



The Bulletin 417

The Royal Society of New South Wales

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For Your Diary:

5 February 2018

RSNSW & SMSA

The Enlightenment Series

Kim M^cKay AO

**'Learning, Adaptation & the
Enlightenment: The Museum'**

6.00pm for 6.30-7.30pm

Mitchell Theatre, SMSA, 280 Pitt St

15 February 2018

Southern Highlands Branch Lecture

Professor Madeleine Beekman

**'Are You Smarter than a Slime
Mould?'**

6.30pm start

Mittagong RSL

(For more information, see p. 4)



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

RSNSW Scholarship Awards

Wednesday, 7th February 2018

This special event celebrates the work of three outstanding young researchers. They are each a candidate for an advanced degree in a science-related field within New South Wales.

Grace Causer

Institute for Superconducting and Electronic
Materials

University of Wollongong

Yu-wei (Wayne) Lin

Advanced Drug Delivery Group

Faculty of Pharmacy

University of Sydney

Cara Van Der Wal

School of Life and Environmental Sciences

University of Sydney

See page 3 for more information

Date: Wednesday, 7 February 2018; 6:00 pm 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/44>

Enquiries: royalsoc@royalsoc.org.au Phone: 9431 8691

All are welcome.

From the President



It gives me the usual great pleasure to kick off the year with this President's column. I hope you have had a grand holiday season and the ever warming climate is not getting you down. Our efforts on behalf of the planet have been dealt a blow by the untimely death of Professor Stuart Wenham FRSN at 60. He was Director of the Photovoltaics Centre of Excellence at UNSW Sydney, and a pioneering researcher and inventor of solar cell technologies. Our condolences go to his family and friends.

In my last newsletter we were looking forward to the Forum. As usual it was many times oversubscribed; my apologies to the members who could not secure a place. From the feedback and my own experience of the day, it was the best Forum ever. Both our Patron, His Excellency General The Honourable David Hurley AC DSC (Ret'd), and supporter in chief, Professor Mary O'Kane FRSN, gave interesting and thoughtful introductions to the subject 'The future of rationality in a post truth world'. Look for their written contributions in the special issue of the Journal and Proceedings which will appear soon. The substantive presentations will be described elsewhere. I was very pleased that Sir Peter Gluckman fulfilled his promise to talk to us, quite beyond the call of duty, by flying in from New Zealand for the day. His talk nicely nailed how to offer well-thought-through advice on scientific matters to a government that has many other issues on its plate. Jumping to the end, I credit Des Griffin FRSN for suggesting the economics editor of the Sydney Morning Herald, Ross Gittins FRSN, as our last speaker and rapporteur. Ross is not a scientist and pointed out that the rather offended tone of many speakers ('why won't they listen to us ...?') suggested an almost wilful ignoring of history – it was ever thus.

I know of one of our planning team who has already written to Ross at length, and so if the point of the forum was to encourage reflection on a complex topic, then I believe we succeeded. Thanks to our friends in the four learned academies, and the planning group who spent much of 2017 working on the programme.

Our joint series with the Sydney Mechanics School of Arts (recall the signing of an MOU reported in the last Bulletin) on the Enlightenment continues next month (Monday 5th February) with a talk by Kim Mackay, Director and CEO of The Australian Museum on the topic 'Learning, Adaptation and the Enlightenment: The Museum'. See elsewhere for more details on how to book. I attended the SMSA Christmas Party on our behalf. This is always a jolly affair, as was the Governor's Christmas party. In his wrap of the year His Excellency mentioned the RSNSW and the Forum. Mrs Hurley led the singing of carols, so I am pleased to note that our Patron is working hard for the people of NSW, and remains a good friend of the RSNSW. Our Christmas OGM heard from Moritz Merklein, the Jak Kelly Award Winner for 2017, who told us about an optical memory based on sound. Young scientists are always good value and we have three RSNSW Scholarship winners to kick off 2018 on Wednesday 7 February (see advert in this Bulletin).

Finally my warm thanks to Professor Jim Kehoe FRSN (editor) and Edward Hibbert (managing editor) for producing the Bulletin so well for more than two years, and the very best of luck to Dr Laurel Evelyn Dyson.

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Grace Causer

**Institute for Superconducting & Electronic Materials
University of Wollongong**



‘Uncovering Hidden Nanoscale Worlds with Neutrons’

For decades, neutrons have been used to probe almost all kinds of matter to unveil hidden characteristics, such as, the dynamics of chemical reactions, the performance of engineering components under strain, and the properties of low-dimensional systems. In this talk, I will discuss a number of prototype thin film devices which I have investigated as part of my PhD. Specifically, the interface physics of an exemplar high-density magnetic recording device formed by ion-beam irradiation, and a magnetic thin film sensor designed to act as a safety switch in next-generation vehicles powered by hydrogen will be discussed.

