



# The Bulletin 407

The Royal Society of New South Wales

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22 February 2017

## For Your Diary:

**23 February 2017**  
**Annual Meeting of the Four Societies**

Rear Admiral the Honourable Kevin Scarce AC CSC RAN (Rtd)  
ComplEAust

**“South Australia: A Nuclear State in a Global Solution”**

5:30 pm for 6-8 pm  
International Convention Centre  
Darling Harbour, Sydney

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**16 March 2017**

**Southern Highlands Branch Lecture**

**Dr. Barbara Briggs**  
**“Royal Botanic Gardens at 200”**

6:30 pm start  
Chevalier College, Bowral  
*(For more information, see page 5)*



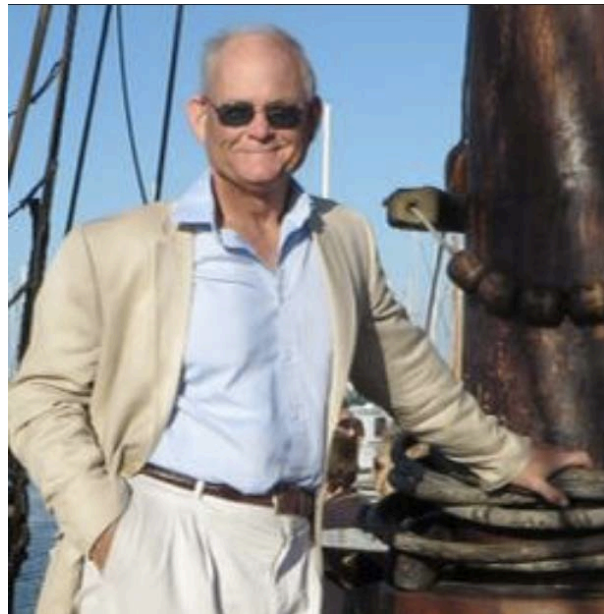
**Patron of The Royal Society of NSW**

His Excellency General The Honourable David Hurley AC DSC (Ret'd)  
Governor of New South Wales

## Open Lecture & OGM

**“Creative Minds:  
Artistic and Scientific Endeavour on  
Polar Expeditions 1851 to 1951”**

**Richard G Ferguson FRGS**  
Executive Director, Craft Victoria



*For more information, see page 3*

**Date:** Wednesday, 1 March 2107: 6:15 for 6:30 pm

**Venue:** Union, University and Schools Club, 25 Bent Street, Sydney

**Entry:** \$10 for Members and Associate Members of the Society,  
\$20 for Non-Members, which includes a welcome drink.

**Dress:** Business

**Dinner** (including drinks): \$80 for Members and Associate Members,  
\$90 for Non-Members.

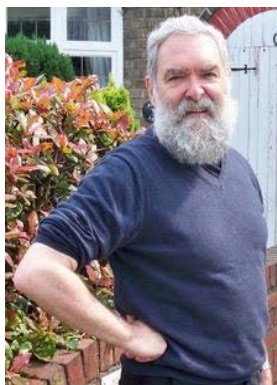
Reservations must be made at least 2 days in advance

**Reservations:** <https://nsw-royalsoc.currinda.com/register/event/30>

**Enquiries:** [royalsoc@royalsoc.org.au](mailto:royalsoc@royalsoc.org.au) Phone: 9431 8691

**All are welcome.**

# From the President



Australia Day 2017 gave us two exciting pieces of news. First our immediate past President Don Hector was awarded membership of the Order of Australia (AM) “for significant service to science in the field of chemical engineering, and to business.” We trust his enormous contribution to the resurgence of the Royal Society of New South Wales also contributed to the decision to honour his excellent service. Don was applauded in absentia at the February OGM.

A few days before, Michelle Simmons, Dist FRSN gave the Australia Day Address to an audience including our Vice Regal Patron, His Excellency General The Honourable David Hurley AC DSC (Ret'd) and the new Premier of NSW, Gladys Berejiklian. Michelle's comments caused some furore in the media, not for the explanation of quantum computing, but on the ‘feminisation’ of the HSC physics curriculum, where maths and theory has given way to essays and qualitative appreciation.

