

13–15
November
2019

The Australasian Association for the
History, Philosophy, and Social Studies
of Science

Centre for Science in Society
Victoria University of Wellington
Aotearoa New Zealand



AAHPSSS 2019
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Conference welcomes

Welcome from the President

I would like to take this opportunity to welcome all conference attendees, including our distinguished guest, Dyason Lecturer Margaret Pelling, our panel and session organizers, our many speakers and all other attendees, for many of whom this will be their first AAHPSSS conference. We have a diverse and exciting programme over the three days of the conference, including several special events other than the Dyason Lecture on Wednesday evening. Three plenary sessions presented by Ocean Mercier, Ruth Barton and Kari Lancaster will take place during the first sessions of each day of the conference. There will also be a lunchtime session on Wednesday focused on the politics of exclusion and the possibilities for inclusion, a Friday afternoon session featuring 'Writers on Science', and a film screening of the documentary feature, 'Containment' by Peter Galison and Rob Moss. For those who wish to further develop their writing and research skills, a writing retreat organised by Rhian Salmon will be held post-conference, between Sunday 17 and Wednesday 20 November, which is focused on exploring the relationship between theory and practice in Public Engagement with Science and Technology (PEST) and Research into Responsible Innovation (RRI).

This is the first time the AAHPSSS conference has been held in New Zealand/Aotearoa for many years, and came about thanks to the initiative of Rhian Salmon and Courtney Addison from Victoria University Wellington, and AAHPSSS former secretary Darrin Durant from the University of Melbourne. Clearly, this event has helped to rejuvenate the Association's ties with our New Zealand colleagues, and we therefore hope that we can more frequently hold the conference in the Land of the Long White Cloud in future.

Wellington is a beautiful city and VUW is a gorgeous campus. I wish you all a stimulating and enjoyable time during your stay here, and hope to have the opportunity to meet and speak with you all over the next few days.

Adam Lucas

President & Treasurer
AAHPSSS

About AAHPSSS

AAHPSSS is the Australasian Association for the History, Philosophy, and Social Studies of Science, and covers all aspects of science studies broadly construed. It is a not-for-profit association, with the mission to advance the history, philosophy and social studies of science and technology. Membership is open to anyone interested in science studies, including residents of countries outside Australia and New Zealand. The Association has been active since 1967.

More information, including how to join and a list of the current committee can be found at the AAHPSSS website: aahpsss.net.au

About the Centre for Science in Society

Our expertise covers public engagement with science, the history of science, anthropology of science, mātauranga Māori, science writing, and aesthetics and science. Our course offerings include a Science in Society minor, a Science Communication major offered under the Bachelor of Science or Bachelor of Communication, the Master of Science in Society, Master's of Science (Science in Society), and PhD.

victoria.ac.nz/science/research/science-in-society

At the conference

Code of conduct

We are committed to providing an environment free of harassment and discrimination. A full Centre for Science and Society code of conduct can be found online, including definitions of harassments and inappropriate behaviour, and procedure for reporting and responding to incidents. For the purposes of this conferences, attendees can contribute to creating a safe and inclusive environment by:

- Not assuming a person's gender until they have disclosed it to you.
- Not defaulting to male pronouns for ungendered subjects.
- Issuing content warnings if your talk or slides might upset someone.
- Engaging respectfully – do not talking over other speakers, keep your talk to the time allocated, keep questions concise so that multiple people can engage.

Bathrooms

There is a gender diverse bathroom in Alan MacDiarmid 158, signposted as accessible, and one on each floor of Te Toki a Rata.

Catering

Conference registration includes catering for the conference reception on Wednesday evening, lunches, and morning and afternoon teas. These will be served in the foyer outside the conference rooms, in the Alan MacDiarmid Building.

All conference catering is vegetarian as standard. Additional dietary requirements could be selected on registration. If you are unsure if you have supplied these restrictions, please check with a conference helper as soon as possible.

Alcohol is not part of any pre-paid conference catering. There will be a cash bar at the Evening reception and the Conference dinner.

There are various options for eating on campus, which are listed here:

victoria.ac.nz/students/campus/food

ATMs

There is only one ATM on campus, which is located on the front of the Von Zedlitz Building, 28 Kelburn Parade. This is approximately a 5 minute walk from the conference location. Please ensure you have cash for the Wednesday night reception.

Lactation

There is an office available at all times for lactation purposes. It is a private (lockable) space with a comfy chair and a kitchen including fridge and microwave downstairs. You can find this at 42 Kelburn Parade (over the road and a few doors down the hill), room 207. Lactating parents are welcome to leave your supplies in this room during the conference. The door will be closed but unlocked so that you can come and go as you need.

Wifi

Select the network named 'Victoria', then open your browser and when the web portal appears, click 'Don't have an account' and enter your details to connect.

Laundromat

There is a laundromat available at AAHPSS, but it's not for your normal wash up! In October, the New Zealand Association of Scientists' conference had a theme of *Changing the culture of science*, and *A load off your mind* Science Culture Laundromat was devised as a space to 'air the dirty laundry of science', gathering thoughts from the conference and beyond. We are pleased to have the laundromat open for a second spin at AAHPSS! It is an informal, playful third space where you'll have the opportunity to share thoughts on science culture from your perspective, and also to respond to the scientists' characterisation of their world. Feel free to hang out, perhaps get in a lather and agitate a little, and iron out if science is in need of a delicate wash, stain removal or some soft-soaping. Spin by and take a load off your mind, or find out more at makinggood.design/thoughts/ALoadOffYourMind.

Sustainability

We have tried to make this annual meeting as sustainable as possible. This includes using eco-friendly stationary, minimising paper products in the conference pack, arranging vegetarian catering, and supporting video conference presentations. If you'd like to help us make AAHPSSS 2019 sustainable, you can:

- Use public transport to get to and from campus
 - Grab an againagain cup from VicBooks café. Againagain is a cup loan scheme, where you pay \$3 for a reusable cup that you can cash back in at the end of your visit
 - Consider using the online programme, or recycle your paper programme appropriately
 - Use the correct bins for compostable, recyclable, and landfill rubbish
- **Rideshare:** several car share services operate in Wellington. We recommend using Zoomy, which is a New Zealand owned company that compensates its drivers better than international alternatives. Those alternatives are Uber and Ola.
 - **Taxi:** taxi companies include Wellington Green Cabs 0800 464 7336, Wellington Combined Taxis 04 384 4444, and Capital Taxis 04 384 5678

Please note that parking is extremely limited on and around campus. On street parking is available on Kelburn Parade, Salamanca Road, Upland Road, and side streets. This is 'coupon parking'. Coupons are available from local shops, or you can pay using paymypark.com. There is no on-campus car park for visitors. We recommend using public transport or sharing taxis/rideshare where possible.

Social media

Twitter users can use the conference hashtag [#AAHPSSS19](https://twitter.com/AAHPSSS19). If you do not want images of yourself or your slides to be tweeted, please indicate this at check in and you will be given a coloured sticker. You may also like to put an icon of a crossed through Twitter logo on your slides if you do not want to be tweeted, or to include your Twitter handle if you do.

Getting about

There are several ways you can reach Kelburn campus:

- **Bus:** bus numbers 21 and 22 go from town to campus every ten minutes during peak hours, and the 18e runs every 15 minutes. You can pay in cash (change or \$5 notes), or if you are staying for a little while, a Snapper card can be purchased at many dairys. You can load money onto your Snapper card and then tap on or off as you travel.

What to see, do and eat in Wellington

There's plenty to see and do around Wellington (Te Whanganui-a-Tara). The following links have recommendations of places to eat, drink and visit.

- neatplaces.co.nz/places/wellington
- wellingtonnz.com/discover/
- theguardian.com/travel/2015/nov/30/48-hours-in-wellington-new-zealand-wwhere-to-go-what-to-do

In addition, we recommend the following.

Sights:

- Zealandia Ecosanctuary: An incredible restoration of native bush, birds and wildlife. A free shuttle runs regularly from the top of the cable car.
- Te Papa Tongarewa, Museum of New Zealand: Full of art, natural history, and other treasures
- City Gallery Wellington holds a rotating series of exhibitions
- Wellington is home to a lot of lovely independent movie theatres. The most central are Lighthouse Cuba and The Penthouse, Brooklyn

Wellington is a city of exceptional coffee. Try:

- Raglan Roast (156 Willis St)
- Coffee Supreme (39 Ghuznee St)
- Havana Coffee works (163 Tory St, closed weekends)
- Café L'Affare (27 College St)

Excellent food can be found at:

- Loretta (181 Cuba St)
- Hillside Kitchen (241 Tinakori Rd)
- Lulu (31 Courtenay Place)
- Mr Go's (59 Taranaki St)
- Pizza Pomodoro (13 Leeds St)
- Highwater Eatery (54 Cuba St)

Good food on a budget:

- Little Penang (40 Dixon St)
- Sweet Mother's Kitchen (5 Courtenay Place)
- Mekong Café (138 Vivian St)
- The Wellington Night market is on Friday (116 Cuba St) and Saturday (Lower Cuba St) from 5pm
- Ekim burgers (257 Cuba St)
- Ramen shop (99 Victoria St)

Watering holes:

- Laundry Bar (240 Cuba St)
- Golding's Free Dive (14 Leed St)
- Sprig and Fern (342 Tinakori Rd)
- Noble Rot wine bar (6 Swan Lane)

Conference events

Politics of exclusion, possibilities of inclusion: a conversation

Science and scientific knowledge have historically belonged to and practiced in certain spaces. To open up the field, then requires addressing two fundamental questions. First, what is gained by opening up science and studies of science to be more inclusive to historically marginalized communities and second, how does one go about making this change. In this lunch-time conversation, Gemma Lucy Smart, Nayantara Sheoran Appleton, and Eden Smith, take on the problems around exclusions and the possibilities in the practices of inclusion in/from/within Science. Format will include introductory comments and questions from the audience.

Postgrad meetup

Postgrads at AAHPSSS 2019 are invited to meet up before heading to the evening reception on the first night. Get to know your fellow postgrads from different institutions. Meet outside Wishbone Café, Alan McDiarmid Building after sessions end on Wednesday 13 November.

Evening reception

The evening reception will take place on Wednesday 13 November from 5.00 to 6.30 pm prior to the Dyason Lecture by Dr Margaret Pelling. The reception will be catered, including canapés and a cash bar provided by Nosh Catering & Events.

Conference dinner

The conference dinner is at Milk & Honey Restaurant, in Rankine Brown Building, VUW, on Thursday 14 November at 6.30 pm. This dinner must be pre-booked. It is not possible to pay for the dinner at the conference.

The menu is all vegetarian, including two mains, two side dishes, and freshly baked bread rolls and salted butter, along with petit fours.

Drinks are *not* included. There will be a cash bar with a range of alcoholic and soft drinks.

Postgrad workshop

This workshop is a chance for a semi-formal chat with early career researchers Dr Courtney Addison, Dr Tim Corballis, Dr Kari Lancaster and facilitated by AAHPSSS Postgraduate Representative Gemma Lucy Smart. Together we will discuss the challenges and advantages of postgraduate work in studies of science. It is also an opportunity for postgraduate researchers attending the conference to establish connections with other students in our disciplines and share ideas, strategies and resources.

AAHPSSS AGM

The AAHPSSS AGM will be held on Friday 15 November during the conference lunchbreak from 12.00 to 1.15 pm. AAHPSSS is an unincorporated, member-run organisation and everyone is expected to contribute to its running. A formal agenda has been circulated to members prior to the conference, but note that the AGM includes elections for committee positions. All members are encouraged to consider standing for the committee. Please advise the AAHPSSS Secretary, Martin Bush (martin.bush@unimelb.edu.au) by the end of Thursday, 14 November, if you have any items you wish placed on the general business section of the agenda.

Writers on science

In one of her seminal writings about science¹, feminist scholar Donna Haraway argued for “the view from a body, always a complex, contradictory, structuring, and structured body, versus the view

from above, from nowhere, from simplicity.” In this literary event, with visual accompaniments, scholars from the Centre for Science in Society step away from their academic perspectives and read from their *personal*, often highly embodied, writings – including fiction, creative non-fiction, memoir, and poetry – about science and scientists.

Readers will include Rebecca Priestley (reading from her Antarctic memoir *Fifteen Million Years in Antarctica*), Tim Corballis (reading from his novel *Our Future is in the Air*), Courtney Addison (reading from her entry in the Anthropogenic Table of Elements), Rhian Salmon (reading from her personal essay *Waiting for the Polar Sunrise*) and Zoë Heine (reading from her MSc project in progress).

(1. Haraway, Donna (Autumn 1988). “Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective”. *Feminist Studies*. **14** (3): 575–599)

Containment, a film by Peter Galison and Robb Moss

Can we contain some of the deadliest, most long-lasting substances ever produced? Left over from the Cold War are a hundred million gallons of radioactive sludge, covering vast radioactive lands. Governments around the world, desperate to protect future generations, have begun imagining society 10,000 years from now in order to create monuments that will speak across time. Part observational essay filmed in weapons plants, Fukushima and deep underground—and part graphic novel—*Containment* weaves between an uneasy present and an imaginative, troubled far future, exploring the idea that over millennia, nothing stays put.

The homepage for *Containment* is at containmentmovie.com.

Additional interviews can be seen at:
[youtube.com/watch?v=KbVHkxd8P7E](https://www.youtube.com/watch?v=KbVHkxd8P7E)
[youtube.com/watch?v=OXQs9Tlp3Rc](https://www.youtube.com/watch?v=OXQs9Tlp3Rc)
[youtube.com/watch?v=-cbNIXVRrb0](https://www.youtube.com/watch?v=-cbNIXVRrb0)

Ian Langham prize award

The final session of the conference includes the award of the Ian Langham Prizes. These are awarded to the best conference presentations by current postgraduate students by the AAHPSSS2019 conference committee. No application is required for these awards.

