delivery. My education, knowledge, and experience are still valued globally, and I am fortunate enough to find myself employable in challenging times.

### 5. What advice would you give to an undergraduate student considering a career in STEMM fields?

Be positive about your time spent learning, consider how your research will benefit society, be pragmatic enough to understand your limitations (we all have them), and be reassured that you will create change in the world as a result.



Dr Gavin Smith



**Dr Djuke Veldhuis**

### **1. What is your current role title, and what do you do in this role?**

I'm course director for the Bachelor of Advanced Science - Global Challenges at the Faculty of Science at Monash University, a program that sits at the intersection of 'science and society'. I am ultimately responsible for the degree across all four years including teaching, leading overall program development and vision, managing budget, and managing more than 30 industry, government and charitable partnerships each year. In what spare time I find, I collaborate with colleagues on research in the science education space.

### **2. What are your qualifications and what was your experience of STEM education and training?**

Despite working in a Faculty of Science, I hold a Bachelor of Arts in Archaeology and Anthropology and a PhD in Biological Anthropology (which deals with the evolution of humans, their variability, and adaptations to environmental stresses) from the University of Cambridge. Although operating broadly under the humanities and social sciences, it is worth noting that these degrees are incredibly interdisciplinary by nature and the combination of scientific method with a deep understanding of human behaviour, culture and history, serves me very well in my current role. I also obtained a Masters in Science Journalism from City, University of London, because I am passionate about science communication and public engagement with science, particularly tackling scientific misinformation.

### **3. Did you have a firm idea about what you wanted to do next?**

Not specifically, and I'm comfortable with that. What I DO know is that I thrive working in 'grey' areas - complex, interdisciplinary problems that often have a combination of human (behavioural) considerations as well as science and governance. I value roles that challenge multiple aspects of my interdisciplinary skills and allow me to engage with a diverse range of people and sectors.

### **4. How did you find your way to your current job, and is your training still relevant?**

Although not STEM trained specifically, the transferable skills, such as problem-solving and understanding human behaviour, that were nurtured during my training are more relevant than ever. My pathway has equally been shaped by experience outside of academia. During my PhD, I became passionate about science communication and public engagement in science. That led me to jobs in academic, charitable and corporate organisations all in roles that sat at the intersection of science, society and education, all of which underpin the skills I use in my current role.

### **5. What advice would you give to an undergraduate student considering a career in STEM fields?**

Explore! The role and the degree I now coordinate did not exist when I was studying, indeed, one of my supervisors commented that: "We didn't think that someone with your skill set combination existed". But that is the point: the world is changing at an incredible rate, the jobs that exist today may or may not be around tomorrow, but in their place, there will be others. Technical knowledge (e.g. how DNA is sequenced) may be outdated within a handful of years of you graduating, however, transferable skills like an ability to reason through problems or a capacity to communicate complex information clearly and concisely, will always be required. So, study what you enjoy and the rest will come.



**Dr Aeron Hurt**

### **1. What is your current role title, and what do you do in this role?**

I am a Principal Global Medical Director for Infectious Diseases, and I work at the pharmaceutical company Roche. I work in Medical Affairs, which means for the drugs that we develop, I am part of the external-facing part of the company that liaises and communicates the scientific and clinical information to the medical community. Aside from the core medical affairs activities, I also get involved in the development of new drugs, the design and conduct of clinical trials and liaising with Governments about pandemic preparedness.

### **2. What are your qualifications and what was your experience of STEM education and training?**

I have a BSc(Hons) in aquatic science/marine biology and a PhD in influenza virology. Two STEM specialties that are not well connected! During my undergraduate in aquatic science, I became very interested in molecular biology, getting involved in the population genetics of fish. Based on my molecular biology lab skills I got a job genetically analysing influenza viruses for a WHO influenza surveillance laboratory, and during my time in that surveillance laboratory I enrolled and completed a part-time PhD in influenza antivirals. So not a typical straightforward academic path!

### **3. Did you have a firm idea about what you wanted to do next?**

No, there was no grand plan I followed. Instead, I kept my eyes open to new opportunities/pathways that seemed interesting and exciting and embraced them when they arose. Sometimes it can be tricky to know what opportunities exist outside of one's area of daily work, so I believe that it's important to use your network to learn more about what other people do.

### **4. How did you find your way to your current job, and is your training still relevant?**

My 20+ years of research in respiratory viruses and antivirals led me to make a number of connections with industry, and it was through this that I was able to join one of the companies that I had previously collaborated with. My prior training and experience remain very relevant to my current role, but at the same time I have also experienced a huge learning curve in developing many new skills that are needed. Although



making these career jumps is scary, it is also hugely rewarding and enriching to gain new experiences and tackle different challenges.

### 5. What advice would you give to an undergraduate student considering a career in STEM fields?

STEMM career pathways are rarely predictable and linear, so it's important to embrace (and not be scared of) the diversity of opportunities that present themselves to you along your journey. Remain curious about options and paths beyond those in your everyday role and build your network of peers and mentors, as not only will they be responsible for opening future doors for you, they will also help you decide which are the best ones to walk through!

Dr Aeron Hurt



### 1. What is your current role title, and what do you do in this role?

I work part-time in the Victorian Conservation Seedbank, Royal Botanic Gardens Victoria (RBGV) where I am a researcher in the Science Division, working in rare and threatened plant species recovery programs. I am also a Postdoctoral Fellow in the School of Life Sciences at Deakin University, where I am studying resilient seed sources capable of thriving under future environmental conditions in alpine regions.

### 2. What are your qualifications and what was your experience of STEM education and training?

I began my journey into STEM as a mature-aged student. I had left an incomplete Arts degree and was unsure of what I wanted to do. I enjoyed spending time outdoors and working with plants, so I enrolled in the National Certificate of Horticulture at Burnley College, which was a program I thoroughly enjoyed. I then went on to complete an Associate Degree in Applied Science in Horticulture and subsequently gained a position in RBGV's nursery. I then joined the newly established RBGV Herbarium seedbank to work for a global initiative to save threatened plant species through long term seed storage. I undertook further technical training at Royal Botanic Garden Kew, UK during which time I completed a Bachelor of Horticulture with First Class Honours. I then completed my PhD in plant adaptation at the University of Melbourne. A highlight was the fieldwork where I spent long periods in remote areas working under variable environmental conditions. These supported my further skill development and importantly resilience.

### 3. Did you have a firm idea about what you wanted to do next?

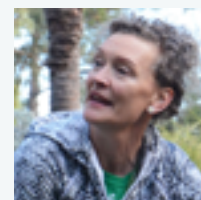
I want to continue my work in the Victorian Conservation Seedbank and complete my Post-Doctoral Fellowship. Additionally, as an outcome of my PhD, I developed the concept of Raising Rarity which explores the horticultural potential of plants at risk. I have continued to build on this and now am working to raise awareness of Victoria's rare and threatened plants and engaging the community to grow them. I recently undertook a Certificate IV in Training and Assessment to develop my skills in program delivery, as I believe engaging the community in plant conservation activities increases the likelihood of successful plant conservation outcomes.

### 4. How did you find your way to your current job, and is your training still relevant?

I utilise my STEM training daily through experimental work, interdisciplinary collaboration, and student supervision. I have also co-developed the program Botany Bootcamp which sets out to provide skills in plant identification, botanic nomenclature, garden history and design. Recently we teamed up with two neuroscientists for Botany Braincamp, where we explore connections between the brain and nature, and how a brain injury may impact how we encounter the world around us. My STEM training underpins all these activities.

### 5. What advice would you give to an undergraduate student considering a career in STEM fields?

Follow your interests and keep an open mind about possibilities in the rapidly changing fields of STEM endeavour. Take every opportunity to attend relevant conferences and meet researchers, and where feasible, volunteer for field or lab work and apply for industry placements. You may also wish to explore opportunities in postgraduate training. Finally, recognise that change may bring new opportunities you have not yet considered.



Dr Meg Hirst



**Dr Tim Read  
MP**

### **1. What is your current role title, and what do you do in this role?**

I began my working life as a doctor, moving to medical research and becoming MP for the state electorate of Brunswick, and Victorian Greens spokesperson for population health, mental health, and integrity.

### **2. What are your qualifications and what was your experience of STEM education and training?**

When I started GP training, the AIDS epidemic was well underway in the early 90s. I did a Diploma in Sexual Health and found myself at the Darwin sexual health clinic in 1997 when effective HIV treatments had just arrived and we had to learn how to use them.

### **3. Did you have a firm idea about what you wanted to do next?**

I specialised in sexual health, completing a PhD in the epidemiology of HIV and human papillomavirus and worked at Melbourne Sexual Health Centre, and part-time at the Royal Melbourne Hospital. For a brief moment, I understood logistic regression and saw myself as a clinical researcher on HIV and antibiotic-resistant bacteria.

### **4. How did you find your way to your current job, and is your training still relevant?**

Viruses and bacteria weren't my only influences. As a student in the 80s when doctors were campaigning against cigarette advertising, I joined a group spray-painting health warnings on cigarette billboards and got arrested.

And as a doctor treating HIV patients, I had patients from Africa needing the expensive anti-retroviral drugs to stay alive, but without Medicare, they faced pharmacy bills of \$1,000 per month. So, I illegally scrounged medication for them and started importing cheaper generic copies of the pills, made by Indian factories in defiance of the big pharmaceutical companies.

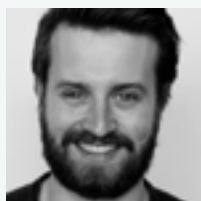
Whether it was cigarette advertising, or getting over-priced medicines to people who needed them, I was learning the important role of politics in public health. I was also learning how commercial interests work against progress.

In the 2000s another threat became impossible to ignore, where powerful companies again wanted to downplay scientific evidence and preserve their right to profit at the expense of public wellbeing. It was this threat, climate change, that drove me toward politics and the Greens.

I was a part-time researcher, part-time clinical doctor, and always thinking about my next publications in HIV epidemiology or antibiotic-resistant *Mycoplasma genitalium*. But I was also interested in current affairs and was increasingly worried that our political establishment wasn't listening to climate scientists.

### **5. What advice would you give to an undergraduate student considering a career in STEM fields?**

Keep an eye on the wider world. It's easy to become obsessed with a molecule or a microbe, but watch what's happening in our democracy. The bad guys are well-funded and active in politics, and the good guys always need help.



**Mr Thomas  
Kitt-Thompson**

### **1. What is your current role title, and what do you do in this role?**

I am a clinical informatics officer at the Royal Melbourne Hospital. My role centres around ensuring safe and efficient staff and patient experience with the Electronic Medical Record (EMR). The EMR is the centralised digital health solution to paper charts across hospitals. It's an exciting role to be influencing change and growth in this next phase of digital health in the hospital and Australian healthcare.

### **2. What are your qualifications and what was your experience of STEM education and training?**

I have a Bachelor of Science with a major in Pathology, a Master of Nursing Science, and a Graduate Certificate in Digital Health and Health Informatics. My STEM education and training varied with each course, offering new but related skills: the Bachelor was theory focused, Master's was practical focused, and graduate certificate was research focused. This gave me a well-rounded approach to my current role and taught me valuable general skills which would be applicable to a broad range of careers.

