



# The Bulletin 439

The Royal Society of New South Wales

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February 2020

## For Your Diary:

**Thursday 20 February 2020**

Royal Society of NSW

## Liversidge Lecture

Scientia Professor

**Martina Stenzel**

School of Chemistry, UNSW Sydney

**“The journey from simple polymers to nano-football: opportunities for better cancer treatment”**

**Venue:** The Galleries, John Niland Scientia Building, UNSW Sydney)

(For more information, see p. 4)



**Patron of The Royal Society of NSW**

Her Excellency The Honourable Margaret Beazley AO QC  
Governor of New South Wales

## 1280th OGM & Open Lecture

## Presentation by 2020 Royal Society of NSW Scholarship Recipients:

**Emma Austin, University of Newcastle**

*Drought and wellbeing in Australian rural communities: implications for improving adaptive capacity and resilience to drought*

**Shayam Balaji, University of Sydney**

*Searches for Extended Higgs Sectors, Flavour Physics Anomalies and Dark Matter at the LHC*

**Michael Papanicolao, University of Technology Sydney and the Garvan Institute**

*Charting the Extracellular Matrix Through Breast Tumour Progression*

**Thomas Pettit, University of Technology Sydney**

*Botanical biofilters for the phytoremediation of urban air pollutants*  
*See page 3 for more information*

**Date:** Wednesday, 12 February 2020, 6.00pm for 6.30pm

**Venue:** Gallery Room, State Library of NSW (Entrance: Shakespeare Place, Sydney)

**Entry:** \$25 for Non-Members, \$15 for Fellows, Members and Associate Members of the Society, \$5 Students (including a welcome drink)

**Dress Code:** Smart Casual

**Dinner (Including Drinks):** \$120 for Non-Members, \$100 for Fellows, Members and Associate Members, \$75 for students. Reservations close Monday, 10th February at 9:30am.

**Enquiries:** RSNSW Secretariat Phone: 9431 8691

**All are welcome:** [Click Here to Register](#)

# From the President



## **The Science of Climate Change**

Questions about climate change have been much on the minds of Australians as we have watched this summer's terrifying bushfires. Given the amount of confusion and misinformation that circulates about climate change, I thought it could be a service to our Members and Fellows to draw attention to an authoritative source of information, one you can trust. This is a nicely written and quite short (30 pages odd) pamphlet put out by the Australian Academy of Science, called "The Science of Climate Change: Questions and Answers". The 2015 version of the publication is available free of charge, and in a variety of formats, on the [Academy of Science website](#)

This is a meticulously prepared statement of the scientific case, at a level intended for the intelligent general public. It does not present the opinions of individuals, but rather the evidence and the science as assessed by an expert group. It is measured, non-judgemental, non-partisan, and based entirely on evidence.

The pamphlet contains nine chapters, centred around nine questions. After the first deceptively simple question of "What is Climate Change?", the second is "How has climate changed?" I was interested in a figure showing together temperature and CO<sub>2</sub> levels over different time intervals. It shows an extraordinarily detailed correlation between CO<sub>2</sub> levels and temperature over an 800,000 year interval. Perhaps better known is the alarming increase in both CO<sub>2</sub> levels and temperature since the Industrial Revolution.

If you want to be able to discuss climate change with your friends, family and acquaintances in a sensible way, I thoroughly recommend that you read this little work.

To finish this message, it gives me enormous pleasure to welcome the new Editor of our Bulletin, Mr Tim Humphrey. It's great to have you with us, Tim!

Ian H. Sloan AO FAA FRSN  
President  
Royal Society of New South Wales  
[President@royalsoc.org.au](mailto:President@royalsoc.org.au)

## Presentation by 2020 Royal Society of NSW Scholarship Recipients

The evening's program comprises four short talks presented by PhD Candidates who have been awarded Royal Society of NSW Scholarships for 2019.

**Ms Emma Austin** — *Drought and wellbeing in Australian rural communities: implications for improving adaptive capacity and resilience to drought*

Ms Austin's research investigates the relationship between drought and wellbeing in rural communities in NSW, taking into account the links between wellbeing and adaptive capacity, and the need for the successful adaptation to drought together with increased resilience which is essential for the survival of rural communities.

**Mr Shayam Balaji** — *Searches for Extended Higgs Sectors, Flavour Physics Anomalies and Dark Matter at the LHC*

Mr Balaji's research is in the field of particle physics which explores the fundamental building blocks of the Universe and the interactions between them. The focus of his work, as a member of the ATLAS Collaboration at CERN's Large Hadron Collider, is in testing exotic Higgs boson models and extensions to the Standard Model of Particle Physics.