Yu-wei (Wayne) Lin

**Advanced Drug Delivery Group
Faculty of Pharmacy, University of Sydney**



‘Developing New Ways to Treat ‘Superbugs’ using Old Antibiotics: Are We There Yet?’

Antimicrobial resistance is one of the greatest threats to human health globally. Multidrug-resistant (MDR) *Pseudomonas aeruginosa* is at the top of the 2017 WHO Priority Pathogen List. As no novel classes of antibiotics will be available for many years to come, polymyxins, a class of ‘old’ antibiotics, are being increasingly used as a last-line therapy for lung infections caused by MDR *P. aeruginosa*. The overarching aim of my PhD was to investigate the pharmacokinetics/pharmacodynamics/toxicodynamics of inhaled polymyxins, to maximise antimicrobial efficacy, while minimising toxicity and the emergence of resistance.

Cara Van Der Wal

**School of Life and Environmental Sciences
University of Sydney**



‘Reconstructing the Phylogeny and Evolutionary History of Mantis Shrimps using Molecular Data.’

Mantis shrimps (Crustacea: Stomatopoda) are ecologically and often economically significant crustaceans, being dominant predators in many coastal ecosystems and serving as an important fisheries resource. Despite these unique attributes much remains unknown about stomatopod systematics, evolution and phylogeny. To fill this knowledge gap, I used molecular sequence data to estimate the phylogeny and evolutionary timescale of the group. The results of this study have significantly added to the knowledge of stomatopod evolution and diversification, suggesting systematic revisions may be required.

2018 Events

Royal Society – Southern Highlands Branch

Date*	Event	Speaker	Topic	Location**
15-Feb-18	Public Lecture	Dr Madeleine Beekman	Are You Smarter than a Slime Mould?	Mittagong RSL
15-Mar-18	Public Lecture	Dr Bradley Tucker	Black Holes and the Milky Way	Mittagong RSL
19-Apr-18	Public Lecture	Prof Anne Cutler	Babies are Working Harder than We Think	Mittagong RSL
17-May-18	Public Lecture	Prof Gordon Parker	Anti-depressants	Mittagong RSL
21-Jun-18	Public Lecture	Dr David Suggett	Future Reefs: How climate change will impact coral reefs	Mittagong RSL
19-Jul-18	Public Lecture	Dr Ken McCracken	t.b.a.	Mittagong RSL
16-Aug-18	Public Lecture	Dr Philip Cam	Philosophy in Schools	Mittagong RSL
20-Sep-18	Public Lecture	Prof Bert Roberts	Aboriginal Art from 65,000 years ago	Mittagong RSL
18-Oct-18	Public Lecture	Hugh Mackay	The State of the Nation Starts in Your Street	Mittagong RSL
15-Nov-18	Public Lecture	t.b.a.		Mittagong RSL

*Lectures are the third Thursday of each month.

** 1st Floor, Room Joadja/Nattai. Note change of venue due to renovations of usual location.

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Professor Madeleine Beekman to speak on **‘Are You Smarter than a Slime Mould?’**



Professor Madeleine Beekman is professor of Behavioural Ecology at the University of Sydney. She did her PhD at the University of Amsterdam and was a Post Doctoral researcher at the University of Sheffield before she moved to Australia in 2001. Madeleine has held prestigious research Fellowships such as an Australian Research Council (ARC) Queen Elizabeth II Fellowship (2003-2012), an ARC Future Fellowship (2013-2016) and a Sydney University Senior International Research Fellowship (2006-2010). She has been editor of numerous scientific journals and is currently deputy Head of School of the School of Life and Environmental Sciences as well as Chair of Ecology, Evolution and Environment. Her main model organism beside Slime Moulds is honey bees.

Professor Beekman will raise the question of whether Slime Mould’s achievements are just ‘cute’, worthy of mentioning in passing, but nothing to take too seriously? or do they hint at the fundamental processes underlying all decision making and, more broadly, ‘Cognition’? The Slime Mould is a unicellular organism without so much as a single neuron. Is it as smart as we are with our large brain? The Slime Mould has emerged as a model system for decision making since, despite its simplicity, it is capable of rather complex behaviour: not only is it able to detect the presence and location of food, its chemical senses allow it to discriminate between oats from Woolworth’s and Coles.