### **3. Did you have a firm idea about what you wanted to do next?**

As an undergraduate, I didn't have a strong idea. Even going into nursing, I hadn't thought at great length about it, but I knew there were many different career paths within nursing for which I could use my STEM education.

### **4. How did you find your way to your current job, and is your training still relevant?**

I found the digital health world at a time when I couldn't find an area of nursing I enjoyed. My manager asked for people who wanted to contribute to the EMR roll-out. Digital health had always seemed exciting to me. I assisted in the initial roll-out, then became a trainer for the hospital-wide roll-out. and finally, once the entire system was live, I secured my current role. The role has certainly evolved over the last three years; however, I do find my STEM education still useful everyday providing clinical guidance to improve healthcare for clinicians and patients alike.

### 5. What advice would you give to an undergraduate student considering a career in STEMM fields?

It is absolutely okay not to know what you want to do, take all the opportunities presented to you, listen to yourself. If you innately find something interesting, maybe there is a career in that but also, your eventual career may not exist in its current form yet, my role didn't exist three years ago. That is the exciting thing about science and digital health, they are constantly evolving, changing, and adapting and are great areas to work in.

Mr Thomas  
Kitt-Thompson



### 1. What is your current role title, and what do you do in this role?

I manage Biodiversity Services at Royal Botanic Gardens Victoria. My team primarily comprises the organisation's botanists, who document and sample plants across the state for inclusion in the National Herbarium of Victoria to provide a permanent record of the state's past and extant biodiversity. We also deliver VicFlora (an online portal documenting all of Victoria's wild plants) and the in-house botanical journal *Muelleria*, and curate the botanical Library and Archives. We also operate the Victorian Conservation Seedbank, a critical facility safeguarding Victoria's threatened plants and directly supporting Australia's urgent conservation needs.

### 2. What are your qualifications and what was your experience of STEMM education and training?

I have a PhD in plant developmental biology from the University of Cambridge (UK), a Bachelor's in micro-biology (plant pathology) from University College London (UK), and I am a qualified teacher. My STEMM education requirements as a career scientist were largely met thanks to the modular nature of the degree courses available to me at my alma maters, allowing me to develop a good grasp of those areas of research I found most interesting—or otherwise.

### 3. Did you have a firm idea about what you wanted to do next?

I had a firm idea of what I wanted to study from kindergarten age; I appreciate that this isn't necessarily the norm, but that lifelong conviction has helped me to negotiate course and career paths that have kept me close to botany, even during periods of economic downturn when jobs in our sector were amongst the first to dry up and the slowest to recuperate.

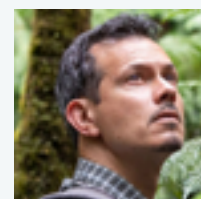
After completing my PhD, I knew that I wanted to stay in research, but with less time engaged in lab-based research and more time involved in field based and taxonomic research.

### 4. How did you find your way to your current job, and is your training still relevant?

The transferable skills gained through studying STEMM are valuable across all job sectors and allowed me to flourish even when working in temporary roles not immediately aligned with my primary interests. I have always pursued roles that have allowed me to engage in research, leading me to my current role, which involves both management and taxonomic work.

### 5. What advice would you give to an undergraduate student considering a career in STEMM fields?

Plant science isn't the primary career path for those hoping to earn oodles of cash, but roles that allow any naturalist to actively take part in preserving biodiversity can be immensely rewarding in all other respects. I'm a strong advocate of pursuing specialist areas of study or additional languages wherever possible, even if they aren't central to one's day-to-day work; while I don't draw upon my molecular biology background each and every day, a grounding in the field is extremely valuable, particularly when reviewing and critiquing research based on genetic analyses, and being able to communicate well in languages other than English is a great skill for relationship building.



Dr Alastair  
Robinson



**Dr Sue  
MacLeman**

### **1. What is your current role title, and what do you do in this role?**

I have recently stepped down as Chair of MTPConnect (the Industry Growth Centre for Medical Technologies and Pharmaceuticals) after seven years (two as inaugural CEO, five as Chair). I sit on a number of Boards as a Non Executive Director (ATSE, Planet Innovation, OMICO and Rhythm Biosciences). I am a member of various academic and government advisory committees including with the Commonwealth Dept of Health and DISR, NSW Govt, CSIRO, Health Systems Security Australia (DMTC), L.E.K. Consulting, Pharmaventures, ANU, and Asialink Business.

### **2. What are your qualifications and what was your experience of STEM education and training?**

I am a registered Pharmacist with some specialist qualifications, having completed a BPharm at the Uni of Qld. I worked in hospital pharmacy and then moved to industry. I also have a Masters of Laws and a Masters of Marketing and am a graduate and Fellow of the AICD.

### **3. Did you have a firm idea about what you wanted to do next?**

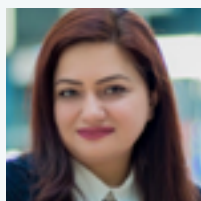
I have always wanted to have a positive impact on patients' health and have worked to extend and enhance human life through my volunteer work, my work as a Pharmacist and in my industry roles. The path was not always clear but by keeping patients at the centre helped guide the course. I was fortunate that I had good mentors and that there were always options to have an impact and make a difference.

### **4. How did you find your way to your current job, and is your training still relevant?**

I think the work I do in my current non-executive and advisory roles are a natural progression of my executive life and the skills and expertise I gained over many years in many different roles (strategic leadership, medical, marketing, business development, capital markets, governance and finance). I am pleased to give back to the sector and mentor the next generation of talent as they translate and commercialise technology that will make a difference to patients. I am still a registered Pharmacist and keep up my continuing education. This STEM training has held me in good stead as I have navigated my career and has provided a professional qualification with those values and principles to guide my path. Additional training has supplemented those skills and has allowed me to broaden my skill set.

### **5. What advice would you give to an undergraduate student considering a career in STEM fields?**

Go for it as there are so many interesting and diverse areas to study and learn. I would find something you are passionate about, study at the best institution you can, find a mentor that inspires you, stretch yourself and be open to new things and collaborate to amplify your and others' impact.



**Dr Muneera  
Bano**

### **1. What is your current role title, and what do you do in this role?**

I am a Senior Research Scientist at CSIRO's Data61, focusing on Diversity and Inclusion in AI. In this role, I promote diversity and inclusion, and ensure ethical practices within the field of artificial intelligence. In addition, I serve as a Diversity, Inclusion, and Belonging Officer for Data61 to foster an inclusive workplace culture.

### **2. What are your qualifications and what was your experience of STEM education and training?**

My journey began with Bachelor's and Master's degrees in Computer Science, both from the International Islamic University in Islamabad. I subsequently pursued my PhD in Software Engineering from the University of Technology Sydney. Later, I obtained a Graduate Certificate for Higher Education from Deakin University.

I have held multiple research positions, and my academic career has seen me grow from an Associate Lecturer to a Lecturer, and to a Senior Lecturer, with positions held at esteemed institutions. Each of these experiences has allowed me to deeply immerse myself in STEM education and training, enriching my understanding and proficiency in the field while empowering me to contribute meaningfully to diverse aspects of computing and software engineering.

### **3. Did you have a firm idea about what you wanted to do next?**

In truth, my career trajectory has not been governed by a rigid plan. I believe in life's uncertainties and its dynamism often serves up unexpected opportunities that can lead us down innovative paths. My approach has been to embrace these moments and use them as catalysts for personal and professional growth.

### **4. How did you find your way to your current job, and is your training still relevant?**

My journey has been unconventional, but I believe it is these unique twists and turns that have truly enriched my experience and have made me a better professional.

After studying in Pakistan, I decided to pursue further education abroad. This was a significant step both personally and professionally. It broadened my horizons, and exposed me to diverse perspectives and opportunities. Following my doctoral studies, I held various academic positions at notable Australian universities. This experience allowed me to not only impart knowledge but also to continuously learn and stay at the forefront of technological advancements. However, I felt a compelling desire to apply my skills in a different context. This led me to transition from academia to a research-focused position at CSIRO.

### 5. What advice would you give to an undergraduate student considering a career in STEMM fields?

- STEMM subjects can be tough, but they're also fascinating. Let your curiosity lead you.
- You never know where your career might take you! Be ready for new opportunities.
- Knowing your subject is important, but so is understanding other things like leadership, ethics, and communication.
- Inquisition and research can give you a taste of real-world problems in your field and show you the latest discoveries.
- The world of STEMM is always changing, so always be ready to learn new things. Your career is more than just what you know—it's also about how you use your knowledge.

**Dr Muneera Bano**



### 1. What is your current role title, and what do you do in this role?

I am the Reproductive Biologist for Zoos Victoria. I work across Zoos Victoria's four zoos and a variety of field locations to improve threatened species reintroduction and captive breeding success, and lead reproductive and behavioural research projects. I lead Zoos Victoria's strategic programs for the Mountain Pygmy-possum, Tasmanian Devil, and cryopreservation, and manage a team of dedicated scientists working to recover species including the Pookila, Smoky Mouse, Swamp Antechinus and Broad-toothed Rat. I also sit on several Threatened Species Recovery Teams, plus international specialist groups for the IUCN.

### 2. What are your qualifications and what was your experience of STEMM education and training?

I completed my undergraduate studies at the University of Melbourne in Australia and University of Pretoria in South Africa, before completing my PhD on mate choice, genetics and breeding success in the Agile Antechinus. My post-doctoral research examined assisted reproduction and techniques to maximise success in captive breeding colonies of marsupials. I have also been involved in a variety of wildlife and conservation programs across Australia, Asia, Africa and the Americas. In 2019, I was part of the largest ever all-woman expedition to Antarctica with Homeward Bound, a competitive global leadership initiative for women in STEMM.

### 3. Did you have a firm idea about what you wanted to do next?

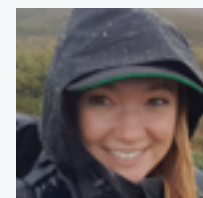
When I was three years old, I told my parents I wanted to work in a zoo and make baby animals – a lifelong focus! I have my dream job at Zoos Victoria helping recover endangered native marsupials, rodents and frogs and supporting Zoos Victoria's commitment that no Victorian terrestrial vertebrate species will ever go extinct.

### 4. How did you find your way to your current job, and is your training still relevant?

My early jobs included horse riding instructor and trainer, and teaching field and lab classes at the University of Melbourne. I met the team from Healesville Sanctuary when I was providing advice to the Mountain Pygmy-possum State Recovery Team. In 2007, I was offered a job working on the breeding program for the Mountain Pygmy-possum at Healesville Sanctuary, and then moved to Zoos Victoria's Wildlife Conservation and Science Department in 2009. All of my training from my previous jobs is still relevant, but I have also learnt many new skills to aid wildlife conservation. You never stop learning!

