



# The Bulletin 405

The Royal Society of New South Wales

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30 November 2016

**For Your Diary:**

*Happy Holidays  
and Safe Travels*

16 February 2017

Southern Highlands Branch Lecture

Professor Adam Guastella

“Autism and Oxytocin”

6:30 pm start

Chevalier College, Bowral

(For more information, see page 4)

Watch this space  
for more announcements  
of Society events  
in the next *Bulletin*,  
which will be distributed  
late January 2017



**Patron of The Royal Society of NSW**

His Excellency General The Honourable

David Hurley AC DSC (Ret'd)

Governor of New South Wales

Public Lecture & 1249<sup>th</sup> OGM

**Presentation of Jak Kelly Award &  
Christmas Party**

Wednesday, 7 December 2016

**Dr. Matthew Barr**

School of Mathematical and Physical Science,  
Newcastle University

**“Imaging with a Deft Touch  
The Scanning Helium Microscope  
– A Modern Pinhole Camera!”**



Dr. Matthew Barr will receive the The Jak Kelly Award as the winner of a competition conducted at a recent meeting of the Australian Institute of Physics (NSW Branch). Among the candidates for the prize, Dr. Barr was judged to have made the best presentation. The award was created in honour of Professor Jak Kelly (1928 - 2012), who was Professor of Physics at UNSW and also President of the Royal Society of NSW (2005 and 2006). The award's purpose is to encourage excellence in postgraduate research in physics.

**Date:** Wednesday, 7 December 2016: 6:15 for 6:30 pm

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

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

**Party** (including drinks): \$50 for Non-Members, \$40 for members.

Reservations must be made at least 2 days in advance

**Reservations:** <https://nsw-royalsoc.currinda.com/register/event/27>

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

**All are welcome.**

# From the President



Welcome to Thomas Keneally and the 13 new fellows whom I was exceptionally pleased to write to following the November OGM! We hope they all will find Fellowship of the RSNSW fulfilling and worthwhile.

I am looking forward to the next few days, with the Reception at Government House hosted by our Vice Regal Patron, His Excellency General The Hon David Hurley AC DSC (Ret'd), Governor of NSW. The evening reception is the traditional forerunner of the Forum, but this year also celebrates the 150<sup>th</sup> anniversary of the Royal Society becoming 'Royal'. On Tuesday November 29<sup>th</sup> we return to Government House to participate in the Forum "*Society as a complex system: Implications for Science, Practice and Policy*". With speakers from all four learned Academies and the Royal Society, I expect to reach Tuesday evening having some better idea of the big picture of Society and perhaps what to do about it.

I shall make thanks on the day, but I acknowledge the tremendous work done by many – the Forum planning group, the staff at TAS and at Government House, Members of Council – to make this gathering more than a bunch of talks. Look out for a write up next week, and a special edition of the Journal with full papers and discussion.

Fellows continue to excel in their fields. New Fellow Emma Johnston FRSN, the marine biologist and TV personality, has just been

announced as Dean of Science at UNSW. We hope she will find time to engage with the Society, and that we can add value to her time as Dean. She joins Barbara Messerle FRSN and Judith Smith (new to UTS) as female Science Deans, which must be a good sign for the future of Sydney science.

Away from straight academia Janice Reid FASSA FRSN has won the Board/Management category of the 2016 AFR/Westpac 100 Women of Influence Award for her work at Western Sydney University. (See p. 4 for more information.) <http://www.100womenofinfluence.com.au/alumni/2016-2/> ).

David Black AO FRSN FAA has won the Australian Academy of Science 2017 David Craig Medal for his outstanding contribution to organic chemistry. <http://newsroom.unsw.edu.au/news/science-tech/academy-medal-eminent-chemist> . This award is particularly relevant to the RSNSW as the late David Craig was a Distinguished Fellow of the Society.

Finally, I recommend Councilor and former President Ragbir Bhathal's piece in *The Conversation* <https://theconversation.com/how-astronomy-paved-the-way-for-terra-nullius-and-helped-to-get-rid-of-it-too-66703>. In this intriguing essay Ragbir describes early Aboriginal astronomy and how its legacy formed part of the successful case against *terra nullis* that was made by Mabo in the 1990s.

Meanwhile emails continue to flow back and forth on climate change. I am sure the debate, if nothing else, is adding to global warming.