Anne Wood FRSN

Royal Society of New South Wales & Sydney Mechanics' School of Arts

The Enlightenment Series 2018

Date*	Event	Speaker	Topic	Location**
5-Feb-18	Public Lecture	Kim McKay, AO	Learning, Adaptation and the Enlightenment: The Museum	Sydney Mechanics School of Arts***
1-Mar-18	Public Lecture	Paul Brunton, OAM	Learning, Adaptation and the Enlightenment: The Library	Sydney Mechanics School of Arts***
5-Apr-18	Public Lecture	George Paxinos, AM	Sophistry - Global Deflation: The Enlightenment has Failed!	Sydney Mechanics School of Arts***

* Monday 5 February 2018, 6pm for 6.30 to 7.30pm. Light refreshments will be served.

Cost: \$15 members of RSNSW and SMSA, \$20 non-members

Registration: <https://smsa.org.au/events/event/the-enlightenment-series-3/>

** Mitchell Theatre, Level 1, Sydney Mechanics School of Arts, 280 Pitt St, Sydney (near Town Hall Station)

Kim M^cKay AO

Director and CEO, The Australian Museum

‘Learning, Adaptation and the Enlightenment: The Museum’



This is the third in a series of lectures on the theme ‘Is the Enlightenment dead?’ Join Kim M^cKay, Director and CEO of the Australian Museum, as she talks about the Museum’s 190-year history and its evolution as an expression of the Enlightenment.

The Australian Museum, along with its sister museums in Victoria and South Australia, was a major focus of the intellectual life of colonial Australia and at the forefront of contemporary science and natural history research. Kim will also address the Museum’s recent transformation during her tenure as Director and CEO, and the challenges that lie ahead, particularly visitation, digitisation and international collaboration and why Museums will continue to play an important role in shaping society.

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The Enlightenment Series

Kim McKay AO, the Australian Museum's first female Director, has led the transformation of the Australian Museum into one of the world's pre-eminent natural history and cultural institutions.

She co-founded the Clean Up Australia and Clean Up the World campaigns. She also co-created The Genographic Project, the world's largest DNA population study, for the National Geographic Society.

Kim was made an Officer of the Order of Australia, in 2008, for distinguished service to the environment and the community. She is featured in the book *The Power of 100...One Hundred Women who have Shaped Australia*.



Distinguished Fellow of the Royal Society of New South Wales Professor Michelle Simmons named 2018 Australian of the Year



Prof Michelle Simmons

Michelle Simmons DistFRSN, quantum physicist and Scientia Professor at the University of NSW, was named this year's Australian of the Year. The award recognises her pioneering research and leadership in quantum computing, a field which could revolutionise the time required for complex computations. In accepting the award, she noted that the team she leads as Director of the Australian Research Council Centre of Excellence for Quantum Computation and Communication Technology were 'pushing the frontiers of technology'. Last year she also founded Australia's first quantum computing company: 'We want to build not just a quantum computer, but a quantum computing industry.'

Professor Trevor McDougall FRSN was also acknowledged in the Australia Day Awards as a Companion of the Order of Australia for his leading work in the role oceans play in climate change.

Report of the 1259th OGM

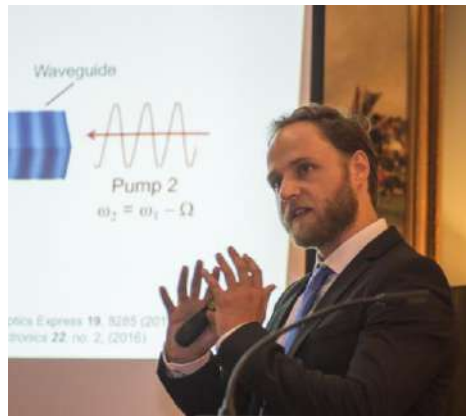
Wednesday 6th December 2017

Presentation of Jak Kelly Award & Christmas Party

Moritz Merklein

Department of Physics, University of Sydney

'How to Store Light: An Optical Memory Based on Sound Waves'



Moritz Merklein delivers his lecture at the Jak Kelly Award Ceremony

Moritz Merklein received the Jak Kelly Award as winner of a competition conducted by the Australian Institute of Physics (NSW). The award was created in honour of Professor Jak Kelly, who was Professor of Physics at UNSW and also President of the Royal Society of NSW. Its purpose is to encourage excellence in postgraduate research in Physics.

Moritz's thesis focused on realising a memory for optical data that is based on sound waves and has the potential to revolutionise next-generation computer chips. Photonic interconnects can solve one of the great challenges in computing, that is, connecting different processing units without generating heat, while offering a large bandwidth and data throughput.