### 5. What advice would you give to an undergraduate student considering a career in STEMM fields?

Play to your strengths – if you are passionate about something, you will be good at it. I ensured I gained many skills through my studies (field ecology, animal handling, lab genetic analyses, captive breeding, etc) which would help me reach my dream job. I also volunteered around Australia and overseas to gain additional experience and skills. Volunteering is also a lot of fun and great for networking!



**Dr Marissa Parrott**



**Ms Cindy McLeish MP**

### **1. What is your current role title, and what do you do in this role?**

I am the State Member for Eildon and Shadow Minister for portfolios including Small Business, Women and Prevention of Family Violence. As a Member of Parliament, I represent and advocate for those living in the Eildon electorate, spanning 10,000+ sq km from Mansfield and Murrindindi Shire to parts of Nillumbik and Yarra Ranges Shires.

### **2. What are your qualifications and what was your experience of STEMM education and training?**

Prior to entering parliament, I earned degrees in a Bachelor of Science, Majoring in Human Movement & Psychology and completed a Diploma of Education, both at the University of Melbourne, as well as a Graduate Diploma in Counselling, and completed a Master of Business Administration from the Melbourne Business School.

### **3. Did you have a firm idea about what you wanted to do next?**

Despite maintaining and working voluntarily in sport psychology, there were very limited jobs in the sport psychology field.

I began work as a secondary science teacher before undertaking additional study and changing focus into psychology and management. Science is such fun to teach, and I found it easy to engage with all students regardless of ability...just light a Bunsen burner and they all take notice pretty quickly.

I worked as the CEO of a sports association and immediately prior to being elected to parliament I worked as a consultant in leadership development, change management and organisation effectiveness, where organisational psychology was a very useful tool to have. I did a lot of work in the mining sector and my love for the earth and geology became apparent - maybe I missed my calling!

### **4. How did you find your way to your current job, and is your training still relevant?**

I have always had a passion for STEMM learning as well as studying and teaching. I am glad I had the opportunity to combine all three at various points in my career. I would love to demystify science, in particular at primary school level – sometimes teachers are fearful of it, where it really can be made simple and fun for everyone.

My STEMM training has remained relevant and useful throughout my career, even to this day and has given me a firm understanding of the field.

### **5. What advice would you give to an undergraduate student considering a career in STEMM fields?**

I encourage undergraduate students considering a career in STEMM fields to pursue their passion as I did, particularly women. Only 27 per cent of those working in the STEMM field are women, with only 8 per cent STEMM CEOs. I, like many, would like to see this number continue to increase and the opportunities expanded for women interested in pursuing STEMM studies or already in the field, to further their careers.



**Professor Kim-Anh Lê Cao**

### **1. What is your current role title, and what do you do in this role?**

As a Professor in Computational Statistics and Biology, I develop methods and algorithms to make sense of large biological data. The international research community has embraced my mixOmics software, employing my methods to enhance disease diagnosis, evaluate the effectiveness of new vaccines, and develop improved strategies for ecological conservation.

### **2. What are your qualifications and what was your experience of STEMM education and training?**

I started with a 5-year engineering diploma in mathematics, then decided to pursue a more theoretical path with a Master's in statistics. After completing two internships as a statistician, one in a medical school and another in a wet laboratory, I realised that my true ambition was to embark on a career as a researcher within a diverse and interdisciplinary environment. I enrolled in a PhD in statistics applied to biology.

### **3. Did you have a firm idea about what you wanted to do next?**

I moved to Australia after graduating my Ph.D as a research fellow, but my work now applies to cutting-edge sequencing technologies which did not exist when I was studying in France.

### **4. How did you find your way to your current job, and is your training still relevant?**

All the skills I have learnt during my studies have been very useful in my career. For example, my engineering background has been very useful in developing computational software, and my natural ability to collaborate between statistics and biology has been built from my postgraduate studies.

### **5. What advice would you give to an undergraduate student considering a career in STEMM fields?**

I recommend embracing flexibility in your academic pursuits. Internships and experience in different work environments are insightful to decide what to do next. Throughout my academic journey, I recognised the importance of identifying my strengths, determining the skillsets I wished to enhance, and understanding my personal preferences. This allowed me to choose a rewarding career path that resonates with my values.

## 1. What is your current role title, and what do you do in this role?

I am the Chief Executive Officer of the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) – the Australian Government’s primary authority on radiation protection and nuclear safety. I oversee its operations and strategic direction and represent Australia on several national and international bodies related to radiation protection, nuclear safety and regulation.

## 2. What are your qualifications and what was your experience of STEMM education and training?

In 1999, I completed a PhD in environmental radiochemistry, and from 2000-2003, I was a Postdoctoral Research Fellow at the Australian Nuclear Science and Technology Organisation (ANSTO). Throughout my training, my peers were supportive and I had great role models. My PhD co-supervisor worked nationally and internationally as a specialist in measurement of radioactivity in a range of environments. I thought this was an amazing career, and it inspired me to consider a similar pathway.

## 3. Did you have a firm idea about what you wanted to do next?

I wanted to continue my work in environmental measurement of radioactivity and radioecology and was initially interested in a career in research. However, I found it difficult to see a pathway that would allow me the flexibility to raise a family and advance in my research career.

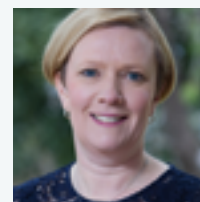
## 4. How did you find your way to your current job, and is your training still relevant?

After deciding to leave research, my first role was with the Australian Defence Organisation in hazardous materials and environmental management. My work was diverse and included management of radiation, dangerous goods and hazardous substances across operational, warehousing and distribution activities, policy development, and environmental management.

After having children, it was time for a change, and I explored different opportunities with the potential for career progression. I joined ARPANSA in late 2010 and following the 2011 Fukushima-Daiichi nuclear accident, all my training and experience in environmental radiological assessments came to the fore. I supported ARPANSA’s role in advising government and the Australian public on the impacts of the accident, and worked on the UN Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) Fukushima project. This was career defining, and to this day I remain involved in international work related to the nuclear accident. My career blossomed at ARPANSA: since late 2010, I have worked in six different roles, including three promotions to my current role as the CEO that I commenced in March 2022. My scientific qualifications and work experiences have been invaluable throughout my career and remain fundamentally relevant to the work I do today.

## 5. What advice would you give to an undergraduate student considering a career in STEMM fields?

- Opportunity and encouragement are essential. I have been blessed with some opportunities and have had wonderful encouragement from those around me. Role models, mentors and sponsors are important. Find one. Be one.
- Find your passion and try to keep that present, not to the exclusion of all else, but to balance out the things you struggle with or don’t enjoy.
- You will learn the most when you are challenged – embrace the challenges.
- Don’t be afraid of change – try something new – divert from your path.



Dr Gillian Hirth



Dr. Hirth’s training and experience in environmental radiological assessments was put to use in the aftermath of the catastrophic 2011 Fukushima-Daiichi Nuclear Accident in Japan.



**Dr Gillian Sparkes AM**

### **1. What is your current role title, and what do you do in this role?**

I have had the honour of serving as Victoria's Commissioner for Environmental Sustainability (CES) since 2014. In that role I am supported by a small team to provide independent science reports and advice on the condition of Victoria's environment to "encourage decision making that facilitates ecologically sustainable development" (CES Act 2003).

### **2. What are your qualifications and what was your experience of STEM education and training?**

I enjoyed chemistry and maths in high school. I went on to specialise in surface and colloid chemistry to PhD level. I have an MBA, an Honorary Doctor of Science from Swinburne University and am an Honorary Fellow of Monash University. I have great appreciation for the mentors who guided me along the way, including my Year 11 chemistry teacher Alison who was my first female science teacher. Alison ignited my passion for science. Professor John Ralston played an important role in my tertiary STEM education at Swinburne University, and later became my PhD supervisor at the University of South Australia.

### **3. Did you have a firm idea about what you wanted to do next?**

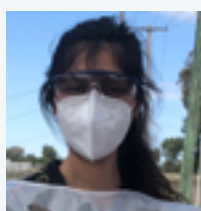
I knew that I wanted to pursue my passion for chemistry and science, but as a teenager I had no idea how that would unfold. I was fortunate that after leaving high school, I gained a position as trainee industrial chemist at the local steel mill – later part of BHP Steel. The decision to take that role became pivotal as BHP supported me through integrated work learning and I completed three STEM qualifications while working. I was very lucky to have been given these opportunities and while I have never had my career mapped out, when I look back, I can see a pattern: I accepted opportunities and worked hard towards success in every role.

### **4. How did you find your way to your current job, and is your training still relevant?**

In the second half of my career, I moved from industry into the public sector – I held senior executive and non-executive positions in government before my current job. As Commissioner my STEM training is as relevant and important as ever! I am grateful for the education and opportunities afforded to me through decades working in industry. My practical experience in industry and government, working at the interface of environmental, industrial and community issues informs how I approach my work as Commissioner.

### **5. What advice would you give to an undergraduate student considering a career in STEM fields?**

You can build a wonderful career through STEM education. We are problem solvers and that skill has very broad application. You don't need to stay "at the laboratory bench" if you don't want to. Be pragmatic, participatory and persist. Embrace your interests, complement this with building hands-on work experience and developing your technical and leadership capabilities. Maintain focus, work hard, and remember the best job today is the one you have. Be patient!



**Dr Ayesha Sheikh**

### **1. What is your current role title, and what do you do in this role?**

I'm a general practitioner (GP) working in an Aboriginal Health Service. I work in different Aboriginal and Torres Strait Islander communities and most of the work is with chronic disease management.

### **2. What are your qualifications and what was your experience of STEM education and training?**

I completed a bachelor's degree in Biomedical Science at the University of Melbourne and a post-graduate medical school at Monash University. Following my internship and residency year I started rural general practice. I followed with the Royal Australian College of General Practitioners in 2018 and it's been one of the highlights of my career.

### **3. Did you have a firm idea about what you wanted to do next?**

I have wanted to be a doctor since I was a child. I had uncertainty about whether I would have the opportunity or the marks to study medicine, but fortunately my efforts paid off. My current goal is to become a rural generalist, which is a GP who has up-skilled in emergency work and other specialised skills such as obstetrics or anaesthetics.

### **4. How did you find your way to your current job, and is your training still relevant?**

I completed the John Flynn Scholarship program in Far North Queensland during medical school. It's a program that ties medical students with a rural and remote community and a GP mentor. The rural generalists who worked there were inspiring; they had extensive knowledge of their communities and specialised medical skills. They were and continue to be open and resourceful mentors for me. The community also took me in as their own. The enriching experience and connections I made through this program brought me back to rural and remote work. After medical school I applied to Far North Queensland and I've continued to live and work remotely since.

### **5. What advice would you give to an undergraduate student considering a career in STEM fields?**

There are so many rewarding paths, and each experience will enrich the next. I used to have a telescopic view of what I wanted in my career. In retrospect, each experience has contributed to who and where I am today. I also could not have predicted where I would have ended up and what I would have enjoyed the most. So, my advice would be to embrace and value every unexpected step of the journey.