Thanks for your comments and observations (send to [president@royalsoc.org.au](mailto:president@royalsoc.org.au) ), and I hope to see you at the December OGM (when we will present the Jak Kelly award to Dr. Mathew Barr) and the Christmas Party that follows!

Brynn Hibbert FRSN

## Report of 17 November 2016 Meeting Royal Society – Southern Highlands Branch

**Professor Gordon Wallace**  
University of Wollongong

### **“The Use of 3D Printing and the Replacement of Body Parts in Medicine”**



Gordon Wallace is a leading scientist in the field of electromaterials. Currently, he is Executive Director, ARC Centre of Excellence for Electromaterials Science, Director, Intelligent Polymer Research Institute, University of Wollongong, and Director, Australian National Fabrication Facility, Materials Mode. He was NSW Scientist of the Year 2008

In 1990, Prof. Wallace established the world’s first intelligent polymer research laboratory in NSW. His work is focused on the application of nanotechnology to intelligent materials, a field that bridges nanotechnology and human biology. He emphasized throughout his lecture that research such as this is highly dependent on having interdisciplinary teams to address the many challenges that constantly arise.

It is not surprising that Prof. Wallace has developed collaborative research relationships with the inventor of the Cochlear Bionic Ear, Professor Graeme Clark and Professor Stephen O’Leary from the Cochlear Institute, as well as Professor Peter Choong from the Peter McCallum Cancer Centre where bone tumours and advanced limb reconstruction are conducted. He has also collaborated with Professor Mark Cook on the development of an implantable device to treat epilepsy, as well as on the development of novel polymer based drug delivery systems.

Professor Wallace’s present focus lies in developing bio-communications from molecular to skeletal domains to improve human performance via medical bionics. This biofabrication is now being enabled by 3D body part printing. Biofabrication aims to take a patient’s specific medical condition, whether it be cancer or diabetes, and treat it by printing a cell, bone or organ in three dimensions and inserting it into the body via surgery. Gordon Wallace predicted that in the next few years, experts will be able to treat arthritis through 3D cartilage regeneration, potentially cure type 1 diabetes with islet cell transplants, print stem cells and even use biofabrication for epilepsy detection and control in the brain.

An extraordinary development that has now become available from this research is the handheld 3D printing BioPen, developed jointly by Wallace’s team and orthopaedic surgeons at St Vincent’s Hospital in Melbourne. This landmark, mobile 3D bioprinting device could help reduce the hundreds of thousands of arthritis-related knee

and hip replacement surgeries that take place every year, reducing medical expenses and eliminating the need for patients to undergo painful and invasive surgical procedures. The major advantage of the 3D printing BioPen is that it gives surgeons an unprecedented level of control and allows them to sculpt bespoke 3D scaffolds directly into the damaged area.

Another huge advantage resulting from 3D printing of body parts is that it is now possible to research organs in 3 dimensions, rather than in 2D sheets of cells which has been the only option in previous years. Wallace’s team has now produced the “brain on the bench”, a new model offering potentially vast benefits. The team used gellan gum to create the structures. They created the bio-ink using the gellan gum which was combined with brain cells and found that the gellan gum help the brain cells grow well and function as a network, mimicking a real brain. Wallace believes that having such a 3D model will help give scientists a much more accurate image of what is really going on in the brain. This should then propel research into diseases like Alzheimer’s and Parkinson’s disease.

The rate of change in this research field is astonishing. Gordon Wallace told the 60 person audience that he sees rapid advances and new applications on a weekly basis, never knowing what the next day may bring. He attributes this extraordinary development rate partly to the Australian government backing of the 3D printing industry, and the cost-effective price of customised medical 3D printers – approximately \$30,000 each. Another factor is the huge interest and involvement shown in worldwide research. Wallace pointed out however that the rate of implementation of these new applications is still dependent on factors beyond the laboratory such as community acceptance and regulation. In an effort to address these potential hurdles, Wollongong University has taken the initiative of running the first ever “101” courses on 3D printing and biofabrication, available on-line to experts and the general public alike.

An exciting lecture.

**Anne Wood FRSN**

# AFR/Westpac 100 Women of Influence Award To Emeritus Professor Janice Reid FRSN



Former Vice Chancellor of the University of Western Sydney, Emeritus Professor Janice Reid AC FRSN FASSA has won the Board/Management category of the AFR/Westpac 100 Women of Influence Awards for 2016. The award recognises her work at the university but also for her regional reach, as chair of the Pacific Friends of the Global Fund, where she helps developing nations with their strategies against malaria, TB and HIV.