**Mr Michael Papanicolao** — *Charting the Extracellular Matrix Through Breast Tumour Progression*

Mr Papanicolao's research involves investigations into the role of the extracellular matrix (ECM) in breast tumour progression. The focus of his work is on charting how the ECM evolves with tumour progression, using protein mass spectrometry and advanced imaging to identify targetable proteins that are important in breast cancer metastasis.

**Mr Thomas Pettit** — *Botanical biofilters for the phytofiltration of urban air pollutants*

Mr Pettit's research is in the field of biofilter technology, in which he has been developing and assessing the use of active green walls to clean the air of active pollutants to provide functional reductions of air pollution in zones where they are most needed.

# Royal Society of NSW Liversidge Lecture

Scientia Professor

## Martina Stenzel



Thursday  
20 February 2020

Venue: The Galleries,  
John Niland Scientia  
Building, UNSW Sydney

5.30 for 6.00pm

**Liversidge Lecture**, to be presented by the 2018 awardee, Professor Martina Stenzel FAA. The Liversidge Lecture is awarded at intervals of two years for the purpose of encouraging research in Chemistry. It was established under the terms of a bequest to the Society by Professor Archibald Liversidge MA LL D FRS, who was Professor of Chemistry in the University of Sydney from 1874 to 1907 and was one of the Council members who sponsored the Society's Act of Incorporation in 1881.

**The journey from simple polymers to nano-football: opportunities for better cancer treatment**—Professor Stenzel will take the audience on a journey from simple polymers that are widely used for commodity polymers to highly complex nanoparticles that have shapes of footballs, pancakes and bamboo-sticks. These nanoparticles can now be filled with anti-cancer drugs to facilitate the delivery of therapeutic goods into cancer cells. Our main purpose is to understand how the shape and size of these nanoparticle affect the interaction with healthy and cancerous cells.

**Scientia Professor Martina Stenzel** studied Chemistry at the University of Bayreuth, Germany, before completing her PhD in 1999 at the Institute of Applied Macromolecular Chemistry, University of Stuttgart, Germany. She started as a postdoctoral fellow at UNSW in 1999 and is now a full Professor in the school of chemistry as well as co-director of the Centre for Advanced Macromolecular Design (CAMD) and the ARC training center for chemical industries. Her research interests focus on the synthesis of functional nanoparticles for drug delivery applications. She is interested in exploring the relationship between the structure of the underpinning polymers and the resulting nanoparticle shape and size, which will ultimately influence the biological activity. Martina Stenzel published more than 300 peer reviewed papers on polymer and nanoparticle design. She is scientific editor of *Materials Horizons* and serves currently on a range of editorial boards. She received a range of awards including the 2011 Le Fèvre Memorial Prize of the Australian Academy of Science. Martina Stenzel is a Fellow of the Academy of Science and is currently chair of the Academy's National Chemistry Committee.

Advance Notice -  
Southern Highlands Lecture  
Thursday 20 February 2020

**Professor John Thompson**  
(Retired) Head of the Sydney Melanoma Unit

# ‘Melanoma Detection and Treatment’



**Temporary change of venue:**  
**Thursday 20 February 2020**  
**(due to recent bushfires)**

**Moss Vale Services Club**  
**Venue: Cnr Argyle / Yarrawa streets,**  
**Moss Vale, 2577**  
**6 for 6.30pm**

Professor John Thompson is Professor of Melanoma and Surgical **Oncology** at The University of Sydney. He was the Director of Sydney Melanoma Unit from 1998 and thereafter Executive Director of the Melanoma Institute Australia until the end of 2016. He was a member of the Board of Directors on inception of the company in 2007 until December 2016. He is author of over 700 peer-reviewed scientific articles and holds positions on the editorial boards of several international journals.

Prof Thompson is a past President of the International Sentinel Node Society, and was Chairman of the Australian and New Zealand Melanoma Trials Group for 15 years. He is a member of the Melanoma **Staging** Committee of the American Joint Committee on Cancer, and chairs the Working Group that is updating the Australian Clinical Practice Guidelines for the Management of **Cutaneous** Melanoma.



Report of the 1279<sup>th</sup> OGM  
Wednesday 4th December 2019

**Ms Gayathri Bharathan**  
Macquarie University

**‘ALL-INTEGRATED MID-INFRARED LASER SOURCES’**



Ms Gayathri receiving her Jak Kelly Award from Mrs Irene Kelly

The infrared (IR) part of the electromagnetic spectrum is sub-divided into the near (0.8 – 2  $\mu\text{m}$ ), mid (2-15  $\mu\text{m}$ ) and far (15-1000  $\mu\text{m}$ ) infrared region. Amongst those three, the mid-IR is of particular relevance as it corresponds to photon energies that overlap with the strong vibrational molecular resonances of most common constituents of atmospheric gases and with liquid water. Potential applications include but are not limited to environmental monitoring, trace molecular detection (e.g. for airport security screening) as well as non-invasive breath analysis where the presence of certain molecules in the human breath can be used as an indicator of a specific disease.