## 1. What is your current role title, and what do you do in this role?

My title is General Manager, Victoria, Engineers Australia and I represent around 26,000 members in the engineering profession. My role is incredibly varied and involves liaising government and industry, delivering services and connections for members and the profession and one of the most fun parts – promoting the profession to students, who are the next generation of engineers.

## 2. What are your qualifications and what was your experience of STEMM education and training?

I completed a combined Engineering (Civil) and Commerce (Finance/Management) degree at the University of Melbourne and later a Master of Engineering (Project Management) at UNSW. I enjoyed university life, but the technical subjects weren't always easy. Thankfully I had a good network of friends and we supported each other. That made it fun too!

## 3. Did you have a firm idea about what you wanted to do next?

I had no idea! I was encouraged to 'go to uni' but I really didn't know what came next. A career defining point was a volunteer project I worked on in Mongolia – I lived in a community without infrastructure, no water, sewage, electricity, telecommunications, or roads. This made me acutely aware of the importance of infrastructure to maintain our way of life and the role of engineers to deliver this infrastructure. I've been truly committed to the engineering profession since this experience.

## 4. How did you find your way to your current job, and is your training still relevant?

I've always looked for opportunities to volunteer, to contribute and give back. My involvement with Engineers Without Borders connected me with Engineers Australia's network. Eventually I took on the role of President, Victoria for Engineers Australia in 2018 and then a staff role as General Manager the following year.

Whilst I no longer use my technical skills, I still rely on an engineering mindset every day. The critical thinking, problem solving, and analytical skills that I developed through study and as a practising engineer are so useful for approaching all kinds of problems.

## 5. What advice would you give to an undergraduate student considering a career in STEMM fields?

Please, please ensure that you explore the rewarding and diverse options of an engineering career. Engineering is perfect for creative thinkers who want to use science, technology, and maths to solve real world problems and create solutions that make a difference in the world. Solutions to provide clean renewable energy to our homes to power our devices (also designed by engineers), creating electric cars or sustainable public transport to reduce our reliance on petrol vehicles, or maybe creating robots to automate repetitive or dangerous tasks or even explore Mars or deep underwater. There are so many, many options for engineers to make a difference in our lives.



**Ms Alesha  
Printz**

## 1. What is your current role title, and what do you do in this role?

I'm a physicist by training and work as a Staff Engineer with the Q-CTRL's solutions team, where I help many of the world's leading quantum tech companies maximise the performance of their hardware using quantum control. Also, I serve on the Council of the Royal Society of Victoria, so feel free to reach out to us for more insights into building a career in STEMM.

## 2. What are your qualifications and what was your experience of STEMM education and training?

I completed a BSc focusing on Physics and Applied Maths at the University of Melbourne. I followed this with an MSc in physics, developing quantum diamond sensors for free radical detection, where I developed an interest in biological applications. In my PhD, I designed and patented quantum sensing technologies for imaging individual protein structures in 3D with atomic resolution - a challenge of significant interest in structural biology and drug development.

## 3. Did you have a firm idea about what you wanted to do next?

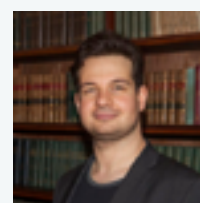
Research and technology development have always been my passion, and this is precisely what I wanted to do long-term. However, by then, I realised that pursuing my goals outside of the academic workplace could provide pathways to a more significant and scalable impact.

## 4. How did you find your way to your current job, and is your training still relevant?

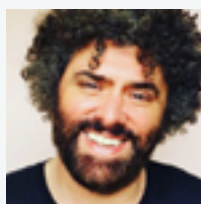
A colleague of my PhD supervisor founded a company around a year after I finished my PhD. I had complete confidence in the company's vision, and over the last five years, we've grown to become the world leader in infrastructure software for quantum computing hardware. I'm lucky, in that my research skillset is not just relevant, but it serves me on a daily basis.

## 5. What advice would you give to an undergraduate student considering a career in STEMM fields?

Becoming a STEMM professional can be a decades-long journey of extreme intellectual, emotional, and personal demands. Appreciate the two resources you'll need: persistence & resilience. You can use these two to compensate for any other resource you lack, but not the other way around. Also, remember, everyone you'll meet along the way has been on this same journey since starting out, just like you.



**Dr Viktor  
Perunicic**



**Mr Simon Pampena**

### **1. What is your current role title, and what do you do in this role?**

I am a Programs Officer at Scienceworks and I look after programs that we run for the public. This can range from organisation and communication all the way to full content creation - my personal favourite! I also run my own science communication business where I have been working independently since 2009. My current project is developing programs for Indigenous kids in communities across Australia.

### **2. What are your qualifications and what was your experience of STEM education and training?**

For the longest time my highest qualification was First Class Honours in Pure Mathematics from the University of Melbourne. Soon after that I applied for and was offered a place at ANU to study science communication, however, I thought it was best to make my own way in Melbourne. I started creating and producing stand-up comedy shows based on maths, becoming a stand-up mathematician. Through this process, I gained an enormous amount of science communication knowledge and experience. This led to work with ABC's Catalyst followed by six years with the Discovery Channel in Los Angeles. During the pandemic, I returned home and took the opportunity to formalise my experience with a Graduate Certificate in Science Communication from ANU.

### **3. Did you have a firm idea about what you wanted to do next?**

I have always loved storytelling and performance and saw an opportunity to communicate science to the public in ways that had not been done before. This has led me to a rich and diverse career doing all sorts of things from moderating discussion on sustainability to being an ambassador for numeracy. During the pandemic I saw the opportunity to work within a larger organisation to advance science communication. It has allowed me to develop another passion of mine - Indigenous STEM. I am now working to bring Indigenous voices and representation into Scienceworks.

### **4. How did you find your way to your current job, and is your training still relevant?**

I was already working for Museums Victoria in a road safety program called Road to Zero. I took that role to expand my experience in VR as a storytelling and educational tool. The role at Scienceworks came up internally and I took the offer to start working there while still in my Road to Zero role. The training I received at ANU was excellent and combined brilliantly with my own experience as I was thrown into the fast-paced environment of Scienceworks.

### **5. What advice would you give to an undergraduate student considering a career in STEM fields?**

Take your training and run with it. Look at what inspires you and learn from it. Look at what you're good at and see how it can be applied to the world of Science Communication. There is so much to do and many new platforms to explore. Just get started and you will find a path that fits you!



**Professor Sally McArthur**

### **1. What is your current role title, and what do you do in this role?**

I am a Professor of Materials Engineering and Director of the Institute for Frontier Materials at Deakin University. I lead a large and diverse team of researchers and technical staff who investigate how we can use interdisciplinary science to create new materials that will help us solve some of the biggest issues facing the world today: energy and waste. We create ways of recycling plastics, fibres and metals, and create materials that provide us with new ways of creating, storing and utilising green energy. We need to be able to make the things we create in the lab at larger scale, to suit different populations or to meet a price requirement. It is my job to ask lots of questions so I can understand the constraints my solutions need to fit within to be useful and usable by my industry and community partners.

### **2. What are your qualifications and what was your experience of STEM education and training?**

As someone who trained as a materials engineer, I wanted to bring together my interests in chemistry, biology and physics to create solutions for all of us. I love thinking about problems and understanding what the barriers are to changing the way we live our lives. A lot of my career has been spent working on medical applications of materials (e.g. contact lenses, medical devices and even artificial skin).

### **3. Did you have a firm idea about what you wanted to do next?**

As I work more and more with industry, I love how I can discover the challenges that are stopping ideas from becoming products and try to solve those problems.

### **4. How did you find your way to your current job, and is your training still relevant?**

At this point in my career, I love thinking about how we bring different people together to solve problems and develop new ideas. I can use my training as a materials engineer to think about the different skills a project needs and shape a project plan. Sometimes I bring my specific materials skills and other times I mediate communication between different fields of science, business and the arts. I love discovering how different people think and approach a problem, see and experience the world. I am constantly learning new things.

### **5. What advice would you give to an undergraduate student considering a career in STEM fields?**

I want you to be assured that the biggest thing you need to bring is your true self, that is what we need the most, your ideas, your experiences and your ways of thinking are what will ultimately solve the problems and bring you to the opportunities you need to thrive.

# FEATURES AND ARTICLES

## 1. What is your current role title, and what do you do in this role?

I have a half-time position lecturing in science communication at the University of Melbourne and I am a freelance writer/broadcaster/science journalist/science communicator in the other half of my time. I write science-related opinion pieces for the Sydney Morning Herald, talk about science on ABC radio once a fortnight, and write and present science events. And in my lecturing role, I teach students to do the same.

## 2. What are your qualifications and what was your experience of STEMM education and training?

I have a BSc(Hons) in Applied Mathematics and a PhD in Astrophysics.

## 3. Did you have a firm idea about what you wanted to do next?

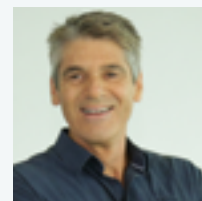
I did have a firm idea of what I wanted to do after my PhD - pursue a research career. But a few years later I had a change of heart. I finished my academic career by quitting my job as an ongoing research scientist at CSIRO and set myself up as a freelance science writer. It was a risky move, but fortunately things worked out.

## 4. How did you find your way to your current job, and is your training still relevant?

After leaving research, I wrote for newspapers, had books published, talked on radio for many hours and appeared on a number of television programmes - always on science related matters. I ended up in ABC television's science unit where I worked as a reporter, presenter and producer for many years. I was the host of the science television programme Catalyst for several years. My PhD was obviously highly relevant to my research work, but I think it was also useful for my media work as well. It gave me great insight into how science works, which made reporting on science so much easier.

## 5. What advice would you give to an undergraduate student considering a career in STEMM fields?

I know it sounds like a cliché, but...follow your dreams. Try to work out what really motivates you work-wise and pursue it, even if it involves changing direction.



**Dr Graham Phillips**

## 1. What is your current role title, and what do you do in this role?

I am a Research Scientist at the Bureau of Meteorology, working on global weather and climate forecast models and machine learning. I aim to improve the portability of the weather and climate prediction models and the working practices of the communities who use them, and additionally explore how machine learning can be used to make our forecasts faster, more accurate, and more computationally affordable.

## 2. What are your qualifications and what was your experience of STEMM education and training?

I have a PhD in astrophysics. My time at university involved a lot of hard work - I certainly didn't cruise through my courses! I also took a while to work out what I wanted to do, and my strategy at the time was to focus on the subjects I both enjoyed and had an aptitude for, ultimately focusing on physics and astrophysics.

## 3. Did you have a firm idea about what you wanted to do next?

I didn't! I chose to focus on physics, maths, and then astrophysics because I found them more interesting. Early in my PhD, I realised I didn't want to stay in astrophysics, nor in academia. It wasn't until my second year at the Bureau, developing trial forecast products for our seasonal prediction system, that I finally felt like I had found my calling. My job is perfect for me as it combines elements of research and statistics with software engineering and technical development, AND provides a service to the public. The feeling that my work is helping people is what gives me a sense of fulfilment. Basically, I realised what it was I wanted to do only after I had stumbled upon it!

