



The Royal Society of New South Wales Bulletin and Proceedings 350

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October 2011

Future Events 2011

Lectures in Sydney are held on the first Wednesday of the month at the University of Sydney.

Wednesday 2 November 2011 at 6.30pm

Grid-connected Energy Storage: the Key to Sustainable Energy?

Professor Tony Vassallo, the University of Sydney

Seminar Room 102, New Law School Building, Eastern Avenue, University of Sydney.

Commemorating Governor Sir Thomas Brisbane

Thursday 1 December 2011 at 5:30pm

Annie Wyatt Room, The National Trust, Observatory Hill, Sydney

Saturday 3 December 2011 at 2pm
Parramatta Park, Parramatta

Clarke Memorial Lecture

Tuesday 13 December 2011 at 6.30pm

Professor John Dewey, University College, Oxford

Eastern Avenue Auditorium, Eastern Avenue, University of Sydney.

Southern Highlands Branch

Meetings are held on the third Thursday of each month in the Drama Theatre at Frensham School, Mittagong (enter off Waverley Parade), at 6.30pm.

November Meeting

Thursday 17 November 2011 at 6:30pm

Biomedical Science
Professor John Shine, the Garvan Institute of Medical Research

Drama Theatre at Frensham School, Mittagong (enter off Waverley Parade)

Central West Branch

For further information please contact Kerry Madden at Charles Sturt University Orange on Tel: 02 6365 7500.

The 1197th Ordinary General Meeting Grid-connected Energy Storage: the Key to Sustainable Energy?

Professor Tony Vassallo, the University of Sydney

Wednesday, 2 November 2011 at 6:30pm Seminar Room 102, New Law Building, University of Sydney



Energy storage has been described as the missing technology in modern electrical grids. The absence of storage means that a very significant fraction of generating capacity must be kept as "spinning reserve" in order to meet any instantaneous or rapidly changing demand. The integration of renewable energy sources, such as wind and solar power, introduce an additional element of intermittency which, in the absence of storage, will increase the need for spinning reserve. As the price of electricity increases, and wholesale price volatility increases, energy storage will become more attractive. Grid connected energy storage systems will be able to accommodate fluctuating

and intermittent generation sources and provide a stabilising effect. Depending on their location, energy storage systems will also be able to provide valuable network services and increase the utilisation of the grid's most expensive infrastructure. However, the technology for widespread integration of such storage systems requires substantial development. This presentation will outline the need for energy storage, how it might be used and some promising new developments in materials for electrochemical energy storage.

Professor Tony Vassallo holds the inaugural Delta Electricity Chair in Sustainable Energy Development in the School of Chemical & Biomolecular Engineering at the University of Sydney. Before joining the University in 2008, Tony was a Senior Principal Research Scientist in the CSIRO Division of Energy Technology, followed by a period of consultancy to industry and government in the field of sustainable energy technology. His primary research interests concern sustainable energy systems and energy storage. Tony is a Fellow of the Royal Australian Chemical Institute and President of the Australian Institute of Energy.

Booking is not necessary. All welcome. Entry is free to RSNSW members. There is a charge of \$5 for non-members.

Patrons of The Royal Society of NSW

Her Excellency Ms Quentin Bryce AC

Governor-General of the Commonwealth of Australia

Her Excellency Professor Marie Bashir AC CVO Governor of NSW

From the President



At the end of September I initiated a dialogue with the Australian Institute of Policy and Science (AIPS), a national group interested in promoting science and scientists and engaging the community in what science is all about. This is remarkably similar to what our Society is about so it was felt that developing a relationship with this organisation would be a good idea. AIPS is also the custodian of the Tall Poppy Campaign and manages the Young Tall Poppy Science Awards. I suspect we will be hearing more about this organisation in the future.

I am very pleased to report that the arrangements for the Clarke Memorial Lecture for 2011 are nearing completion and this year we are very fortunate to have an internationally renowned geological luminary as our Clarke Lecturer. He is Professor John F. Dewey FRS FAA, Distinguished Emeritus Professor at the University of California and Emeritus Professor and Supernumerary Fellow at University College Oxford. He is well known for his pioneering work in the field of plate tectonics and continental drift. The lecture will be held in conjunction with the Australian Academy of Science, the NSW Division of the Geological Society of Australia and the School of Geosciences at the University of Sydney. I encourage you to come along to this important lecture.

As indicated in the previous Bulletin, five action committees have been formed to pursue the five key priorities determined at Council's Strategic Planning meeting in May. We are keen to get as much involvement from members as possible in determining the future directions of the Society so I would encourage all members to contact one of the leaders of the committees and see how you can help.

John Hardie

New Members

Five new members were announced at the October meeting of the Society:

Antony Lyndon Bailey - Full Member
Salvatore Sebastiano Gambacorta - Full Member
David Malouf - Full Member
Catherine Patricia Foley - Full Member
Cyndi Shannon Weickert - Full Member
We welcome them into the Society.

