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Royal Society of New South Wales
Awards for 2014

Award	Recipient
Clarke Medal	Professor Robert F. Park
Edgeworth David Medal	Associate Professor Richard Payne
James Cook Medal	Scientia Professor Martin Green
RSNSW Scholarships	Melanie Laird
	Ruth Wells
	Stephen Parker
Jak Kelly Award	Linh Tran

Articles from the award winners will be published in the 2015 issues of the Society's Journal.

The Clarke Medal

Professor Robert F. Park
University of Sydney, Plant Breeding Institute

The Clarke Medal was established to acknowledge the contribution by the Rev William Branwhite Clarke MA FRS FGS, Vice-President of the Royal Society of New South Wales from 1866 to 1878 The Medal is awarded annually for distinguished work in a natural science done in Australia and its Territories.

The Medal is awarded by rotation in the fields of geology, botany and zoology. This year's award is in the field of botany in all its aspects.

The Clarke Medal for 2014 in the field of Botany has been awarded to Professor Robert Park of the University of Sydney.

Professor Robert Park is an international leader in plant pathology and genetics, who focuses particularly on rust fungi that infect crop plants in agriculture. He has made major contributions to the global effort to control these diseases using genetic approaches, especially in cereal rusts. Working across a number of related areas, Professor Park has made crucial research findings in the genetics of resistance, pathogenic and molecular variability in rust pathogens, and more recently, functional genomics of host-pathogen interactions. By helping to safeguard the world's primary cereal crops, Professor Park is making an enormous contribution to national and global food security, the economic viability of agricultural production, and the ecologically sustainable use of Australia's natural resources. A recent count of commercial wheat cultivars in Australia indicated that Professor Park's pre-breeding genetics work contributed to 51 of the 150 or so that are listed.

The 2014 Clarke Medal in the field of Botany is a fitting recognition of Professor Robert Park's huge impact and contributions to plant science.

The Medal will be presented at the Annual Dinner of the Royal Society in 2015.

Edgeworth David Medal

Associate Professor Richard Payne
University of Sydney, School of Chemistry

The Edgeworth David Medal, established in memory of Professor Sir Tannatt William Edgeworth David FRS, a past President of the Society, is awarded for distinguished contributions by a scientist, under the age of 35, having accomplished the majority of his or her work in Australia.

The conditions of the award of the Medal are:

- The recipient must be under the age of thirty-five years at 1st January, 2013.
- The Medal will awarded be for work done mainly in Australia or its Territories or contributing to the advancement of Australian science.

The 2014 Edgeworth David Medal has been awarded to Associate Professor Richard Payne of the University of Sydney.

Associate Professor Payne has achieved an extraordinary amount over his short scientific career thus far and this has led to his recognition as one of Australia's leading chemists. His research is focused on using the tools of organic chemical synthesis to engineer new molecules targeted towards specific problems in biology and medicine. A/Prof Payne's research can be divided into two distinct areas. The first of these is anti-infective drug discovery, with a strong focus on the design and development of new anti-tuberculosis and anti-malarial agents. He has developed a number of tuberculosis (TB) drug leads which target novel enzyme targets, an example being the development of inhibitors for an essential cell wall lipase in *Mycobacterium tuberculosis*. The second field that A/Prof Payne has made important contributions to is the development of novel strategies for the synthesis of carbohydrate-modified peptides and proteins for applications in therapeutics and materials research, including cancer vaccines and diagnostics and antifreeze biomolecules.

Associate Professor Payne is an exceptional young scientist working in an exciting field where he is already acknowledged as a world leader, and he is a worthy winner of the Edgeworth David Medal for 2014.

The Medal will be presented at the Annual Dinner of the Royal Society in 2015.

The James Cook Medal

Scientia Professor Martin Green AM FTSE FAA FRS
UNSW, Australian Centre for Advanced Photovoltaics

The James Cook Medal was established in 1947 with funding by Henry Ferdinand Halloran. Halloran, who had joined the Society in 1892 as a 23 year-old, was a surveyor, engineer and town planner. He did not publish anything in the Society's Journal but he was a very enthusiastic supporter of research. Halloran funded what were to become the Society's two most prestigious awards, the James Cook Medal and the Edgeworth David Medal, the latter being the medal for young scientists. The James Cook Medal is awarded at intervals for outstanding contributions to science and human welfare in and for the Southern Hemisphere.

The 2014 James Cook Medal has been awarded to Scientia Professor Martin Green of the University of New South Wales.

