



Proceedings of the Royal Society of New South Wales

The 2014 programme of events – Sydney

The venue for Society meetings was the Union University and Schools Club, 25 Bent Street, Sydney unless noted otherwise.

Wednesday 6 February 2014

1218th Ordinary General Meeting - Scholarship Presentations

Mr John Chan (Pharmacology, University of Sydney)

Ms Jessica Stanley (Chemistry, University of Sydney)

Mr Jiangbo (Tim) Zhao (Advanced Cytometry Labs, Macquarie University)

Thursday 29 February 2014

Joint Meeting with Australian Academy of Forensic Sciences

Searching for clues: unmasking art fraud and fraudsters

Assoc. Professor Robyn Sloggett

Thursday 27 February 2014

The Four Societies Lecture

Questions about power in NSW

Professor Mary O'Kane, NSW Chief Scientist and Engineer

Venue: Hamilton Room, Trade & Investment Centre,
Industry & Investment NSW
Level 47, MLC Centre, 19 Martin Place, Sydney

The Four Societies Lecture was presented in conjunction with the Nuclear Engineering Panel of the Sydney Branch of Engineers Australia, the Australian Nuclear Association and the Australian Institute of Energy.

Wednesday 5 March 2014

1219th Ordinary General Meeting

Big data knowledge discovery: machine learning meets natural science

Professor Hugh Durrant-Whyte FRS, CEO of NICTA

Thursday 3 April 2014
Annual General Meeting

Dr Donald Hector was re-elected President of the Society.

1220th Ordinary General Meeting

The Jameson Cell

Laureate Professor Graeme Jameson AO

Wednesday 7 May 2014

Annual Dinner, 1221st Ordinary General Meeting

Royal Society of NSW 2014 Distinguished Fellows Lecture and presentation of Awards

The Royal Society of NSW 2014 Distinguished Fellows Lecture was presented by Professor Barry Jones AC Dist FRSN.

The President, Dr Donald Hector, presented the Society's 2013 awards. The Edgeworth David Medal was presented to Assoc. Prof David Wilson, for his outstanding work on modelling HIV/AIDS and using this information to develop treatment and prevention strategies. Prof. Michelle Simmons Dist. FRSN was awarded the Walter Burfitt Medal and Prize and Professor Brien Holden AM was awarded the James Cook Medal for his work in treating myopia (a leading cause of preventable blindness), particularly in developing world countries. The Clarke Medal was awarded to distinguished geologist William Griffin, who was overseas and unable to attend.

Tuesday 13 May 2014

Joint meeting with Australian Institute of Physics and the Royal Australian Chemical Institute

The Australian Synchrotron in the International Year of Crystallography

Wednesday 4 June 2014

1222nd Ordinary General Meeting

Lessons learnt? The Global Financial Crisis six years on

Professor Robert Marks, FRSN

Wednesday 2 July 2014

1223rd Ordinary General Meeting

What causes MS? The impact of the genetic revolution

Professor Graeme Stewart AM

Wednesday 6 August 2014

1224th Ordinary General Meeting

Science: essential education and the role of the Australian Academy of Science
Emeritus Scientia Professor Eugenie Lumbers AM Dist FRSN FAA

Wednesday 3 September 2014

1225th Ordinary General Meeting

The Fourth Dimension and Beyond: the paradox of working in unimaginable worlds
Scientia Professor Ian Sloan AO FRSN

Wednesday 1 October 2014

1226th Ordinary General Meeting

Australia's most spectacular environmental rehabilitation project: Phillip Island, Pacific Ocean
Dr Peter Coyne

Wednesday 5 November 2014

1227th Ordinary General Meeting

A Drop of Optics
Dr Steve Lee and Dr Tri Phan, joint winners of the 2014 ANSTO Eureka Prize
for Innovative Use of Technology

Thursday 20 November 2014

The Liversidge Research Lecture 2014

Recent Studies on the Total Synthesis of Natural Products and Related Systems
Professor Martin Banwell, Research School of Chemistry, Institute of Advanced
Studies, Australian National University, Canberra

Professor Banwell is an organic chemist and is one of Australia's most
accomplished researchers into the synthesis of complex organic compounds.

The Liversidge Research Lecture is presented by Royal Society of NSW, in
conjunction with the University of Sydney and the Royal Australian Chemical
Institute.

Venue: Lecture Theatre 4, School of Chemistry, Eastern Avenue, University of
Sydney

Wednesday 3 December 2014

1228th Ordinary General Meeting

RSNSW 2014 Jak Kelly Award Presentation and Society's Christmas Party

Awarded to Ms Lhin Tran, a third-year PhD student at the Centre for Medical
Radiation Physics (CMRP) at the University of Wollongong.

