



The Royal Society of Victoria

Promoting Science.

PATRON: The Hon Linda Dessau AM
Governor of Victoria

PRESIDENT: Dr Bill Birch AM BSc (Hons) PhD

Headlines...

10th September: Fortifying for the Future: Micronutrient-Enriched Cereals to Improve Global Health

24th September: Young Scientist Research Prizes
Note earlier starting time: 6:30pm

Advance notice...

8th October: Urban Ecology: Creating Green, Healthy, Resilient & Liveable Cities

8th- 9th October Symposium: Managing Biodiversity Under Climate Change to be held at the University of Melbourne.

22nd October: Phillip Law Postdoctoral Awards

September 2015 Newsletter

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September Meeting

FORTIFYING FOR THE FUTURE: MICRONUTRIENT- ENRICHED CEREALS TO IMPROVE GLOBAL HEALTH



The first September meeting will be held on **Thursday, 10th September 2015 at 7.00 pm.**

Speaker: Dr Alex Johnson
School of Biosciences, University of Melbourne

Micronutrient deficiencies are one of the most serious health issues facing billions of people in developing countries of Asia, Africa and Latin America. Rice and wheat provide 40% of the world's dietary energy supply, yet people who consume large quantities of these cereals often suffer from debilitating malnutrition disorders due to low concentrations of iron, zinc and vitamin A in the cereal grain. Over two billion people are affected by iron deficiency with symptoms ranging from poor mental development in children, depressed immune function to iron deficiency anaemia. Approximately two billion people are also affected by zinc deficiency with symptoms that include stunting in children and increased susceptibility to disease. The development of nutrient enriched food crops – a process commonly referred to as “biofortification” – has emerged as a highly economical and sustainable approach towards increasing micronutrient intakes in developing countries of the world.

At the University of Melbourne Dr Johnson has established the Plant Nutrition Laboratory to explore new ways of producing iron and zinc biofortified cereals. Their overall aim is to develop high-yielding varieties of wheat and rice that produce more nutritious, micronutrient-enriched grain.



Book online now at <http://ow.ly/QKizt>, call or email the RSV office to secure your place: 9663 5259, rsv@sciencevictoria.org.au. Our lectures are free to members of the public with an optional gold coin donation to our science programs.

Pre and Post-Lecture Gatherings

If you plan to join us for refreshments prior to the lecture, please register your attendance so we can arrange appropriate catering. All most welcome.

Register for any of our events at <http://ow.ly/OEY92>, or phone 9663 5259, or email rsv@sciencevictoria.org.au

2015 SYMPOSIUM

MANAGING VICTORIA'S BIODIVERSITY UNDER CLIMATE CHANGE



Organised by



Major sponsors



The 2015 Symposium will be held on **8th - 9th October, 2015**, in partnership with the Victorian National Parks Association and the Bio 21 Institute at the University of Melbourne.

What practical steps can we take to help Victoria's native species and ecosystems survive the impacts of climate change?

Over two days, a series of speakers will briefly outline likely impacts of climate change on Victoria's ecosystems. Their presentations will address a likely scenario, or a series of scenarios in 2050. Each talk will be followed by 20 minutes of discussion facilitated by a similarly qualified person. All symposium participants are encouraged to take part in the discussions and recommend useful management actions that can be taken by State Government agencies, local councils, community organisations and/or private landholders.

After the symposium, the information that has emerged will be compiled by ecologist Dr Ian Lunt and published online.

The symposium will prove useful to scientists, land managers, policy makers, conservation NGOs and anyone else interested in the future of Victoria's natural heritage: our remarkable biodiversity.

Featuring: Dr Bill Birch, Dr Penny Whetton, Adj Prof Dick Williams, Dr Libby Rumpff, Dr Chris Taylor, Prof Rod Keenan, Prof Ralph Mac Nally, Prof Andrew Bennett, Prof Michael Clarke, Prof Brendan Mackey, Prof Max Finlayson, Prof Jon Barnett, Prof Mick Meough, Assoc Prof Sarah Bekessy, Assoc Prof Kathryn Williams, Ms Caitlyn Griffith, Mr Crhis Smyth, the Hon Lisa Neville MP, Prof Peter Gell, Prof John Handmer, Mr Tom Fairman, Prof Janette Lindesay, Prof Steven Chown, Mr Andrew Cox, Dr Jim Radford, Ms Pip Walsh, Dr Andrew Weeks, Prof Michael McCarthy, Assoc Prof Brendan Wintle, Dr Kath Handasyde, Prof Andrew Bennett, Prof Ary Hoffmann, Prof Lynne Selwood and Mr Phil Ingamells.