Reducing expectations of a child is the result of such dumbing down of the curriculum. The NSW Education Standards Authority was quick to say that the new physics and chemistry syllabi coming in 2018 would address these concerns by having “greater focus on mathematical applications.” Meanwhile enrolments in maths and science subjects continue to be of great concern.

The long-awaited 2016 Journal and Proceedings of the Royal Society of New South Wales is now published with our thanks to the new editor Bob Marks (see page 8.) In his first editorial, Bob writes on the past and future of this scholarly work and ends by encouraging “review articles and articles taking an historical approach to the development of science and social phenomena. I also urge readers to consider writing longer book reviews of recent books that raise issues of interest, particularly of science policy and history.” Bob has provided links to archived copies of all journal volumes back to Volume 1 in 1867, and then earlier issues including “Four papers presented at meetings of the Philosophical Society of Australasia in 1822”. A lot of work by Bob has gone into this, but the legacy to the Royal Society is invaluable.

Meanwhile a group has been formed under Ragbir Bhathal to look at our library collection and recommend what might be done.

Finally a new Fellow, Emma Johnston FRSN has been writing to the newspapers (about science in a ‘post-truth’ world. This has resonated with the group planning the 2017 Forum who are kicking around a potential topic that looks at the fate of rationalism in a ‘post-truth’ world. If you have any views on this, or indeed on any topic that has taken your interest, please write to [president@royalsoc.org.au](mailto:president@royalsoc.org.au).

P.S. We have just heard that His Excellency and Mrs Hurley will be our guests at the Annual Black Tie Awards Dinner on Wednesday 3rd May 2017. We hope to see you there. Registration details are coming soon.

Brynn Hibbert FRSN

## Richard G. Ferguson – “Creative Minds: Artistic and Scientific Endeavour on Polar Expeditions”

Increased specialisation of academic disciplines in the 20th century has for many led to the view that Art and Science are at polar opposites when it comes to the value and contribution that art disciplines have made to scientific expeditions. This presentation will give an overview of artistic endeavor on early scientific expeditions such as those of Cook / *Endeavour* 1768 – 1771, Baudin / *Geographe* 1800 – 1803, and Fitzroy / *Beagle* 1831 - 1836, and how this directly influenced the application of photography on polar expeditions.

There is a mounting body of illustrative and taxonomic artistic works being produced as documents of record on scientific and exploring expeditions. The more dramatic and romantic views such as, *The Icebergs* (1861), created by Hudson River School artist Fredrick E Church (1826 – 1900) and *Sealers Crushed in Ice* (1876) by New Bedford born artist William Bradford (1823 – 1892) are what captured the imaging of the public.

The productive mix of art and science is demonstrated through an analysis of over 1,000 images, from three 19th century arctic expeditions: William Bradford 1869; Benjamin Leigh Smith 1873, 1880; and George Strong Nares 1875 – 1876. I will also discuss a re-photographic survey of the Antarctic work of Australian photographer Frank Hurley undertaken over five expeditions between 1987 and 1996.

Richard Ferguson has been involved in the cultural, heritage and education sectors for more than 30 years in both Australia and England. His initial tertiary training was at the National Art School, Sydney and later training in visual arts

and photography enabled him to undertake original research and Antarctic field work on five expeditions with the Australian Antarctic Division and commercial operators. His particular area of interest is the use of photography on polar expeditions, which was initially based at the Mawson Institute for Antarctic Research at the University of Adelaide, Scott Polar Institute, Cambridge and then the South Australian Museum.

This research, curatorial work and collections management gave rise to increasing involvement in the management of a variety of cultural projects at various museums and galleries. These include: Australian National Maritime Museum; Geelong Gallery; National Maritime Museum, Greenwich, one of twelve lead National Museums of England; and the Melbourne Cricket Club. Prior to that he was Manager of the Museums Australia Museums Accreditation Program.

He was elected as a Fellow of the Royal Geographical Society in 1993 for his polar research and fieldwork. He is a member of the Royal Society of Victoria and currently a National Council Member of the International Council of Museums, Australia.



*Crushed in Ice*  
William Bradford (1823-1892)  
<http://hoocher.com/>

# Report of 16 February 2017 Meeting Royal Society – Southern Highlands Branch

## Professor Adam Guastella, University of Sydney Autism and Oxytocin



Professor Adam Guastella is interested in developing more effective clinical treatments based on neuroscience advances for a range of mental health conditions. This work recently culminated in providing the first evidence of a medical treatment to improve social impairments in child autism.

