

ANZIAM awards: EO Tuck Medal, J.H. Michell Medal, TM Cherry Prize

In honour of the late Ernest Oliver Tuck, FAustMS, FTSE, FAA, ANZIAM has instituted a mid-career award for outstanding research and distinguished service to the field of Applied Mathematics.

In its first year, the *EO Tuck Medal* was bestowed upon Shaun Hendy, Professor of Computational Physics in Victoria University of Wellington's School of Chemical and Physical Sciences and Industry and upon Geoffry Mercer, Associate Professor in Disease Modelling, Head, Infectious Disease Epidemiology & Modelling Group, National Centre for Epidemiology and Population Health, Research School of Population Health, Australian National University.

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 2013 J.H. Michell Medal was awarded to Dr Terry O'Kane.

Citations for these three Medal winners appear below.

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 *T.M. 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 Theodore Vo (University of Sydney) were awarded the T.M. Cherry Prize for the best student talks at the ANZIAM 2013 Conference for their talks 'Using Models to Uncover Dynamical Features of Malaria Infections that are Difficult to Measure' and 'Combining Mathematics and Electrophysiology to Understand Bursting in Pituitary Cells' respectively.

The 2013 EO Tuck Medal: Citation for Geoffry Norman Mercer

Geoffry Mercer has made an outstanding contribution to applied mathematics research across a wide range of applications, and has a very distinguished record of service to the field of applied mathematics, in particular ANZIAM and Mathematics in Industry Study Group (MISG). His expertise, talent and energy in multidisciplinary science has infused all aspects of his career, in particular, his teaching and communication of research results, his supervision of PhD students and his community leadership.

As a mid-career researcher, Dr Mercer's research record is most impressive. He has published approximately 100 journal articles and has been awarded \$2.5 million in external grant funding, including ARC and NHMRC grants. Many of Dr Mercer's papers have been published in leading international journals including *Proc. Roy. Soc. Ser. A*; *SIAM J. Appl. Math.*; *IMA J. Appl. Math.*; *PLoS one*; *Vaccine and Epidemiology*. The breadth of Dr Mercer's research contributions is striking: combustion and heat transfer, bushfire modelling, flow through porous media, dispersion and hydrodynamics and currently epidemiology and population health.



Dr Mercer is the leader of the Infectious Disease Epidemiology and Modelling group at the National Centre of Epidemiology and Population Health (NCEPH) and a member of NCEPH's management team. He is responsible for setting the research agenda of a very diverse set of researchers ranging from applied mathematicians, biostatisticians, epidemiologists, medical and allied health trained professionals as well as assisting in their career development. He is lead researcher on numerous large national and international inter-disciplinary projects on issues of vital importance to our regional population health; e.g. determination of source attribution of Salmonella, developing a new pandemic plan, modelling tuberculosis in the

Torres Strait, seasonal and pandemic influenza and dengue fever.

After completing his PhD at the University of Adelaide in 1993, Dr Mercer built a rewarding and successful long-term collaboration with his colleagues at the Australian Defence Force Academy; in particular, Dr Steven Barry, Associate Professor Harvinder Sidhu and Associate Professor Rodney Weber on combustion, dispersion and many real world problems arising from deliberations at various MISG.

Dr Mercer has made an outstanding service contribution especially to ANZIAM and MISG. Most recently, he was Secretary of ANZIAM (2008–2012), a key role involving the oversight and arranging of many society activities, and providing continuous support and liaison to the Chair and Treasurer. His advice, sound judgment, knowledge of ANZIAM history and procedure were invaluable to our professional body. In addition, he has contributed to a wide range of other ANZIAM activities, such as being Founding Chair of the ANZIAM special interest group in Mathematical Biology, chair and member of the ANZIAM ACT branch and member of various conference organizing committees.

He has also provided outstanding contributions to the MISG, as project coordinator on five occasions, as a member of various MISG organizing committees, and as a participant. The MISG projects he worked on have been very successful, leading to ongoing interactions with industry and to successful ARC linkage grants.

His service contribution has also involved the successful supervision of five PhD students and the current supervision of four PhD students. Students value the rich knowledge and experience that Dr Mercer brings to their development.

These examples demonstrate that Dr Mercer has played a pivotal and influential role in the support of applied and industrial mathematics in Australia and ANZIAM. In addition, he uses the multi-disciplinary nature of his research to effectively promote the discipline of Applied Mathematics at a national and international level. Dr Mercer is a committed applied and industrial mathematician and has demonstrated through his enthusiasm, energy and sustained achievements that he well and truly meets the criteria for this mid-career award. The selection panel unanimously recommends that Dr Geoffry Norman Mercer be awarded an ANZIAM 2013 EO Tuck Medal.

The 2013 EO Tuck Medal: Citation for Shaun Cameron Hendy

Shaun Hendy has made remarkable contributions to applied mathematics and varied contributions to his profession, in particular to ANZIAM, as well as communicating the excitement of science to many communities. An innovative thinker and commentator who is widely read by policy makers, his research prowess is already indicated by the positions he holds: Professor of Computational Physics in Victoria University of Wellington's School of Chemical and Physical Sciences and Industry and Outreach Fellow at Callaghan Innovation. He also served as Deputy Director of the MacDiarmid Institute for Advanced Materials and Nanotechnology from 2008–2012.

Elected as a Fellow of the Royal Society of NZ in 2012, Professor Hendy has published many peer-reviewed and well-cited papers and a book, and is in demand for invited talks and postgraduate student supervision. He has managed over NZ\$20M of research contracts, is a consultant to the New Zealand Ministry of Education, and has a regular speaking slot on a National Radio program. He has ongoing collaborations with Stanford, Tennessee, UC Berkeley, Flinders, Sydney, Dresden, Lyon, Lublin Universities and Imperial College.