Presented by Mrs Irene Kelly, widow of Professor Kelly.

Tuesday 9 December 2014

Dirac Lecture

The Beauty and Serendipity of Blue Sky Research

Professor Serge Haroche, Head of the Collège de France, Paris

Professor Haroche (jointly with David J. Wineland) was awarded the 2012 Nobel Prize for Physics for ground-breaking experimental methods that enable measuring and manipulation of individual quantum systems, for their work on understanding the photon.

The Dirac Lecture was presented by the University of New South Wales, in conjunction with the Royal Society of NSW and the Australian Institute of Physics.

Venue: Tyree Room, John Niland Scientia Building, University of New South Wales





Proceedings of the Royal Society of New South Wales

The 2014 programme of events – Southern Highlands Branch

The usual venue for Southern Highlands branch meetings is the Performing Arts Centre, Chevalier College, Bowral.

Thursday 20 February 2014 at 6:30 pm.

Forensic Entomology

Dr James Wallman

Thursday 20 Mar 2014 at 6:30 pm.

Building Sustainability

Professor Paul Cooper

Thursday 17 April 2014 at 6:30 pm.

Using lasers to create the coldest stuff in the universe

Professor Ken Baldwin

Thursday 15 May 2014 at 6:30 pm.

The relationship between baroque music and senile dementia

Dr Chistian Heim

Thursday 19 June 2014 at 6:30 pm.

The Good Life

Hugh MacKay

Thursday 17 July 2014 at 6:30 pm.

The Royal Society and Gulliver's Travels

Emeritus Professor Clive Probyn

Thursday 14 Aug 2014 at 6:30 pm.

Green materials and recycling end-of-life polymers in steelmaking

Scientia Professor Veena Sahajwalla

Thursday 16 Oct 2014 at 6:30 pm.

Higgs-Boson and CERN

Professor Kevin Varvell

Thursday 6 Nov 2014 at 6:30 pm.

Bees in the food chain – economy and threats

Dr Madeleine Beekman

Thursday 20 Nov 2014 at 6:30 pm.

Genes and their relationship with Epigenes

Dr Catherine Suter





The Distinguished Fellows Lecture 2014

Wednesday, 3 April 2013

Evidence, opinion and interest – the attack on scientific method

Professor Barry Jones AC Dist FRSN FAA FTSE FASSA FAHA



Professor Barry Jones delivering the Distinguished Fellows Lecture.

The Society was proud to have Professor Barry Jones present the Fellows Lecture on Wednesday, 7 May 2014. Professor Jones is the only person to have been elected a Fellow of all four of Australia's National Academies.

Science and research generally are given disturbingly low priority in contemporary public life in Australia, although medical research and astronomy may be exceptions. Scientists, especially those involved with climate change, or the environment, have come under unprecedented attack, especially in the media, and the whole concept of scientific method is discounted, even ridiculed. In a complex world, people seem to be looking for simple solutions that can be

expressed as slogans, and the quality of public debate on scientific issues has been trivialised, even infantilised. The controversy on anthropogenic global warming (AGW) has been conducted at an appalling level on both sides of politics. (Debates on refugees and taxation have been conducted at a similar level.) Vaccination, fluoridation and even evolution are hotly, but crudely, disputed in some areas. Despite Australia's large number of graduates (more than 4,000,000), our 38 universities and intellectual class generally have very limited political leverage and appear reluctant to offend government or business by telling them what they do not want to hear. Universities have become trading corporations, not just communities of scholars. Their collective lobbying power seems to be weak, well behind the gambling, coal or junk food lobbies and they become easy targets in times of exaggerated budget stringency. Paradoxically, the Knowledge Revolution has been accompanied by a persistent 'dumbing down', with ICT reinforcing the personal and immediate, rather than the complex, long-term and remote. In a democratic society such as Australia, evidence is challenged by opinion and by vested- or self-interest. Australia has no dedicated Minister for Science with direct

ownership / involvement in promoting scientific disciplines. If every vote in Australian elections is of equal value, does this mean that every opinion is entitled to equal respect? It is easy to categorise experts as elitists, and out of touch. There are serious problems in recruiting science teachers, and numbers of undergraduates in the enabling sciences and mathematics are falling relative to our neighbours. In an era of super-specialisation, many scientists are reluctant to engage in debate, even where their discipline has significant intersectoral connections. Science has some outstanding Australian

advocates, Gus Nossal, Peter Doherty, Ian Chubb, Fiona Stanley, Robert May, Brian Schmidt, Ian Frazer, Mike Archer among them, but they lack the coverage that is needed and that they deserve. There is a disturbing lack of community curiosity about our long term future, with an apparent assumption that consumption patterns will never change.