In this lecture, Adam presented some of his findings to an audience of sixty at Chevalier College, highlighting the neurobiology of social behaviour, the critical role of the social environment in social development, and how this knowledge is now informing 21<sup>st</sup> century treatments for social impairments in disorders such as autism.

Autism is a disorder of social dysfunction. Marked qualitative impairments in social interaction are obvious especially in the use of non-verbal behaviours such as eye-to-eye gaze, facial expression, body postures and gestures to regulate social interaction. There is failure to develop peer relationships appropriate to developmental level, and a lack of spontaneous seeking to share enjoyment, interests or achievements with other people. Lack of social or emotional reciprocity is clearly evident along with qualitative impairments in communication. There is also the problem of lack of varied, spontaneous make-believe play or social imitative play appropriate to development level. It is not surprising then that children demonstrating these characteristics are often the target of bullying.

One of the first empirically supported markers of autism is failure to use eye-to-eye gaze. Many treatments have been used for social dysfunction in autism and schizophrenia, with very limited success. Those that have been found to be of little or no use include anti-depressants, anti-psychotics, herbal remedies, cognitive behavioral therapy (CBT), hyperbaric chambers, family therapy, electric shock, and dolphin therapy. One exception has been the use of behaviour therapies.

Professor Guastella and his team have published ground-breaking work on the effects that oxytocin exhibits in enhancing social cognition. Importantly they have published their findings that oxytocin enhances eye-gaze and also improves recall of positive social memories. They have recently shown in a large trial that oxytocin improves emotion recognition too. That work was published in 2013 in *Neuropsychopharmacology*. It is known too that oxytocin enhances trust.

As for social intervention in children, research has shown in previous years that early intervention is associated with improved therapeutic outcomes, and that young children appear to respond better to treatment. Guastella feels that if oxytocin is likely to benefit people with autism, there is greater potential for these benefits during the younger years of life. His hypotheses are that oxytocin nasal spray will improve everyday interactions in those with autism, and that there will be improved functioning, reduced repetitive behaviour, as well as reduced caregiver stress. Of course there will have to be many investigations into the tolerability and safety for this young population.

Guastella emphasised throughout his lecture that although certain aspects of his research have been encouraging, there are still many questions to be answered. A huge factor in assessing the significance of any trials such as these is the subjectivity involved. He has seen on many occasions that because a parent is so eager to see improvement in a child, they will often declare that huge improvement has been achieved by the administration of a placebo.

His next research trial is planned for September with a 160 autism child trial. He also plans to conduct a PET ligand development study to research the question of where oxytocin goes in the brain. It is not surprising that Professor Guastella faced a particularly long question time from his appreciative audience.

Anne Wood FRSN



# 2017 Events

## Royal Society – Southern Highlands Branch

Date*	Event	Speaker	Topic	Location**
16-Mar-17	Public Lecture	Dr Barbara Briggs Sydney Botanical Gardens	Royal Botanic Gardens	Chevalier College, Bowral
20-Apr-17	Public Lecture	Dr Robert Kennedy Cardiologist	Post mortem drug studies	Chevalier College, Bowral
18-May-17	Public Lecture	TBA	TBA	Chevalier College, Bowral
15-Jun-17	Public Lecture	Dr Michael Birrell	Egyptology	Chevalier College, Bowral
20-Jul-17	Public Lecture	TBA	TBA	Chevalier College, Bowral
17-Aug-17	Public Lecture	Hugh MacKay AO	The changing place of religion in Australia	Chevalier College, Bowral
21-Sep-17	Public Lecture	Prof Peter Schofield Neuroscience Research Australia	Alzheimer's Disease	Chevalier College, Bowral
19-Oct-17	Public Lecture	TBA	TBA	Chevalier College, Bowral
16-Nov-17	Public Lecture	TBA	TBA	Chevalier College, Bowral

\*Lectures are the third Thursday of each month. \*\*Location may change due to renovations

### 16 March 2017

#### Southern Highlands Branch Lecture

### Dr. Barbara Briggs

## “Royal Botanic Gardens at 200”

Dr. Barbara Briggs is one of the foremost Australian botanists, and she is the Garden's longest serving female scientist. In her talk, Dr. Briggs will describe the history of the Gardens and her life there as a scientist. She will recount the early years, how the original Garden survived because its soil was so poor for growing plants. She will talk about the scientific advances in which she has played a part, including identification of 80 new plant species, the discovery of the Wollemi Pine, and the analysis of a leaf fragment that helped solve a murder case. She will also discuss the challenges and opportunities facing the Gardens over the next 200 years.