The full program is available online from <http://ow.ly/Rb35u>.

Venue: Ground Floor Conference Room, Bio 21 Institute, 30 Flemington Rd, Parkville



Book online now at <http://ow.ly/Rb3bE>, call or email the Victorian National Parks Association to secure your place: 9341 6500, philipi@vnpa.org.au. Registration is priced at \$120 for general admission, \$100 for Non-Government Organisations (including RSV members) and concession holders.

Professor David Karoly wins the 2015 RSV Medal for Scientific Excellence



Renowned Victorian climate scientist Professor David Karoly is the 2015 winner of the prestigious Royal Society of Victoria's Medal for Scientific Excellence in the Earth Sciences. A Professor of Atmospheric Science from the School of Earth Sciences within the University of Melbourne's Faculty of Science, Professor Karoly's acclaimed career has placed him ahead of a very strong field of nominees.

An author of seven academic books, 13 book chapters and 73 refereed journal articles since 2005, his leading research publications have been cited more than 6,500 times since 2010 in first-tier, highly ranked, multidisciplinary journals such as *Nature*, *Nature Geoscience*, *Nature Climate Change* and *Geophysical Research Letters*. A pioneer of theoretical and numerical modelling studies on the propagation of large-scale, low-frequency waves in the atmosphere, his work has enabled colleagues to **observe linkages between climate anomalies at large distances** across the globe and is now fundamental to all studies on atmospheric dynamics.

Professor Karoly has been a global leader in the development of the detection and attribution of global climate change. His pioneering work on **fingerprint detection** of climate change using the spatial patterns of temperature change in the troposphere and stratosphere has been crucial to the early identification of **anthropogenic influence** in observed climate change, along with the development of simple indices to help colleagues track and detect the influence of human activity on the climate system. Heavily

involved in the assessment work of the **Intergovernmental Panel on Climate Change** (IPCC) as both Contributing and Lead Author, he shared in the award of the **2007 Nobel Peace Prize** awarded jointly to the IPCC and Al Gore for "efforts to build up and disseminate greater knowledge about man-made climate change, and... lay the foundations for the measures that are needed to counteract such change."

Professor Karoly has consistently contributed to his discipline and the scientific community through building collaborative research environments, directing the work of the Cooperative Research Centre for Southern Hemisphere Meteorology at Monash University with partners the Australian Bureau of Meteorology, two divisions of CSIRO and Silicon Graphics (Australia). He was instrumental in the foundation of the Australian Meteorological & Oceanographic Society (AMOS) and has served as **Chief Editor** of their journal since 2009. Finally, and perhaps most importantly, he has a strong record of developing the next generation of young scientists, mentoring and supervising a very large number of Honours, Masters and PhD candidates.

Medal Presentation, Lecture and President's Soiree

Professor Karoly will be awarded the RSV Medal for Scientific Excellence at the Royal Society of Victoria at a ceremony on **10 December** and will deliver the RSV Research Medal Lecture titled "Using climate science to inform decision making." Members are invited to attend the **President's Soiree** following the lecture to celebrate the year's achievements; Formal booking forms will accompany the next newsletter. Please keep the date free, and contact the RSV office to book your place for the dinner. Only 50 places available, so get in early!

The Royal Society of Victoria's Social Media



Members have been variously delighted, confronted and confounded with invitations to join our new group on the professional networking/social media platform LinkedIn in recent weeks. This latest initiative follows efforts to establish a stronger online profile in the science community and grow important channels for communicating events, initiatives and

announcements through new media. These typically give our efforts in science promotion far greater visibility and impact than traditional media outlets.

