# The Royal Society of New South Wales

# Bulletin and Proceedings 352

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## Future Events

Lectures in Sydney are held on the first Wednesday of the month at 6:30pm.

**February**

Friday 24 February 2012 at 6:30pm
**Annual Dinner at St Paul's College**
Guest of Honour Professor Mary O'Kane, the Chief Scientist and Scientific Engineer for NSW
(see separate flyer)

**March**

Wednesday 7 March 2012 at 5:30pm
**Annual Meeting of the Four Societies**
"Counting atoms for a living—tales of Accelerator Mass Spectrometry"
Dr Andrew M. Smith, Institute for Environmental Research
(see details on right)

**April**

Wednesday 4 April 2012 at 5:30pm
**Annual General Meeting**
The Society's AGM plus a special event looking at the relationship between research and the media.

**Southern Highlands Branch**

Thursday 15 March 2012 at 6:30pm
**A Controversial Theory Regarding Sunspots and Solar Activity**
Dr Ken McCracken
The Drama Hall at Frensham School , Mittagong
Admittance $5 (members)

Dr McCrakcen will describe how he and his Swiss colleagues have challenged the foundations of solar physics.

## Annual Dinner at St Paul's College

### Friday February 24 at 6:30 for 7:00 pm

There are still places available for the Society's Annual Dinner on Friday 24 February at St Paul's College at Sydney University.

**Professor Mary O'Kane**, Chief Scientist and Scientific Engineer for NSW is our guest of honour, and will present our Awards for 2011. Please see separate flyer for more details. All welcome.

## The Annual Meeting of the Four Societies

### Wednesday March 7 at 6:30pm

ENGINEERS AUSTRALIA Sydney Division

ANA

AUSTRALIAN INSTITUTE of ENERGY

### "Counting atoms for a living - Tales of Accelerator Mass Spectrometry"

**Dr Andrew M. Smith,** Institute for Environmental Research
The development of the technique of Accelerator Mass Spectrometry (AMS) during the 1970's has lead to a renaissance in many fields of research, notably in archaeology, biomedicine and the geosciences.

**Hamilton-Parkes Room,** Trade & Investment Centre
Industry & Investment NSW **Level 47, MLC Centre**, 19 Martin Place, Sydney
Refreshments served from **5:30 pm** for a 6:00 pm start

RSVP by Noon, Monday 5 March to info@royalsoc.org.au

Please see separate flyer for more details.

Venue kindly sponsored by NSW GOVERNMENT Industry & Investment

**Patrons of The Royal Society of NSW**

Her Excellency Ms Quentin Bryce AC CVO, Governor General of the Commonwealth of Australia
Her Excellency Professor Marie Bashir AC CVO Governor of NSW

# Clarke Memorial Lecture 2011

**"Ordovician arc-continent collision in the Caledonian-Appalachian Orogen" delivered by John F Dewey**


*Professor John F Dewey*

The lecture was held on Tuesday 13 December 2011 in the Eastern Avenue Auditorium at The University of Sydney. The lecture was followed by a reception for Pofessor Dewey hosted by the School of Geosciences at Sydney University.

Professor Dewey is a global leader in the field of plate tectonic theory, especially the processes driving the development and evolution of mountain ranges. His work has been undertaken in many spectacular locations around the world, including Norway, Ireland, Greenland and the continental United States.

Professor Dewey is a Senior Research Fellow at University College, Oxford, and Distinguished Professor Emeritus Member of the US National Academy of Sciences

# Royal Society of NSW Scholarship Presentations

On Wednesday 7 December 2011 in the Rogers Room, St Paul's College, University of Sydney the Society's Scholarship Awards were presented.
Three students won a Royal Society of NSW Scholarship, and the fourth was the winner of the joint Royal Society of NSW & Australian Institute of Physics Scholarship. The winners were selected from a range of high quality submissions from PhD students at several different universities in NSW. They took the opportunity to present a summary of their work to the Society.

**Andre Kyme**, from the Brain & Mind Research Institute and School of Physics, University of Sydney, presented his project "An investigation of animal motion tracking to facilitate preclinical imaging of conscious animals". In neurological research, animals are conventionally anaesthetized in order to avoid movement during imaging or scanning of the brain. Andre has developed a novel method that measures the head motion of fully conscious rats, and accounts for this motion in the reconstruction of the brain images. The method will facilitate imaging the brains of fully conscious animal subjects.

*The President presents a Scholarship Certificate to Amelia Edington.*

**Amelia Edington**, of the Discipline of Pharmacology, University of Sydney, spoke about her project "Identifying drug binding sites on glycine transporters to assist with the development of a novel class of analgesic compounds". There is a clear need to develop new therapeutics to improve pain management. Amelia is studying a novel analgesic and its interaction with a glycine transporter, a molecule present in the brain. This research has helped our understanding of how compounds interact with glycine transporters, and will assist with the design of new analgesics.
The President presents a Scholarship Certificate to Amelia Edington.

The next winner, **Benjamin Parker** from the Discipline of Pathology, University of Sydney, whose project is "The use of mass spectrometry to identify protein modifications associated with ischemia / reperfusion injury in the brain and heart." Benjamin was overseas at the time, collaborating with scientists in the University of Southern Denmark, and his presentation was given by his supervisor, Associate Professor Stuart Cordwell. Benjamin is studying the effects of different drugs on proteins during a heart attack. His research involves administering various drugs before and after a heart attack in rats, and monitoring the function of the heart. He has identified thousands of proteins not previously known to be modified by a heart attack.

The final presentation was given by **Martin Fuechsle**, the winner of the **Royal Society of NSW & Australian Institute of Physics Scholarship**. Martin is from the Centre for Quantum Computation and Communication Technology, University of NSW. His project is "From single atoms towards the most powerful computer".