6:30 pm start  
Chevalier College, Bowral



# Report of the 1250<sup>th</sup> OGM RSNSW Scholarship Awards Wednesday, 1 February 2017



RSNSW Scholarship Award 2016 winners Yik Lung (Jeremy) Chan, Isobel Ronai, and Andrew Ritchie with Awards Committee Chair, Prof. E. James Kehoe FRSN (left) and Society President Emeritus Professor Brynn Hibbert.

The first meeting of 2017 opened the year with an impressive demonstration of the capabilities of three of the state's younger scientists. They were the three winners of the 2016 RSNSW's scholarships. They were chosen late last year by a committee of Deans of Science and Engineering chaired by the NSW Chief Scientist and Engineer, Prof. Mary O'Kane.

Before receiving their medals and \$500 cheque, each displayed their mettle by giving a 20-min talk about their research and findings so far. Although the talks spanned a wide range of topics, they converged on the ever-growing understanding of how DNA and its molecular mechanisms exercises a thorough going influence of every aspect of life.

**Yik Lung (Jeremy) Chan** (School of Life Science, University of Technology Sydney) spoke on the **“Effects of maternal cigarette smoke exposure on brain health in offspring.”** While the toxic effects of alcohol consumption by mothers on their unborn young has been widely studied, less is known about the effects of tobacco exposure, including passive smoking, on unborn infants. Using a mouse model, Jeremy described his findings how passive smoking by pregnant females altered their mitochondrial DNA and consequently their neural structure as evidenced visibly by deficits in behavioural tests conducted with the offspring after they had been born and had time to mature.

*Continued on next page.*

*Continued from previous page.*

## **RSNSW Scholarship Awards**

**Andrew Ritchie**, School of Life and Environmental Sciences, University of Sydney, described his research in “**New Ways of Modelling the Ancient Past to Understand Evolution.**” Andrew has applied his background in modelling the evolution of biological diversity to understand the evolution of linguistic diversity. He showed how the languages of people separated in time and space share similarly-sounding words that have the same meaning. In other cases, words with the same meaning may have distinctive sounds. Using the words from the lexicons of different languages as if they were the units of inheritance, Andrew has tested different mathematical models for tracing how Indo-European languages have changed over millennia from a common ancestral language group. Among other things, the results may help determine whether Indo-European languages evolved out of the Western Asia steppes or the Tigris-Euphrates Valley.



**Isobel Ronai**, School of Life and Environmental Sciences, University of Sydney, gave a talk entitled “**Anarchy in the honey bee colony: the genetic basis of worker sterility.**” Bee colonies are characterised by what can be anthropomorphically described as a mass altruism. Thousands of female worker bees forgo reproducing their genes in favour of supporting reproduction by a single individual, the queen. Based on previous identification of a gene labelled Anarchy, Isobel has illuminated how expression of this gene inhibits worker fertility. More specifically, the Anarchy gene regulates the activity of a worker’s ovary via programmed cell death. In turn, expression of the Anarchy gene depends on a pheromone from the queen bee. In the absence of the pheromone, workers regain their fertility. In this way, Isobel’s findings have provided a breakthrough in understanding reproduction among social insects.



## Publication of *Journal of the Proceedings of RSNSW*

"Last month, Sydney's Observatory Hill notched its warmest January for maximum, mean, and minimum temperatures in records dating back to 1858, the Bureau of Meteorology said." --- *SMH*, 2/2/2017, p.7. So much for the global warming deniers. However, there is a curiosity in this newspaper report. The Bureau of Meteorology was not established until after Federation. So, where do the 1858 records come from? Answer: The polymath William Stanley Jevons, who was worked as an assayer at the Royal Mint in Macquarie Street. He was also a Fellow of the Philosophical Society of NSW from 1856 to 1859. Thereafter, he returned to England and became one of the pioneers of the neo-classical revolution in micro-economics. He



William Stanley Jevons

is possibly the most significant unsung (at least by the Society) Fellows in our 160-year history.