With numerous advantages, fibre lasers represent the ideal light sources for most applications and have therefore become the most widespread used type of lasers in the near-IR. In contrast, mid-IR fibre laser technology is still in its infancy, mainly due to the nonexistence of fibre coupled optical components required to form an all-fibre cavity, which severely limits their applicability. The possibility to utilize femtosecond lasers to directly inscribe high-quality and robust integrated components such as fibre Bragg gratings as well as in-fibre polarizers opens a new avenue for the development of future mid-IR all-fibre laser systems. The aim of my research work is therefore to investigate the fabrication of integrated components in mid-IR compatible glasses for the development of high beam quality all-fibre mid-IR lasers.

# Announcement of Awards for 2019



The recipients of the Society's Awards for 2019 were also recently announced at the December OGM:

- **The James Cook Medal** for outstanding contributions to science and human welfare in and for the Southern Hemisphere. This medal is the Society's most prestigious award. The 2019 James Cook Medal is awarded to **Scientia Professor Matthew England** from the University of New South Wales.
- **The Clarke Medal** – for distinguished research in the natural sciences conducted in Australia and its territories. The 2019 award is in the field of geology. The 2019 WB Clarke Medal is awarded to **Professor Dietmar Müller** from The University of Sydney.
- **The Edgeworth David Medal** – for distinguished contributions by a young scientist under the age of thirty-five years, for work done mainly in Australia or its territories; or contributing to the advancement of Australian science. The 2019 Edgeworth David Medal is awarded to **Professor Si Ming Man** from the Australian National University.
- **The History and Philosophy of Science Medal** - in recognition of outstanding achievement in the History and Philosophy of Science with preference being given to the study of ideas, institutions, and individuals of significance to the practice of the natural sciences in Australia. The 2019 Royal Society of NSW History and Philosophy of Science Medal is awarded to **Professor Evelleen Richards** from The University of Sydney.
- **The Walter Burfitt Prize** - awarded at intervals of three years to a pure or applied scientist, resident in Australia or New Zealand, and whose papers and other contributions published during the past six years are deemed of the highest scientific merit. The 2019 Walter Burfitt Prize is awarded to **Professor Kourosh Kalantar-Zadeh** from the University of NSW.

# New Fellows & Members

At the **December OGM** Fellowships were awarded to Professor Sean Brawley, Professor Venni Krishna & Professor Hala Zrieqa. Mr Guy Loucks became a Member. Congratulations to all!



Vice-President, Mr John Hardie FRSN congratulates **Professor Sean Brawley** on receiving his Fellowship

**Professor Hala Zrieqa** receives her certificate from Mr Hardie



**Professor Venni Krishna** receiving his fellowship certificate from Vice President Mr Hardie





**Additional Report of 21 November 2019**

**Royal Society of NSW  
Southern Highlands Branch**

**Dr Steve Harrison's  
Bushfires devastation**



We reported in the last edition of the RSNSW Bulletin that the day before Dr Steve Harrison was to deliver the last lecture of the year to the Royal Society Southern Highlands Branch, the Powerhouse Museum launched its Willoughby Bequest 2020 Commissioning Program. Its media release commissioned six artists who work across glass and ceramics to create a new work for the Powerhouse Museum's collection. One of the artists chosen was our speaker, ceramicist Steve Harrison.

In 2017, the Powerhouse Museum received one of its most significant bequests from Barry John Willoughby, a passionate Sydney based collector of decorative arts.

Willoughby bequeathed objects from his private collection along with funds for acquisition of works by contemporary artists who work with clay or glass. The day before Steve was to deliver his lecture to an audience of 90, Lisa Havilah, Chief Executive Powerhouse Museum stated "The Powerhouse is grateful that this bequest has enabled the Museum to commission new works from six Australian artists working in his honor."

As we now know, soon after that excellent lecture in November, Steve's tiny hamlet of Balmoral in the Southern Highlands was decimated by horrendous fires. **Dr Steve Harrison made headline news around the world** when he miraculously survived by sheltering in a makeshift "coffin" which he quickly constructed from ceramic fiber. Unfortunately, although he was able to save his home, the fires ravaged his studios, workshops, works of art and precious materials.