2019 AAHPSSS Conference: at a glance

Wednesday 13 November

8:30 – 9:30	Registration		
9:30 – 9:45	Conference opening		
9:45 – 10:45	Plenary 1	Ocean Mercier: Mātauranga and science – torsion, friction and other forces	
10:45 – 11:00	Morning tea		
11:00 – 12:30	Session 1	Technoscience futures	Doing Darwin Down Under I
12:30 – 1:30	Lunch	<i>including</i> Politics of exclusion, possibilities of inclusion event	
1:30 – 3:00	Session 2	Digital wellbeing	Doing Darwin Down Under II
3:00 – 3:15	Afternoon tea		
3:15 – 4:45	Session 3	New philosophies	Doing Darwin Down Under III
5:00 – 6:30	Evening reception	<i>including</i> Postgrad meetup	
6:30 – 8:00	Dyason Lecture	Margaret Pelling: Diana Dyason (1919-1989) and the history of medicine - as I knew them	

Thursday 14 November

9:30 – 10:30	Plenary 2	Ruth Barton: Class, religion and scientific expertise: the shifting cultural authority of science in Victorian England		
10:30 – 10:45	Morning tea			
10:45 – 12:15	Session 4	Histories, W of Tasman	Ontologies, pathologies, biopolitics	Public Engagement with Science I
12:00 – 1:15	Lunch			
1:15 – 2:45	Session 5	Responding to the replication crisis	Transferring science & botany	Public Engagement with Science II
2:45 – 3:00	Afternoon tea			
3:00 – 4:30	Session 6	Historical & social epistemologies	Biosociality	Public Engagement with Science III
6:30	Conference Dinner			

Friday 15 November

9:30 – 10:30	Plenary 3	Kari Lancaster: Thinking with 'evidence-making interventions' in health		
10:30 – 10:45	Morning tea			
10:45 – 12:15	Session 7	Histories, E of Tasman	Negotiating the politics of knowledge	Postgrad workshop
12:00 – 1:15	Lunch	<i>including</i> AAHPSSS AGM		
1:15 – 2:45	Session 8	Writers on science		
2:45 – 3:00	Afternoon tea			
3:00 – 4:30	Session 9	Film Screening: <i>Containment</i>		
4:30 – 5:00	Conference closing	<i>including</i> Langham Prize award		

Session details

Wednesday 13 November

Room	TTRLT1	
Plenary 9:45-10:45	Ocean Mercier: Mātauranga and science – torsion, friction and other forces	
Morning tea		
Room	AM102	AM104
Session 1 11:00-12:30	Technoscience futures Chris Hesselbein: <i>Optimizing for technoscientific controversies in the marketplace of ideas</i> Tara Roberson: <i>Engineering a quantum future</i> Shannon Walsh: <i>Innovation under capital</i> <i>Chair: Adam Lucas</i>	Doing Darwin Down Under 1: Darwin and Darwinism in New Zealand and Australia John Stenhouse: <i>Reading Darwin during the New Zealand Wars</i> Rosi Crane: <i>A better day dawned for biology</i> Ian Hesketh: <i>Narratives of Charles Darwin down under</i> <i>Chair: Evelleen Richards</i>
Lunch		
Session 2 1:30-3:00	Digital wellbeing Alex Beattie & Michael Daubs: <i>Framing platforms as a social good by promoting digital wellness</i> Cherie Lacey: <i>Wellness capitalism and the 'perfect user'</i> Catherine Caudwell: <i>Pain points: the curative practices of user experience design</i> <i>Chair: Tim Corballis</i>	Doing Darwin Down Under 2: Challenges: interpretative & historiographical Mark Francis: <i>The philosophical and scientific context of Herbert Spencer's early evolutionary theory</i> Emma Zuroski: <i>Depths of evolution: exploring the deep sea in the age of Darwinian thinking</i> Rod Buchanan & James Bradley: <i>Exhuming reputations: the historiography and moral implications of diagnosing Darwin</i> <i>Chair: Mark S. Micale</i>
Afternoon tea		

Room	AM102	AM104
Session 3 3:15-4:45	<p>New philosophies</p> <p>Eden Smith: <i>Participant-observation in the Scuttleverse</i></p> <p>Thomas Green: <i>Now, more than ever, we need the space philosophers</i></p> <p>Patrick Dawson: <i>Reconciling presentism with Special Relativity</i></p> <p><i>Chair: Tim Corballis</i></p>	<p>Doing Darwin Down Under 3: Class, status, and Darwinism</p> <p>Ruth Barton: <i>John Lubbock: Darwinian gentleman</i></p> <p>Roundtable: <i>Ruth Barton, Mark S. Micale & Evellen Richards</i></p> <p><i>Chair: John Stenhouse</i></p>
Evening reception (foyer of TTR)		
Room	TTRL1	
Dyason Lecture 6:30-8:00	<p>Margaret Pelling:</p> <p>Diana Dyason (1919-1989) and the history of medicine - as I knew them</p>	

Thursday 14 November

Room	TTRLT1		
Plenary 9:30-10:30	Ruth Barton: Class, religion and scientific expertise: the shifting cultural authority of science in Victorian England		
Morning tea			
Room	AM102	AM104	AM106
Session 1 10:45-12:15	<p>Histories, west of the Tasman</p> <p>Ian Wills: <i>Australia's Failed Nuclear Weapons Ambitions</i></p> <p>Ian Tasker: <i>History and Philosophy of Australian Astronomy in the Twentieth Century</i></p> <p>Bill Palmer: <i>M. M. Pattison Muir (1848-1931): chemist, author and historian of chemistry</i></p> <p>Chair: John Wilkins</p>	<p>Ontologies, pathologies, biopolitics</p> <p>Alexander Pereira: <i>On the nature of pathological fear: specific phobias and natural kinds</i></p> <p>Richard Heersmink: <i>Self, memory and technology</i></p> <p>Gemma Smart: <i>Complexity in Psychiatry: addiction, delusions and the narrative of disorder</i></p> <p>Chair: Courtney Addison</p>	<p>Public Engagement with Science: Integrating theory and practice 1</p> <p>Wendy Russell, Sujatha Raman & Joan Leach: <i>The institutionalisation of Public Engagement with Science and its problems</i></p> <p>Rhian Salmon & Jo Bailey: <i>Engagement by design, engagement through design</i></p> <p>Rebecca Priestley, Rhian Salmon, Zoë Heine & Taciano Milfont: <i>It's the first metre that matters</i></p> <p>Chair: Rhian Salmon</p>
Lunch			

Room	AM102	AM104	AM106
Session 5 1:15-2:45	<p>Reflecting on and responding to the Replication Crisis</p> <p>Fiona Fidler: <i>What crisis?</i> Eden Smith: <i>Disagreements about replication</i> Martin Bush: <i>The replicATS project</i> Fallon Mody: <i>Predicting replicability</i> Chair: <i>Fiona Fidler</i></p>	<p>Transferring science and botanical knowledge, 1600s-2000s</p> <p>Meera Muralidaran: <i>Economic botany and the production of natural history knowledge, 1678-93</i> Anton Sveding: <i>From Hooker to Cockayne: New Zealand nature & science, 1853-1934</i> Zoë Heine: <i>Exploring concepts of a changing climate with gardens, gardeners and gardening</i> Chair: <i>Adam Lucas</i></p>	<p>Public Engagement with Science: Integrating theory and practice 2</p> <p>Sujatha Raman: <i>Can the 'Public Good' stop research on responsible innovation (RRI) from descending into conversations about risk?</i> Max Soar: <i>Communicating complexity, risk and uncertainty</i> Joan Leach & Fabien Medvecky: <i>Towards a social ethics of public engagement</i> Chair: <i>Wendy Russell</i></p>
Afternoon tea			
Session 6 3:00-4:30	<p>Historical and social epistemologies</p> <p>John Wilkins: <i>What would Darwin do? Classification, philosophy and the use of scientific precursors</i> Laura Sumrall: <i>What has Harvey ever done for us? – dissection and discord in early modern English medicine</i> Kristian Camilleri: <i>Pedagogy, place and personality</i> Chair: <i>Meera Muralidaran</i></p>	<p>Biosociality</p> <p>Tatjana Buklijas: <i>Human development and environment between the colonial past and indigenous expectations in Aotearoa/New Zealand</i> Roberta Pala: <i>Mimicry, how vaccines meet nature</i> Chair: <i>Courtney Addison</i></p>	<p>Public Engagement with Science: Integrating theory and practice 3</p> <p>Workshop: <i>Where to from here? How should theory and practice inform and enhance each other in Public Engagement and RRI? What can we do to build the quality of these institutions (theory and practice)?</i> Chair: <i>Wendy Russell and Rhian Salmon</i></p>

Friday 15 November

Room	TTRLT1		
Plenary 9:30-10:30	Kari Lancaster: Thinking with 'evidence-making interventions' in health		
Morning tea			
Room	AM102	AM104	AM106
Session 7 10:45-12:15	<p>Negotiating the politics of knowledge in the 21st century</p> <p>Darrin Durant: <i>Echo chambers and the politics of knowledge</i></p> <p>Adam Lucas: <i>Climate change science and climate change policy: re-forming the translation and mediation of expert knowledge</i></p> <p>Chair: Nayantara S. Appleton</p>	<p>Histories, East of the Tasman</p> <p>Kate Hannah: <i>Uncovering historic whisper networks: women's friendships in mid-twentieth century New Zealand science</i></p> <p>Martin Bush: <i>The lost history of Mary Proctor and the Commonwealth Solar Observatory project</i></p> <p>James Braund: <i>J. R. Forster's observations of southern cormorants on Cook's second voyage</i></p> <p>Chair: Rebecca Priestley</p>	<p>Postgraduate Workshop</p> <p>Gemma Lucy Smart with Dr Courtney Addison, Dr Tim Corballis, Dr Kari Lancaster in discussion on the challenges and advantages of postgraduate work in studies of science</p>
Room	TTRLT1		
Session 8 1:15-2:45	<p>Writers on Science</p> <p>Courtney Addison, Tim Corballis, Zoë Heine, Rebecca Priestley and Rhian Salmon will read from their own works of fiction, creative non-fiction, memoir & poetry</p>		
Session 9 3:00-4:30	<p>Film Screening</p> <p>A screening of the film by Peter Galison and Robb Moss, <i>Containment</i></p>		
4:30-5:00	<p>Conference closing</p> <p>Including Langham Prize award</p>		

Dyason Lecture: Margaret Pelling

'Diana Dyason (1919-1989) and the history of medicine – as I knew them'

Abstract

In the 1960s, Diana (Ding) Dyason was both a family friend and head of the HPS Department in Melbourne. I knew her in each of these capacities, was taught by her and her colleagues, and owe her an enormous amount for two critical interventions which enabled me, against some odds, to become an academic historian. These interventions were typically forceful and disregarding of convention, and may be taken also to reveal a little of Diana's hankering after the history of medicine. They happened in the early days of the growth of medical history as an academic subject area and when the organisation of graduate study was infinitely looser than it is now. Thanks to Diana I was launched into Oxford, but the subject did not then exist at that university and my somewhat chequered early experience illustrates the differences between then and now. I end though with Diana herself, her background and personality as I would appreciate them so many decades later.

Biography

Margaret Pelling joined the Wellcome Unit for the History of Medicine in Oxford when it was founded in 1972, and she retired as Reader in the Social History of Medicine in 2009. She is currently an Associate Member of the History Faculty. Her early research was on 19th century British public health and theories of epidemic disease, but for most of her career she has worked on aspects of health and medicine in early modern England, focusing on the Tudor and Stuart period and on the lower orders of medical practitioner, particularly barber surgeons. Her associated interests have included poverty, child health, apprenticeship, old age, foodways, marriage, guilds and civic office-bearing, beards and masculinity, iconography, and the London Bills of Mortality. Her most recent monograph is *Medical Conflicts in Early Modern London: Patronage, Physicians and Irregular Practitioners 1550- 1640* (2003) and her present project is a book on the cultural history of barbers, 16th to 20th centuries.

Plenary: Ocean Mercier

Mātauranga and science – torsion, friction and other forces

Abstract

Māori have become a pivotal force in New Zealand's science system. Tikanga, or Māori values, increasingly invite the science system to open its doors to indigenous values. Mātauranga Māori – encompassing Māori knowledge, Māori methods of knowledge creation and Māori ways of knowing – is being consulted, aligned with or brought into conversation with science in various ways. In this presentation, Ocean will draw from her research experience to explore how these forces drive and shape Aotearoa New Zealand science.

Biography

Ocean van Berkel Mercier (Ngāti Porou) is Head of School at Te Kawa a Māui, Victoria University of Wellington. She has a PhD in physics. Her research includes an exploration of how Māori te taiao (environmental) advocacy connects communities to place; how cross-cultural ocean knowledge platforms can support iwi interests; how oral histories and mātauranga can inform groundwater science; and investigating how Māori values and perceptions inform biotechnological controls of pest wasps in Aotearoa. She is the presenter of Māori Television's Project Mātauranga and TVNZ's Coast.

Plenary: Ruth Barton

Class, religion and scientific expertise: the shifting cultural authority of science in Victorian England

Abstract

This paper illustrates the shift in the cultural position of science over the Victorian period, from the 1840s when aristocrats and bishops brought status to scientific and cultural institutions to the 1880s and 1890s when scientific men had achieved independent authority. It focuses on the campaigns of the “X Club,” a small group of eminent scientific men, who colluded to gain power and status for themselves and men like themselves. Various institutional exemplars of cultural authority are discussed, including the Royal Society of London (1830s-80s), the Athenaeum Club (1840s-60s), and the anti-Sabbatarian Sunday lecture movement (1860s-1890s). I will include analysis of T H Huxley’s brilliant and controversial Sunday lecture “On the Advisableness of Improving Natural Knowledge.”

Science against Religion interpretations of the Victorian culture wars are rejected for more multi-actor interpretations. I will show how the men of science were allied with other outsider aspirants to cultural authority (such as Roman Catholics, Unitarians and positivists) and also with reforming representatives of traditional authority.

Biography

Ruth Barton is an historian of science and technology whose major work has been on science and culture in Victorian England. She has recently published two books, the co-edited *Correspondence of John Tyndall, Vol. 3, 1850–1852* (University of Pittsburgh Press, 2017) and *The X Club: Power and Authority in Victorian Science* (University of Chicago Press, 2018). She has also published articles on the history of New Zealand science; and on family life, domestic technology and housework in 20th-century Australia. Since retiring from the History Department of the University of Auckland, Ruth has been an honorary research fellow in the School of Humanities at the University of Auckland. She is a current member of the International Advisory Board to the British Society for the History of Science.

Plenary: Kari Lancaster

Thinking with 'evidence-making interventions' in health

Abstract

Implementing 'evidence-based interventions' is the catch-cry of governments. Yet many interventions are never actualised into use, others fail, some harm, and most produce unexpected effects. To overcome the limitations of 'evidence-based' approaches, this presentation invites a critical shift away from thinking with evidence primarily as a matter of *epistemology* – the different ways interventions can be known – towards thinking with evidence as a matter of *ontology* – how interventions are performed through knowledge-making practices. I propose a framework for conceptualising interventions in health as 'evidence-making interventions'. By emphasising relational materiality and performativity, this approach engages with interventions, and their knowing, as matters-of-practice in local implementation events. This thinking has implications for evidencing and intervening. It questions evidence, interventions and their effects as fixed and stable, instead proposing them as relational and emergent. Drawing on case examples from the fields of drug policy and viral hepatitis I will illustrate how thinking with 'evidence-making interventions' challenges presumptions of separation between the material and social, nature and culture, and evidence and practice, which dominate mainstream evidence-based paradigms, and extends notions of intervention to include all knowledge-making practices in an implementation event, including those of expertise, experience, science and technology. I suggest that this approach might afford a more critical, as well as more careful, way of knowing and doing health intervention which does not simply ask 'What is the evidence?', but also asks 'How is evidence *made*?', 'How is evidence *put-to-use*?', and 'How is evidence *made-to-matter*'?