Shaun has pioneered the transformational research area of mathematical modelling in nanotechnology in New Zealand. There are very few groups worldwide involved in mathematical work in nanotechnology; Professor Hendy is undoubtedly a research leader in this field, and has demonstrated considerable initiative. Many aspects of nanotechnology require mathematical and numerical methods for their description. The insights gathered from his research cover the whole research spectrum, from highly theoretical results, relating for example to the discovery of new phase phenomena at the nano-scale, to very practical patents relating to novel intellectual property that is relevant to nano-device manufacture.

Professor Hendy, analogously with the late Professor Tuck, has made significant contributions to the theory of fluids. Shaun's major research discoveries include identifying new solid-liquid phase behaviour, such as superheating, that can occur in nanoparticles, and the classification of novel recoil behaviour of nanoparticles. Their discovery by Shaun attests to his scholarship, especially given the very applied and industrially motivated aims of his research programs.

More recently, in a pioneering study, Professor Hendy has used the international patent databases, and Google Earth, to show how innovation develops in space and time. He has developed methods which allow NZ innovation to be benchmarked internationally and contributes to IBM's Innovation Index for NZ. Industrial Research Ltd (now Callaghan Innovation) appointed Hendy as their inaugural Industrial and Outreach Fellow, and provided additional resources for his research into innovation.

Shaun Hendy is a remarkable scientific thinker, commentator and communicator. He uses all forms of modern communication to bring his message to a wide variety of audiences: blogging relentlessly with his *A Measure of Science* on SciBlogs, and communicating through radio, public talks, print media and blogging. He is widely read by policy makers in the innovation sector in New Zealand, and his blog has become a leading forum for discussion of the links between science, innovation and economic growth. The wider community has embraced the power of his messages, delivered in his unassuming style. Shaun won the 2012 NZ Prime Minister's Science Media Communication Prize for being an effective communicator. The 2012 Callaghan Medal for outstanding contribution to science communication was awarded to Shaun for his remarkable work in raising public awareness of science and its role in increasing economic prosperity. The late Sir Paul Callaghan, FRS, and previously New Zealander of the Year, wrote that Shaun 'is emerging as one of New Zealand's great science leaders and communicators. I see him as achieving anything I have achieved here and more'.

Professor Shaun Hendy, as was the late Professor Tuck, is a strong contributor to ANZIAM, being Chair of the New Zealand Branch between 2008–2010, and Secretary in 2011. As Chair of the NZ Branch, he introduced electronic voting, and he initiated changing the NZ Branch to an Incorporated Society, a lengthy but important process, which was only completed in 2012. These changes represent the most significant modernization of the NZ Branch since its formation.

Shaun is recognized as a leading scientist for his energy, scholarship, leadership, high connectivity and high standing in our region and in the international science community. The selection panel unanimously recommends that Professor Shaun Cameron Hendy be awarded an ANZIAM 2013 EO Tuck Medal.

On behalf of ANZIAM

- Robert Anderssen (CMIS Canberra)
- Jim Hill (University of Adelaide)
- Kerry Landman (University of Melbourne)
- Robert McKibbin

Citation for the 2013 J.H. Michell Medal

The committee for the 2013 JH Michell Medal has unanimously agreed to nominate Dr Terry O’Kane of CSIRO Marine and Atmospheric Research for this award.

Dr O’Kane has made outstanding original contributions to difficult and important problems in applied mathematics. His achievements span theoretical and computational fluid dynamics, statistical dynamics and statistical mechanics, ensemble prediction, data assimilation, subgrid-scale parameterisations, wave turbulence interactions in atmospheric and oceanic flows, numerical methods for integro-differential equations, Markov and non-Markov processes, Gaussian and non-Gaussian processes, applications to climate variability and change. O’Kane devised the first computational implementation of a tractable statistical dynamical closure theory for general inhomogeneous turbulent flows. This has been a milestone achievement in statistical fluid dynamics, allowing the direct computation of the statistics of realistic flows. He has made further pioneering contributions to the statistical dynamics of ensemble prediction, data assimilation and subgrid modelling. He has also made important contributions to ensemble prediction methods for operational numerical weather forecasting and ocean circulation prediction. He has around 80 publications and is a regular contributor to ANZIAM’s CTEC conferences.



Dr O’Kane received his PhD from Monash University in 2003, under the supervision of Dr Jorgen Frederiksen (CSIRO) and Professor David Karoly (University of Melbourne). Prior to his PhD O’Kane obtained a H1A in applied mathematics at La Trobe University and a H1A Masters (by Research) in theoretical physics at The University of Melbourne. After his PhD, O’Kane continued to work at CMAR with Dr Frederiksen as a postdoctoral researcher and subsequently with Dr Steve Rintoul (CSIRO) as a research fellow at the Antarctic, Climate & Ecosystems CRC. O’Kane took up his first permanent position at the Australian Bureau of Meteorology (BoM) as ensemble prediction scientist in 2007.

Following nearly two years at the BoM, during which time he developed the Australian Global & Regional Ensemble Prediction System (AGREPS), O’Kane returned to CMAR where he is currently a senior research scientist. He was awarded an Australian Research Council Future Fellow position in 2012.

The committee consisted of Tony Roberts, University of Adelaide (Chair), Carlo Laing, Massey University and Frances Kuo, University of New South Wales.