

About the authors

Professor Brian Anderson AO

Brian Anderson is a Distinguished Professor in the College of Engineering and Computer Science at the Australian National University. He is also Distinguished Researcher in National ICT Australia (NICTA) where he served as the first President and then Chief Scientist (2002–2006). He was President of the Australian Academy of Science (1998–2002). He has made significant contributions in control systems and signal processing, with his work currently focusing on distributed control of multiagent systems, sensor network localisation, and macroeconomic modelling.

Professor Robin Batterham AO

Robin Batterham is Kernot Professor in the Department of Chemical and Biomolecular Engineering at the University of Melbourne. Previously, he was Chief Scientist of Australia (1999–2006) and President of the Academy of Technological Sciences and Engineering (2007–2012). Throughout his long and distinguished career in the industry and government, Professor Batterham has been devoted to furthering energy research, and is deeply involved with the Melbourne Energy Institute.

Professor Mark Buntine

Mark Buntine is the President of the Royal Australian Chemical Institute and Head of the Department of Chemistry at Curtin University. His experimental research uses lasers to explore a range of chemical phenomena, employing a variety of spectroscopic approaches to characterise molecular structure. He also

undertakes computational chemistry research involving electronic structure methods. Professor Buntine is a founder and Director of the Advancing Science by Enhancing Learning in the Laboratory (ASELL) project. Details of this project can be found at www.asell.org.

Professor Ian Chubb AC

Ian Chubb commenced his role as Australia's Chief Scientist in May 2011. Prior to this appointment he was Vice-Chancellor of the Australian National University and Vice-Chancellor of Flinders University of South Australia. He has also held the position of Senior Deputy Vice-Chancellor, Monash University, Chair of the Commonwealth's Higher Education Council and Deputy Vice-Chancellor, University of Wollongong. Professor Chubb was appointed a Companion of the Order of Australia for 'service to higher education including research and development policy in the pursuit of advancing the national interest socially, economically, culturally and environmentally and to the facilitation of a knowledge-based global economy'.

Professor Andrew Cockburn

Andrew Cockburn is Professor of Evolutionary Ecology at the Australian National University. He has worked and published extensively on the breeding behaviour of White-winged Choughs and Superb Fairy-wrens. In 2004 he was awarded the Royal Australasian Ornithologists Union's D.L. Serventy Medal, which recognises excellence in published work on birds in the Australasian region. He is interested in the evolution of life histories, complex mating systems, and gender and sex in animal societies.

Professor Mike Coffin

Mike Coffin, Executive Director of the University of Tasmania's Institute for Marine and Antarctic Studies, has pursued an international career that reflects the boundless nature of the global ocean. Previously he has worked at the United Kingdom's University of Southampton/National Oceanography Centre (2007–2010), the University of Tokyo (2001–2007), the University of Texas (1990–2001), and Geoscience Australia (1985–1989). As a blue-water marine geophysicist, Professor Coffin's research expertise encompasses episodic Earth-Ocean system phenomena and processes; in particular, massive seafloor volcanism and its environmental effects.

Dr Dana Cordell

Dana Cordell is a Research Principal at the Institute for Sustainable Futures at the University of Technology, Sydney. As co-founder of the Global Phosphorus Research Initiative (GPRI) she leads research on sustainable phosphorus futures for food security in Australia and internationally. In addition to undertaking independent research, the GPRI also facilitates networking, dialogue and awareness-raising among policy makers, industry, scientists and the public regarding the biophysical and socio-economic dimensions of the global phosphorus challenge for food systems and potential solutions.

Professor Merlin Crossley

Merlin Crossley is the Dean of Science at the University of New South Wales (UNSW). Previously he was Professor of Molecular Genetics (2005–2009) and Acting Deputy Vice-Chancellor Research (2006–2008) at the University of Sydney. Crossley's laboratory at UNSW studies DNA-binding proteins that turn

genes on and off, and their roles in genetic diseases of the blood and of metabolism. He has received several awards for his work on gene regulation.

Professor Tamara Davis

Tamara Davis is an Australian Research Council Future Fellow and astrophysicist at the University of Queensland. She was a winner of the 2011 Australian Institute of Physics Women in Physics Lectureship and the 2011 Queensland Tall Poppy Award. After leading cosmology analyses for two international supernova surveys she returned to Australia to be part of the WiggleZ dark energy survey, which mapped more than 220,000 galaxies across half the observable universe. She uses these data to investigate new fundamental physics, such as the properties of dark energy and dark matter and the mass of the neutrino.