Biography

Dr Kari Lancaster is a Senior Research Fellow and Scientia Fellow at the Centre for Social Research in Health at UNSW, and an Honorary Associate Professor at the London School of Hygiene and Tropical Medicine. Kari is an interdisciplinary, qualitative social researcher in health, with a background in law and policy studies. Her research uses approaches drawn from science and technology studies to critically examine issues of contemporary policy and practice significance in the fields of drugs and viral hepatitis. Her research has examined how policy problems and knowledges are constituted, and the dynamics of 'evidence-based' policy. Kari's current research concentrates on 'evidence-making' practices and critical approaches to the study of implementation science and intervention translations in health, especially in relation to viral elimination and addiction treatments.

Symposium: Doing Darwin Down Under – Wednesday 13 November

This workshop follows on the first *Doing Darwin Down Under Workshop*, held at the University of Sydney from 23-24 August 2019. Our general aim is to bring together Australasian scholars from a rich array of disciplinary fields and methodological approaches who are concerned with evolutionary theory, past and present, and its many implications and applications. We want, in other words, to include work that represents the full spectrum of current Australasian scholarship in the field of Darwin Studies, broadly conceived. We seek to promote communication, to cut across compartmentalized disciplinary divisions, and to advance fresh perspectives. We further believe that greater contact and cohesion among this sizable group will promote Australasian research in the area and enhance its international visibility.

Session I: Darwin and Darwinism in New Zealand and Australia

(Chair: Evellen Richards)

1. John Stenhouse: “Reading Darwin during the New Zealand Wars”

The first copies of the *Origin of Species* arrived in New Zealand during the early 1860s, near the beginning of the longest and most consequential phase of the land wars, fought mostly in the North Island. Historian David Livingstone has argued that local contexts significantly shaped dealings with Darwin around the world. Drawing science, religion, race and politics into a single analytic framework, this paper explores how this distinctive colonial context shaped the ways in which settlers read Darwin.

2. Rosi Crane: “A better day dawned for biology”

The self-confessed disciple of Huxley and ardent

evolutionist Thomas Jeffery Parker FRS (1850-1897) was in no doubt that “a better day dawned” with the publication of *Origin of Species*. He expounded as much from the podium in an inaugural lecture to open the University of Otago’s 1881 session. Newly arrived in Dunedin, Parker delivered what quickly became known as the “notorious lecture” in a rhetorical manner worthy of his mentor Huxley. This paper examines the reasons that Parker an English zoologist incurred the wrath of his new compatriots in a largely Scottish Presbyterian settler town. Was it simply a case of speaking “great swelling words far beyond the truth” as one critic observed? The relationships between Parker, Huxley, his father the anatomist William Kitchen Parker FRS (1823-1890), and New Zealand men of science and religion all have their part to play in the story of late-nineteenth century Darwinism down under.

3. Ian Hesketh: “Narratives of Charles Darwin down under”

Despite the fact that Charles Darwin spent several months in Australia in the final year of his *Beagle* voyage that circumnavigated the globe, most studies that deal with Darwin’s life or his discovery of evolution spend little time discussing his Australian period, if it is mentioned at all. His time there is largely deemed to have produced little of significance in comparison to his visits to other places such as the Galapagos Islands, which has long been mythologized in Darwin scholarship as providing the key sources of observable data that ultimately led Darwin to his revolutionary evolutionary speculations. In recent years, however, Darwin’s period in Australia has received more attention, most notably a Cambridge monograph, *Charles Darwin in Australia*, that details the many connections that were established between Darwin and the country, and a well-received novel, *Mr. Darwin’s Shooter*, which focusses on one of Darwin’s servants, Syms Covington, who assisted Darwin in collecting and classifying many

Australian specimens and then himself emigrated to Australia where he continued a now well-known correspondence with Darwin. While much of this literature provides an important corrective to previous Darwin scholarship, it has also worked to inform more romantic and popular narratives of Darwin's period in Australia that seek to argue that Darwin's key "evolutionary revelation" was made not in the Galapagos but in the Blue Mountains, a claim that has been recently made in *The Conversation*, *The National Geographic*, and *The Smithsonian Magazine*. This paper therefore seeks to examine critically the literature on Darwin Down Under, focussing in particular on this recent romantic turn that seeks to situate Australia as the key site of inspiration for Darwin's theory of evolution.

Session II. Challenges: interpretative and historiographical

(Chair: Mark Micale)

4. Mark Francis: "The philosophical and scientific context of Herbert Spencer's early evolutionary theory"

Despite being false, Spencer's claim to priority over Darwin has had the result of obscuring the novelty of his own evolutionary perceptions. These did not – as Spencer himself claimed – depend upon his early essay on development theory; instead, they were a product of his serious work on the philosophy of mind and neurophysiology during the mid-1850s. This Spencerian evolutionary theory ignored questions of paleobiology and species change in favour of a demonstration that higher animals all possessed a very similar neurophysiology. The species of the animals did not matter so much as the fact that the functioning of the brains and nervous systems was almost identical. The discovery that all mammals (including human beings) had brains and nervous systems that functioned in similar ways was an assault on the uniqueness and nobility of present-day man: A human being could no longer be seen as defined by having a distinctive soul, consciousness, or reasoning capacity. This evolutionary idea was much more dangerous than the Darwinian theory that man had descended from primitive ancestors. That, at least, had exempted

modern man from being a beast: It was only in prehistory that man was animal-like. Spencer's evolution tore away this prehistoric fig leaf: all men were animal-like.

5. Emma Zuroski: "Depths of evolution: exploring the deep sea in the age of Darwinian thinking"

In 1872 HMS Challenger set sail on what would become the most ambitious exploration of the deep sea ever pursued. When HMS *Challenger* began its four-year circumnavigation of the globe *On the Origin of Species* had been in circulation for over a decade and the naturalist community in London was firmly grounded in evolutionary thinking. Many naturalists believed that the ocean would provide answers to the unresolved questions left in the wake of Darwin's and Alfred Russel Wallace's initial theories. By the early 1870s, as William Carpenter, Charles Wyville Thomson and others advocated for a circumnavigation dredging expedition, they enrolled support in part by highlighting that the deep sea could shed light on yet unknown histories of biotic life. The deep sea promised unlimited potential for evolutionary theory as an unexplored repository of information on the origins of life. From this background the *Challenger* naturalists set sail on a mission to examine depths of the ocean never before reached.

It was entirely unexpected when the findings of the expedition came to challenge one of the central tenets of Darwinian theory: natural selection. The *Challenger's* head naturalist Wyville Thomson observed a notable absence of "transitional species" in the abyssal region of the ocean, which, he concluded, would be evident if natural selection occurred in the way Darwin believed. In short Wyville Thomson asserted that fauna from the abyssal region affirmed the theory of evolution but provided no evidence in support of the central process by which evolution occurred.

In this talk I focus on a contentious public exchange between Wyville Thomson and an aged Darwin at the conclusion of the expedition to examine its contribution to, and agitation of, contemporary debates around the theory of evolution and the mechanics of natural selection. By situating the debate and expedition within a history of nineteenth century scientific voyages and the rise of Humboldtian science, I demonstrate that

the ocean came to be seen as a new frontier for the exploration of evolutionary theory in natural history while also presenting unanticipated challenges to Darwin's theories.

6. Roderick D. Buchanan & James Bradley: "Exhuming reputations: the historiography and moral implications of diagnosing Darwin"

Diagnosing Darwin's health problems has been a long-running detective game played by a variety of medical and paramedical specialists, as well as many Darwin scholars. Innumerable diagnoses have been proffered in a host of letters, articles and a handful of dedicated books. Darwin's many biographers would also find it increasingly hard to ignore his health issues. Initially, most writers put his ill health down to the common diagnoses of the period. However, diagnostic speculation soon began to diversify in the early decades of the 20th century, exhibiting contrasting biological or psychosocial preferences. By the late 1950s, the blithe interpretative imperialism of psychoanalytic interpretations had begun to be forcefully countered by somatic explanations citing specific (e.g., infectious, toxic) aetiologies. While much of this tension remains, psychosocial accounts have tended to be swamped by an array of somatic diagnoses in recent times, most championed by biomedical specialists. Diagnosing Darwin is like an onion – many layered and tinged with bitterness. The way scholars have treated Darwin's ill health tells us something about changing approaches to scientific biography and retrospective diagnosis. Darwin's various diagnoses also have a *syndrome de jour* aspect to them; they speak of the worries of a particular age and the way mind and body have been configured in illness narratives. They form a micro-history of the way gut-related chronic complaints have been explained over the past century and a half. Finally, the conversation about Darwin's health represents a tussle over the man's reputation animated by the moral freight associated with the illness categories in play.

Session III. Class, Status, and Darwinism

(Chair: John Stenhouse)

7. Ruth Barton: "John Lubbock: Darwinian gentleman"

John Lubbock was only a boy when his father, Sir John William Lubbock, mathematician and wealthy banker, announced that Charles Darwin was coming to live in the neighbouring village of Down. Sir John hoped that his son would follow him into mathematics (and banking) but young John was much more interested in natural history. He was fortunate that Darwin was nearby, for it was Darwin who taught him to dissect and draw microscopic creatures and mentored him in his early steps as a naturalist. Although a wealthy gentleman like Darwin, Lubbock did not live in comparable, single minded retirement. He entered the family bank while a young man, published at length in four different scientific areas, and was a member of parliament for decades.

This paper will focus first on issues of class and expertise and their interaction as young Lubbock sought to make his way in mid-Victorian scientific institutions. It will contrast the ease with which Lubbock was elected to elite scientific societies and with the struggles of more lowly born contemporaries, and also show that his administrative and leadership roles in scientific societies had a different pattern from those of lower birth. More briefly, it will examine the ways in which Lubbock was a "Darwinian" – in his ethnological/ anthropological studies (he preferred the label ethnologist to anthropologist), in his research on the behaviour of insects, and in his extensive studies of plant forms.

Roundtable - Discussion Theme: *In this age of the globalisation of Darwin Studies, what do Australasian scholars bring to the table, by virtue of living and working Down Under?*

Ruth Barton

Mark S. Micale

Evelleen Richards

Symposium: Public Engagement with Science: Integrating theory & practice – Thursday 14 November

Practices of communicating with publics about science have existed since the Enlightenment. Throughout this time, these practices have been influenced by theoretical explorations of science, its role in society, and its relations with citizens and the state. At times, theoretical contributions have had profound influences on practices.

In recent years, European researchers have in turn subjected these novel practices of science/society engagement to reflexive critical scrutiny and called for ways of ‘remaking participation’ (Chilvers & Kearnes, 2016). These theoretical interventions have mostly emanated from Europe, yet one of the key theoretical insights that has animated new directions in public engagement theory is the situatedness in cultural contexts of public engagements with science.

This symposium will therefore explore theory and practice in an Antipodean context and will consider how we can draw on lessons from our northern colleagues and their experiences, while developing our own innovations in response to our unique context. It will feature invited speakers from both sides of the Tasman Sea, to explore, unpack and interrogate how theory and practice inform each other in Public Engagement with Science (PES) and Responsible Research and Innovation (RRI), and how theory and practice can be built in the Antipodes.

Session I. Tensions between theory and practice

Wendy Russell, Sujatha Raman & Joan Leach: the institutionalisation of Public Engagement with Science and its problems

In this article, we assess the adoption of Public Engagement with Science (PES) rhetoric, approaches and methods in the Antipodes (Aotearoa and Australia). Specifically, we explore analysed

cases of public dialogue and deliberation about science and technology issues here over the last two decades. We take an historical and interpretive approach, drawing on grey literature, commentaries, and the experiences and observations of the authors to consider the strengths and weaknesses of the processes and what is to be learnt from them. At face value, the analysis points to the need for public engagement to be institutionalised, to increase its quality and impact. However, lessons from elsewhere, particularly the UK and Europe, caution against such institutionalisation. We draw on critical scholarship of public participation and other developments in the broader area of science communication in Australia and Aotearoa to reconsider directions for public engagement and responsible innovation down under. We consider the possibility of ‘leapfrogging’ institutionalised and stabilised forms of public engagement and their problems and developing more distributed, flexible and responsive approaches to improving science-society relations.

Rhian Salmon & Jo Bailey: Engagement by design, engagement through design

Over the last decade, science communication has shifted away from ‘pop outreach’, towards more strategic, deliberative approaches. However, many scientist-communicators still lack the support, training and professional recognition required to design effective, thoughtful and theoretically-informed public engagement.

This research builds on two recent papers that explore the concept of reflexivity as a mechanism for changing the focus of public engagement. Salmon et al. (2017), propose an approach to transforming public engagement by scientists through exploration of the political-economic context, institutional context, and personal assumptions that implicitly influence them. Building on this, Salmon & Roop (2019) propose a framework for engagement design that encourages reflexive practice through explicit

consideration of engagement purpose, drivers, people and power structures.

In this presentation, we share how we are applying these underpinning concepts to three practical case studies to develop theoretically-informed public engagement. The first case study, Te Pūnaha Matatini, is a Centre of Research Excellence in Aotearoa New Zealand focused on transforming complex data into knowledge. It is fortunate to boast some of the country's top scientist-communicators in its cross-disciplinary, inter-institutional research team. Working with an engagement committee and individual scientist-communicators with a recognised and awarded practice, we interrogate more deeply the role that reflexivity can play in informing how public engagement is designed and delivered, including encouraging audience-centricity, dialogue and co-production.

The second case study, focuses on Maths Craft NZ, a mathematician-led project which explores the links between mathematics and craft through hands-on activities in a festival context. In this case, our research explores how a design approach can be used to stimulate reflexivity through retrospective analysis and future-mapping. The third case study explores how these design interventions can be used at the start of engagement planning, using NZ SeaRise as our example.

Collectively, this work explores the larger question of what engagement is, why the science community does it, and what interventions might be useful in shifting engagement practice from 'standard outreach' to a more theoretically-informed, end-user focused, dialogic or participatory approach.