(contd page 4)

# From the President

Welcome to the first edition of the Bulletin for 2012!

This is the first edition managed by our new Office Manager, Emma Dallas. I'd like to welcome Emma to the Society and wish her all the very best for her time with us. She brings to us a wealth of experience and expertise in a wide variety of arenas. I would like to invite all members to make contact with her at the office and make her welcome. Our office opening hours have changed with Emma's arrival and they are now more in line with standard business hours (only shorter – see the back page of this Bulletin).

This year promises to be no less hectic than last. We begin with some changes to our digital face to the world – our website. It has received a makeover courtesy of our Hon. Secretary (Editorial), Dr Don Hector, and will continue to receive regular updates. I encourage you to take a look at http://nsw.royalsoc.org.au/index.htm .

Our events calendar also promises something fresh. We have taken a bit of the old and mixed it with something new to produce a more varied program for 2012. Our 'new' programming stems from the success of the debate held last year between Barry Jones and David Malouf at our Annual General Meeting. We are programming more of that style of activity into our events calendar to broaden the appeal of our activities and help gain more publicity for the Society. In addition we will, of course, be holding our prestigious named lectures later in the year – the Liversidge and the Pollock, and we will be joining with other organisations, such as the Australian Institute of Physics, to hold joint events.

Our Journal is gaining more traction with the inclusion of a very pertinent paper by a former President of the Royal Society in London, Lord May of Oxford, among others in the latest issue. This year will see an increase in the number of papers published as well as an increase in its production quality.

This year will also see the Society making more of the links between science and art, literature and philosophy. This aspect of the Society's charter has been overlooked for a considerable period and now is the time to address it – witness the article by Elizabeth Farrelly in the *Sydney Morning Herald* recently. I believe that a concentration on these four corners of our charter will put us in a unique position to further the intellectual capital of our state.

To that end I need to let you know that the Society is very seriously pursuing an opportunity to create a new and unique centre for the furtherance of these objectives. Council is looking at creating such a centre in The Rocks, not far from Science House, where educational, promotional, commercial and co-operative activities might take place under the aegis of the Society. I will provide more information on this initiative in coming bulletins.

John Hardie

Show off your membership with a Royal Society of NSW pure silk tie.

Every purchase helps support the Society. Contact the Society's office for an order form

Just $40.00 plus postage & handling.

## New Members of the Society

We welcome the following new members to the Society:

- Mr Charles Daniel Laurenz
- Mr Daniel Cronin
- Prof. Tony Vassallo
- Mr Anthony Gaskell

### Professional Members

Council recently approved applications by the following members to upgrade their membership to Professional status in accordance with the new provisions announced recently. This allows them to have their professional qualifications and attainments recognised by the Society and to use the postnominal MRSN. Congratulations to:

- Mr John Hardie
- Prof. Heinrich Hora
- Dr Frederick Osman

# Vale Jak Kelly

*Professor Jak Kelly*

Council of the Society is saddened by the death, on Saturday 11 February, of a long-serving member and former President Professor Jak Kelly.

Professor Kelly did an enormous amount for the Society, together with his wife Irene, and we mourn our loss greatly. A full obituary will appear in our *Journal and Proceedings.*

# To the Editor...

I would like to share with the membership about my work with Hyperpanometrics.

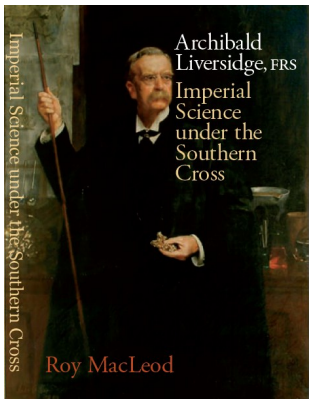
Hyperpanometrics is a three phase process to explore complex data patterns through modelling, using transformation, compression, and graphical output. The Transformation is a Discrete Cosine Transformation (Nolan's Variation), which generates values that represent unique sequences of data, when applied through a cascading prime number calculation. The fingerprint/hash not only produces a unique sequence representation, but it also preserves represented distance. The other type of transformation is called Nolan's peer relativity transformation, which is a rescaler that positions observations within a population relative to all other observations within that dataset.

Either transformation can be used separately to generate data sequence fingerprints/hashs, or data chain/sequences to generate clusters or patterns. The real power is when these two transformations are combined together in different orders to achieve both crisp and fuzzy logic outputs, which can then be data mined or graphically represented.

When the transformations are used in a System of Systems data modelling approach, the product of each system representation in a matrix, a unique representation hash can be used within a parent/child model. Thus, it becomes possible using granulation, fuzzy logic, finite and *n*th dimensional mathematics, in a dynamic model to show real time cause and effect.

These techniques were first presented in the late 1990's, and have been used to model environmental safety audit profiling, artificial life cognitive computing, weather & climate change modelling, fiscal profiling for non compliance in taxation, share trading, and decision making.

Tony Nolan




Copies of Roy MacLeod's wonderful book about Archibald Liversidge are available from the Society's office. Contact the office to order your copy at the special price of just $39.95.

Martin's work is directed towards miniaturization of computing, by developing a process known as quantum computation. Martin has used scanning tunneling microscopy to characterize atomically precise nanostructures in silicon. He has made a transistor that uses as its active element a single phosphorus donor. The work is an important step towards quantum computing.

*The President presents a Scholarship Certificate to Martin Fuechsle.*

## Introducing our new Office Manager

Emma Dallas joined the Society as Officer Mangaer in November 2011. Emma comes to us from a background in arts administration and independent publishing.

Please join us in welcoming Emma to the Society.

## Contact your office bearers

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|---|---|---|---|
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