

ANZIAM awards

Winner of the 2014 ANZIAM Medal

The ANZIAM Medal is the premier award offered by ANZIAM. It is presented biennially.

The ANZIAM medal is awarded on the basis of a combination of research achievements, activities enhancing applied or industrial mathematics or both, and contributions to ANZIAM. This year, it was bestowed upon Professor Kerry Landman, Department of Mathematics and Statistics at the University of Melbourne.

Citation for the 2014 ANZIAM Medal



Left to right: Larry Forbes, Bob Anderssen and Kerry Landman

Professor Kerry Landman is an Applied Mathematician committed to cross-disciplinary research. She graduated with a PhD from the University of Melbourne in 1979, and subsequently has acquired a distinguished publication record with a total of 116 peer-reviewed papers in highly regarded international journals. Her research reflects a life-time career devoted to the development of Applied Mathematics in Australia, and in particular to the application of mathematical modelling to industrial, environmental, biological and medical areas. The excellence of her research career and her long-standing support for ANZIAM and its aspirations form the basis for the award of the ANZIAM Medal.

Research excellence

Professor Landman has made fundamental and significant contributions to the understanding of physical and biological processes across a remarkably broad spectrum of applications. She has successfully exploited a wide variety of mathematical techniques, and has pioneered their use in numerous disparate applications. Her work encompasses:

- *Modelling biological cell invasion* which has provided a fundamental understanding of the embryonic development of the nervous system in the intestine. She and her collaborators have made major advances to the understanding of Hirschsprung's Disease. Her work in the mathematical

modelling has provided much insight and has greatly clarified how the disease is caused.

- *Mathematical study of patterns on growing domains* is a current research topic of considerable moment. While previous studies had been limited to slow growth, Kerry has pioneered the study of cell migration patterns on rapidly growing domains. These results have crucial implications to understanding and mitigating embryonic developmental defects.
- *Discrete cellular automata models* has been one of her research topics since 2007. Kerry together with Professor Barry Hughes and their group have made significant advances in understanding the average properties of agent-based models through the approximating partial differential equations.
- *Industrial applications* have continued to motivate her principal research activities in Applied Mathematics. Her work, jointly with Professor White, has made fundamental contributions to predicting the performance of solid–liquid separation processes (gravity thickeners and pressure filters) and to characterising fundamental material properties of solid–liquid systems. This particular work has made a significant contribution to environmental waste management, water treatment and minerals processing. Her research has developed a generalised approach to the understanding and prediction of solid–liquid separation procedures, and she has developed new numerical techniques to handle the difficult moving interfaces that evolve in flocculated suspensions.

Exemplary leadership in science

In summary, Professor Kerry Landman has established and led research collaborations across engineering, industry and biological fields for over 30 years. She has a proven record of achievement in the advocacy and public promotion of mathematics through partnership building and collaboration. As a role model, she has demonstrated influence across the scientific community.

While an ARC Australian Professorial Fellow 2008–2012, she was also an Invited Speaker at the 2011 International Congress for Industrial and Applied Mathematics (ICIAM) in Vancouver, being the sole invitee from our region. Professor Landman is an exceptional supervisor of higher degree students in the mathematical sciences. To date, she has supervised nine Doctoral students and ten Post-Doctoral appointments, many of whom have gone on to successful careers in academe and industry. Many of her students are women, who she has encouraged and mentored.

She has an exemplary record of leadership in a generation of collaborative research programs; this is particularly demonstrated through her role as the Director of the Mathematics-in-Industry Study Group (MISG) during the period 1993–1997. As Director, she provided strong leadership to the Applied Mathematics community, bridging the interface between the University of Melbourne and the community, and expanding the mathematics profession’s public profile through extensive media coverage. She played a large role in developing MISG into the professional organisation that is today recognised nationally and internationally.