The research utilises a human-centred design approach to bring together perspectives from science, PEST and design. Through this hybrid process, the scientists' relationship with their engagement can be examined, as can the relationship between scientist and publics. This reflexive analysis may, in turn, inform how our scientist-communicator participants develop their subsequent public engagement.

Salmon, R. A., Priestley, R. K., & Goven, J. (2017). 'The reflexive scientist: an approach to transforming public engagement. *Journal of Environmental Studies and Sciences*, 7(1), 53–68.

Salmon, R., & Roop, H. (2019). 'Bridging the gap between science communication practice and theory: Reflecting on a decade of practitioner experience

using polar outreach case studies to develop a new framework for public engagement design'. *Polar Record*, 1-14. doi:10.1017/S0032247418000608

Rebecca Priestley, Rhian Salmon, Zoë Heine & Taciano Milfont: It's the first metre that matters

Scientists agree that, as a consequence of global warming, the oceans are rising and will continue to do so for centuries to come. But there is uncertainty around how much the sea will rise, how rapidly it will rise, and how it will impact New Zealand's coastal areas. The NZ SeaRise project is a \$7.1 million, five-year (2018-2023) research programme to improve predictions of sea level rise in Aotearoa New Zealand to 2100 and beyond.

In this talk, we report findings from a public engagement research project associated with the NZ SeaRise programme. Analysis of sea level rise coverage in New Zealand print media from 1980 to 2018 focuses on the way the media has (i) quantified the amount, timing and rate of sea level rise projections and (ii) identified quote-worthy sea level rise experts.

A two-phase public survey of adults in Aotearoa New Zealand, taken in July and September 2019, explores public understanding of the mechanisms of sea level rise, and the amount, rate, and timing of sea level rise expected this century, and finds that respondents tend to overestimate the expected amount of sea level rise. It also investigates the degree to which New Zealanders feel more or less at risk of sea level rise in Aotearoa compared with the rest of the planet and explores sea level rise impacts people have already experienced.

Results of this work will have value for scientists communicating about sea level rise, and climate change more broadly, in the years ahead.

Session II. Using theory in practice

Sujatha Raman: Can the 'Public Good' stop RRI from descending into conversations about risk?

This talk draws on lessons from UK research and practice on responsible innovation (RI). I aim to pose a series of provocations for those of us in Australia and New Zealand embarking

on developing frameworks for RI in our region. For example, I am part of a new CSIRO-ANU Collaboration on Responsible Innovation that aims to build research capacity in RI around precision medicine and synthetic biology.

Responsible innovation has been primarily conceptualised in terms of a set of *procedural* principles for meaningful normative engagement with scientific research and innovation systems. Anticipation, reflexivity, inclusive deliberation, openness and responsiveness encapsulate principles ('dimensions' in the authors' own words) for opening up meaningful discussion and action on the futures that innovation might bring into being by design or by accident (Owen and Pansera 2018).

But, conceptualised in terms of procedural qualities, the *substantive* normative underpinnings of RI can too easily slip out of view. Why innovate? What and for whom is innovation for? Can we innovate better? These questions are at the heart of RI frameworks, but many studies of attempts to embed such thinking show that responsibility for the future tends to be translated in a limited way as securing public consent for new technologies by developing assurances that present and future harms can be averted. Framed as a way of bringing responsibility to bear on a pre-given technological option, RI can inadvertently reinforce the divide between technological and the social, making it harder to have integrative conversations about how to innovate better (Raman 2015). Such conversations, I argue, are more likely when a normative objective is the explicit starting point of RI inquiry.

In this talk, I explore the potential of 'the public good' as the central normative object around which to explore responsible innovation matters. I consider the challenges as well as the productive possibilities entailed by the concept for changing RI conversations that tend to descend into ones about risk/safety of technology. I argue that a public good standpoint may be capable of altering the usual temporalities invoked in RI discussions where 'responsibility' is commonly positioned as a vehicle for slowing down 'innovation'. Yet, using the public good as orienting device might help us see times when it is the dominant pathway of innovation that appears paradoxically slow in its entrenchment in established models while the logic of responsibility

displays an impatience for transforming social inequalities, in the here and the now.

Max Soar: Communicating complexity, risk and uncertainty: science communicators' relationship with publics in Aotearoa

Scientists, science communicators, and science scholars have all, in their own ways, identified a lack of cohesion between social science analyses of public engagement with science and the evolution of its practice. In 2014 "The Reflexive Scientist", motivated by its authors' confronting experience with a special issue of *Public Understanding of Science*, joined calls for a reflexive approach to science communication practice. The authors imagined a reflexive scientist-communicator who reflected on their political and institutional context, and their own personal assumptions about audiences.

This research steps into the boundary zone between the social science theory on public engagement with science and the practice of scientists-communicators. Through interviews with a cohort of scientist-communicators from the New Zealand Centre of Research Excellence Te Pūnaha Matatini, this research focuses on the elements of scientific complexity, risk, and uncertainty that manifest in their work and how those elements inform and configure their relationship with the publics they communicate with. It explores and documents the learned experiences of individual scientist-communicators in real-life contexts and attempts to bring them into conversation with STS literature on complexity, risk and uncertainty. In doing so this research attempts to help foster reflexivity by avoiding representing science as a monolith; instead being attentive to the particular politics of research fields and the institutional contexts of scientists who are interacting with the public.

Joan Leach & Fabien Medvecky: Is a Social Ethics of Science Engagement Needed?

Calls for codes of ethics in public engagement have been largely frustrated by 3 things. First, in the absence of a strong tradition of ethical reasoning, codes are difficult to create and perhaps yet more difficult to follow. Second, science engagement

exists in a normatively hybrid space with norms from the disciplines of the natural sciences, communicative norms, and norms deriving from the study of ethics itself jostling for attention. Third, science engagement is shifting from attention to the social acceptance of science to addressing a wider variety of potential concerns from disparate social groups. Using examples from neuroethics, synthetic biology, and other emergent 'hybrid' sciences, this talk will explore some of the trends and concepts in the ethics of engagement.

Session III. Workshop: ways forward

Workshop: Where to from here?

We will come together for an interactive workshop about Public Engagement with Science. This will be a continuation of and will draw from the previous Public Engagement sessions, but anyone is welcome to participate. We will use a range of engaging methods to consider the questions: Do we agree about the nature and purpose of Public Engagement with Science (PES)? How should theory and practice inform and enhance each other in PES and Responsible Research and Innovation? What is distinctive about PE in Australia and NZ/Aotearoa? How can we build our distinctive approach? What might be some first steps towards this?

Session abstracts

Session 1: Technoscience futures

Chris Hesselbein: Optimizing for technoscientific controversies in the marketplace of ideas

Search platforms such as Google rely on algorithms to rank their search results. Recently, these algorithms have been criticized for providing users with misinformation and conspiracy theories instead of the scientific consensus, thus exacerbating, among other issues, the rejection of vaccination programs, obstructing access to abortion providers, and casting doubt on climate science. In response to critiques of their role in the dissemination of misinformation, Google has periodically updated its methodologies to privilege reputable sources over less reputable ones.

Search results, however, are not determined by algorithms alone. They also are the product of a low-profile yet multibillion industry of search engine optimization (SEO) professionals. SEOs offer a range of services that promise to increase the visibility of their clients' websites by monitoring changes in the engine's ranking methods, identifying key search terms for a given web page, and creating "quality" content and backlinks. Although primarily a commercial strategy, SEO is also used to highlight or obscure various types of information.

This paper examines the professional practice of SEOs, and their impact on the public understanding of science and medicine. We focus our attention on three key markers thought to be used by Google to rank search results: Expertise, Authority, and Truthfulness (EAT). In particular, we discuss how SEO practitioners (working for conventional scientific and policy institutions as well as less mainstream actors) negotiate, circumvent, mobilize, affirm, and subvert these notions. Understanding how access to and the dissemination of (non) scientific information on search engines is manipulated through SEO practices is a crucial aspect in the unfolding of current technoscientific controversies on the Internet and beyond.

Tara Roberson: Engineering a quantum future

The messaging around quantum technologies is future-oriented and bold: the best-known application of the field – the quantum computer – has been subject to intensive promotion by researchers, governments, and industry. This messaging largely centres on a promise that quantum technologies will affect all aspects of society, from health and the environment, to security and the economy.

While the emerging quantum economy might seem inevitable in the face of the purely technological advantages of the science, social change is necessary for any kind of technology revolution. In this case, different social factors are at work which shape each nation's approach to achieving leadership in the 'quantum race.'

In this talk, I outline how three national strategies framed expectations for quantum to motivate cohesive national agendas. The lobbying to produce these strategies highlights the potential for economic gain, the need to maintain global leadership, and security concerns. In doing so, they have shaped national strategies and perhaps even the technology itself.

Shannon Walsh: Innovation under capital

Over the past thirty years innovation policy has largely come to replace science policy in government approaches to the public management and administration of knowledge production. Far from an innocent semantic slip this replacement signals major transformations in the relationship between knowledge production and capitalism. The contradictions this has given rise to are nowhere more apparent than in the emerging discourse of Responsible Research and Innovation (RRI). Currently at play in major research programmes within the European Union such as Horizon 2020, RRI seeks to make the outcomes of innovation processes more socially desirable and ethically acceptable. Critical analyses of RRI have noted, however, that the current structure of the innovation

process, with the private firm at its centre, presents major obstacles to the realisation of RRI's ambitions. In addition to outlining these transformations to science policy, this paper offers a Marxist approach to the critical study of innovation. Although there is wide recognition of the economic aspects of innovation, it is rare for scholars to name capitalism as the specific determining economic factor. I demonstrate the way that innovation policy supports and reproduces capitalist relations of production. A Marxist approach to innovation offers new analytical tools for understanding the social aspects of innovation that are increasingly coming into focus within academic and practitioner fields.

Session 2: Digital wellbeing

Alex Beattie & Michael Daubs: Framing platforms as a social good by promoting digital wellness

This contribution argues that companies such as Apple, Facebook, and Google are increasingly incorporating features that supposedly promote “digital wellbeing” to forestall regulation of their platforms and services. The inclusion of these features, we suggest, frames these commercial platforms as providing a social good by promising to encourage more “intentional” or “mindful” use of social media and mobile devices. Apple’s June 2018 iOS update, for example, included a new function called Screen Time, which incorporates features similar to other digital wellbeing mobile apps including the ability to impose time limits on the use of specific apps and data analytics on amount of time a user spends on their device.

The introduction of these features demonstrates how oft-critiqued platforms are increasingly adopting the language of their critics in order to frame themselves as a social good. This strategy mimics that used by radio executives in the United States in the early 20th century, where the medium developed as a fully commercial enterprise. To avoid regulation, it became necessary to perpetuate the perception that commercial broadcasters were also a social good that fulfilled a public service function. Popular entertainment programming was thus supplemented with “high culture” music programmes (e.g., classical music), news, and “home services” shows. Platforms today, we assert, are inadvertently or purposefully adopting a

similar tactic to position themselves as leaders in a developing digital wellness market in the hopes of avoiding future governmental regulation

Cherie Lacey: Wellness capitalism and the ‘perfect user’

In recent years, a number of science and technology scholars have considered the user-subject to be an evolution of the Humanist subject (Bratton, 2015; Chun 2011; Halpern 2014; Hu 2015). These scholars note, in particular, the way interface design appears to extend the volition of the self-sovereign human agent; as Chun argues, computers “embody a certain logic of governing or steering us through the increasingly complex world around us”, leading to a resurgence of the “seemingly sovereign” individual of the Enlightenment (2011, 8-9). Similarly, Bratton links the Humanist subject directly to today’s user-subject: “As this figure of the Enlightenment came to organize systems in its own image, its synthetic replication through microeconomics and social psychology set the stage for its cohesion into what is called, by design, the User” (2015, 251).

Alongside this, the ‘humane technology’ movement is gathering pace, with Humanist discourses of subjectivity operating as its ideological pro. Applications of technological humanism appear to reinstate the classic Humanist belief in the *perfectibility* of the individual *vis-à-vis* an array of wellness technologies, which reveal a deep-seated belief that the human being can and should move towards a “higher potential of functioning” (Dunn 1959). The purpose of this paper is to add to literature on user-subjectivity by exploring the notion of an ‘Elite User’ for today’s wellness culture. Specifically, it will explore Humanism’s “unshakable certainty [in] the almost boundless capacity of humans to pursue their individual and collective perfectibility” (Braidotti, 2013, p.13; italics added) and its alignment with Californian wellness culture.

Catherine Caudwell: Pain points: the curative practices of user experience design

The practice of user experience design (UX) underpins and informs the digital products that permeate everyday life. The goal of UX is broad and ambitious: to understand and design for the target user to a degree that product experiences are ‘meaningful’, ‘seamless’, ‘fluid’, and ‘optimal’. A

key UX process in producing these experiences is the identification and amelioration of user's 'pain points'—moments of interaction that interfere with the user's optimal experience and are "so irritating that a consumer feels compelled to seek out a remedy" (Watson). Through this terminology, UX design co-opts the concept of pain to describe any barriers to the use of products. In this sense, any moments of challenge, indecision, frustration, or even delay, become pains to be ameliorated. Inherent is the belief that 'better' experiences are 'easy' experiences.

The term 'pain point' co-opts the language of wellness to present value judgements of what 'good' and 'bad' technology use looks like. In the context of 'digital wellbeing', the terminology of UX practices is revealing of the kinds of experiences it aims to bring into being. In this paper, I trace the processes of UX that identify, capture, present, and ameliorate experiences and interactions as points of pain to articulate design's implicit ideological imperatives to the user. I examine the role that language plays in the research that leads to digital products, and ultimately the values and beliefs of design. In its quest to improve and engineer every facet of an 'experience', UX becomes the curative practice for the complexity of everyday life.

Session 3: New philosophies

Eden Smith & Kate Mannell: Participant-observation in the Scuttleverse: cultivating self-reflective practices

Reflecting on our study into the sociotechnical dynamics of the *Scuttleverse*, this paper examines the challenge of negotiating participant-observer identities. In this context, the Scuttleverse consists of overlapping projects exploring the potential that the 'secure scuttlebutt' (ssb) protocol offers for creating a range of decentralised peer-to-peer technologies. In addition to this distinct protocol, the Scuttleverse is characterised by an unusually explicit engagement with the range of values being built into ssb-based technologies. Having explored several approaches to negotiating our identities as participant-observers, we will reflect on the specific challenges presented by the highly technical and emotionally fraught discussions that occur within the Scuttleverse. In interrogating our approaches to participant-observation in the Scuttleverse, we

seek to contribute to the literature on the value of self-reflectivity within historical, philosophical, and social studies of scientific and technological practices.