Prime Minister's Science Prizes Awarded

The 2011 Prime Minister's Prizes for Science were awarded at a presentation ceremony held on 12 October 2011 in Parliament House, Canberra. Australia's newest Nobel laureate, Professor Brian Schmidt, presented an occasional address at the awards ceremony. The Prime Minister's and Science Minister's Prizes for Science are the nation's pre-eminent awards for excellence in science and science teaching. The prizes are awarded annually and are a tribute to the important contributions that our scientists and science teachers are making to Australia's current and future scientific capabilities.

2011 Prize Recipients

Prime Minister's Prize for Science

- Professors Ezio Rizzardo and David Solomon

Science Minister's Prize for Life Scientist of the Year

- Associate Professor Min Chen

Malcolm McIntosh Prize for Physical Scientist of the Year

- Professor Stuart Wyithe

Prime Minister's Prize for Excellence in Science Teaching in Primary Schools

- Mrs Brooke Topelberg

Prime Minister's Prize for Excellence in Science Teaching in Secondary Schools

- Dr Jane Wright

The President has offered his congratulations to Professor Stuart Wyithe, a former Clarke Medallist of the Society.

The Society Congratulates Brian Schmidt

The President has sent his congratulations on behalf of all members of the Society to Professor Brian Schmidt from the Research School of Astronomy and Astrophysics at the Australian National University who has won the 2011 Nobel Prize for Physics. The award is for the discovery that the Universe is expanding at an accelerating rate. Professor Schmidt is well known to the Society, having been our Pollock Lecturer in 2009, and presenting to our Southern Highlands Branch on two occasions.



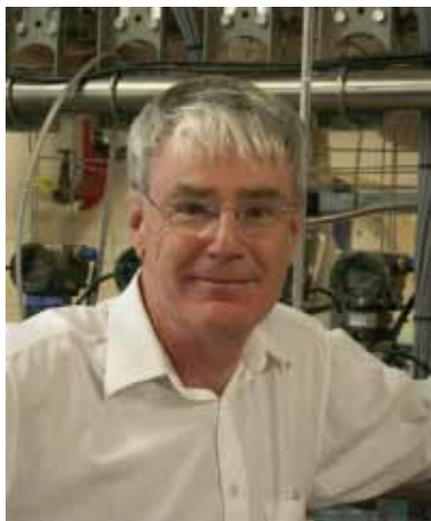
Professor Brian Schmidt Photo: Belinda Pratten

Southern Highlands Branch

Report on September Meeting

Photonics and its impact on the community

Professor Michael Withford



The Southern Highlands Branch meeting of 29 September was held at 6.30pm in the Drama Theatre, Frensham School, Mittagong on an extremely cold Southern Highlands evening. A hardy audience of 30 people arrived dressed for the near freezing conditions.

Professor Michael Withford presented an exciting lecture in line with his team's current research directions – astrophotonics, microphotonics, nanophotonics, biophotonics, optical sensing, photonic sources and ultrafast lasers. It is now 50 years since the first demonstration of a laser, a device which quickly evolved from a scientific curiosity to a tool declared to be "a solution looking for a problem". The rapidly growing field of photonics, the optical analogy of electronics, has been made possible by advances in laser technology.

Photonics has been defined as the use of light to obtain, convey or process information. "Light" here includes infrared and ultraviolet radiation, as well as the visible spectrum.

Photonics is now used in important applications in areas such as engineering, surveying, defence communications, computers and medicine. A recent review by the European Commission also determined that "photonics

technologies underpin at least 10% of the European economy, and that the reliance will increase as those technologies are further developed in the next decade".

Withford emphasised that photonics is still in its infancy, even though its significance is already clearly seen in the world community. The internet for example combines both photonics and electronics, the latter involving complications with high heat dissipation and air-conditioning issues. It is known that 70 Google searches generate approximately 14g of carbon dioxide, the same as boiling a kettle, and that the internet accounts for 1% of electricity usage in the USA. If the power drawn by the end-users is included, then electricity usage due to the internet rises to 10%, a remarkable statistic. It is clear that dramatic improvements must occur as the field of photonics is further explored and developed.

Nano-optics and nanophotonics are closely related, entailing interaction of light with tiny nanometre-scale structures (1 nm = one millionth of a mm). On this scale of length, phenomena are influenced by quantum size effects of matter, and by the near-field properties of light. Efficient control of light on this scale, for instance by plasmonics, is a promising way to miniaturise next-generation photonic devices (e.g., thin metallic films with apertures or periodic features, or particles on surfaces). This raises critical issues, such as how energy is transferred between photons and matter. Both theoretical and experimental nanoscale research is needed to understand light emission, propagation and interaction with matter, as well as optical properties of materials and structures. Techniques used in this context include optical microscopy, surface plasmon effects (including surface-enhanced Raman processes), near-field probes, and interconversion of optical excitation between propagating modes and localised light fields. This is widely regarded as fertile ground for significant future advances.