Professor Sabine Dittmann

Sabine Dittmann is Associate Professor for Marine Biology at Flinders University and President of the Australian Marine Sciences Association. She has been Director of the Lincoln Marine Science Centre for five years, and supports the translation of science into management through her membership in science advisory groups and the Marine Park Council. Professor Dittmann has several decades of research experience in temperate and tropical coastal ecosystems, studying species interactions and effects of human impacts in tidal flats and estuaries.

Professor Michael D'Occhio

Michael D'Occhio is the Nancy Roma Paech Chair in Range Science at the University of Sydney. His career is devoted to discovery and translational science in agriculture and he works closely with industry to facilitate the timely adoption of new

knowledge and technology. He is interested in the balance between the imperative to utilise the environment and natural resources to produce food and the need to maintain healthy and resilient ecosystems. He believes that global food insecurity could be addressed more effectively if more effort was devoted to reducing food loss and wastage at the same time as striving to produce food more efficiently. Greater equity in the global distribution of food should also be a goal in achieving improved food security.

Laureate Professor Peter Doherty AC

Peter Doherty shared the Nobel Prize in Physiology or Medicine in 1996 with Swiss colleague Rolf Zinkernagel, for their discovery of how the immune system recognises virus-infected cells. He was Australian of the Year in 1997, and has since been commuting between St Jude Children's Research Hospital in Memphis and the Department of Microbiology and Immunology at the University of Melbourne. His research is mainly in the area of defence against viruses. He regularly devotes time to delivering public lectures, writing articles for newspapers and magazines and participating in radio discussions.

Dr Katy Evans

Katy Evans is an ARC Future Fellow at the Department of Applied Geology, Curtin University, where she works on the exchange of redox-sensitive elements in open systems. This work has developed from her PhD on metamorphic fluid flow at Cambridge University, and projects undertaken as a research fellow at CSIRO Exploration and Mining, and as an Australian Synchrotron Research Fellow at the Research School of Earth Sciences at the Australian National University.

Dr Marguerite Evans-Galea

Marguerite Evans-Galea is an investigator at the Murdoch Childrens Research Institute. She trained in world-leading US laboratories, returning to Australia in 2008 to develop therapies and biomarkers for repeat-associated neurodegenerative diseases. She has received awards from the Australasian Gene Therapy Society and the Friedreich Ataxia Research Alliance USA, and is funded by the NHMRC. As Founding Chair of the Early-Mid Career Researcher Forum with the Australian Academy of Science, she has led multiple policy submissions and was recognised with an Australian Leadership Award in 2013.

Dr Cathy Foley

Cathy Foley is the Chief of CSIRO Materials Science and Engineering. She is a Fellow of the Institute of Physics in the United Kingdom, Immediate Past President of the Australian Institute of Physics and Science and Technology Australia, and Fellow of the Academy of Technological Sciences and Engineering. She is Editor-in-Chief of the journal *Superconductor Science and Technology*. Dr Foley is well known for her interests in physics, science education, women in science, science in the media and translation of research to industry.

Associate Professor David Glance

David Glance is Director of the UWA Centre for Software Practice (CSP), a UWA research and development centre. Originally a physiologist, he subsequently worked in the software industry for more than 20 years at companies such as Microsoft, Tibco and IONA Technologies, before spending the past 12 years at The University of Western Australia (UWA). The UWA CSP has developed software for the tertiary education and health sectors. Associate Professor Glance has been leading a collaboration on the

development and use of the OpenEdX platform developed by the edX team based at MIT. Professor Glance has been a contributor to *The Conversation* since its inception and has written more than 150 articles covering the impact of technologies on people and society, and he has published a book based on these articles.

Professor Michael Good AO

Michael Good is a NHMRC Australia Fellow at Griffith University, the former Director of the Queensland Institute of Medical Research (QIMR) and the former Chairman of the National Health and Medical Research Council of Australia. In 2008, he was made an Officer of the Order of Australia (AO) for contributions to medical research and education. His interests are in the field of immunity and vaccine development for malaria and rheumatic heart disease.

Mr John Gunn

John Gunn is the Chief Executive Officer of the Australian Institute of Marine Science. Previously, he was Chief Scientist of the Australian Antarctic Program and the Deputy Chief of CSIRO's Marine and Atmospheric Research Division. He has an international reputation in the fields of pelagic fish ecology and in the development of marine biological observing technology and systems. Gunn is a passionate advocate for science — in particular, marine science — and its role in securing a prosperous and sustainable future for Australia.