Thomas Green: Now, more than ever, we need the space philosophers: international regulatory and licensing schemes for telecommunication satellites in low earth orbit to mitigate anti-competitive behaviour and manage natural monopolies

Previous work has been undertaken (ex Green, Neumann, Grey 2018) to consider the development of the Newspace Sector and its impact on space activities in Low Earth Orbit (LEO).

This previous work noted that although propertisation of space and celestial bodies is prohibited pursuant to the *Outer Space Treaty 1967* (UN), orbits within space still remain rivalrous and commercially lucrative. For example, by operating in a LEO orbital plane or orbital shell, a satellite; or, constellation of satellites would prevent other competitors from also operating and providing services within that same orbital plane or orbital shell.

A licensing scheme may be advantageous in mitigating anti-competitive conduct between private enterprises by allowing new entrants to market to 'bid' on orbital planes or orbital shells in LEO for a specified period of time within an international forum. However, a bidding process may also inadvertently preclude smaller entrants to market from establishing telecommunication or similar services to the general public as they may be 'out bid' by larger competitors, thereby creating a smaller class of providers who may provide telecommunication or similar services in LEO.

The prior literature on space ethics does not consider how actors can interact with space. This paper will consider these issues and explore what a regulatory or licensing scheme would look like, and offer solutions to facilitate a regulatory or licensing scheme that prevents anti-competitive conduct.

Patrick Dawson: Reconciling presentism with Special Relativity

Presentism – the theory that only the present exists – has been rejected by many in the philosophical

community, in part because of the widely-held belief that presentism contradicts special relativity. There seems to be a conflict between the ontology of presentism, wherein all existing things are objectively copresent, and the relativistic model of Minkowski space-time, wherein there is no objective simultaneity at all. In this talk, I will argue that previous discussions about the conflict between relativity and presentism have lacked specificity about the relationship between Minkowski space-time and presentist ontology. Presentists obviously deny that relativistic space-time *exists*, instead believing it to merely be a useful representation or tool. It is not obvious, then, why the presentist should be concerned if there happens to be no simultaneity within that representation. I will argue that the presentist only needs to ensure that her theory agrees with the experimental predictions and observable consequences of special relativity, and on that basis, I will briefly outline three different approaches by which the presentist might respond to the relativistic objection - two of which are original. None of these approaches are flawless, and I will not be seeking to prove that any of them can comprehensively answer the relativistic objection. Instead, I will simply argue that this objection is often posed in an incorrect way - one which focuses too much on the properties of Minkowski space-time, and not enough on the experimental predictions and philosophical content of relativity theory. As a result, there remains several unexplored avenues by which relativity and presentism might yet be reconciled.

Session 4: Histories, west of the Tasman

Ian Wills: Australia's failed nuclear weapons ambitions

It is an open secret that Australia's plans to acquire nuclear weapons started within weeks of the atomic bombing of Hiroshima and Nagasaki in 1945 and continued to 1973, ending with Australia's ratification of the Nuclear Non-Proliferation Treaty. Between 1945 to 1973, Australia's pursuit of this secret goal had far reaching consequences that included building of the Showy Mountains Scheme, establishing the Australian National University and a failed plan to build a plutonium producing reactor.

A secret report prepared in 1968 by the Australian Atomic Energy Commission (AAEC) claimed that for a comparatively modest outlay, Australia could produce enough plutonium a year for 30 Nagasaki size nuclear devices. It was a bold and credible plan, yet while other less well-endowed nations succeeded in acquiring nuclear weapons, Australia failed.

This paper argues that Australia's failure was the consequence of a range of factors including misunderstanding the nature of technological innovation, failure to understand the changed nature of war and the potential role of nuclear weapons, and fundamental errors in the management of the project. Central to most of these was Sir Phillip Baxter, chairman of the AAEC and first vice chancellor of the University of New South Wales.

Ian Tasker: History and philosophy of Australian astronomy in the twentieth century: modelling the determinants of the viability of scientific institutions and their programs

The contribution of Sydney Observatory to international science has not been widely recognised within the context of Australian astronomy. This paper draws inferences from Basalla's model of the Diffusion of Western Science and redefines the decline of colonial science with the ascension of modern astronomy, post-World War II, using Sydney Observatory as its marker.

In order to model the viability of scientific institutions and their research programs, a dataset was constructed of the service, affiliation and publication records of more than 450 Australian astronomers and astrophysicists from 1916 to 1986. The composition of Australia's membership in the International Astronomical Union, involving 175 Australians, mostly astrophysicists, was examined in the light of changing scientific priorities and funding for astronomical infrastructure. This was viewed against the backdrop of Australia's dependence on, and changing relationships with, the United Kingdom and America.

What emerged from the dataset was that the determinants of the viability of scientific institutions and their research programs include both the significance of their scientists' outputs (measured quantitatively by publications) and a

weighting of their influence (measured qualitatively through their service records). This new weighting system provides a more holistic approach to funding decisions than the existing citation methodology currently in use. It became apparent that Sydney Observatory outperformed all other Australian astronomical institutions, and should never have been closed.

Bill Palmer: M. M. Pattison Muir (1848-1931): chemist, author and historian of chemistry

Matthew Moncrieff Pattison Muir was born on 1st November 1848 in Glasgow, Lanarkshire. His father was William Muir, a merchant in Glasgow and his mother was Margaret Moncrieff Pattison (Ancestry). His education was at Glasgow High School, Glasgow University and Tubingen University. He was employed as a demonstrator in chemistry at Anderson's College, Glasgow between 1871 and 1873, followed by time at assistant lecturer in chemistry at Owens College, Manchester. He was appointed as Praelector to Gonville and Caius College, Cambridge University in Chemistry. Muir was thus in charge of the Gonville and Caius College chemistry laboratory, which had been constructed on college land from a former billiards room behind 'The Blue Boar' which was a local public house. His research and that of his students between 1876 and 1888 mainly related to the chemistry of bismuth.

In spite of his success in research, he gradually moved to writing textbooks, historical texts and the popularisation of science. During his working life, Pattison Muir was in touch with many well-known scientists, such as with J. J. Thomson. In 1908, Pattison Muir retired to Norwich and he later moved to be near his son in Epsom, Surrey where he died on 2nd September 1931.

Session 4: Ontologies, pathologies, biopolitics

Alexander Pereira: On the nature of pathological fear: specific phobias and natural kinds

Are mental disorders natural kinds? If so, *which* disorders? Why care? These questions, together, characterise the literature on natural kinds in psychiatry. The first and third questions have

received a lion's share of attention, garnering enthusiasm and controversy in (roughly) equal measures. The second question – *which* disorders are natural kinds? – has been comparatively downplayed. Given the slew of criticisms levelled at taxonomies like the DSM-5, it seems crucial that we focus on sorting out which of our current categories of psychopathology are trustworthy, and which require radical revision. I hold that natural kind concepts have an important role to play here. This presentation argues for two points which dovetail in an interesting way: (1) natural kinds are coherent in psychiatry and mapping them will fuel progress in the field; (2) specific phobias are the best current candidate for a natural kind of psychopathology. Regarding (1), I cautiously endorse Khalidi's (2015) Simple Causal Theory of natural kinds which conceives of them as projectible nodes in causal networks. Regarding (2), I argue that there are at least three striking reasons for thinking that phobias are natural kinds: (i) phobias are cross-culturally stable, (ii) we have a sophisticated understanding of fear, (iii) phobias are reliably cured by exposure therapy – a rare psychiatric success story. I then construct a model of fear and outline how putative changes disrupt the system to lock it into a stubborn state of dysregulation. In this, I demonstrate how phobias might exist as a 'node in a causal network'.

Richard Heersmink: Self, memory and technology

In this article, I outline various ways in which artifacts are interwoven with autobiographical memory systems and conceptualize what this implies for the self. I first sketch the narrative approach to the self, arguing that who we are as persons is essentially our (unfolding) life story, which, in turn, determines our present beliefs and desires, but also directs our future goals and actions. I then argue that our autobiographical memory is partly anchored in our embodied interactions with an ecology of artifacts in our environment. Lifelogs, photos, videos, journals, diaries, souvenirs, jewellery, books, works of art, and many other meaningful objects trigger and sometimes constitute emotionally laden autobiographical memories. Autobiographical memory is thus distributed across embodied agents and various environmental structures. To defend this claim, I draw on and integrate distributed cognition theory

and empirical research in human-technology interaction. Based on this, I conclude that the self is neither defined by psychological states realized by the brain nor by biological states realized by the organism, but should be seen as a distributed and relational construct.

Gemma Smart: Complexity in psychiatry: addiction, delusions and the narrative of disorder

There is a tradition in the history and philosophy of science of taking a multi-faceted approach to any subject matter we engage with. Psychiatric disorders can be viewed from many directions, like the many side of sides of a crystal. In this view it is only through the consideration of all or most of the possible angles using diverse methodologies that we can get a handle on what any particular disorder *is*. An alternative approach is to suggest that a disorder is not a single object ontologically, but potentially many different ontologies applying to broad category of behaviours and experiences related to that disorder. Multi-ontological disorders are constructed both methodologically and epistemologically. Both approaches require a multidisciplinary approach to understanding mental phenomena. Bringing together diverse approaches to mental disorder may be idealistically sound, but it is also rather difficult. No one way of considering a psychiatric disorder is trump. I will use the case studies of addiction and delusions to consider the tension(s) present in current methodological approaches in critical studies of psychiatry and attempt to develop a method that can handle and retain the complexity of psychiatric disorders, rather than privilege simplicity in both methodology and explanation. I also argue that is not the *experience* of a disorder we should begin with, but the *narrative* of disorder.

Session 5: Reflecting on and responding to the Replication Crisis

Fiona Fidler: What crisis?

There are well known debates over statistical inference in the social and behavioural (and other) sciences, dating back to at least the 1960s. These are not simply nit-picking arguments about technical

corrections to tests. Rather, they raise serious questions about whether the inferential hypothesis testing tools employed by these scientists fit with their purpose, goals and values. Despite literally thousands of published critiques between 1960 and 2010, and interventions from journal editors and academic societies, efforts to reform scientific practices over those years largely failed. Between 2011 and 2015, this situation changed dramatically, following the release of results from first replicability and reproducibility projects in psychology. What we call the ‘replication crisis’ happened during these years. It marks a significant departure from earlier attempts to draw attention to the same (or very similar) problems. This talk is about what is different about this episode, and why it happened then and not before.

Eden Smith: Disagreements about replication

Replication is a contested concept. Despite the difficulties this presents in practice, replicating experiments is widely regarded as a crucial step in establishing the reliability and robustness of research claims. As with other concepts, there is value in understanding the continued uses of replication despite ongoing disagreements about what the criteria for replicating an experiment are (or should be). In this paper, we focus on positioning the current uses of replication within the context of its longer-term conceptual development. To illustrate this process, we will draw from historical, philosophical, and social studies of the sciences to highlight how different uses of the concept of replication have helped to establish either the reliability or robustness of research claims. Then, reviewing reflections from contemporary scientists about the challenges of replicating experiments in practice, we aim to highlight the different ways that goal-directed uses of this concept can contribute to scientific practices.

Martin Bush: The repliCATS project

The repliCATS project at the University of Melbourne is a response to the replication crisis in the social and behavioural sciences. Situated within the broader SCORE program, which aims to develop ‘confidence scores’ for published research claims, this meta-research project uses a structured elicitation protocol (IDEA) to allow experts to make

group assessments of specific research claims. This includes both quantitative assessments of the reliability of each claim as well as qualitative analysis of the reasoning and heuristics used by experts in assessing the work of other scientists. I will describe the background, goals, methodologies and timelines of the project.

Fallon Mody: Predicting replicability

In the context of the replication crisis, the value of exploring and evaluating methods that could systematically elicit accurate predictions of replicability are self-evident. In this paper we will outline and discuss the results of an exploratory study to predict replicability as defined for the repliCATS project. In the exploratory study, five groups separately assessed 25 research claims for which there is a known replication outcome, serving as an evaluative benchmark for elicited predictions. Preliminary results suggest a correlation between knowledge of replication meta-research and participants' ability to accurately judge whether a particular result will replicate. Further, participants were able to more accurately judge replicability after discussing the original studies with their group, but the extent of this effect differed between groups and was more evident for some studies than others. Thus, we will reflect on the implications of these findings, including what features - at both the participant-level and group-level - correlate with making accurate judgements.

Session 5: Transferring science and botanical knowledge, 1600s-2000s

Meera Muralidaran: *Hortus Malabaricus*: Economic botany and the production of natural history knowledge, 1678-1693

The south-western coast of India, known as the Malabar Coast, already familiar to Europeans, was subject to the process of intense botanical transfers under successive European trading companies from the sixteenth century. The Dutch East India Company established itself as a major trading company in the Indian Ocean after capturing the city of Cochin in Malabar from the Portuguese in 1663. Of the many Dutch Governors who served for VOC in Malabar, Adriaan van Rheedee is best

known for the legacy of *Hortus Malabaricus*, a botanical treatise he compiled on the flora of Malabar. The work was published in Amsterdam as a 12-volume series from 1678 to 1693 over fifteen years. It contained information on 725 plants and has 791 illustrations of the flora. Rheedee was assisted by a team of physicians, scholars, botanists and engravers in the compiling this multi volume project. Native informants helped with collecting specimens, identifying the plants and properties based on their knowledge of native *materia medica* manuscripts.

The intricate relationship between European expansionism in Asia and botanical knowledge transfers in the early modern period has been garnering attention since the last two decades. Building on this impressive body of knowledge, this paper is an attempt to locate *Hortus Malabaricus* in the growing literature of botanical knowledge networks of early modern period to analyse how indigenous knowledge was collected, documented and transferred into European botanical and scientific networks from Kerala, South India.

Anton Sveding: From Hooker to Cockayne. Portraying New Zealand nature and science, 1853-1934

After the British botanist Joseph Dalton Hooker returned from Ross's Antarctica Expedition (1839-1843), he wrote *Flora Novae-Zelandiae* (1853; 1855). The flora constituted a part of Hooker's *Flora Antarctica*. Almost sixty years later, the New Zealand botanist Leonard Cockayne wrote *New Zealand Plants and their Story* (1910). Hooker's flora covered almost every known flower and fungi in New Zealand by Europeans at the time, and the work was very much a reflection of Victorian science. Meanwhile, Cockayne's ambition with his handbook was to nurture an interest and enthusiasm for botany among the New Zealand public. By studying the production of these two works, as well as other floras and handbooks produced during this period, I examine the many roles handbooks and floras played, ranging from imperial inventories to patriotic gardening books. On a broader scale, my paper explores how the epistemological ideas that encouraged and fostered human-nature relations.