Please be assured there is no onus on members to participate! However, the members-only group on LinkedIn provides us with an excellent platform to raise issues of importance and interest for discussion and debate with one another between meetings, and can offer particular value to those members who live further afield. It also allows RSV members to demonstrate their membership of Victoria's oldest learned society on their professional profile, of particular benefit to the standing and visibility of our early to mid-career members, but also an opportunity to provide mentorship and support as a senior member.

If you are a LinkedIn user and interested in joining, simply search for "Royal Society of Victoria" and apply to join. Group membership is restricted to current members only.

Meanwhile, here is where you can find us on our various social media channels. If you have an account on any of these platforms, **please join us** to increase our visibility and impact through your personal and professional networks:



Facebook:

<https://www.facebook.com/royalsocietyvictoria>



Twitter:

<https://twitter.com/RoyalSocietyVic>



LinkedIn:

<http://www.linkedin.com/company/the-royal-society-of-victoria>

2015 Young Scientist Research Prizes – 24 September

At the time of writing we are very close to announcing the finalists for the 2015 Young Scientist Research Prizes.

The eight finalists will each provide an oral presentation to a meeting of the Royal Society of Victoria on the evening of **24 September**. Presentations will be judged and prize winners announced on the night, with the prize and certificate presented by the Society's President, Dr William Birch AM.



A limited number seats are available to RSV members, online at <http://ow.ly/Rgll5> . Please **book early** to support the next generation of Victorian scientists.

Nominations for RSV Membership have been received from the following PhD applicants, subject to the same conditions as the regular applicants below:

Farzad Aghakarim Alamdara, Dhika Amanda, Brendan R E Ansell, Nicholas V Apollo, Ehsan Atazadeh, Elham Azizi, Emma Bland, Guohui Cai, Emma T Callegari, Weiyi Chen, Anita M D'Angelo, Mathias S Egglseeder, Eamon T Fahy, Melanie Finch, Anna Flanagan-Moodie, Luke Gamon, Michelle Gazdik, Caitlin M Gionfriddo, Jessica F Griffith, Jessica L Harding, Demunu S D Hewagalamulage, Flora Hui, Indranath K Jayasinghe, David Kaplan, Rui Li, Adam Lopez-Denman, Matias Maturana, Kathleen M McCloskey, Elsa Molina, Edward A Nagul, Tan Nguyen, Travis Park, Joseph P Paul, April L Philpott, Ashleigh R Poh, George Shefin, Jackson Smith, Ryan L Smith, Mary H Speir, Kelly Stanger, Zhan Tang, Hosna Tashakkori, Syed A Uddin, Stefan A Vollgger, Brant Walkley, Nicole M Wiedemann, Ambepitiye W G C D Wijetunge, Melanie J Williams, Zaiquan Xu, Yundong Zhou, Berihun M Zeleke

Nominations for RSV Membership

Nominations for membership of the Society have been received on behalf of:

- Mr Kieran Declan ICT
- Mr James P Johns ICT Systems
- Dr Anton Knieriemen GP
- Dr Trent McCarthy CEO

Unless Members request a ballot, they will be considered for election by Council and if elected, will be announced at the Ordinary Meeting of the Royal Society of Victoria held on 10th September.

Recently elected members who have not yet signed the Society's membership book nor received their certificate are invited to attend the 10th September meeting to be formally welcomed as members.

Donations & Bequests

Donations to the RSV Science Foundation are very welcome and can be made at any time. As we continue to build our Foundation in support of science literacy, activity, engagement and promotion in Victoria, we would be grateful if you could consider a contribution to this future fund as a component of your enduring legacy. This can be made as a **general bequest**, or be purposed towards a **specific activity**. To discuss **making a bequest** to the RSV Science Foundation, please contact Mike Flattley in the office.

Notice: Fax for the Memories

We are refreshing our photocopier contract with Canon and taking on a brand new model as a part of the process. In negotiating the contract, we reviewed the cost and usage of our fax line (both as a printer function and dedicated phone line). It is in sole usage by junk mail distributors, while all valid electronic correspondence is now received as email attachments and printed out where necessary.

Accordingly, we now bid a fond farewell to our fax machine, a once transformational business communications technology consigned to redundant anachronism. Vale, fax machine!