Dr Steve Harrison says now that there seems little chance that he can ever honor that prestigious appointment and produce his original work for the Powerhouse collection.

now online

Royal Society of NSW  
Journal and Proceedings

vol. 152, part 2, 2019

The December 2019 issue of the *Journal & Proceedings* is now [on-line](#), the printed version is being mailed out to subscribers. There are **six papers**: three submitted, two commissioned, and one a reprint.

Topics include:

- The fragment of a Hebrew book found in the binding of a C17th book in Fisher Library,
- The science of red meat in NSW,
- The first drawings in the Colony of Botany Bay,
- Measuring the speed of light and how this led to Einstein's breakthroughs,
- An historical review of the development of plastics (polymers), and the psychology of perception in Aboriginal bark paintings.

There are **five PhD thesis abstracts**, and an obituary of historian Ann Moyal FRSN.

The Proceedings include the **2019 award winners** and the **newly gazetted Fellows of the Society**.

The Royal Society of NSW

“... for the encouragement of studies and  
investigations in Science Art Literature and Philosophy ...”

# Royal Society of NSW

## Other News

- **Interested in nominating for Council?** Please send your submission to royalsoc@royalsoc.org.au before close of business **12 March 2020**. Nomination forms have recently been emailed to all members by Rachel Greenwood. Positions will be appointed at the upcoming Annual General Meeting in April.
- **Australia Day honours** were recently awarded to our patron The Honourable **Margaret Beazley**, Governor of New South Wales. Her Excellency received the award of Companion of the Order of Australia (AC) for eminent service to the people of New South Wales, particularly through leadership roles in the judiciary, and as a mentor of young women lawyers. Mr **Robyn Williams** received the award of an Honorary Officer of the Order of Australia (AO) for distinguished service to science as a journalist, radio presenter and author, and to education.
- The Society has recently offered members an opportunity to collectively support the **Red Cross Bushfire Appeal**. Our group fundraising initiative has already raised over \$3,000 and donations can be made via [Currinda](#) or the Society's bank account:

Royal Society of NSW  
BSB: 062-031  
Account Number: 0090 0043

- For members travelling to Melbourne, our sister organisation, **The Royal Society of Victoria**, offers guided tours of its Hall (which is not normally open to the public). These take place every Thursday between 12:30 and 1:30pm at 8 La Trobe Street in the CBD.



RSV Hall 8 La Trobe Street

## News to share?

Feel free to send through relevant news which may be of interest to fellow members, to Bulletin Editor  
Tim Humphrey  
[timh@spatialgroup.com.au](mailto:timh@spatialgroup.com.au)

# Royal Society of NSW Other News

(continued)

SOLD OUT BY  
POPULAR DEMAND

## Speaking of Music... The Magic of Solo Violin

(A joint event with the Sydney Mechanics' School of Arts)

Interspersed with live performances of two complete works for the violin, Dr David Hush will outline the historical reasons that the unaccompanied violin recital is more the exception than the rule today, and explore the ways composers who came before Bach influenced his music, and how Bach, in turn, influenced later composers.

Performances by Anna Da Silva Chen:

- *Sonata for Solo Violin No. 1 in G minor BWV 1001* — J.S. Bach
  - *Partita for Solo Violin* (2019) — David Hush
- WORLD PREMIERE** (Commissioned by the Royal Society of NSW)



**Dr David Hush FRSN**



**Anna Da Silva Chen**

**Thursday  
27 February 2020**

**Venue: Sydney Mechanics' School of  
Arts, 280 Pitt Street, Sydney**

6pm: Registration / Drinks  
6.30 for 7.30pm Lecture

Light refreshments will be served before the  
lecture

Cost: \$15 – SMSA Members  
\$15 – Royal Society Members and Fellows  
\$20 – Guests and General Entry



## Changed your email address?

Let's keep in touch

Please let the office know if your contact details have changed. [royalsoc@royalsoc.org.au](mailto:royalsoc@royalsoc.org.au)

Date	Event	Speakers	Topics and Presentations	Location
12 Feb 20	Ordinary General Meeting	2020 RSNSW Scholarship recipients	4 short talks by RSNSW Scholarship Recipients (See pages 1 & 3)	State Library of NSW
20 Feb 20	Liversidege Lecture	Martina Stenzel	The journey from simple polymers to nano-football: opportunities for better cancer treatment	State Library of NSW
20 Feb 20	Southern Highlands Branch Public Lecture	John Thompson	Melanoma Detection and Treatment	Moss Vale Services Club
27 Feb 20	Joint Event with SMSA	Dr David Hush / Anna Da Silva Chen	Speaking of Music...The Magic of Solo Violin	SMSA, 280 Pitt Street

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