Zoë Heine: Exploring concepts of a changing climate with gardens, gardeners and gardening

What can the species being cultivated (or un-cultivated) in contemporary community gardens reveal about historical botanical knowledge transfer? The global climate is changing yet our everyday experience of this change will always be limited to local experiences of weather. How can ideas of climate and weather be explored through gardens and gardeners? Experiencing weather is a core part of gardening and the narratives that gardeners tell about their history of gardening. Additionally, the species gardened respond to weather and seasonal change. In terms of the Anthropocene gardens are patches of local liveability which connect us to the global impacts of the Anthropocene.

To form the base of this research observations have been made at four community gardens in the Wellington region. I have participated in gardening activities and made observations at each of these locations. For example, I am weeding alongside my interviewees and making notes on what is being cultivated. In addition, eight gardeners from these sites have been interviewed. I will return to each of these gardens in Spring to complete follow up interviews and build on the conversations already had.

Session 6: Historical and social epistemologies

John Wilkins: What would Darwin do? Classification, philosophy and the use of scientific precursors

Taxonomy is regarded today as largely a matter of convention or as preparatory work for the investigations of biology. However, there is a large and longstanding debate over this, as there was in Darwin's time. Here I shall discuss the extent to which Darwin's views on classification led him to his theoretical accounts of evolution, and to which his theoretical views of classification have affected modern views in the life sciences on the role of classification, especially in the context of the crisis of biodiversity.

Laura Sumrall: What has Harvey ever done for us? – dissection and discord in early modern English medicine

In 2018, the Royal College of Physicians in London celebrated their 500th anniversary by designing an exhibit around the life and works of William Harvey, who in 1628 described the operation of the heart in relation to the circulation of blood.¹ But his work, predicated on unnumbered dissections and vivisections, was not always considered a boon to medical practice. In 1665, the English chemist and physician George Thomson published a critique of anatomical investigation in which he claimed that, in spite of Harvey's contributions to physiology, he saw the "Therapeutick part little advanced thereby."² Diseases were just as difficult to cure then as they were beforehand.

Within the year, William Johnson, the chemist employed by the Royal College of Physicians, published a response. Johnson argued that Harvey's work was instead invaluable for improving the administration of medicaments and in particular for improving techniques of therapeutic bloodletting.³ Thomson would be unconvinced; his critique of Harvey's work extended beyond this dubious benefit to question the prevailing understanding of diseases and the therapeutic programs employed to address them.

In this paper, the dispute between Johnson and Thomson over the relevance of anatomical investigation to medical therapeutics is shown to reveal fundamental distinctions in how chemical physicians such as Thomson understood the prerogative of the physician and the proper mode of medical epistemology – focused not on anatomical dissection but instead on 'pyrotechnical anatomy,' the chemical investigation of health and illness that challenged the benefit of Harvey's work before it was taken for granted.

1 Royal College of Physicians, "Ceaseless Motion: William Harvey's experiments in circulation." 2017. <https://www.rcplondon.ac.uk/events/ceaseless-motion-william-harveys-experiments-circulation>

2 George Thomson, *Galeno-Pale*. (London: R. Woof for Edward Thomas, 1665), p. 27.

3 William Johnson, *Agyrto-mastix*. (London: T. Mabb for Henry Brome, 1665), p. 29

Kristian Camilleri: Pedagogy, place and personality

There has been a good deal of attention of late on the historical conditions that led to the dominance of the so-called “Copenhagen interpretation” of quantum mechanics and the marginalization of rival views after 1927. Perhaps the two most influential works of the past twenty-five years to attempt to deal with this question are

James Cushing’s *Quantum Mechanics: Historical Contingency and the Copenhagen Hegemony* and Mara Beller’s *Quantum Dialogue: The Making of a Revolution*. Both the works appeared in the 1990s, amidst of the resurgence of interest in the foundations of quantum mechanics, and both were instrumental in challenging the standard historical narrative.

In this paper, I argue that both Cushing and Beller offer problematic sociological accounts of the emergence of the Copenhagen orthodoxy. Here I will outline what I see as a more promising sociological approach to the historical question of why there was so little support for alternative views of quantum mechanics until after the Second World War. Here I focus on the early generation of quantum dissidents, Einstein, de Broglie, Schrödinger and their failure to mobilize support for any alternative research program. Here I propose that we can gain a deeper understanding of the marginalization of rival views by looking at the social, institutional and pedagogical networks and even the individual personalities and temperaments that shaped the practice of theoretical physics in the inter-war period.

Session 6: Biosociality

Tatjana Buklijas: Human development and environment between the colonial past and indigenous expectations in Aotearoa/New Zealand

Environmental epigenetics investigates how environmental influences change the gene expression not only of the affected organism but also its descendants. Providing an authoritative, molecular way to address the heritable impact of exposures ranging from nutrition to stress, this field has been hailed as a bridge between “nurture” and “nature” by biological and social scientists but also

the groups that had experienced multigenerational trauma e.g. Māori. It is seen as a vindication of indigenous views that embed the individual in its environment. Yet the origins of environmental epigenetics lie in the field of developmental origins of health and disease (DOHaD). Just like fetal and reproductive medicine, DOHaD developed vigorously both in Australia and Aotearoa/New Zealand. Its success is grounded in the agricultural economies of settler colonies, where large-scale, export-oriented food production centred on animal breeding has been the key element of the national incomes and identities.

This talk brings together my research into the historical approaches to fetal growth and development and their connections to animal breeding science in the twentieth century Aotearoa/New Zealand with my recent experiences communicating the science of epigenetics to audiences that included Māori. I will discuss the tensions between the expectations that these audiences have and the fundamental features (such as methods and conceptualizations of environment) of the disciplines of DOHaD and environmental epigenetics.

Roberta Pala: Mimicry, how vaccines meet nature

My PhD project investigates vaccines from a biohumanities perspective. I look at vaccines as biosocial actants, biological substances that exist through social practices. The idea is that a vaccine becomes a vaccine through the process of its encounter with the immune system, when a relation is established, when a response is elicited. This is what makes these substances social, the fact that they exist through a multitude of bodily encounters.

In this presentation, I would like to focus on the mimetic relation that characterises the encounter between vaccines and nature. Taking cues from natural infections, vaccines are supposed to recreate natural immunity without pathogenicity. Many natural infections induce complex and interdependent immune responses that eliminate pathogens and generate long-lasting immunity. The ideal vaccine is then supposed to mimic this process, to recreate nature but different, without the disease.

The concept of mimicry in biology has a rich history and heterogeneous theorisations.

In thinking about the diverse mimetic events in which vaccines are implicated, I would like to consider the definition of mimicry as “sympathetic magic” offered by Caillois and Shepley (1984). In this sense, mimicry can be thought as a process of intimate resemblance, an event that establishes new connections between different forms of life, reaching beyond the scientific framework.

I’m ultimately trying to consider: what is at stake when I frame vaccines’ work in terms of a strive for mimicry, as a way of building connections? And, how does this characterise vaccines’ encounter with nature?

Caillois, R., & Shepley, J. (1984). Mimicry and Legendary Psychasthenia. October, 31, 17-32. doi:10.2307/778354

Session 7: Histories, east of the Tasman

Kate Hannah: Uncovering historic whisper networks: women’s friendships in mid-twentieth century New Zealand science

Women’s participation in, and contributions to science in New Zealand in the mid-twentieth century can be understood via patterns of geographic location and social relations. These patterns, found using computational methods which analyse graduation data from the University of New Zealand 1870-1961, enable analysis of the attributes of locations where women clustered. Looking specifically at a cluster of women scientists—Lucy Moore, Lucy Cranwell Smith, Nancy Adams, Greta Stevenson Cone, and Betty Batham—who maintained lifelong friendships over long distances, despite not having studied or worked together, this paper investigates the networks of safety and support these women constructed for themselves within a national scientific community which offered them benign paternalistic sexism through to disregard and discrimination. Drawing on personal papers, letters, and interviews with family members, and using a mixed methods approach to analyse discourse, a historic ‘whisper’ network is revealed, as women look out for the welfare of other women, and promote each others’ work. Exploring the nature of this network—environment, managerial culture, key individuals, social relationships and connectivity, friendship and rivalry—offers

opportunities to understand the ways in which women could and did thrive in scientific careers, and mitigates against what Margaret Rossiter named as “camouflage intentionally placed”.

Martin Bush: The lost history of Mary Proctor and the Commonwealth Solar Observatory project

Between July 1912 and April 1914, Mary Proctor undertook a tour of Australia and New Zealand in order to promote the Commonwealth Solar Observatory project, which would ultimately be realized as the Mount Stromlo Observatory in Canberra. Mary’s tour came at the request of Walter Duffield, who would go on to be the first Director of the Mt Stromlo Observatory. The particular context was the need to raise funding for the project – at that stage the Australian government had provided in-principle support, but only limited funding.

Famous both as an astronomical popularizer in her own right, and as the daughter of the celebrated astronomer Richard Proctor, Mary’s tour was highly successful, raising significant public support that culminated in the promise of funding for an Observatory to be built in New Zealand as part of the proposed Cawthron Institute. However, following the death of the benefactor, the Cawthron Observatory was never built, and a few years later, in 1923, Australian government funding for Mt Stromlo was finally secured.

Despite her success, Mary Proctor is almost entirely absent from the histories of both Mt Stromlo Observatory and the Cawthron Institute. In this paper I will detail her tour and offer some suggestions as to this historical lacuna.

James Braund: J. R. Forster’s observations of southern cormorants on Cook’s second voyage

Cormorants and shags make up a well-known family of large aquatic fish-eating birds which has an almost global distribution and is currently recognised as comprising some 40 extant species. An important early study of birds in this family was undertaken by Johann Reinhold Forster (1729-1798), the German-born naturalist on Cook’s second voyage. Between March 1773 and January 1775, in various locations in New Zealand and Tierra del Fuego, Forster recorded seven different cormorant species, of which he eventually described four –

and this at a time when Linnaeus had described just two. Unfortunately for Forster, however, his generosity with the results of his ground-breaking work in the field and his tardiness in publishing them after the voyage effectively allowed other naturalists to enjoy the priority of description that he richly and more properly deserved. This paper will briefly: a/ introduce Forster; b/ outline the state of scientific knowledge about cormorants at the time of his appointment to Cook's expedition; c/ summarise his observations of these birds over the course of the voyage; and d/ discuss how other workers were able to beat him to publication, thus denying him due recognition as an early authority on this avian family.

Session 7: Negotiating and re-forming the politics of knowledge in the 21st century

Darrin Durant: Echo chambers and the politics of knowledge

Some argue that think tanks are balancing forces, independent of state and private interests, and thus vital resources in any democratic politics of knowledge. Yet this quaint and functionalist view is giving ground to the realization that (especially right-wing) think tanks are often scourges on democracy. Here I explore the implications of conceiving of think tanks through two lenses: one, power through the lens of wealth and class, not political correctness; and two, the politics of knowledge through the lens of an STS-informed view of knowledge. I focus on one aspect of think tank behaviour: their associated echo chambers. Are right wing echo chambers of a distinct type to left wing echo chambers? Is this claim of distinct types true? Moreover, what is the problem with echo chambers *per se*? Restricted and heavily filtered input? If that is a problem in general, where does that leave specialized domains of knowledge themselves? Always democratically suspect? Never possibly reliable? Is that an appropriately STS-inspired politics of knowledge?

Adam Lucas: Climate change science and climate change policy: re-forming the translation and mediation of expert knowledge

Despite calls from many quarters for a greater diversity of disciplinary and epistemic inputs into climate change research and policymaking over many years, including contributions from the interpretive social sciences and humanities, the geosciences have continued to dominate the kinds of expert advice which inform the international approach to climate change policy to this day. Although social science and humanities researchers have been the most visibly critical of the epistemic hierarchy which currently dominates international policymaking on climate change, soon after the fourth assessment report of the Intergovernmental Panel on Climate Change (IPCC) appeared in 2007, a number of climate scientists began publicly expressing their disquiet about two different but related problems that were firmly located in the science-policy interface. Like the critique of the climate policy 'knowledge pyramid' identified in the mid-1990s by Shackley and Wynne, wherein climate modelling maintains the status of privileged knowledge in the epistemic hierarchy, the climate scientists' critique has broader implications for the way in which the current international policy regime is configured, including how different forms of expertise are incorporated into that regime. The disquiet within the climate science community revolves around the growing body of observational and empirical evidence affirming that human activities are changing the climate far more quickly than climate models have predicted, or that the IPCC has been prepared to admit. This paper agrees with the critics that there are deep structural problems in the way in which the IPCC and the UNFCCC are currently organised and function. Drawing on this research, it outlines a range of recommendations for the reform of both institutions, including recommendations for revising the articles enshrined in the UNFCCC which guide the IPCC's activities.

Presenter Biographies

Jo Bailey is a Senior Lecturer in Visual Communication Design at Massey University and a Te Pūnaha Matatini PhD candidate at the Centre for Science in Society, Victoria University of Wellington. My communication design research focuses on innovative systems to facilitate access to and comprehension of complex information. My work marries functional and aesthetic elements within interactive and analogue works, including websites, data visualisations, books, brand communication systems, exhibition and installation design. My current research practice and the focus of my PhD applies design to science communication as a reflexive, interdisciplinary practice. It explores ways to use design as a vehicle to connect scientist-communicators with social science theory on science communication, building reflexivity and user-centring engagement.

Ruth Barton is an historian of science and technology whose major work has been on science and culture in Victorian England. She has recently published two books, the co-edited *Correspondence of John Tyndall, Vol. 3, 1850–1852* (University of Pittsburgh Press, 2017) and *The X Club: Power and Authority in Victorian Science* (University of Chicago Press, 2018). She has also published articles on the history of New Zealand science; and on family life, domestic technology and housework in 20th-century Australia. Since retiring from the History Department of the University of Auckland, Ruth has been an honorary research fellow in the School of Humanities at the University of Auckland. She is a current member of the International Advisory Board to the British Society for the History of Science.

Alex Beattie is a PhD student at Victoria University of Wellington studying technological ways to disconnect from the internet. He recently undertook an ethnography of UX design counterculture in Silicon Valley, United States. Outside of academia, Alex writes about technology and digital culture and runs a wellbeing workshop called Healthy Tech Habits.

James Bradley lectures in the History of Medicine and Life Sciences in the School of Historical and Philosophical Studies at the University of Melbourne. He teaches a course on Darwin and is currently researching the history of the nervous system. His recent publications include (with Rod Buchanan) 'Darwin's Delay: A Reassessment of the Evidence', *Isis*, 2017.