If you have any unhatched plans to contact us via fax, please review them at your earliest convenience.

Meetings in Review

Science in our World: Victoria's Lead Scientist

It was a real privilege to have Leonie Walsh deliver the first of our lunchtime lectures on **25 June**. An Applied Science graduate and seasoned industry practitioner, Ms Walsh has extensive experience in the management and commercialisation of research, driving commercial improvements and innovation in organisations such as Dow Chemical and Visy

Industries over a 25 year career prior to taking up the role of Victoria's Lead Scientist. Her prolific contributions to public debate on the role of innovation and the status of women in the sciences were recognised and honoured by the Swinburne University of Technology with an honorary doctorate in 2014.



Leonie Walsh

Leonie's presentation focussed on the rate of change in science and technology over the past 30 years and, in particular, the need for us to anticipate further transformation. With traditional manufacturing and mining industries on the wane, the emergence of new industries based on science, technology and innovation will be central to Victoria's future job market and prosperity.



RSV President Bill Birch with Leonie Walsh

We have an emerging problem in that not enough entrepreneurship and creativity is taught as a component of talent development in the sciences. Further, we are not activating the whole of our STEM talent pool. Gender parity in particular continues to plague participation in the engineering field.

Collaboration between industry and academia has historically been 'abysmal,' with some notable exceptions. Much of the engagement gap is a cultural problem – essentially, tribal boundaries – but also a problem of different

measures of success, status and merit. Where a scholar chases citations, the industrialist chases commercialisation, for example.

Both sectors, however, rely on science literacy and expertise to grow and thrive. How can Australia keep pace with its global research rankings which flow on to an enormous education export industry? How can Australia become a place that builds things and “makes everything better?” The modern “apathy” for science literacy requires vigorous engagement with children from primary school up, where the aspiration to achieve mastery is founded.

An insightful audience discussion followed with our inspiring Lead Scientist, a role carrying out vital work for Victoria’s future prosperity and growth.

High Satiety: Why is it So Hard to Lose Weight?

On **9 July**, endocrinologist and President of the Australian and New Zealand Obesity Society, Professor Brian Oldfield sought to improve our empathy and insight to the plight of the morbidly obese, giving us the science behind chronic weight gain, the pervasiveness of the health issue and the physiological factors that confound effective, sustainable weight loss.

Obesity is growing exponentially across the developed world, its incidence blossoming most vigorously with underprivileged communities. Brian argued a lack of understanding about obesity leads to prejudicial attitudes; it is not a “lifestyle choice,” nor purely a matter of “personal responsibility.” Attitudes towards those suffering from obesity stem from medieval attitudes; Dante’s divine comedy describes the “damning sin of gluttony,” a flawed understanding that is deeply culturally ingrained in our society.

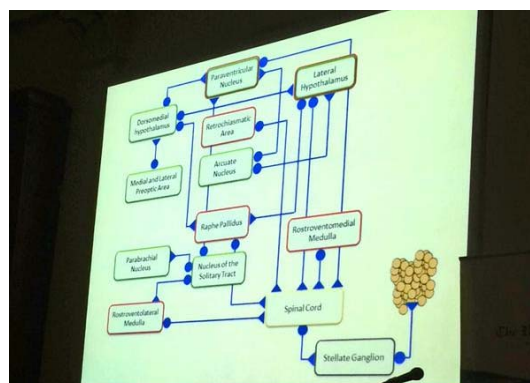
Obesity has become a modern epidemic due to the unprecedented availability of high calorie food across the developed world. While there is an assumption that all one needs to do is “reduce your energy intake and increase your energy use” to remediate the condition, this has proved a fundamentally flawed strategy. Few obesity interventions through diet and exercise alone keep the weight off over time – only data from bariatric “lap band” surgery has shown a consistent loss.

As with so much else, issues stem from our genes and our brains. The evolutionary development of the brain’s hypothalamus to control body weight and the influence of the regulatory hormone leptin have enormous, but short-term, influence over the activity of genes

found to drive physiological behaviours leading to obesity (ob) and diabetes (db).