In his research, Moritz developed an integrated optical buffer that is based on a transfer of optical information to high-frequency hyper-sound waves. For the first time, it could be demonstrated that all the characteristics of light commonly used in optical data transmission – amplitude, phase and wavelength – can be transferred to hyper-sound waves and unambiguously retrieved afterwards. Multiple amplitude and phase levels with a GHz bandwidth could successfully be stored and retrieved, proving the compatibility of this new approach with complex telecommunication encoding schemes. His experiments also showed that light with different wavelengths can be stored as different pitched sound waves and be unambiguously retrieved afterwards preventing cross-talk between the separate wavelength channels.

Report of the RSNW & Four Academies Forum 2017

‘The Future of Rationality in a Post-Truth World’

The most recent Forum, held on 29 November 2017 at Government House, Sydney, was well attended and had a number of engaging talks. Speakers discussed the implications of the rise of a ‘post-truth’ approach to shaping public opinion. Does it have the potential to undermine the institutions upon which open, democratic societies are built? Does it advantage the propagandists and those who wish to pursue sinister agendas? What public responsibilities do the traditional and emerging media have? What should – or can – those who believe in evidence-based, objectively-determined policy do about it?

Distinguished scholars from Australia, New Zealand, and England addressed the following topics: ‘Rationality and Post-Truth: The Threat to Democratic Society’ (Dr Donald Hector); ‘Wind Turbine Syndrome: A Communicated Disease’ (Prof Simon Chapman); ‘The Brexit Experience: Evidence, Expertise and Post-Truth Politics’ (Prof James Wilsdon); ‘The Role of Evidence and Expertise in Policymaking’ (Sir Peter Gluckman); ‘Influences on Evidence ... Putting the Cart before the Horse’ (Prof Lisa Bero); ‘Why are Scientists so Quiet? ... The Public Voice of the Scientist’ (Prof Emma Johnston); ‘Algorithms of Hate: How the Internet Facilitates Racism’ (Prof Andrew Jakubowicz); and ‘Mind and Language in the Post-Truth Era’ (Prof Nick Enfield). Abstracts of the talks can be accessed at:

<https://www.royalsoc.org.au/rsnw-four-academies-forum-2017-abstracts>



Prof Mary O’Kane, Chief Scientist and Engineer of NSW, delivers her introductory comments at the Forum

The President in particular thanked Sir Peter Gluckman for coming from New Zealand for the day, and James Wilsdon for making his talk available for Paul Griffiths to deliver. Ross Gittins’s take on the day was an excellent summary and perhaps brought the complaining academics back down to earth. In discussion the good job of compare by Paul Griffiths was noted. It was also suggested that it would be good to have podcasts or YouTube videos, to make it available to a wider and more immediate audience. The Editor of the Journal and Proceedings noted that a special issue will be published with the talks, and a transcript of the day’s events is being prepared.

Schedule of RSNSW Events 2018

Date	Event	Speakers	Topics and Presentations	Location
7-Feb-18	Ordinary General Meeting	Scholarship Winners 2017	Royal Society 2017 Scholarship Presentations	Union, University & Schools Club
7-Mar-18	Ordinary General Meeting	Prof Leslie Burnett	DNA and Personalised Medicine	Union, University & Schools Club
14-Mar-18	Annual Meeting of the Four Societies	Prof Robin Grimes	tba	UNSW Colombo Theatre
4-Apr-18	Annual General Meeting	Prof Paul Fennell	tba	tba
2-May-18	Pollock Memorial Lecture	Prof Andrea Morello	tba	
18-May-18	Annual Dinner	Tom Keneally, AO	Annual Dinner, Distinguished Fellows Lecture and 2017 Awards Presentation	State Library of NSW
6-Jun-18	Ordinary General Meeting	Prof Ben Oldroyd	No sex please, we're Cape bees	tba
4-Jul-18	Ordinary General Meeting	Prof Gordon Wallace	3D Printing of Body Parts	tba
8-Aug-18	Ordinary General Meeting	Prof Muireann Irish	Neuroscience	State Library of NSW
11-19 Aug-2018	National Science Week	TBA	Royal Society of NSW Lunchtime Science Talks	
5-Sep-18	Ordinary General Meeting	Prof Richard Kemp	Eyewitness Evidence	tba
tba	Poggendorff Lecture	Prof Brent Kaiser	tba	
3-Oct-18	Ordinary General Meeting	TBA		
7-Nov-18	Ordinary General Meeting	TBA		
November	RSNSW & Four Learned Academies Forum	TBA		
5-Dec-18	Ordinary General Meeting	Jak Kelly Award Winner	2018 Jak Kelly Award Presentation & Christmas Party	tba

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