## 4. How did you find your way to your current job, and is your training still relevant?

I cast a wide net when job hunting at the end of my PhD. I chose a role at the Bureau of Meteorology because they offered a variety of roles, and it was interesting and challenging work. Having grown up on a farm, the Bureau was also close to my heart - as it is for many farmers - since its forecasts are so important for agriculture.

I still use the skills I acquired throughout my training every day in my job. This includes the ability to formulate and execute a research plan, analyse and apply statistical methods to results, and document and present findings. Other highly valuable STEMM skills I use every day include project management, negotiation, communication, and people management skills.

## 5. What advice would you give to an undergraduate student considering a career in STEMM fields?

Build a good professional network! When you are talking to anyone about possible employment, ask whether they (or a connection) might have need for your skills (and if you have studied STEMM, you can be confident you have valuable skills!). If each person you talk to connects you with one or two more people, your network will grow quickly, and you will find yourself spoiled for choice for possible careers. I would also encourage maintaining a good balance between work and recreation. It's very easy to push too hard when you are young and motivated, and find yourself burning out later. Practise giving yourself the space to rest and recuperate.



**Dr Catherine de Burgh-Day**

## FEATURES AND ARTICLES

Navigating a career in STEMM is made easier by establishing and sustaining an excellent network of colleagues who can help each other with professional directions, opportunities, and decisions.

Membership of the Royal Society of Victoria provides access to events and gatherings with scientists, educators, researchers, public servants, entrepreneurs, consultants, advocates, and more - we welcome your participation in Victoria's science community.  
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# RESEARCH INFRASTRUCTURE: MAKING DISCOVERIES POSSIBLE

By Dr Chris Freelance MRSV

Microscopes with lasers, screens filled with complex equations. These are things we often see in media reports about a scientist's latest research breakthrough. But behind much of that specialised infrastructure are the people we don't often see: technical experts who possess specialist knowledge and skills that help other scientists make their research projects a reality.

Many specialist pieces of equipment - such as electron microscopes and mass spectrometers - can be extremely expensive, and require trained staff with comprehensive skills and knowledge. This combination of factors makes it unfeasible for every individual lab that wants to use such equipment to have one for themselves.

Beyond equipment, many research projects also involve the application of techniques that most scientists don't regularly or routinely use. Instead, those researchers might need to consult with the specialists who can assist them with a tailored approach for their work.

## RESEARCH PLATFORMS

This is where research infrastructure comes in. At the University of Melbourne alone, we have over 20 different research platforms, each dedicated to a specialised area of research support spanning all areas of science. For example, the microscopy platforms have cutting-edge optical and electron microscopes, which are operated and maintained by experienced microscopists - who also train researchers to use the equipment themselves for their projects. There are also people-based platforms, such as data analysis and statistical consulting platforms, staffed by dedicated experts who assist researchers to use specialised, often complex, models and programs to generate and analyse data.

## MANY PATHWAYS, MANY ROLES

The pathways to a career in research infrastructure are as diverse as the research platforms themselves.

Many research platform staff have a research background and a PhD. Some may have developed or refined an analytical technique for their thesis, and others may have simply used a specific technique a lot over the course of their research project.

Rather than being traditional "teaching and research" academics (lecturing and leading research groups), many are considered Academic Specialists, reflecting the specialised nature of their role in performing a specific suite of research-related functions. In their role, they often still undertake academic tasks such as presenting at conferences, teaching, and co-authoring research articles.

Many other platform staff are not 'academics', in that they don't teach classes or have their own research projects. They may have a PhD, but their qualifications depend on what their role involves: for example, some technical officers have a discipline-specific laboratory medicine degree, and others have an Honours or Masters degree with experience in performing histology techniques (histology is the study of the microscopic anatomy of biological tissue).

Not everyone who goes into science wants to do a PhD, and not everyone who does one ends up becoming (or wants to become) a research group leader. Working in industry isn't for everyone, either. From technical specialists responsible for a specific application, to positions involved in institution-wide strategy, there are diverse roles in research infrastructure. For those who are passionate about specialist scientific techniques, it's well worth considering a career in research infrastructure where you put your skills to good use making discoveries possible.

## MEET SOME RESEARCH INFRASTRUCTURE STAFF FROM DIFFERENT PLATFORMS AT THE UNIVERSITY OF MELBOURNE



**Dr Chris Freelance**  
Manager, Melbourne Histology Platform

While I manage a research histology platform, I am not a histologist by training: I have a background in neuroscience, anatomy and zoology, and a PhD in evolutionary biology. During graduate school, I used a lot of histology and microscopy techniques and worked casually as a histology technical officer. When nearing the end of my PhD, I applied for the role of Platform Manager at the then newly-established Melbourne Histology Platform ([biomedsciences.unimelb.edu.au/research/services/histology](https://biomedsciences.unimelb.edu.au/research/services/histology)), and got the job. While I still do some science, as the Platform Manager I am responsible for the oversight of human and physical resources, budget, and strategic development. Platform Managers end up being a bit of a "Jack (or Jill) of all trades": my workday can involve teaching coursework students, giving a seminar, generating invoices, participating in a committee meeting, writing a grant application or research paper, preparing a budget, creating marketing material, or spending time with a researcher to discuss their work, teach them a technique, or look down the microscope. The Histology Platform receives samples from a variety of organisms from diverse projects, from lab-grown organoids used to study disease, to plant roots in studies of nutrient stress in cereal crops, to corals collected for biodiversity conservation research - there are some beautiful views down the microscope! I like having impact beyond my own research as an academic through ensuring that researchers have the necessary expertise and infrastructure available to them through the Histology Platform.



### Emily Gracie

Histologist, Phenomics Australia at The University of Melbourne

I am a histologist and mouse pathologist at the Phenomics Australia Histopathology and Slide Scanning Service ([biomedsciences.unimelb.edu.au/departments/anatomy-and-physiology/research/services/phenomics-australia-histopathology-and-digital-slide-service](https://biomedsciences.unimelb.edu.au/departments/anatomy-and-physiology/research/services/phenomics-australia-histopathology-and-digital-slide-service)) which is based at The University of Melbourne and is funded by the federal government (NCRIS). I provide support and expertise to improve biomedical research outcomes, helping to prepare and view slides of mouse tissue.

I completed an Associate Degree of Applied Science and a Bachelor of Biomedical Science (Laboratory Medicine) majoring in Clinical Biochemistry and Medical Microbiology. As part of my studies, I had a placement with the Phenomics Australia Histopathology and Slide Scanning Service at The University of Melbourne, and at The Royal Children's Hospital in Molecular Microbiology. It was a fantastic experience to obtain real-world laboratory experience and to work in both a research and diagnostic field.

I chose to officially work at Phenomics Australia because I can work on projects from the beginning to the end. I now work with an expert team of mouse pathobiologists and pathologists, which has increased my independent and critical thinking while learning new techniques. I am constantly discovering new things about mouse tissue, disease, and cells. My daily workload is varied, which keeps me active and relevant to the ever-changing research sector.



### Dr Anders Barlow

Academic Specialist, Materials Characterisation and Fabrication Platform

I am an Academic Specialist within the Materials Characterisation and

Fabrication Platform (MCFP) ([eng.unimelb.edu.au/nanomaterials](https://eng.unimelb.edu.au/nanomaterials)) at the University of Melbourne where I manage a variety of research infrastructure and laboratory spaces. After completing a PhD in physics at Flinders University, I spent four years in the UK at a surface analysis facility dedicated to supporting researchers with cutting-edge capabilities. This is where I really found my passion for collaborating on multiple projects across a broad range of research areas, rather than a single project of my own. Returning to Australia, I spent some time at a similar facility in Melbourne before joining the MCFP in 2018.

I continue to explore many new research topics with our colleagues, from energy storage and harvesting, to antimicrobial research, to art and heritage conservation. This variety means that I am constantly finding new ways to apply our research infrastructure capability at the MCFP to help solve our collaborators' challenges. Additionally, being a member of the Victorian node of The Australian National Fabrication Facility (ANFF), I am involved in the absolute cutting-edge of Australia's nanofabrication capability, such as developing quantum computing technology, and the fabrication of nanoscale sensors and devices using the MCFP's helium ion microscope - one of only four in Australia. I am exactly where I want to be in my career: always learning, constantly being exposed to new research, and ever excited by the next amazing piece of infrastructure we can use to help our research cohorts in Australia.



### Dr Sandy Clarke-Errey

Consultant, Statistical Consulting Centre

There were so many things that I wanted to study when I came to the University of Melbourne for a B.Sc, making it hard to choose. I only stumbled upon statistics because the probability pre-requisite

subject sounded interesting, but I found that it satisfied both my appreciation for the beauty of mathematics and my desire to pursue an area with clear practical applications. The opportunity to do a small research project with the Statistical Consulting Centre ([scc.ms.unimelb.edu.au/](https://scc.ms.unimelb.edu.au/)) came up, and I loved the project as well as the workplace and colleagues. I took the opportunity to apply for a job they were offering after graduation and haven't left since. I was also able to complete a PhD whilst maintaining a part-time position, which further confirmed that I prefer more applied work. Most researchers end up travelling the world and working in different places, but I have been very content in this role because of the diversity of projects and applications. I am always working on several projects at a time, including assisting research students and staff at the University, supporting clinical trials for our affiliate hospitals, and preparing reports and reviews for various government agencies and industry partners.



### Dr Lauren Hyde

Research Infrastructure Development Manager

I have always had a passion for research infrastructure. Throughout my PhD I was drawn to the equipment side of my

research and always jumped at the opportunity to learn a new analytical technique to incorporate into my project. Since then, I have gravitated towards several infrastructure-related roles, managing and working in several leading research institutions and national facilities, most significantly as a leading contributor to the establishment and success of the Materials Characterisation and Fabrication Platform at the University of Melbourne. As the Platform Manager, I provide a supportive environment for researchers to extract the best results for their research project, from a crystal-clear image to the development of a new method. My passion rapidly evolved to elevating the professionalism of platform operations, promotion of its capabilities, and supporting the staff that provided these expert services and support. I started by participating in working groups that drove a small infrastructure-related initiative such as access management or professional development program for platform staff, and then officially transitioned into an operations strategy role. As the Research Infrastructure Development Manager, I am contributing to the Research Infrastructure ecosystem from a strategic and operational perspective, and I love it! While I still manage to sneak into the lab from time to time, every day I am driving the change to improve the coordination, discoverability, and efficiency of the research infrastructure across the university and being an advocate for the expert staff that operate these world-class Research Platforms.

# WHERE CAN PHYSICS TAKE ME?

By Giulia C. Cinquegrana

A class of year nine students can confidently tell you that the mitochondria is the powerhouse of the cell. Chemistry is sometimes a little more intimidating-but most of the population can remember that one great experiment in school where they turned a flame bright pink with potassium. Mention the word physics? From most people, you will get a blank stare and some squirming in their seat.