Two papers about Jevons, one by the late Ian Castles, erstwhile Commonwealth Statistician, and another by the Hon. Editor, Robert Marks, are among the offerings in the latest issue of the Journal. It contains four more articles and sixteen abstracts from recent doctoral dissertations in NSW. To read them, please go to: <http://royalsoc.org.au/index.php/society-publications/current-issue>

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### **William Stanley Jevons in NSW**

(extracted from Castle's paper in the Journal)

After studying chemistry in London, Jevons came to New South Wales at the age of 19 to work at the Sydney Mint. The Gold Rush was in full swing, and his job was to assess the quality and purity of the precious metal from the diggings. This work put him in a unique position, at the intersection of geology, chemistry, economics and industry.

Wanting to document as many aspects of life in Australia as he could, Jevons also took up photography, even taking his camera equipment to the goldfields.

After five years in Sydney, Jevons returned to England, where he eventually became the first Professor of Economics at University College in London. He left Australia in April 1859. He drowned in 1882, aged 46.





**Sat. 22 April 2017, 12:00 pm – 3:00 pm AEST**  
**Assemble at Martin Place**

“The March for Science celebrates the public discovery, distribution, and understanding of scientific knowledge as crucial to the freedom, success, health, and safety of life on this planet. We are a nonpartisan group, marching to demand action in the following areas: Funding, Communication, Policy, and Literacy. For more information see:

<https://www.eventbrite.com.au/e/march-for-science-sydney-tickets-31798910397>

## Schedule of RSNSW Events 2017

Date	Event	Speaker(s)	Topics and Presentations	Location
5-Apr-17	<b>Annual General Meeting</b>	Dr Greg Organ Chief Scientist, Lion Company	Science of Beer	Union, University & Schools Club
3/05/2017 Tentative	<b>Annual Dinner</b>	Prof. Peter Baume AC DistFRSN	Annual Dinner, Distinguished Fellows Lecture, and 2016 Award Presentation	Union, University & Schools Club
7-Jun-17	<b>Ordinary General Meeting</b>	Prof. Madeleine Beekman University of Sydney	Slime Mould	Union, University & Schools Club
5-Jul-17	<b>Ordinary General Meeting</b>	TBA		Union, University & Schools Club
2-Aug-17	<b>Ordinary General Meeting</b>	Prof. Ann Williamson FRSN University of New South Wales	Self Driving Cars: Will they help?	Union, University & Schools Club
6-Sep-17	<b>Ordinary General Meeting</b>	Dr. Helen Mitchell Conservatorium of Music	Complexity of Music	Union, University & Schools Club
4-Oct-17	<b>Ordinary General Meeting</b>	TBA		Union, University & Schools Club
1-Nov-17	<b>Ordinary General Meeting</b>	TBA		Union, University & Schools Club
6-Dec-17	<b>Ordinary General Meeting</b>	Jak Kelly Award Winner	2017 Jak Kelly Award Presentation & Christmas Party	Union, University & Schools Club

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## New Society Ties are Now Available For Purchase

New Society ties are now available for purchase for \$45 (exclusive of postage and credit card fees). If you wish to order one, please do the following:

1) Enter this URL into your browser

<https://nsw-royalsoc.currinda.com/register/event/29>

2) When the website opens, you should see “Sales of Silk Tie” under the “Royal Society of New South Wales” banner.

Either create a profile or login to your existing profile with your email address + your selected password.

3) When you see “You have not yet registered for this event,” press the **Register** button.

4) If you see, “Register your profile,” go to the bottom of the page, tick the box next to “I agree ....”, and press **Save and Continue**.

5) When you see “Confirm your membership details,” press **Continue**.

6) When you see “Select your registration type,” click on the button for either purchase + postal delivery (\$8.50 postage) or collection at next OGM. Then, tick the box next to “I agree...” and press **Continue**.

7) When you see “RSNSW Silk Tie » Add-ons,” select whether you want extra ties. (Select 0 if you want to just one tie.) Press **Continue**.

8) When you see “Payment details,” proceed to fill them in to complete purchase.