Professor Martin Green, often described as "the father of modern photovoltaics", is Director of the acclaimed Australian Centre for Advanced Photovoltaics at The University of New South Wales. A global leader in the development of alternative energy technology, the real world outcomes of his research have revolutionised solar cell technology and the associated industry. Martin Green has made unparalleled contributions to solar cell design, uptake of photovoltaics technology and to the realisation of its benefits. His fundamental research achievements, as well as his incitement of major investment in the technology, have resulted in vastly improved cell performance and radically reduced production costs. Key concepts Green introduced that are now standard in high efficiency solar cell design include small area contacts to control detrimental impacts, thin oxide layers in his 25% efficient cells, inversion layers under such oxides, moderate doping to control Auger impacts, non-ergodic light-trapping using macroscopic surface texture, electroluminescence to monitor cell quality, as well as invention of the successive generations of devices exploiting these features which have broken the world record for efficiency at every stage of development. Scientia Professor Green, as the James Cook Medal citation reads, has clearly made "outstanding contributions to science and human welfare in and for the Southern Hemisphere".

The Medal will be presented at the Annual Dinner of the Royal Society in 2015.

Royal Society of New South Wales Scholarships
The Jak Kelly Award

The Royal Society of NSW Scholarships are funded by the Society in order to acknowledge and support outstanding achievements by early-career individuals working towards a higher research degree in a science-related field.

The Jak Kelly Award is awarded jointly with the Australian Institute of Physics to the best PhD student talk presented at a joint meeting with the AIP.

Three Royal Society of NSW scholarships were awarded in 2014, to Melanie Laird of the University of Sydney, Ruth Wells of the University of Sydney and Stephen Parker of the University of New South Wales.

The Jak Kelly Award was made to Linh Tran of the University of Wollongong.

Melanie Laird (University of Sydney, School of Biological Sciences)
Melanie Laird, a University of Sydney Medallist, is in her second year of a PhD under the supervision of Professor Michael Thompson, studying reproduction in marsupials. The main aim of her project is to identify the uterine changes involved in preparation for pregnancy in marsupials to understand the importance of uterine changes in the evolution of amniote viviparity. Melanie's project makes a major contribution to our understanding of marsupial pregnancy as it is the first study of the specific uterine changes involved in preparation for attachment. Marsupials make an exciting contribution to evolutionary questions, and the project highlights many interesting areas for future research. The next step is to identify the major molecular changes required to produce the morphological changes in marsupials, and to determine whether these changes are consistent across viviparous amniote groups. Melanie has recently published her first paper in the high-ranking Journal of Morphology.

Ruth Wells (University of Sydney, School of Psychology)
Ruth Wells is enrolled in a doctorate of clinical psychology and Master of Science at the University of Sydney. With an exceptional display of initiative, Ruth built relationships with psychologists, psychiatrists, academics and health workers in Jordan over the internet; crowd funded her travel costs, and then completed the research project in Jordan where she explored barriers to mental health care for Syrian refugees living in Jordan. Planned research in 2015 will involve community members, including both psychologists and lay people, in the administration and evaluation of the program Ruth and her team have developed to train Syrian staff and volunteers to run group treatment programs.

Stephen Parker (University of New South Wales, School of Chemistry)
Stephen Parker is in his final year of a PhD in the Nanomaterials group in the School of Chemistry, UNSW, where he is making surfaces that can capture cells from a blood sample and then release a single targeted cell that has a particular characteristic. This is achieved using innovative surface chemistry that has an electrochemically-cleavable group in it. Stephen has combined his discovery with technology from the group that allows the electrochemistry to be directed to specific locations on the surface. The research is directed at circulating tumour cells which provide a potentially accessible biomarker for detection, characterisation and monitoring the progression of non-haematological cancers.

Linh Tran (University of Wollongong, Centre for Medical Radiation Physics (CMRP))
Linh Tran is a third-year PhD student at Centre for Medical Radiation Physics (CMRP), University of Wollongong, Australia. Linh's research field involves development of innovative semiconductor detectors for dosimetry and microdosimetry in radiation protection and radiation therapy applications and their radiation hardness. She was a major contributor in development and study of large area alpha particle silicon cleanable detector for in-field measurement of soil radioactive contamination and new generation of 3D silicon microdosimeters mimicking human biological cells and used for measuring dose equivalent in mixed radiation field relevant to the space radiation environment as well as in heavy ion therapy. Linh received Master Degree in Physics in 2008 from Dubna University in Russia. She then has started her professional career in Vietnam Atomic Energy Institute and has worked as researcher in radiation protection for 3 years before coming to Australia as a PhD student. Linh has been awarded with a full scholarship for her studies in Russia and in Australia. She is now very much enjoyed doing research with CMRP team at University of Wollongong and she hopes that innovative radiation measurements devices will be available soon for improvement of human quality of life. She won the Jak Kelly prize through her presentation on the "Development of 3D semiconductor microdosimetric sensors for RBE determination in ^{12}C heavy ion therapy" at a joint meeting of the RSNSW and Australian Institute of Physics as part of the AIP's annual postgraduate awards meeting, held at the University of Sydney on 18 November, 2014.

The Jak Kelly Award winner also presented at the Society's meeting on 3 December. The other three winners will be invited to make a presentation on their work at the first Society's first meeting in 2015, to be held in Sydney on 4 February, 2015.