In 2022, only 10% of the age cohort chose to study VCE physics.<sup>1</sup> Only 5% of students that identified as female chose physics. Even though its laws govern our everyday lives, many concepts in physics can be quite alien. The maths is thick – and to add to that complexity – changes depending on whether you are looking at the really small, the really large, or the everyday in between. But the somewhat dry and mathematical picture that students often associate with physics is missing the incredible applications that an understanding of these laws allows us.

After all, physics is simply the study of how the universe works. It teaches us that while the big bang gave us all the hydrogen (and most of the helium) in the universe, the other elements on the periodic table were formed after, in stars.<sup>2</sup> Local Victorian physicists are trying to understand why glass is a solid,<sup>3</sup> and how we can maximise the information we get from X-rays, whilst minimising the radiation that patients are exposed to.<sup>4</sup> Physics teaches us how to measure the collision of two black holes, 36 and 29 times the mass of our sun, the signals of which have been travelling for millions-if not billions-of years.<sup>5</sup> And remember, all these discoveries were made by people within that small percentage that took physics and then the smaller percentage that chose to stay with it. The possibilities with a larger cohort are endless, but we need to adjust our approach. To attract more Australian students, we need to show students what they can do with physics.

We – the Victorian Physics Teachers Network (VicPhys), Dr. Sara Webb (Swinburne University), and I – tried to do something about it. Supported by funding from the Victorian Government's Connecting 'Learning to Work Project', Inspiring Victoria Partnership Network scheme (managed by the Royal Society of Victoria), and the Laby Foundation, we interviewed 20+ Australian professionals – that started out with a background in physics – to see what they did with those skills. You can find this resource at [wheretowithphysics.org.au](http://wheretowithphysics.org.au).

In this cohort, a basis in high school physics supported our interviewees to pursue research in astrophysics, climate science, particle physics, condensed matter physics, geophysics, psychology, and oceanography. Our first lesson, however, is that studying

physics at school does not restrict you to academia. Our other interviewees went into industry, including quantum computing, data science, engineering (software, mechanical, coastal, and civil), medical radiation physics, physiotherapy, and organisational psychology. Some felt a strong desire to support the next generation in teaching and education positions. Armed with a newfound understanding of aerospace engineering, one of our interviewees just wanted to fly, and became a pilot. Some of our interviewees sprinted straight from high school physics to university and academia; some were terrified of physics in school and found science later in life, going back to university as mature age students.

Further than just an extensive collection of achievements, we noticed three primary qualities that our interviewees had in common (and in spades). Creativity, passion, and an incredibly deep curiosity of the world. Importantly, this did not only extend to physics or science. We witnessed their eyes light up as they spoke about their other loves in music, art, and sport, with many of these 'hobbies' also professional. These scientists, engineers, teachers, and artists serve as excellent role models to how deeply complex, diverse, and rewarding a career, starting with physics, can be. We hope that students of the next generation can see their future selves in these profiles--we need more people to love (and pursue) physics in this country. After all, we still don't know what 96% of the universe is made up of.

*Giulia Cinquegrana is an astrophysicist and final year PhD candidate at Monash University. Her research focuses on the stellar origins of the periodic table of elements.*

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Particle accelerators at the Deutsches Elektronen-Synchrotron (DESY), Germany



Queers in Science members at the 2023 Midsumma Pride March. Image: Kim Kwan.

# QUEERS IN SCIENCE: SCIENCE AT THE EDGE

By Dr Catriona Nguyen-Robertson MRSV

We all matter. Because we *are* matter.

We are made of stardust; made of the elements that are forged in stars as they are born, as they live, and as they die. In this sense, we are all the same, yet we all have different stories. Queers in Science celebrates these different stories. Three scientists at the cutting edge of their fields shared their research, their personal journeys, and their vulnerability as part of the annual Queers in Science lecture.

It is an uncomfortable truth that researchers have faced race and gender inequality in STEM for decades – and they still do to this day. Multiple studies, including recent surveys in the US and UK document the disadvantages that LGBTQIA+ scientists face.<sup>1,2,3</sup> Studies indicate that the persistence of heteronormativity, homophobia, and transphobia in STEM has a significant impact on the personal and professional development of LGBTQIA+ academics and students. They are more likely to experience career limitations, harassment, and health difficulties compared with their non-LGBTQIA+ peers – and are hence more likely to leave STEM altogether.

While academia largely remains a cis-heteronormative space, there is increasing support for the LGBTQIA+ community. Queers in Science ([queersinscience.org.au](http://queersinscience.org.au)) is an example of an organisation that champions change and inclusive environment for LGBTQIA+ people in STEMM. Each year, the Royal Society of Victoria and Inspiring Victoria collaborate with Queers in Science to present a lecture series featuring LGBTQIA+ scientists. This year, Associate Professor Deanne Fisher, Dr Kay Hodgins, and Krystal de Napoli shared their “science at the edge”.



A/Prof. Deanne Fisher, Centre for Astrophysics and Supercomputing at Swinburne University. Image: Kim Kwan

## GIANT TELESCOPES AND EXPLODING GALAXIES – ASSOCIATE PROFESSOR DEANNE FISHER

We live on a planet that orbits a star. That star, the Sun, is one of hundreds of billions that are going around the centre of our galaxy. Extending beyond the Milky Way Galaxy, if you counted all the stars in all the galaxies, there would be more stars in the entire universe than grains of sand on all the beaches on Earth. How did they all come to be?

Deanne Fisher has always loved looking at the night sky. After being given a telescope as a child, she went outside every single night to gaze at the Moon - all that her simple telescope would allow. She was hooked, and continues to gaze at the



stars today in an endeavour to better understand their birth and life. The telescopes she uses now, however, are a significant upgrade from what she began with - and they are only getting better and better.

Stars form from accumulated dust and gas. Gravity forces them to come together into dense clumps, squeezing the atoms until their nuclei fuse and a star is born. Prior to radio and infrared (IR) telescopes, all we had was a blurry vision of the stars and distant galaxies. But during star formation, the surrounding area heats up, which can be detected in IR. In 2006, astronomers had their first view of a galaxy in IR with the Spitzer Telescope, providing details they had never seen.

With more information from more powerful telescopes, more questions followed. Why did some sections of a galaxy have more stars than others? How much gas needs to collapse to make stars? One telescope is never enough for astronomers.

To answer these questions, astronomers used radio telescopes. Deanne spent time at ALMA (Atacama Large Millimeter/submillimeter Array), an array of 66 radio telescopes in the Atacama Desert, Chile. By looking at how much gas is in any given spot and counting the number of stars, she and other astronomers could graph star formation. But it seemed as though most of the gas within a galaxy did not become stars. Furthermore, there were symmetrical holes in the gas - something had to be in the middle, blowing them up. Further images of the cosmos revealed what that something was: supernovae, exploding stars. As the technology of ALMA advanced, Deanne could determine the mass of the outflow material for the first time. Surprisingly, the outflow of gaseous material being pushed out of the galaxy by supernovae contained more matter than the material within the galaxy itself, but in a telescope, it appears 100-500 times fainter. This outflow explained the reason so little gas is involved in star formation, and it had finally become visible.

As Deanne progressed through her career and answered these questions, she was also discovering who she was as a woman. In Deanne's words, 'it is not possible to decouple this change from my scientific career'. The man who worked on telescopes was alone and afraid of talking to others, while Deanne is now a group leader who happily works with students and collaborators, and presents at conferences. She believes that letting people express themselves and be comfortable is always better than not. Science is conducted by people, and the way we live our lives impacts our work.

There are only three trans Professors in astronomy around the world. However, as Deanne says, 'three is greater than zero', which was the number when she started.

Dr Kay Hodgins, School of Biological Sciences at Monash University. Image: Kim Kwan.



### RAPID CLIMATE ADAPTATION – DR KAY HODGINS

*Content Warning: The following section mentions suicide.*

Invasive species pose a great ecological and economic challenge: they compete with native plants and animals for limited resources and alter habitats, thereby reducing biodiversity and even causing extinctions. Factoring in costs for management interventions and direct loss and damage, pest plants and animals have cost the Australian economy at least \$390 billion in the last 60 years<sup>4</sup>.

Invasive plants are the biggest burden, spreading rapidly through the environment. How does a single species do it when the environment is not homogenous around the world? Kay Hodgins studies how the common ragweed can be so common.

The common ragweed has disseminated across the world despite different climates and ecological communities. It is a pest in agriculture and also the cause of allergies in one in four people<sup>5</sup> - and as Kay discovered, even if you weren't initially allergic, working with it for years will bring on the hay fever.

Looking at the genetic ancestry of common ragweed, it appears to have been introduced to Europe from North America multiple times between around one and half centuries ago. It then came to Australia 90 years ago from a single source.

Timing is everything for the annually flowering ragweed: they only get one chance to pollinate, germinate and flower. There therefore tends to be a trade-off with plants that flower earlier remaining small and producing fewer seeds, while those that flower later are larger and have more seeds due to the additional resources for photosynthesis.

To determine whether there were any genetic changes in ragweed that dictated whether a plant would flower earlier or later, Kay and her partner Kristen drove around North America to collect ragweed to grow in a controlled greenhouse. The flowering times correlated to the latitude where they were collected: those in warmer regions have long growing seasons, while those in cold climates flower sooner - because if it gets too cold, they may not reproduce at all. The same patterns were seen in ragweed collected in Europe and Australia, even though those plants have only had at most 160 years to evolve in one place as opposed to the thousands North American plants have had. When Darwin proposed natural selection, he thought it was slow, but this is an example of it being very fast.

To investigate the DNA changes responsible for these timing differences, Kay sequenced 600 genomes from modern ragweed plants as well as historic ones preserved in Herbariums. Rather than single genes, there appeared to be whole regions of the genome responsible for flowering times that were affected by climate variables. In fact, she found that 15 whole chromosome inversions (flips) contribute to rapid adaptation in ragweed, which is less common than mutations to individual genes. These inversions have been repeated in the invasive plant as it spread and adapted to its new homes around the world.

Much of Kay's research - and ability to answer these questions - has been aided by her late partner, Kristen. They spent nine years together as research and life partners, and Kristen moved with Kay from Vancouver to help her set up a new lab at Monash University in 2014. But things weren't easy for Kristen. LGBTQIA+ people in Australia have six times the risk of depression and nine times the rate of suicide attempts compared to the general population, and academia does not make it any easier. Kristen committed suicide at the age of thirty after bat-

tling mental health crises. The Kristen Nurkowski Scholarship was established at the University of British Columbia in her honour, and Kay shares Kristen's story in the hope that it removes the stigma around mental illness and suicide.

small band relative to the ecliptic. The tale of Yhi and Bahloo incorporates this celestial dance, but sometimes, the story has an alternative ending: Bahloo will give in and cover Yhi in an embrace. This is an eclipse.



### DEADLY DARK SKIES – KRystal DE NAPOLI

The Australian continent is home to a diversity of communities and cultures, enduring tens of thousands of years. With over 250 language groups and even more dialects, Aboriginal and Torres Strait Islander cultures hold Knowledge systems that span time scales vastly longer than anywhere else. Aboriginal and Torres Strait Islander people observe the Sun, Moon, and stars to inform navigation and calendars, and predict weather. Krystal de Napoli is a Gomerai astrophysicist, who shares Indigenous Knowledge to highlight its intrinsic ingenuity and science.