As the lecture was concluding, Withford passed around the audience Olympic torches from the 2000 games and the Athens Olympics, both of which relied on involvement by his research team. Production of these remarkable objects depended on lasers for the micro-

machining of the fine apertures required to suit the project. The 2000 torch was one of the few torches to be passed between different runners: Raelene Boyle and Betty Cuthbert, Dawn Fraser, Shirley Strickland, Shane Gould, Debbie Flintoff-King, and finally Cathy Freeman who then ignited the cauldron. Michael Withford reported that the cauldron was running on fumes only during its spectacular lift!

Anne Wood

Southern Highlands Branch

Report on October Meeting

The Clinicide Phenomenon: The disturbing phenomenon of doctors who kill

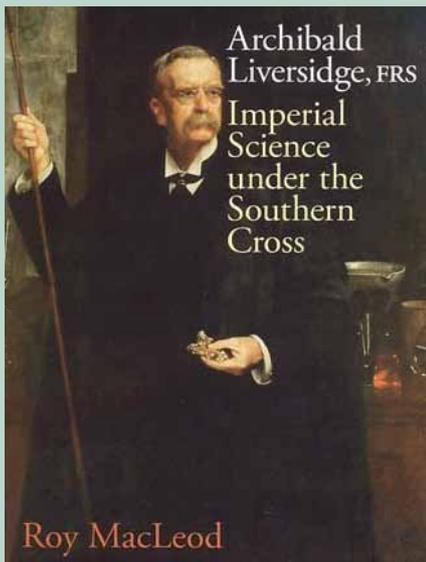
Professor Robert Kaplan

Robert Kaplan defined the term *R*clinicide as the unnatural death of multiple patients in the course of treatment by a doctor. It is a complex behaviour affected by social, cultural, psychological and forensic factors. Just as the classification of illness and the practice of the treating doctor reflects the era in which it occurs, so do the circumstances of clinicide.

The study of medical killers is barely in its infancy. Serial medical killing is a relatively new phenomenon. The role model is Dr Marcel Petiot, the worst serial killer in French history. More recently, Dr Harold Shipman was Britain's worst serial killer and in the United States and Zimbabwe, Dr Michael Swango killed 60 patients. A number of doctors have such high patient death rates that it cannot be ignored. At some level, these doctors have an awareness of what they are doing, countered by an overweening refusal to acknowledge the implications or desist from further treatment.

Many clinicial doctors have extreme narcissistic personalities, a grandiose view of their own capability and inability to accept that they could be criticized or need assistance from other doctors. Such doctors develop a God-complex, getting a vicarious thrill out of ending suffering and by determining when a

Archibald Liversidge, FRS: Imperial Science Under the Southern Cross — Members' Discount



The Council is pleased to extend its offer of a 10% discount to Members on this superb book.

A joint publishing effort between the Society and Sydney University Press, this book is a detailed narrative of the progress and beginnings of scientific inquiry in Australia. It shows how central our Society was to the development of rigorous scientific research in Australia and how our development was intertwined with that of the university.

Now \$54 collected or \$65 posted (within Australia).

person dies.

Kaplan described Dr Harold Shipman as easily the worst serial killer in the UK. He was killing patients from 1974, continuing with only a year's break when he was receiving treatment for drug addiction, until his arrest in 1998. Dr Michael Swango killed 60 patients from the time of his internship in 1983 until he left Zambia in 1996 (with several years away when he was in jail and out of practice). Between them, Shipman and Swango are credited with at least 313 deaths.

Some insight into the macabre behaviour of doctors such as these, and community perceptions of them, can be

gleaned from a comment of the son of one of Shipman's victims. "I remember the time (Dr X) gave to my Dad. He would come over at the drop of a hat. He was a marvellous GP, apart from the fact that he killed my father." Again, nine months before Shipman's arrest in 1998, his practice was subjected to an audit where the comment was made, "Great to see a single-handed enthusiastic GP with a rolling programme of audit – keep up the good work!"

Kaplan has made an extensive study of doctors who kill. In addition to Shipman, he has delved into the worlds of such monsters as Dr Harry Bailey, the Sydney psychiatrist who dispatched numerous patients with the discredited Deep

Sleep Therapy. Then there is Dr Radovan Karadzic, the psychiatrist who led the genocide during the Bosnian War, murderers from history like Dr William Palmer who poisoned his victims for insurance money, and more recent cases like Dr Jayant Patel who terrorised the Bundaberg hospital.

Chilling statistics on Carer-Assisted Serial Killing (CASK) have also been investigated by Kaplan. In 2001, the Virginia State Crime Commission made the alarming claim that 65% of all deaths of people over 65 were not natural, occurring through active neglect, asphyxiation, starvation, under- or over-medication, suicide, poisoning, exposure, choking or arson. In 2003 in the USA, at least 18 people were charged with killing a total of 455 patients over a period of 25 years. Kaplan noted that the year 2011 is when the baby-boomer generation reaches the age of 65 years!

The 52-person audience was clearly challenged by Kaplan's presentation of doctors who are commanded by the Hippocratic Oath to "first do no harm", yet find themselves crossing the line to commit multiple murders. He was warmly invited to return to the Southern Highlands for a series of lectures, and readily agreed.

Anne Wood

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