Appetite and “high satiety,” meanwhile, has been demonstrably affected by the hormone ghrelin, which maintains appetite levels commensurate with being overweight even after sustained weight loss. People who reduce their weight through diet and exercise feel unsatiated by a balanced intake years after returning to a healthy diet. Further, both dieting and lap band surgery create a reflex action that lower’s the body’s energy expenditure and thyroid function, which confounds efficacy. Obesity “pulls you back in.”



These extremely complex neurological, hormonal and epigenetic triggers have demonstrated roles in driving appetite and satiety in test subjects. The “Biggest Loser” approach to weight loss is essentially a pejorative, ignorant perspective that lacks understanding of recurring obesity as metabolic adaptation.

All is not lost, happily. Recent research into fat production has revealed there are epigenetic changes effected by the type of fat produced. The body’s production of “brown” fat from glucose uptake during cold conditions, in particular, was found to limit obesity, whereas the “beige” fats most obesity sufferers produce are a major culprit of sustained weight. Thus far, a continuous infusion of drugs such as thyroxine in combination with lap band surgery have shown very promising results, with brown fat produced in higher quantities than beige and the body’s

energy expenditure maintained after weight loss to keep body weight within healthy ranges.

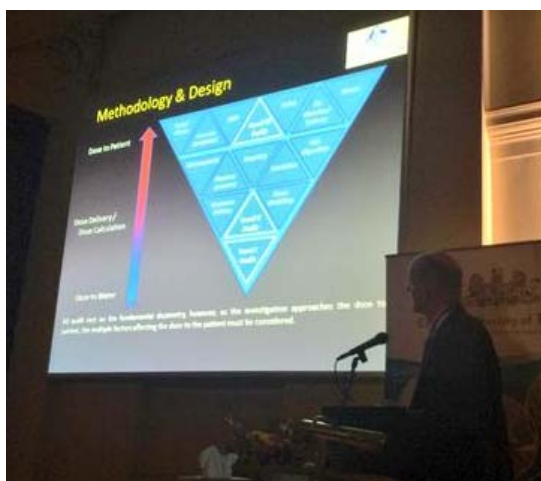


RSV President Bill Birch with Brian Oldfield

An illuminating and frequently funny presentation from an engaging science communicator and health campaigner led to an interesting discussion with the audience on conclusion.

Radiation Safety of the Patient in Cancer Therapy

Our second lunchtime lecture on **23 July** featured Dr Ivan Williams, a medical physicist at the helm of the Australian Clinical Dosimetry Service, convened by the Federal government to audit the practice of radiation dosing in cancer radiotherapy across the nation to reduce the incidence of error in this delicate process. As Ivan assured us, “we can cure any cancer – the trick is not to kill the patient!”



Typically, systemic errors emerge in the workflow between imaging, dose planning and treatment. Surprisingly, underdosing is as big a problem as overdosing, as it means further doses cannot be

administered without killing vital tissues surrounding targeted cancer cells.

The Australian audit process was prompted by an overdosing incident in Adelaide. Ivan instigated a complex and highly-effective three tier interrogative audit program to be applied to every radiotherapy site across Australia – voluntarily. A huge challenge to win the buy-in of the professional community, however there has been 100% support for the pilot, which is now moving to institute the audit program as a requirement of clinical accreditation and practice.

The key to winning buy-in was to not employ the Dosimetry Service as a regulator, but to “use data as a disciplinary force” that settles argument in clinical practice. Social and cultural approaches to practice can address human behaviour and error, but only solid data demonstrates causality. The comprehensive, three tiered approach eliminates the risk of conflating causality with correlation. The audit’s methodology and design, along with the collaborative, supportive approach to improving local practice, were crucial to winning the support of practitioners.



RSV Science Programme Chair Prof Sandra Rees with Ivan Williams

The result of the audit is very reassuring: Australia is in very safe hands across the board, and now has a system of clinical audit that represents a leading global initiative with potential for service provision and benchmarking to other nations with an Australian innovation.

Feeling writerly? Member reviews and other contributions are most welcome! Please email Mike on ed@sciencevictoria.org.au for more information, or for other items you may wish to include for the attention of fellow RSV members