An iconic Indigenous astronomy constellation is the Emu in the Sky. Many Aboriginal and Torres Strait Islander people observe the emu formed by a series of dark patches in the Milky Way. The Milky Way and the dark patches within, caused by gas and dust that obscure light from behind, are a prominent feature of Aboriginal and Torres Strait Islander astronomy but not in European astronomy. This could be due to the tilt of our solar system within our galaxy (similar to Earth's tilt in its orbit around the Sun), here in the southern hemisphere, that points us towards the middle of the Milky Way Galaxy.

In Gomerai traditions of northern NSW, the emu, Gawarrgay, is a totem that informs observers about the bird's breeding behaviour throughout the year based on its orientation on the horizon at sunset. When it is fully visible in the Milky Way during April and May, it assumes the form of a running emu, representing a female emu chasing the males during the mating season. Because emus begin laying their eggs at this time, Gawarrgay's appearance is a reminder that the emu eggs are available for collection. In June and July, the legs disappear, representing the male emu sitting on the nest, incubating the eggs. Later in the year, the emu appears to "sit" in the waterholes when water is bountiful, and by late summer, it dips its head below the horizon, indicating that the water has dried up. Krystal likes this story for the way it demonstrates the interconnectedness of stories of the stars with seasonality, animals, and weather. Stories of the sky passed down generations also represent rare celestial phenomena. In Gomerai traditions, the Sun is a woman named Yhi who falls in love with the Moon man, Bahloo. Yhi chases Bahloo, who has no interest and constantly tries to avoid her, zig-zagging across the sky. In astronomy, the Sun's path across the sky during the day defines the ecliptic, and the Moon follows a similar path, albeit bobbing up and down in a

Krystal de Napoli, Gomerai award-winning author, astrophysicist and science communicator. Image: Kim Kwan.

In order to continue telling these stories and maintaining her culture, Krystal advocates for dark skies. Light pollution, or artificial light at night, is the excessive or poor use of artificial outdoor light. It is largely the effects of bad lighting design, which allows artificial light to shine upward into the sky or other places where it is not wanted, instead of focusing it where it is. The brightness of artificial lights has ecological impacts by disrupting the natural patterns of wildlife, and it also destroys our ability to see the stars, particularly disconnecting Aboriginal and Torres Strait Islander people from their deep connection to the sky.

In Melbourne, we can only see around 50 stars with our eyes in the night sky because of the city's glow, yet in the countryside, it is possible to see thousands. Krystal, who now lives in Melbourne, is always relieved to return home to Country where she sees more stars in comparison, but rather concerningly, her family tells her that the skies are getting brighter there too. Some rural places are committed to keeping their skies dark, but cities can implement changes too. By darkening our skies with better lighting design, we will be able to maintain the rich heritage of Indigenous astronomy.

By connecting the dots in the night sky, we can form all sorts of stories. Stars have helped Indigenous astronomers shape their continuing narratives and cultures, creating meaning in the sky above that guides them in life on the ground below. Hopefully their stories endure tens of thousands of years more.

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Over page: ALMA in the Chilean Andes. Image: European Southern Observatory/Babak Tafreshi.





Under the canopy of myrtle beech and mountain ash trees along the Beeches Rainforest Walk, Yarra Ranges National Park, Victoria.

1973

## VICTORIAN RAINFORESTRY

By Scott Reddiex MRSV

*Nothofagus*, or southern beech, is an ancient genus comprising around 40 extant species, spread throughout countries in the southern hemisphere that were formerly part of Gondwana. In the 1974 *Proceedings of the Royal Society of Victoria*, botanists Dr Truda M. Howard and Dr David H. Ashton published a piece on the distribution of one of these species, *Nothofagus cunninghamii* (myrtle beech), in south-eastern Australia.

In Victoria, it is distributed in three main regions – the Central Highlands, Otway Ranges and Strzelecki-Wilsons Promontory area – occurring chiefly along rivers and gullies, and more rarely on mountain sides and plateaux.

Drs Howard and Ashton described many other species within the ‘plant communities’ containing *Nothofagus* in Victoria and Tasmania. They found it is associated with different species in these forests, depending on the elevation (above sea level): with the Australian blackwood (*Acacia melanoxylon*) up to 650 m, with southern sassafras (*Atherosperma moschatum*) up to 1375 m, and with mountain tea-tree (*Leptospermum grandifolium*) up to its limit at 1,570 m. It was also found to

form an ‘understorey of variable density’ beneath the canopies of different Eucalypt species.

The most consistent environmental factor correlated with the distribution of *N. cunninghamii* was ‘high, uniformly distributed rainfall’. It can potentially be found in “all areas in Southern Victoria with rainfall exceeding 150 cm per annum”, albeit it can flourish with slightly less rain in sheltered gullies .

*Nothofagus* truly is an ancient genus, with its pollen found in the fossil record of Australia, Antarctica, and New Zealand, dating back to the early Campanian age (83.2 – 72.1 MYA).<sup>1,2</sup> Howard and Ashton note that prior to the arrival of Europeans, the “*Nothofagus-Atherosperma* forest appears to have been expanding again”, however “Since white settlement, the existing *Nothofagus* forests have been decimated by severe and repeated burning, which may have further arrested *Nothofagus* expansion.”<sup>3</sup>

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*Proceedings of the Royal Society of Victoria*, Vol 86 (New Series), 1974. The Distribution of *Nothofagus cunninghamii* Rainforest. By Truda M. Howard and David H. Ashton.

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An exponential increase on the 100 plants collected by H. W. Wilson: *The Australian Garden*, located at the Royal Botanic Gardens Victoria at Cranbourne Gardens, features over 100,000 plants from 1,900 plant varieties.

1923

# THE BREATH OF THE WILD FLORA

By Scott Reddiex MRSV

*"So little work has been done on the transpiration of Australian plants, that I was glad to have the opportunity of attacking a branch of research work which opened up so many possibilities."*

On the 13th of December 1923, the University of Melbourne's Herbert Ward Wilson presented to the RSV his 62-page article 'Studies on the Transpiration of some Australian Plants, with Notes on the Structure of their Leaves'.

The paper primarily addressed a question often wondered by European botanists who studied native Australian flora: how did these plants survive in the harsh Australian climate?

Wilson captured contemporary observations on Australia's – and particularly Melbourne's – weather, and how the vegetation handles it, quoting an article from 1910: *"In at least one respect the Australian conditions as represented in the Melbourne district are comparatively unique, for, at certain times, hot dry winds blow from the interior and cause rapid rises of temperature up to 100° [38°C] or even 120° F [49°C]. The hot spell rarely lasts long and is usually followed by a cool change often accompanied by rain. The fall of temperature*

*is usually more rapid than the rise... In neither case does the suddenness of the change appear to operate injuriously upon the vegetation".*

With the scene set, he states the objective of his work, and how he went about solving his research question. *"My main object was to discover whether Australian plants have any special powers of accommodating themselves to adverse conditions, especially of regulating the transpiration rate when the temperature suddenly increases; hence, I considered it would be advisable to work with as many plants as I could handle, and to concentrate on the transpiration rates rather than to work with a few plants and deal more fully with their anatomy."*

Around 100 plant specimens ("Of course, many of these were in duplicate") were supplied by various gardens around the state for the study, including wattles, eucalypts, banksias, and kurrajong. Although Wilson notes that while he was *"unable to use two or three which were attacked by disease, and one or two which were broken by accident", the rest reportedly thrived. Transpiration was measured predominantly via direct weighing, with 'all weight records... standardized, the standard being the*

*"number of grammes of water transpired per sq. metre per hour."*

After 62 pages of results, Wilson draws his conclusions: *"The results of the experiments show that, so long as the available water supply is adequate, the plants have no special powers of accommodation as mentioned above, for, as the temperature rises, the transpiration rate increases to the limit of the transpiring power of the plant for that temperature."*

*"The so-called xerophytic [adapted for limited water supply] plants of Australia are provided with a high average number of stomata, which enables their transpiration rate to respond quickly to changes of temperature and water supply, and they are well protected by their tough outer coverings, in some cases assisted by glands, from injurious loss of water."*

**From:**  
*Proceedings of the Royal Society of Victoria, Vol XXXVI (New Series), 1924. Article XI. —Studies on the Transpiration of some Australian Plants, with Notes on the Structure of their Leaves. By H. W. WILSON, O.B.E., M.C., C.d'G., B.Sc.*



The lecture theatre of the Royal Society of Victoria building in 1954 - the site of thousands of presentations and discussions relating to STEMM over its 164-year history.



1873

## LAYING DOWN THE LAWS

By Scott Reddiex MRSV

A special meeting of the Royal Society of Victoria on the 12<sup>th</sup> of August 1873 saw minor alterations of the Society's laws, primarily to halve the cost of membership for those living more than 10 miles/16.1 km from Melbourne.

In 1873, Melbourne was still seven years away from having a telephone, around 25 years from the first motorcar, and 11 years from the first tram – which was pulled by a horse. The options for commuting to the Royal Society of Victoria's building at 8 La Trobe Street, Melbourne, were one or a combination of walking, by horse (plus or minus a carriage), or by steam train. This meant that it was a substantially greater task to reach the building for one of the monthly meetings, which were held *'on the second Monday of each month during the session, from March to December inclusive' and at which 'the chair shall be taken punctually at eight o'clock, and shall be vacated not later than half-past ten o'clock'.*

As a model of science engagement for Victoria's population of 770,727 (with at least 270,000 of those on the gold fields),<sup>1</sup> the *'library shall be open to members of the Society and the public'*, and *'every*

*Member may introduce two visitors to the meetings of the Society'...although it was decreed that 'No stranger shall speak at a meeting of the Society, unless specially invited to do so by the Chairman.'*

As to the subject of these meetings, *'Members shall have the privilege of reading before the Society accounts of experiments, observations, and researches conducted by themselves, or original papers, on subjects within the scope of the Society, or descriptions of recent discoveries, or inventions of general scientific interest.'*

Now, 150 years later, anyone can still make their way by foot or by train – but perhaps not by horse – to the Royal Society of Victoria's building at 8 La Trobe St, Melbourne, for a presentation on topics of general scientific interest. Thankfully, the invention of the telephone has also made it much easier to watch the presentations online.

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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.**



Mycologist Dr Camille Truong performing field work in Tasmania. Image: Catherine Marciniak/Royal Botanic Gardens Victoria

## FUNGI FASCINATION: IN CONVERSATION WITH A ROYAL BOTANIC GARDENS VICTORIA MYCOLOGIST

By Tanya Hendy, Communications and Media Coordinator, and Dr Camille Truong, Mycologist, at the Royal Botanic Gardens Victoria

Behind the scenes at the Royal Botanic Gardens Victoria - in addition to the gardens themselves - is a centre of excellence for botanical research. Their scientific research supports a range of conservation and sustainability initiatives, with their scientists playing a key role in discovering and naming plants (taxonomy), in understanding their relationships and evolutionary history (systematics), and in the identification of new non-native plants and fungi in the Australian landscape.