Professor John Henstridge

John Henstridge is the Managing Director of Data Analysis Australia and National President of the Statistical Society of Australia. Previously, he was a consultant at Siromath and is

currently an Adjunct Professor of Statistics at the University of Western Australia. In 2008, Professor Henstridge received a Service Award from the Statistical Society of Australia for his contributions to the profession, particularly his encouragement of young statisticians.

Professor Andrew Holmes AM

Andrew Holmes is Melbourne Laureate Professor of Chemistry at the University of Melbourne and a CSIRO Fellow at CSIRO Materials Science and Engineering. Previously, he was Professor of Organic and Polymer Chemistry at the University of Cambridge, where he worked for 32 years. His research is focused on synthesis of all kinds — from biologically active molecules to polymers — and addresses the interface of chemistry with materials science and biology. In November 2012, Professor Holmes received the Royal Medal for applied and interdisciplinary sciences from the Royal Society.

Professor Chennupati Jagadish

Chennupati Jagadish is an Australian Laureate Fellow and Distinguished Professor at the Department of Electronic Material Engineering, Research School of Physics and Engineering, Australian National University. He is serving as Vice-President and Secretary (Physical Sciences) of the Australian Academy of Science and Vice-President (Finance and Administration) of the IEEE Photonics Society. His research interests include compound semiconductor optoelectronics and nanotechnology.

Professor David Jamieson

David Jamieson has served as Head of the School of Physics at the University of Melbourne and as President of the Australian Institute of Physics, and is a Fellow of the AIP and the Institute of Physics UK. His research is in the field of ion beam physics and he is a chief investigator and program manager in the Australian Research Council Centre of Excellence for Quantum Computation and Communication Technology. He has lectured students and the public on important issues in physics.

Professor Nalini Joshi

Nalini Joshi is the Chair of Applied Mathematics at the University of Sydney and a Georgina Sweet Australian Laureate Fellow. She was the first woman to be appointed a professor of mathematics at the University of Sydney and became the first woman head of School of Mathematics and Statistics in 2007. Her research interests lie in non-linear differential and difference equations, with a particular focus on asymptotic methods.

Professor Peter Langridge

Peter Langridge is CEO at the Australian Centre for Plant Functional Genomics. He is an Honorary Fellow of the James Hutton Research Institute, UK, and in 2007 he was appointed Fellow of Food Standards Australia and New Zealand. He chairs the Advisory Boards of the Dryland Cereals Program for the UN Food and Agriculture Organisation's CGIAR, based in India, and the Institute for Biological and Rangeland Sciences in the United Kingdom. Professor Langridge's research focuses on the development and application of new crop breeding technologies, with particular emphasis on global food security.

Professor Jenny Martin

Jenny Martin is an ARC Australian Laureate Fellow and honorary NHMRC Fellow at the Institute for Molecular Bioscience, University of Queensland. She has previously held ARC Queen Elizabeth II and ARC Professorial Fellowships, and chaired the National Committee for Crystallography of the Australian Academy of Science (2008–2011). Her current research focuses on protein structure and function in health and disease, and the application of structure-based approaches to developing new drugs.

Professor Geoff Prince

Geoff Prince is the Director of the Australian Mathematical Sciences Institute, a leading provider of policy advice, programs and strategic initiatives to government and industry. Professor Prince has a long academic career as a teacher and researcher at RMIT University, The University of New England and La Trobe University where he was Head of Department. He works in differential geometry, differential equations and their application.

Professor John Rice

John Rice is Executive Director of the Australian Council of Deans of Science, establishing its annual teaching and learning conferences from 2008, and more recently its Teaching and Learning Centre. He was Dean of the Faculty of Science and Engineering at Flinders University (1993–2000) and the Faculty of Science at University of Technology, Sydney (2004–2008). He established the Australian Science and Mathematics School on Flinders University campus from 2000–2004. He is an Honorary Professor at the University of Sydney with mathematical interests in differential and algebraic geometry.

Professor Andrew Roberts

Andrew Roberts is Dean of the College of Physical and Mathematical Sciences at the Australian National University. He was previously Head of the School of Ocean and Earth Science at the University of Southampton and Associate Director of the UK's National Oceanography Centre. His research interests are focused on magnetism and paleomagnetism, marine geoscience, geochronology and tectonics.