James Braund is an Honorary Research Fellow in the University of Auckland's School of Cultures, Languages and Linguistics, and has been an active member of that university's Research Centre for Germanic Connections with New Zealand and the Pacific since its inception in 1999. He has researched, published, and lectured widely in the areas of science history, natural history, and the European exploration of the Pacific in the eighteenth and nineteenth centuries. He has a special research interest in the German scientific connection with New Zealand and the Pacific in the period prior to World War I, with a particular emphasis on the lives and work of Johann Reinhold Forster (1729-1798) and his son George (1754-1794), the official naturalists on James Cook's second Pacific voyage. His personal research website can be found at: <http://www.southernlandsandseas.com>

Roderick D. Buchanan is an Honorary Research Fellow in the History and Philosophy of Science Program, University of Melbourne, from which he received his Ph.D. in 1993. He has published on Darwin and the history of evolutionary biology, for example: "Darwin's Delay: A Reassessment of the Evidence" (with James Bradley), *Isis*, 108, 2017, 529-552; and, "Darwin's 'Mr. Arthrobalanus': Sexual Differentiation, Evolutionary Destiny and the Expert Eye of the Beholder," *Journal of the History of Biology*, 50, 2017, 315-355. He has also published on the history of psychology and psychiatry, for example: "The History of Psychotherapy in the Modern Era" (with Nick Haslam), *Cambridge Handbook of the Intellectual History of Psychology*, Cambridge, CUP, 2019; "The Enduring Appeal of Psychosocial Explanations of Physical Illness," (with

Nick Haslam and Wade Pickren), in *Personality and Disease: Scientific Proof versus Wishful Thinking*, C. Johansen, ed., London: Academic Press, pp. 205-222; and, *Playing with Fire: The Controversial Career of Hans J. Eysenck*, Oxford, OUP, 2010. His latest project with James Bradley is “Exhuming Reputations: Diagnosing Darwin,” in preparation.

Tatjana Buklijas was trained as a physician in her hometown of Zagreb, Croatia, but then changed career to first study (M.Phil. and PhD) and then work, as a Wellcome Research Fellow, in the Department of History and Philosophy of Science, University of Cambridge. In 2008 Tatjana moved to New Zealand and took up a research fellowship at the Liggins Institute, University of Auckland, where she has remained since except for Senior Thyssen Fellowship at the Institute of Advanced Studies, Central European University, Budapest, Hungary (2015-2016). From January 2020, she will be associate director at the newly established Centre for Science in Policy, Diplomacy and Society, University of Auckland. Her research interests include various themes related to the history and philosophy of the science of human development, evolution and reproduction; science and empires; science and nationalism; science and urban environments. She is currently writing a book on the history of epigenetics.

Martin Bush is a Research Fellow in the Interdisciplinary MetaResearch Group (IMeRG) at the School of Historical and Philosophical Studies at the University of Melbourne. Martin’s meta-research interests focus on public trust in science, and draw on expertise in the cultural history of popular science and professional experience in science communication and the museum sector. Particular interests include planetariums, public reasoning practices, the science communication work of the Ngarrindjeri Australian David Unaipon and popular astronomy in Australia in the era of the lantern slide.

Kristian Camilleri is a Senior Lecturer in History and Philosophy of Science program in the School of Historical and Philosophical Studies at the University Melbourne. He served as the President of AAHPSSS from 2015 to 2017 and before that as Vice President from 2013 to 2014. Kristian

studied physics at the University of Melbourne, but in his first year he discovered history and philosophy of science, and never looked back. After completing a BSc, he went on to do a PhD in HPS at the University of Melbourne. His doctoral thesis formed the basis of a book entitled *Heisenberg and the interpretation of Quantum Mechanics*, which he published with Cambridge University Press in 2009. His primary area of research is in the history and philosophy of quantum physics, but he has written on a range of topics including the role of metaphors in science and the epistemology of thought experiments. Kristian is currently working on a book project on the history of the debates over the interpretation of quantum mechanics, provisionally entitled: *Quantum Mechanics and its Discontents: The Rise and Fall of an Orthodoxy*. Kristian teaches and coordinates a number of subjects in the HPS program including ‘From Plato to Einstein’, ‘God and the Natural Sciences’, ‘Thinking about Science: Past and Present’ and ‘The Dynamics of Scientific Change’. He has also supervised several Masters and PhD theses.

Catherine Caudwell is a Lecturer in User Experience Design at the School of Design, Victoria University of Wellington. Catherine’s research takes a qualitative and interdisciplinary approach to exploring how relationships with emerging technologies are created, reinforced, and reimagined through the nexus of design, marketing, media, and public adoption. As a design researcher and scholar, her particular interest is in the role of design culture, methods, practices, and processes in shaping the production and consumption of new technologies and systems.

Rosi Crane, Honorary Curator Science History, Otago Museum, works on nineteenth-century New Zealand science, and its various styles of expression and exposition. Her largely biographical research extends to the specimens acquired for the museum as well as the people involved—an approach that builds on her doctorate awarded in 2015. Since then she has published several research papers and, continuing in the tradition of museum work, also articles for non-specialist audiences. More broadly Rosi is interested in the nexus of colonial science, culture and art particularly as it played out in the worldwide phenomena of museum building. She is

currently working on a history of the early years of Otago Museum.

Michael Daubs is a Senior Lecturer in Media Studies at Victoria University of Wellington. His research challenges myths associated with mobile and networked media. Currently, he is researching transactional culture on mobile social apps and the networking and internationalisation of white extremism. He is co-editor (with Vincent Manzerolle) of *Mobile and Ubiquitous Media: Critical and International Perspectives* from Peter Lang (2017).

Patrick Dawson is a philosophy of science PhD student at the University of Sydney. Though nowadays a philosopher, Patrick's background mostly lies in physics, which he studied for undergraduate in Otago and for a masters in Melbourne. Accordingly, much of Patrick's research focuses on the philosophy of physics, in particular on the subject of time. His thesis work focuses on the relationships between dynamic theories of time, relativity theory, and quantum mechanics. Right now, Patrick is an advocate for presentism - but as for his past or his future, it's hard to say

Darrin Durant's research focuses on disputes between experts and publics, and on the general features of how authority relations can be legitimate within pluralist democracies. He has published widely on controversies involving nuclear waste management, nuclear power, public policy about energy options, and more recently is investigating climate change policy-making. Recent publications include the book *Experts and the Will of the People* (Palgrave, 2019), and book chapters on how not to ignore experts (Caudil ed 2019), post-truth (Rommetveit ed 2020), think tanks (Landry ed 2020), and the democratic place of experts (Eyal ed 2020).

Fiona Fidler is Associate Professor at the University of Melbourne, with a joint appointment in the Schools of BioSciences and History and Philosophy of Science. She is broadly interested in how experts, including scientists, make decisions and change their minds. Her past research has examined how methodological change occurs in different disciplines, including psychology, medicine and

ecology, and developed methods for eliciting reliable expert judgements to improve decision making. She originally trained as a psychologist, and maintains a strong interest in psychological methods. She also has an abiding interest in statistical controversies, for example, the ongoing debate over Null Hypothesis Significance Testing. She established the Interdisciplinary MetaResearch Group (IMeRG), is a current Australian Research Council Future Fellow, and is lead PI on the repliCATS project.

Mark Francis is Professor Emeritus at the University of Canterbury, Christchurch, New Zealand. He was educated at the University of British Columbia, the University of Toronto and Cambridge University. His visiting fellowships included a stint in the History of Ideas Unit at the Australian National University. He has also been the Rutherford Scholar at Trinity College, Cambridge, the Fowler Hamilton Senior Research Fellow at Christ Church, Oxford, and the Jules and Gabrielle Leger Fellow in Canada.

For the last nine years Francis' major research project has been on nineteenth-century science and indigenous peoples, but he has continued to publish on Herbert Spencer and related subjects.

Thomas Green is a PhD student in the Faculty of Law, Humanities and Arts at the University of Wollongong where he researches the intersection of regulatory frameworks and new technologies — specifically regarding aerospace, 3D printing, and algorithm neutrality. He completed a Juris Doctor from the University of Canberra, and a Bachelor of Arts and Science from the University of Sydney. He is a co-founder of Neumann Space and currently works as a Ministerial and Government Services officer at Transport for NSW where he is involved in projects related to regional and remote work through online platforms.

Kate Hannah is a Te Pūnaha Matatini-funded PhD candidate in the Science and Society Centre at Victoria University Wellington, investigating novel hybrid methodologies for the history of science. She is also a Research Fellow, Department of Physics, University of Auckland; Deputy Director Equity and Inclusion and Executive Manager, Te Pūnaha Matatini; Associate Investigator, Te Pūnaha Matatini. Her principal research area is the

historiography of the history of science, with a focus on the cultures and subcultures of science, gender in science history, and narrative and complexity.

Richard Heersmink is a lecturer in philosophy at La Trobe University, teaching courses in philosophy of biology, ethics of technology, and critical thinking. My research interests are at the intersection of philosophy of cognitive science, philosophy of technology, and applied ethics. The overall aim of my work is to better understand how the informational properties of artifacts enhance and transform memory, cognition, and human identity. I take an extended and distributed cognition view on the relation between agents and cognitive artifacts, but also draw on empirical research from the cognitive sciences, psychology, and human-computer interaction. I further have an interest in the normative and cultural dimensions of cognitive artifacts.

Ian Hesketh is an ARC Future Fellow in the University of Queensland's Institute for Advanced Studies in the Humanities. He is the author of *Victorian Jesus: J. R. Seeley, Religion, and the Cultural Significance of Anonymity* (2017), *The Science of History in Victorian Britain* (2011), and *Of Apes and Ancestors: Evolution, Christianity, and the Oxford Debate* (2009). He is currently working on related projects on the history of Darwinism and large-scale evolutionary narratives in the nineteenth century.

Chris Hesselbein is a PhD candidate in the department of Science and Technology Studies at Cornell University whose research centres upon the relationship between technology, embodiment, and aesthetics. Their current dissertation project explores how skilled bodily movement is designed into high-heeled footwear and negotiated by its wearers, how the materiality of body and shoe is co-constructed, and how notions of fashion and femininity are experienced, consumed, and performed in a technical, discursive, and embodied manner.

Additional research projects examine the transfer of digital aesthetics into the material lifeworld and in what manner this process gives rise to new ways of seeing and experiencing; how subjective notions of style and taste are stabilised and made durable

through the purported objectivity of algorithms; how search engine optimizers stabilise or subvert notions of truth and authority in scientific expertise on search platforms.

Zoë Heine is completing a Master's in Science in Society, for which she is examining how concepts of environmental change can be explored with gardens, gardeners and gardening. She also works as a Research Assistant for the NZ SeaRise programme and as a general helper for the Predator Free New Zealand Trust. Her interests extend to creative non-fiction writing, environmental history and public engagement in science.

Cherie Lacey is a lecturer in Media Studies at Victoria University of Wellington. Her research explores the ways in which the design of 'smart' technologies mediates relationships, emotions, and affects. Situated within the field of Science and Technology Studies (STS), Cherie has published in the areas of data privacy and ethics, dark patterns, digital wellbeing, and user subjectivity.

Kari Lancaster is a Senior Research Fellow and Scientia Fellow at the Centre for Social Research in Health at UNSW, and an Honorary Associate Professor at the London School of Hygiene and Tropical Medicine. Kari is an interdisciplinary, qualitative social researcher in health, with a background in law and policy studies. Her research uses approaches drawn from science and technology studies to critically examine issues of contemporary policy and practice significance in the fields of drugs and viral hepatitis. Her research has examined how policy problems and knowledges are constituted, and the dynamics of 'evidence-based' policy. Kari's current research concentrates on 'evidence-making' practices and critical approaches to the study of implementation science and intervention translations in health, especially in relation to viral elimination and addiction treatments.

Joan Leach has been Director of the Australian National Centre for Public Awareness of Science at the ANU (CPAS) since January 2016. Her research and teaching centres on theories of the public in science communication, language and rhetoric in science (both in public and in technical contexts), and the challenge of ethics in science

communication. She is Chair of the National Committee for History and Philosophy of Science at the Australian Academy of Science. Prof Leach previously worked at Imperial College London, the University of Queensland, and the University of Pittsburgh. She edited the journal *Social Epistemology* for 9 years, was past president of Australian Science Communicators, and a founding member of the American Association for the Rhetoric of Science and Technology. Purdue University (USA) awarded her a science laureateship for services to public engagement with science

Adam Lucas is President and Treasurer of AAHPSSS, and a senior lecturer in science and technology studies at the University of Wollongong (UoW). His research focuses on the history and sociology of early modern and premodern machine technology, and contemporary climate change and energy policy. His work is particularly focused on processes of innovation, institutionalization and the governance of technology. Prior to taking up his current position at UoW, he worked for a number of years as a researcher, project manager and policy analyst for the New South Wales Government in The Cabinet Office, State and Regional Development, Aboriginal Affairs and Housing.

Kate Mannell is a PhD candidate at the University of Melbourne where her PhD is shared between two programs: Media and Communications and History and Philosophy of Science. Her PhD investigates how young adults manage their social availability through mobile messaging. It draws on qualitative interviews to describe the disconnective practices they use to limit interactions with others and with their mobile devices. Kate's broader research interests include mobile media, technology resistance, privacy, and alternative social media.

Fabien Medvecky is senior lecturer in the Centre for Science Communication (Te Paepae Pūtaiao) at the University of Otago. He works on the interaction between science and society, focusing on the role of ethics and economics in social decisions around science. Before joining Otago, Fabien was in the Science Communication Program at the University of Queensland, Australia. He publishes on ethics, economics, ecology, science communication and science policy.

Ocean van Berkel Mercier (Ngāti Porou) is Head of School at Te Kawa a Māui, Victoria University of Wellington. She has a PhD in physics. Her research includes an exploration of how Māori te taiao (environmental) advocacy connects communities to place; how cross-cultural ocean knowledge platforms can support iwi interests; how oral histories and mātauranga can inform groundwater science; and investigating how Māori values and perceptions inform biotechnological controls of pest wasps in Aotearoa. She is the presenter of Māori Television's Project Mātauranga and TVNZ's Coast.

Mark S. Micale is Emeritus Professor of History at the University of Illinois in Urbana-Champaign. After receiving his Ph.D. at Yale in 1987, he taught at the Wellcome Institute for the History of Medicine (1987-89), Yale (1989-1995), the University of Manchester (1995-1999), and the University of Illinois (1999-2018). His fields of scholarly interest are modern European intellectual and cultural history; post-revolutionary French history; the history of medicine, especially psychiatry and neurology; the history of the natural sciences; psychoanalytic studies; and masculinity studies. The majority of his publications have dealt with the history of the mental sciences. Now retired, he plans to pursue a number of Darwin-related projects, including Darwin Down Under.