Her Curriculum Vitae shows much other service to Applied Mathematics and the ANZIAM organisation, including membership of the ANZIAM Journal Editorial Board since 2010. Over her career Professor Kerry Landman has been a constant supporter of ANZIAM, and she is recognised for the excellence of her numerous presentations at the ANZIAM conferences.

For all these contributions, Professor Kerry Landman is to be awarded the ANZIAM Medal for 2014.

Winner of the 2014 J.H. Michell Medal

The J.H. Michell Medal is awarded annually by ANZIAM to at most one outstanding new researcher who has carried out distinguished research in applied or industrial mathematics within Australia and New Zealand. At the recent ANZIAM Annual Meeting, the 2014 J.H. Michell Medal was awarded to Dr Ngamta (Natalie) Thamwattana.

Citation for the 2014 J.H. Michell Medal



Dr Ngamta (Natalie) Thamwattana has made pioneering contributions in the areas of granular materials and nanotechnology. Natalie was awarded her PhD in 2005 for her work on exact solutions and analysis of important industrial granular flows, such as discharge from hoppers. Soon after that, Natalie was a co-founder of the Nanomechanics Group at The University of Wollongong. Her work in that area involves the interaction of atomic and molecular nanostructures, producing accurate and simply expressed analytical results for calculations that had previously been attempted only by numerical methods.

Natalie has published 60 fully refereed research articles in journals including *Proceedings of the Royal Society of London Series A*, *Physical Review B*, *Physical Review E*, *Journal of Physics: Condensed Matter*, *Journal of Nanoparticle Research*, *Quarterly Journal of Mechanics and Applied Mathematics*, *Journal of Mathematical Chemistry* and *Philosophical Magazine*. In addition, Natalie has published 11 conference papers and a book chapter and is co-author on a provisional patent. So far, Natalie has supervised five PhD students to completion.

Natalie has been a wonderful ambassador to potential and current students for science and mathematical studies. In 2009, she presented a subject, 'Mathematics for Nanotechnology' at the AMSI Summer School. In a similar vein, Natalie has served on the Australian Mathematical Society committee for early-career researcher events and has coordinated three such events. In 2011, Natalie was chair

of the NSW ANZIAM Branch and also organised a function for women in mathematics at the annual meeting of the Australian Mathematical Society. Currently, Natalie chairs the AustMS selection committee for Lift-Off Fellowships and Van der Poorten Travelling Fellowships.

Having two young children has not stood in the way of Natalie's achievements during her early career. She goes about all her work with great insight and displays infectious enthusiasm. Dr Ngamta Thamwattana is a worthy recipient of the J.H. Michell Medal.

TM Cherry Prize



Alona Ben-Tal presents the awards to David Khoury (left) and Matthew Chan (right)

A student prize was introduced in 1969 at Victor Harbor, and is awarded annually to the best student paper presented at the Conference. In May, 1976, ANZIAM (then the Division of Applied Mathematics) adopted the title TM Cherry Student Prize in honour of one of Australia's leading scientists, Professor Sir Thomas MacFarland Cherry, Kt, Sc.D., F.A.A., F.R.S. Mr David Khoury (University of New South Wales) and Mr Matthew Chan (University of Sydney) were awarded the TM Cherry Prize for the best student talks at the ANZIAM 2014 Conference for their talks 'Removal of Malaria Parasites by an Infected Host' and 'Modelling the Spread of a Deliberate Wolbachia Introduction' respectively.

The AF Pillow Applied Mathematics Top-up Scholarship

The AF Pillow Applied Mathematics Trust offers an annual 'top-up' scholarship to a student holding either an Australian Postgraduate Award (APA) or equivalent award for full-time research in Applied Mathematics leading to the award of a PhD. The aim of the AF Pillow Applied Mathematics Top-up Scholarship is to increase the quantity and quality of postgraduate students in the field of applied mathematics in Australia. Ms Audrey Markowskei (Macquarie University) was awarded the AF Pillow Applied Mathematics Top-up Scholarship for 2014.