Scientia Professor Veena Sahajwalla

Veena Sahajwalla is the Director of SMaRT Centre (Sustainable Materials Research & Technology) and Associate Dean (Strategic Industry Relations) Faculty of Science, UNSW. Her research interests include sustainability of materials and processes with emphasis on environmental benefits. She invented an environmentally friendly process for recycling plastics and rubber tyres in electric arc furnace steelmaking. She is an international award-winning engineer who has been an ARC Future Fellow and a long-serving judge on ABC television's *The New Inventors*.

Professor Mike Sandiford

Mike Sandiford is Professor of Geology and the Director of the Melbourne Energy Institute at the University of Melbourne. He has received consecutive ARC professorial fellowships and the Mawson Medal by the Australian Academy of Sciences in 2004. His research interests include tectonics, earthquake geology, geomorphology and geothermics, with a special focus on the young tectonic activity in the Indo-Australian tectonic plate. His work on the thermal structure of the Australian crust provides an important framework for understanding the extraordinary abundance of uranium in Australia.

Laureate Professor Brian Schmidt AC

Brian Schmidt is a Nobel Prize winner and a Laureate Fellow at The Australian National University's Mt Stromlo Observatory. He formed the HighZ SN Search team with Nick Suntzeff to trace the expansion of the universe back in time, leading to the discovery of an accelerating universe. In 2008, he was elected a Fellow of the Australian Academy of Sciences. He is continuing his work using exploding stars to study the universe and is leading Mt Stromlo's effort to build the SkyMapper telescope.

Professor Michelle Simmons

Michelle Simmons is a Scientia Professor of Physics and ARC Laureate Fellow at the University of New South Wales. She is Director of the Australian Research Council Centre of Excellence for Quantum Computation and Communication Technology, leading a team to develop a silicon-based quantum computer. An international pioneer of atomic-electronics and quantum computing, Professor Simmons' research has created the world's first single atom transistor and the narrowest conducting wires in silicon. Professor Simmons has filed multiple patents and published extensively on quantum physics and quantum information science. In 2014 she was inducted into the American Academy of Arts and Sciences.

Professor Terry Speed

Terry Speed is Professor of Bioinformatics at the Walter and Eliza Hall Institute of Medical Research. Previously, he shared his time between this position and the Department of Statistics of the University of California, Berkeley. Professor Speed is regarded internationally as the leading expert on the analysis of microarray data, and has made contributions to bioinformatics,

statistical genetics, the analysis of designed experiments, graphical models and Bayes networks. His research concerns the application of statistics to problems in genetics and molecular biology.

Professor Fiona Stanley AC

Fiona Stanley is Founding Director and Patron of the Telethon Kids Institute, Distinguished Research Professor at the University of Western Australia and Vice Chancellor's Fellow at the University of Melbourne. Trained in maternal and child health, epidemiology and public health, Professor Stanley has spent her career researching the causes of major childhood illnesses such as birth defects. She was named Australian of the Year in 2003 and in 2006 she was made a UNICEF Australia Ambassador for Early Childhood Development.

Professor Toby Walsh

Toby Walsh is a Research Leader at NICTA in the Optimisation Research Group, where he leads the Algorithmic Decision Theory project, and is also an Adjunct Professor at UNSW. He is an expert in artificial intelligence research, and has been Editor-in-Chief of two of the main journals in AI — the *Journal of Artificial Intelligence Research* and *AI Communications* — and is currently Associate Editor of one of the leading journals in computer science, the *Journal of the ACM*, covering the area of artificial intelligence.

Associate Professor David Warton

David Warton is an ecological statistician in the School of Mathematics and Statistics and the Evolution & Ecology Research Centre at UNSW. He leads the Eco-Stats group, which

has attracted more than A\$2 million in ARC research funding and several awards. His cross-disciplinary research evaluates data analysis methods currently used in ecology and develops new data analysis techniques where needed. In 2014, Associate Professor Warton was awarded the Australian Academy of Science's Christopher Heyde Medal and a Young Investigator Award from the American Statistical Association.

Professor Rachel Webster

Rachel Webster is Professor of Physics at the University of Melbourne. She is Vice-President of the University Academic Board and was the inaugural AIP Woman in Physics Lecturer. She is a key member of an international consortium involving Australian and American astrophysicists to help design and build a new low frequency radio telescope at Mileura in Western Australia. This major project aims to detect the first sources in the universe. Professor Webster's other interests include quasar emission regions, gravitational lensing and cosmology.