Dr Camille Truong is a mycologist and ecologist focused on understanding and conserving fungi in native forests. As Research Scientist at Royal Botanic Gardens Victoria and Honorary Senior Fellow at the University of Melbourne, her research focuses on the beneficial associations between fungi and plants, called mycorrhizae, and how fungi play important roles in the establishment, growth and health of trees and other plants in forests around the world. She has been conducting field expeditions in forest ecosystems of the Americas, Africa and Australasia, and was awarded the prestigious 2022 Maxwell/Hanrahan Award in Field Biology for her work. The Royal Botanic Gardens Victoria interviewed Dr Truong about her career in STEM.

### Firstly, why are you interested in mycology and what inspired you?

Fungi are fascinating organisms with unique ways of living, dispersing, and reproducing. Working with fungi makes me think outside of the box.

### Could you briefly describe your career path and how you came to work at Royal Botanic Gardens Victoria?

I did a BSci and MSci majoring in botany in my hometown university in Neuchatel, Switzerland. I then worked as Curator Assistant in the fungal collections of Geneva Botanic Gardens, while doing a PhD in fungal systematics in parallel. My tasks at the Geneva Botanic Gardens included cataloguing biodiversity, taking care of the fungal collections, and introducing the world of fungi to the public. After I graduated, I decided to pursue a career in STEM and spent some time doing research and teaching in the USA and Mexico. Australia has such a vast and unique biodiversity, and the Royal Botanic Gardens Victoria, with its ample plant and fungi collections, offered the perfect setting for me to settle down.

### How was the process of transitioning from study to work?

As a student I didn't clearly envision a career in STEM. It was a long process, with joyful and daunting moments, but I enjoyed the journey.

### What are you researching at the moment?

There is so much to investigate about Australian fungi! My research involves exploring the diversity of fungi and understanding what role they play in ecosystems. Fungi can teach us why biodiversity is important and how it is affected by disturbances, such as climate change or local human impact.

Right now, I am describing new species based on material from the National Herbarium of Victoria, and developing new techniques to identify fungi based on DNA. I am investigating fungi eaten by native mammals, such as Bandicoots and Potoroos, and how these animals disperse fungal spores, as well as testing how disturbances, such as fire, affect fungi in forest soils. I also collaborate with South American colleagues to describe the diversity of fungi from Patagonia and their biogeographic connections to our native fungi given the proximity of their historical ancestors in Southern Gondwana during the late Cretaceous Period (i.e., when there were only two continents).

## What have been the highlights of your career so far?

Winning the Maxwell/Hanrahan Award gave me a lot of recognition, especially since mycology is not well-recognized in field biology. Now that I am a mentor to others, it makes me very happy to see students thrive and their success are my highlights too.

## Congratulations on winning the Maxwell/Hanrahan Individual Award in Field Biology. How do you think this has helped your career?

This award came at a crucial moment as I had recently moved to Australia to establish my research program on Australian forest fungi. The award supports scientists, like myself, by elevating our diverse perspectives and enabling us to commit time to the observation and experimentation that help us better understand the world around us. With the award proceeds, I hope to develop an innovative research program in unexplored areas of Australia and give new opportunities to students to be trained in field mycology. The award gives me a lot of freedom to explore new paths. Creativity is fundamental in research.

## What do you love most about the kind of work that you do?

I love that my work is so diverse: in a single week, I may collect samples in the field, design a protocol in the lab, work on a bioinformatic script, publish new research, discuss with students about their own research projects, give a talk to the public, etc.

## What is it like to go on a scientific expedition? Do you get to do this often? How much time do you spend in the office/lab compared to out in the field?

A successful expedition requires careful preparation and good team spirit. It is thrilling but also physically and mentally very demanding. Nowadays I do a lot more project management, but I try to spend at least 2 months in the field every year.

Dr Camille Truong/Royal Botanic Gardens Victoria



Dr Camille Truong/Royal Botanic Gardens Victoria

## What has been your favourite expedition so far?

I got the chance to spend quite a bit of time in the cool temperate and sub-antarctic forests of Patagonia. These forests are so vast, remote and pristine. As a scientist passionate about exploration, it was extremely rewarding.

## What further research would you like to do?

I would like to do more experimental research to test patterns that I observe in the field. One of my dreams is to establish "field labs" in remote places that are not easily accessible by road.

## Do you have any advice for people who envision a STEM career?

A career path is not necessarily straightforward, so don't be afraid to explore different paths. Curiosity is the basis of being a researcher! Surround yourself with good people that can support you in times of struggle and don't be too hard on yourself when things don't work out.

## Now for some fun questions. What is your favourite fungus and why?

I don't have a favourite fungus, but in the field, I like to look for cup fungi (Pezizomycetes) because they are very diverse but overlooked, and a lot of species remain to be described. Some species also help young plants to grow and are therefore important for forest regeneration.

## What is the strangest fungus you have come across?

In Mexico, I cultured a new *Ophiostoma* species that I collected inside the trunk of pine trees. The species was growing in cavities that were carved by bark beetles, where they farm these fungi to feed their larvae. One of many examples of the intriguing interactions of fungi with other organisms.



## 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](https://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. 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 **Guidelines for Authors**. All enquiries and manuscript submissions should be forwarded via email to [editor@rsv.org.au](mailto: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](https://twitter.com/ProceedingsRSV)



# CURRENT GOVERNMENT CONSULTATIONS OF INTEREST TO VICTORIA'S SCIENCE COMMUNITY

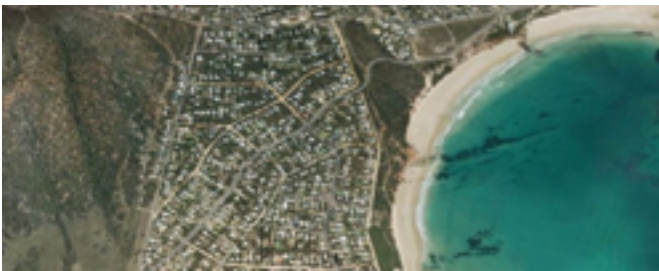
Projects open for consultation from [engage.vic.gov.au/project](https://engage.vic.gov.au/project)



### Victorian Murray Floodplain Restoration Inquiry and Advisory Committee.

Learn about 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](https://engage.vic.gov.au/VMFRP-SIAC)



### 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](https://engage.vic.gov.au/glsac)



### Review of the Kangaroo Harvest Management Plan (KHMP)

The KHMP sets the objectives and requirements for kangaroo harvesting. Harvesting must be ecologically sustainable, humane, and only undertaken by authorised people. The Victorian Government is calling on all members of the Victorian Community to have their say on the KHMP

Consultation closes 11 July 2023:  
[engage.vic.gov.au/kangaroo-harvesting-management-review](https://engage.vic.gov.au/kangaroo-harvesting-management-review)



### Wilson's Prom

Parks Victoria is engaging with the community about Wilson's Prom

Consultation closes 16 July 2023:  
[engage.vic.gov.au/wilsons-prom](https://engage.vic.gov.au/wilsons-prom)



### Victoria's Strategy Towards Elimination of Seclusion and Restraint.

We welcome your feedback about care and support provided to people with innate variations in their sex characteristics.

Consultation closes 21 July 2023:  
[engage.vic.gov.au/victorias-strategy-towards-elimination-of-seclusion-and-restraint](https://engage.vic.gov.au/victorias-strategy-towards-elimination-of-seclusion-and-restraint)



### Victoria's Emergency Backstop Mechanism for rooftop solar

Have your say on the introduction of an emergency backstop mechanism for new and replacement solar systems.

Consultation closes 02 August 2023:  
[engage.vic.gov.au/victorias-emergency-backstop-mechanism-for-rooftop-solar](https://engage.vic.gov.au/victorias-emergency-backstop-mechanism-for-rooftop-solar)

# 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](mailto: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 use a modified APA 7th edition format: reference list in author-year format, with numbered in-text citations. Refer to articles in previous editions for examples, or contact [editor@ScienceVictoria.org.au](mailto:editor@ScienceVictoria.org.au).

## WRITING FOR SCIENCE VICTORIA: ARTICLE FORMATS

### STYLE GUIDE

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** at Home>Editor>Document Stats. 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 STEM. 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 irreparable 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 STEM 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 STEM-related fields in Victoria. Examples of possible topics include:

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

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 STEM-related projects, high-impact publications relevant to Victoria, successes of Victorian scientists, or relevant STEM-related policy news.



ROYAL SOCIETY OF VICTORIA

THE ROYAL SOCIETY OF VICTORIA

*Promotion and Advancement of Science*





# RSV SERVICES AND FACILITIES

## 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](mailto: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
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### The Ellery Lecture Theatre

Raked seating great for lectures, presentations, and conferences.

**Capacity:**

Raked seating	≤110 people.
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### The Cudmore Library

A picturesque room great for larger meetings and seminars.

**Capacity:**

Meetings, seminars, etc	≤24 people
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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](mailto: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](https://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	\$
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	\$
<b>TOTAL</b>	<b>\$</b>

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On the sale of a typewriter. The police prosecutor E. M. Detective Hudspeth, told Mr. Hudspeth, that Allchurch and others in June had been for conspiracy to de- Allchurch had com- perjury while giving nce at this trial. Detective Maurice William s Buchan said that he present when Detective ett interviewed All- ch at Pentridge gaol on ber 16. chuan said Everett told urch that he had com-

When Mr. Hudspeth asked if Allchurch was applying for bail, Senior Detective Everett said that he was at present serving a five-year sentence for conspiracy.

... have their 40-minute meal break. The board was given until this morning to appoint the clerk. The tram employes object to having to carry their takings for the whole of the 8 hour shift. There was no board official available for comment yesterday.

# Australia Lagging in Scientists

Provision for the training of scientists in Australia and for applying the results of science and technology was completely inadequate, Professor R. Street, of the department of physics at Monash University said last night.

Professor Street, who was speaking at the Royal Melbourne Institute of Technology prize giving and conferring of certificates at Storey Hall, said he thought Australia had reached the crisis stage in the production of first-degree qualified science graduates.

In implementing any new policy on scientific and technological training, a delay of eight years was inevitable.

This was the time it took to "manufacture" students of Ph.D. standard from the time they left school.

## Higher Sights

Australia could not hope to compete in the world unless its sights were set higher than just producing more honors or fourth-year students.

Australia had the problem of losing a number of scientists to overseas.

Worthwhile jobs had to be created so that highly qualified scientists could be produced and retained.

# Uranium Town Warned of Closure

BRISBANE, Tuesday. More than 600 people in the Mary Kathleen uranium town told tonight of the town's likely closure late next year.

The managing director of Mary Kathleen Uranium (Mr. A. J. Keast) told a meeting of men, women and children that present contracts would expire September 30 next.

Effort was being made to have the contracts renewed but the outlook was not good.

## Jobs Offered

The company had taken certain precautions to secure the future employment of Mary Kathleen workers in the Consolidated Uranium



FOOD

PINK S

Ocean



**Science Victoria**

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



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