In 16 years leading the University of Western Sydney, Jan transformed it from an uneasy alliance of three former colleges into one of Australia's most progressive and respected institutions, creating a new medical school in part to help address the under-supply of medical practitioners and relatively poor population health profile of Western Sydney. In her current role, Jan is helping boost public health outcomes for developing nation neighbours, fighting malaria, TB, and HIV/AIDS. Jan has served on numerous health, cultural and education boards including the National Library of Australia, UniSuper, Integral Energy, and the Art Gallery of NSW.

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## ***Prof Adam Guastella ... Continued from page 1***

Professor Adam Guastella is a Principle Research Fellow in Sydney University's Brain & Mind Research Institute. Professor Guastella is clinical psychologist whose overarching interest is in using neuroscience to inform and develop novel treatments for young people with mental health problems. These include anxiety, autism, psychosis, and substance dependence.

Prof. Guastella initiated research that revealed the powerful effects of oxytocin administration on enhancing face-perception and the cognitive processing of social stimuli by humans. Subsequently, Prof Guastella's team was the first in the world to show that such medication can improve the social interactions of young children with autism. This research now being conducted at sites across Europe, Asia, and Australia focuses on identifying better who



responds to treatment plus the wider aim of understanding bonding and attachment.

Prof. Guastella has also treated over 400 young people with social anxiety. His program combines Cognitive-Behaviour Therapy with a pre-treatment of D-Cycloserine (DCS). Together, these integrated treatments have helped the young people extinguish their fears.

# Report of the 1248<sup>th</sup> OGM

## Wednesday, 2 November 2016

### Induction of the Honourable Dame Marie Bashir AD CVO as a Distinguished Fellow



The Society's meeting on 2 November was graced by the presence of Professor The Honourable Dame Marie Bashir AD CVO FRS. At the start of the meeting, she was inducted as Distinguished Fellow of the Society for her pre-eminent service and achievements throughout her career.

Upon her graduation in medicine, Bashir took up a posting as a junior resident medical officer at St Vincent's Hospital and then to the Royal Alexandra Hospital for Children. After first living in Elizabeth Bay, Bashir and Shehadie moved their family to Pendle Hill in Western Sydney, where Bashir worked as a General Practitioner. However, wanting to assist people suffering from mental illnesses, Bashir eventually decided to take up postgraduate studies in Psychiatry.

From 1990 to 1992, she served on the New South Wales Women's Advisory Council. In 1993, she was appointed as Clinical Professor of Psychiatry at the University of Sydney and, in 1994, as the Clinical Director of Mental Health Services for the Central Sydney Area. This was a time of major reform in mental health service delivery, which contributed to

substantial change in the provision of public sector mental health services. She served until 2001. In her university role, Bashir was instrumental in developing collaborative teaching programs between colleagues in Vietnam and Thailand with Australian psychiatrists, chairing the University of New South Wales Third World Health Group (1995–2000) and supporting various financial and social support programmes for International students.

In early 2001, Bashir was appointed Governor of New South Wales, making her the state's first female governor and the first governor of any Australian state of Lebanese descent. During her term as Governor of NSW, she was Vice-Regal Patron of the Society.

### Prof. E. James Kehoe FRSN talks on Advances in Instructional Design

Prof. Kehoe gave a lively talk on recent advances in research and theory concerning human cognition and their implications for assisting learners, especially when first introduced to a new body of knowledge or skill. He emphasised the following take-home, practical messages:

- (1) Optimise the load on working memory. It can barely juggle three to four items or operations at one time. For a beginner, every added detail can be a source of overload.
- (2) Organise; don't memorise. New information is best stored and retrieved when the learner concentrates on compiling it into a useful structure, rather than trying to impress it on memory through mere repetition.
- (3) Provide multiple worked examples for beginners to study rather than "front loading" them with theory.
- (4) Encourage self-testing as part of study.
- (5) Encourage patience; allow time for spacing of study and practice.

The schedules for next year's events are still being formulated. Please watch this space. In the mean time:

Happy (I offer this statement without representation or warranty as to the effects or repercussions thereof upon any and all persons who might elect to celebrate the holiday as represented therein and with the understanding that any persons taking such actions without such representation or warranty do so with the express understanding that they have agreed to indemnify and hold me harmless from the effects thereof) Holidays!  
- The Editor

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