Taciano L. Milfont is a Reader in Psychology and Fellow of the Centre for Applied Cross-Cultural Research at Victoria University of Wellington. He is an interdisciplinary environmental-behavioural scientist who studies the underlying psychological, social and contextual factors that motivate and inhibit pro-environmental behaviour. His research has been supported by the Royal Society of New Zealand (Marsden), National Science Challenges, Wellington City Council and other externally funded grants. He is a Fellow of the Association for Psychological Science, Senior Editor of *Environment and Behavior*, and recipient of several research awards including the GV Goddard Early Career Award from the New Zealand Psychological Society.

Fallon Mody is a research fellow in the Interdisciplinary MetaResearch Group (IMeRG) at the University of Melbourne. Her expertise is in science

communication, qualitative analysis, and history and philosophy of science. Fallon has worked in science communication and qualitative research roles for the Faculty of Science and the Centre for Excellence for Biosecurity Risk Analysis (CEBRA) at the University of Melbourne; and the Royal College of Paediatrics & Child Health in London.

Fallon will undertake the research engagement activity for the repliCATS project, as well as assist in the qualitative analysis of expert reasoning that this project will undertake. Fallon's PhD research was to develop and explore a prosopography of European medical migrants in mid-twentieth century Australia.

Meera Muralidaran is currently a PhD candidate and tutor in History at the Department of History, Victoria University of Wellington (VUW), New Zealand. Her doctoral research investigates the role played by cartography and botanical knowledge networks in the knowledge production of Malabar by the Dutch East India Company (17th-18th centuries). Prior to joining Victoria University, she taught at the Department of History, Union Christian College, India. Her diverse research interests in early modern period extend to the histories of environment, trade, culture and the narrative traditions of the Indian Ocean world and the Dutch Republic. She earned her first Masters in History from Jawaharlal Nehru University, New Delhi (2013) and her second Masters in Colonial and Global History from Leiden University, The Netherlands (2015). Her Master's thesis '*Construction and Reconstruction of Authority in Keralaolpatti*' was shortlisted for the Master's Thesis Award by the International Institute for Asian Studies (IIAS), Leiden (2015).

Roberta Pala is a PhD candidate in the Social Policy Research Centre, Faculty of Arts and Social Sciences at the University of New South Wales, Sydney. Her research investigates vaccines from a biohumanities perspective, as biosocial actants that are enacted through a multitude of bodily encounters. She has a BA in Cultural Anthropology from the University of Siena and a MA in Cultural Studies from the University of Sydney, with a thesis on recent public debates about vaccines and immunisation policies in Australia. Her research interests include Social Studies of Science; Science, Technology & Society Studies (STS); and Philosophy of the Body.

Originally from Sardinia, she has been calling Australia her second home for six years now.

Bill Palmer was born in London in 1937. He obtained his B. Sc degree (1959) and Teacher's Certificate at the University of Exeter (1960) and his M. Sc degrees from the University of East Anglia (1970) and the University of Oxford (1981); his PhD (2003) was obtained from the Curtin University, Australia. Apart from Australia, Bill has worked in Britain, Nigeria, Papua New Guinea, Western Samoa and Tanzania. He was a senior lecturer in Science, Education and Health at Charles Darwin University, Australia from 1989 until 2007 when he retired after nearly fifty years in science education. His main research areas are in chemical education and the history of science and he attempts to keep the two areas in communication. He continues his research as an Adjunct Research Associate at Curtin University. He is a Fellow of the Royal Society of Chemistry and of the Royal Australian Chemical Institute. He has been a member of AAHPSSS and presenter the Association's conferences for many years.

Margaret Pelling joined the Wellcome Unit for the History of Medicine in Oxford when it was founded in 1972, and she retired as Reader in the Social History of Medicine in 2009. She is currently an Associate Member of the History Faculty. Her early research was on 19th century British public health and theories of epidemic disease, but for most of her career she has worked on aspects of health and medicine in early modern England, focusing on the Tudor and Stuart period and on the lower orders of medical practitioner, particularly barber surgeons. Her associated interests have included poverty, child health, apprenticeship, old age, foodways, marriage, guilds and civic office-bearing, beards and masculinity, iconography, and the London Bills of Mortality. Her most recent monograph is *Medical Conflicts in Early Modern London: Patronage, Physicians and Irregular Practitioners 1550-1640* (2003) and her present project is a book on the cultural history of barbers, 16th to 20th centuries.

Alexander Pereira is a current Master of Philosophy (Science) student at the University of Sydney in the School for the History and Philosophy of Science. My interests focus on mental disorders

and particularly how the programs of analytic philosophy and cognitive science might inform or help solve the many conceptual issues that crop up in psychiatry. This includes: our attempts to classify and define mental illness, the roles of explanation and prediction in the mind and brain sciences, the relevance of natural kind concepts to psychiatry, and the ways that social and cultural forces shape both the nature of mental illness and our attempts to understand it. My current research aims to provide a comprehensive account of phobias that describes, with precision, the processes that initiate and maintain specific phobias. I suspect that phobias hold a unique place in our picture of mental dysfunction that has been overlooked by the field, both theoretical and empirical. Phobias demand further attention.

Rebecca Priestley is Director of the Centre for Science in Society at Victoria University of Wellington, Aotearoa New Zealand. As an interdisciplinary scholar and creative non-fiction writer, I work at the boundary between science and the humanities. Across my research portfolio, I ask questions about what New Zealand and Antarctic scientists do, and did in the past, and how and why they seek to engage publics. I explore attitudes to issues such as climate change, sea level rise, and nuclear power and investigate ways in which scientists, the media, and artists, communicate about these issues. My creative non-fiction explores the nature and process of scientific research and seeks to engage audiences on contemporary scientific and environmental issues at a deeper level than possible through magazine articles or academic literature. I am a Principal Investigator with Te Pūnaha Matatini and the NZ SeaRise programme. I am a Companion of the Royal Society Te Apārangi and winner of the 2016 Prime Minister's Science Communication Prize.

Sujatha Raman joined the Centre for Public Awareness of Science (CPAS) at the Australian National University in July 2018 as A/Prof and Director of Research. Her research explores challenges and opportunities arising at the interface of science, technology and democracy. She is interested in the question of how we respond to global challenges in the face of diverse ways of knowing, acting and valuing. She has led and

contributed to numerous collaborative projects on environment and sustainability, climate change and energy transitions, antimicrobial resistance, responsible research and innovation, science/public engagement, and science policy. Through partnerships with academics and stakeholders in the UK, Ghana, Malawi, Nigeria, India, Zimbabwe and most recently, Australia, her research spans global North and South settings, and links between them.

Raman's previous appointment was at the Institute for Science and Society (ISS) research group in the School of Sociology and Social Policy, University of Nottingham, UK. She was Director (2016-18; deputy director 2012-16) of the Leverhulme Trust 'Making Science Public' Research Programme led by the University of Nottingham in partnership with the Universities of Sheffield and Warwick. The programme investigated the implications of efforts to promote openness, transparency and public engagement around science and technology in the UK and elsewhere.

Evelleen Richards is Honorary Professor in the School of History and Philosophy of Science, University of Sydney, and a Fellow of the Royal Society of New South Wales. She has received numerous international travel and research awards in recognition of her work, and a longstanding research affiliation with the Department of History and Philosophy of Science, University of Cambridge. Her main fields of interest and publications encompass the social analysis of scientific and medical controversies, and the history of evolutionary biology, with particular reference to issues of sexuality, gender, and race.

Tara Roberson. A science communication researcher and practitioner, Tara works with quantum physicists at the Australian Research Council Centre of Excellence for Engineered Quantum Systems (EQUS). She recently submitted her PhD with Australia's Centre for Public Awareness of Science (CPAS). Tara is the President of the South-East Queensland branch of the Australian Science Communicators.

A. Wendy Russell is a research fellow and sessional academic at the Centre for the Public Awareness of Science at the Australian National University, conducting research on responsible innovation

and convening a course in Science Dialogue. She is also an associate of the Centre for Deliberative Democracy and Global Governance at the University of Canberra. Her research and practice in public engagement with science spans 20 years and has led to more than a dozen peer-reviewed articles. Wendy is a trained engagement practitioner and Director of Double Arrow Consulting, a Canberra business specialising in two-way engagement. Wendy previously worked in the Commonwealth Department of Industry, Innovation, Science and Research, managing the award-winning Science & Technology Engagement Pathways (STEP) program. Before this, she was senior lecturer in the School of Biological Sciences at the University of Wollongong, researching social aspects of biotechnology, transdisciplinarity, technology assessment, and photosynthesis.

Rhian Salmon is a Deputy Director of the Centre for Science in Society at Victoria University of Wellington, Aotearoa New Zealand. I have worked as an atmospheric chemist for nine years, including an Antarctic overwinter, and ten years in science communication. My research is centred around building bridges between theory and practice in science communication and public engagement with science (PES). Examples include research with the Deep South National Science Challenge Engagement Programme (about climate change), Te Pūnaha Matatini Centre of Research Excellence (about complexity) and the MBIE-funded SeaRise project (about sea level rise). I have co-authored 25 peer reviewed journal publications (eight as first-author) and three book chapters

Gemma Smart is a PhD candidate in the School of History and Philosophy of Science at the University of Science. Current research is in the history, philosophy and sociology of psychiatry and neuroscience.

Eden Smith is a research fellow in the Interdisciplinary MetaResearch Group (IMeRG) at the University of Melbourne. Eden's research focuses on investigating the reasoning involved in expert assessments of the replicability, reproducibility, and robustness of scientific claims, as well how concepts such as replicability are used within open-science communities. Eden is also

collaborating on a digital-ethnography project exploring the sociotechnical dynamics involved in the open-source development of decentralised technologies by distributed communities. These projects build on Eden's PhD (2018) research on the historical interdependence of two scientific concepts and their current uses as independent tools in neuroscience experiments.

Max Soar is completing a Master's in Science in Society current focussed on complexity, risk, and uncertainty in science communication. They also have interests in scientific culture more generally, particularly the potential relationship between science, technology, and contemporary fascist movements. After completing undergraduate degrees in Law and Computer Science, Max worked in the Justice Sector and as a freelance science writer, helping the Deep South National Science Challenge summarise their 2017 research activities.

John Stenhouse is currently Head of the History Programme at the University of Otago, where he teaches the history of science as well as New Zealand and European history. Recent publications include *Eugenics at the Edges of Empire: New Zealand, Australia, Canada and South Africa* (Palgrave Macmillan, 2018), co-edited with Diane B. Paul and Hamish G. Spencer. Current projects include a monograph on missionaries, science and medicine from the early church to the present.

Laura Sumrall is a PhD candidate at the University of Sydney with the School of History and Philosophy of Science. Her dissertation project, "Deposing the Demon: Jan Baptista van Helmont and the Authority of Magic in Early Modern Medicine," examines the works of the Dutch chymical physician Jan Baptista van Helmont (1579/80-1644) and his followers, focusing on the demonological framing of van Helmont's disease theory and the reception and transformation of his ideas in later medical philosophies. This project reflects her broader interest in the engagement of esoteric knowledge and early modern science.

Anton Sveding holds a BA and MA in History of Science and Ideas from Uppsala University, Sweden. He is currently in his second year of his PhD. His thesis examines how the New Zealand State Forest

Service sought to educate the public about the importance of forestry in order to prevent economic and environmental disasters during the interwar period.

Ian Tasker was born in New Zealand in 1959 and began his career in telecommunications with the NZPO before immigrating to Australia in 1984. He spent several decades in Information and Communications Technology. In 2004, he was published in the IAU; Commission 46 newsletter, vol. 62, *Robotic Observatories in eEducation and eResearch (ROER)*, and in 2005 wrote a White Paper for the Department of Education, Employment and Workplace Relations, *Why Program Management works across the value chain; employing diffusion of innovation marketing and eCommerce beyond project management limitation*, which formed a section in a R&D proposal for Robotic Observatories in eEducation and eResearch, to be driven by a scheduling switch. Ian returned to academia in 2007 and completed a Post Graduate Certificate in Research Studies. In his thesis, *Feasibility Study for a Planetarium at UWS: The efficacy of planetaria; astronomy and space science education*, he developed a mathematical model to ascertain audience attendance that then set limitations on the technology centre's design parameters and overall budget. Since then, Ian's research interests have matured and he is currently addressing how internationally managed science is funded. He is in the process of publishing his research for a PhD by Publication, which will be supervised by Professors Ray Norris and Brett Bowden in 2020

Shannon Walsh is a doctoral candidate at the University of Auckland and a researcher for Economic and Social Research Aotearoa.

Ian Wills turned to the history and philosophy of science after a career in engineering. His PhD dissertation focused on the history and philosophy of technology using Thomas Edison's laboratory notebooks to understand the processes by which novel artefacts are created.

Subsequent work included industrial heritage in Australia; the science of F W Taylor's Scientific Management; and the Great Strike of 1917. His current interests include Australia's failed attempt to build nuclear weapons; the history of

manufacturing in Australia; and manufacturing's interaction with Australian history more broadly.

His book *Thomas Edison : Success and Innovation through Failure* is due to be published by Springer in November 2019.

John Wilkins is an Honorary Fellow at the University of Melbourne, specialising in the history and philosophy of biology, and in particular of classification and taxonomy. He has published books on the history of the concept of species (*Species: A history of the Idea*, 2009, and *Defining species: a sourcebook from antiquity to today* 2009, and on the philosophy of classification, *The nature of Classification* (2013, with Malte Ebach).

Emma Zuroski is a recent graduate from the University of Auckland, earning her PhD in History in early 2019. Her thesis "Depths of Knowledge: HMS Challenger and the Reconfiguration of Modern Science" examines the history of the famous 19th century voyage and the links between the history and science of the ocean. In addition to being a University Doctoral Scholar at Auckland, Emma was also awarded a Nancy Bamford Research Grant from the Auckland Museum in 2015. Emma also holds a MSc in Science, Technology and Society from Imperial College London and a MA in Science and Technology Studies from Cornell University.

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DDDU = Doing Darwin down under symposium

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- discount on *Metascience*, an international reviews journal for the history, philosophy and social studies of science.

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- **General Fund** (untied, and crucial for new initiatives)
- **AAHPSSS archives** project
- **Travel fund for young scholars** (Ian Langham Bursary)
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Payment is via PayPal or direct deposit into the Society's bank account:

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