(The full text of Professor Jones' lecture was published in vol. 147, nos. 451 & 452, pp. 2-10.)





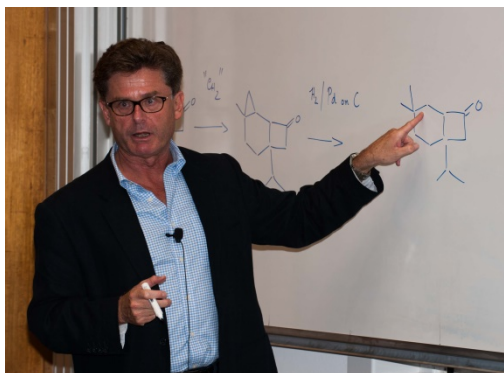
The Liversidge Research Lecture 2014

Thursday, 20 November 2014

Recent studies on the total synthesis of natural products and related systems

Professor Martin Banwell

Research School of Chemistry, Institute of Advanced Studies, Australian National University, Canberra



Professor Martin Banwell delivering the Liversidge Research Lecture 2014.

The Liversidge Research Lecture 2014 was delivered by Professor Martin Banwell at the University of Sydney on Thursday, 20 November 2014. Professor Banwell is an organic chemist and is one of Australia's most accomplished researchers into the synthesis of complex organic compounds. In this year's Liversidge Research Lecture, he described work that has been done in his group over a number of years to synthesise materials that have wide-ranging applications, especially as pharmaceuticals.

The starting point for his work is a family organic chemicals called arenes. These are substances based on a structure of six carbon atoms arranged in a ring, with each carbon atom having a hydrogen atom attached – this substance is known as benzene. Some of the hydrogen atoms can be replaced by other substituents, for example, instead of one of the hydrogen atoms, methyl, bromine, chlorine, trifluorocarbon, hydroxyl, carboxyl etc. groups can be substituted. These can then be used as building blocks, using a variety of synthetic pathways, to make much more complex substances.

Until quite recently, many of these syntheses were done using a variety of chemical reactions that have been developed by organic chemists over the last 150 years. One of the problems that arises with this approach is that substances with the same chemical formula can have different shapes. For example, substances can have the same chemical formula but be mirror images of each another, in much the same way as the

right-hand is the mirror image of the left-hand – these are called enantiomers. Often, one enantiomer will have little physiological effect in comparison to the other. In the last 15 years or so, genetically-modified organisms have been developed that allows synthesis of these substances that favours production of the biologically-active enantiomer.

Professor Banwell described his work to develop synthetic pathways, starting with the simple substances described above and reacting these with genetically modified *e. coli* to produce an arene with two adjacent hydroxyl groups, in addition to the other reactive site. This results in an intermediate that allows a great variety of subsequent synthetic pathways, allowing synthesis of a very large number of biologically active substances. Two examples of these are vitamin C and the influenza drug Tamiflu.

Professor Banwell went on to describe a complex sequence of reactions that has enabled his group to synthesise a substance called Ribisin C, the substance that, at very low concentrations, appears to have a marked effect on the stimulating neurite growth in PC12 cells. (Neurites are projections that grow from neurons (nerve cells) as they develop and PC12 cells are particular type of rat neuron that is used in medical research.) It is hoped that this research work may lead to new treatments for neurological diseases and damage to the nervous system.

Professor Banwell's group is also working on novel pathways for making codeine, an opioid that is currently derived from opium poppy production. A synthetic pathway could, potentially, lead to a much less expensive production process for opiates.





The Dirac Lecture and Medal Presentation 2014

Tuesday, 9 December 2014

The Beauty and Serendipity of Blue Sky Research

Professor Serge Haroche
Head, Collège de France, Paris



Nobel Laureate Professor Serge Haroche illustrated the long road from fundamental discoveries to technological innovations by a few examples taken from his own field of research – atomic and optical physics. He reflected on the dangers that blue sky research faces in our uncertain global world and explained why it is essential to protect it and to make it thrive, in spite of the present economic difficulties.

Professor Haroche is a French physicist who was awarded the 2012 Nobel Prize for Physics jointly with David Wineland for “ground-breaking experimental methods that enable measuring and manipulation of individual quantum systems”, a study of the particle of light, the photon. Since 2001 he has been a Professor at the Collège de France and holds the Chair of Quantum Physics. He is a member of the Société Française de Physique, the European Physical Society and a fellow and member of the American Physical Society.

The Dirac Lecture is held annually by the University of NSW in conjunction with the Royal Society of NSW and the Australian Institute of Physics, NSW Branch.