

# New Fellows 2022



Australian Academy of  
Technological Sciences  
& Engineering

## Dr Nicholas Austin FTSE

Chief Executive Officer, Watertrust Australia Ltd. (ACT)



Dr Nick Austin is a hydrologist by training, bridging agriculture and engineering in the critical area of water. From his earliest appointments in water policy reform, Nick has shown an exceptional ability to build partnerships between government, businesses and society for the common good.

In 2021, Nick became the inaugural CEO of Watertrust Australia, an independent policy centre helping improve how water and catchment policy decisions are made in Australia. He is recognised internationally and domestically for delivering innovative solutions to complex technological and political challenges. He has worked to improve the lives of smallholder farming families, having led the agricultural development program of the Bill and Melinda Gates Foundation and, nationally, as CEO of the Australian Centre for International Agricultural Research.

## Professor Michael Breadmore FTSE

Director, Australian Centre for Research on Separation Science (ACROSS), University of Tasmania (TAS)



Professor Michael Breadmore is an outstanding analytical chemist. His 'lab-on-a-chip' technology separates complex mixtures of chemicals on miniature scale enabling users to test samples and get results on the spot. This research culminated in two world first

portable instruments. First, an instrument that detects, in under 60 seconds, the chemicals used in homemade explosives, revolutionising counter-terrorism efforts. And second, an instrument for the near-real-time detection of nutrients in natural waters, to change the global water monitoring industry. Michael's influence worldwide is evidenced by his repeated presence in Analytical Scientist's top 100 'Power List' in recent years.

## Professor Madhu Bhaskaran FTSE

Co-leader, Functional Materials and Microsystems Research Group, RMIT University (VIC)



Professor Madhu Bhaskaran is an engineer who has developed stretchable skin-like electronic devices for better health care. As skin patches, the technology can monitor health parameters, or include sensors measuring UV exposure for melanoma prevention.

It can be integrated into mattresses for improved monitoring in aged care, intensive care, and for SIDS. Sleep researchers are testing its utility for diagnosing disorders such as sleep apnoea. Madhu also broke boundaries in commercialising this technology. Collaborating with industry and manufacturing partners early meant up-scaling challenges were resolved quickly. Field trial prototypes were ready in three years. Madhu's groundbreaking research has won numerous awards including the ATSE Batterham Medal. She's a passionate advocate for diversity in engineering, and helps lead national initiatives including Women in STEMM Australia.

## Professor Kylie Catchpole FTSE

Deputy Director, School of Engineering, Australian National University (ACT)



Professor Kylie Catchpole is a global expert in solar energy. Her pioneering work demonstrating new approaches to increase the efficiency of solar cells and solar hydrogen technology has shaped the field. She has led teams that have achieved world record solar

cell efficiencies, and the solar hydrogen technology developed by an interdisciplinary team led by Kylie was named a top 10 innovation in 2020 by the Japanese Government's Innovations for a Cool Earth Forum. She has also contributed significantly to Australia's hydrogen strategy. Kylie is an inspiring leader and her popular course, 'Optimism and agency in times of change', is empowering students to identify their contribution to global challenges by defining what's important to them. Students have said, 'This course has truly changed my outlook on life'.

## Professor Michelle Colgrave FTSE

Future Protein Mission Leader, CSIRO Agriculture and Food (QLD); Professor, Food and Agricultural Proteomics, Edith Cowan University (WA)



Professor Michelle Colgrave is internationally known for her cutting-edge work in proteomics – the study of proteins – used to improve agriculture and food for the benefit of human health. Michelle’s work focuses on providing optimum nutrition more sustainably. Her team

supported the development of a canola variety that produces omega-3 oils. Michelle also helped develop the world’s first gluten-free barley. Her team is now examining oat cultivars for use in gluten-free diets. With growing demand for protein globally, her team is studying plant proteins, with lupins an exciting prospect. Michelle’s experience extends beyond research into strategy development for policy making. She is active in encouraging more women into science.

## Dr Elizabeth (Beth) Ebert FTSE

Senior Principal Research Scientist and Head, Forecast Quality Research, Bureau of Meteorology (VIC)



Dr Elizabeth Ebert is a meteorologist with extensive experience working in governments. She holds a science leadership role in the World Meteorological Organization and has had considerable influence on international research in high impact weather.

Beth’s integration of physical and social science has enhanced extreme weather prediction improving impact management. For example, Melbourne’s 2016 asthma-causing thunderstorm overwhelmed emergency services. Ten people died. Within a year, Beth and her colleagues delivered a world-first forecasting system for epidemic thunderstorm asthma. Outcomes are demonstrably better as early warnings alert the public and help health authorities prepare. Beth’s methodologies for verification of forecast performance have been adopted internationally. Her work also enabled rainfall probability to be included in forecasts. She is a highly collaborative mentor to many younger scientists.

## Professor Katrina Falkner FTSE

Executive Dean, Faculty of Science, Engineering and Technology, University of Adelaide (SA)



Professor Katrina Falkner is a top 100 innovator completely transforming computer science education. Her work directly addresses inequities in access to technology, helping to build a fairer Australia. In 2013, 95% of teachers had no education in computer science. Katrina

decided to turn this around. Her wildly successful computer science ‘massive open online course’ (MOOC) shows teachers how computer science works and highlights its importance for children’s futures. Based on rigorous research, the MOOC blends computer science into any subject for an enjoyable learning experience. It has reached 45,000 Australian educators and more than two million students. Katrina’s research shows that teachers are inspired and empowered by the course, moving rapidly from uncertainty to confidence in teaching computer science.

## Professor Mary Foley AM FTSE

Special Adviser and Non-Executive Director, Telstra Health (NSW)



Professor Mary Foley has made an extensive contribution to health systems leadership and policy development in Australia. She was Director General and Secretary of NSW Health overseeing a period of substantial reform of this \$22 billion health system

and 135,000 staff. Previously, she was National Health Industry Leader for PwC Australia, and Chief Executive of St Vincent’s and Mater Health in Sydney. More recently, as Managing Director of Telstra Health, a digital health company owned by Telstra Corporation, Mary has led major digital transformation in healthcare. Significant projects included the National Cancer Screening Register, new at-scale models for virtual care during the pandemic, and expansion of Telstra Health nationally and internationally. Mary is an Adjunct Professor at Western Sydney University, educating post-graduate students on health systems. She has written widely on health policy.

## Professor Maria Forsyth FTSE FAA

Chair in Electromaterials and Corrosion Science,  
Deakin University (VIC)



Professor Maria Forsyth has been at the forefront of global research and collaboration in energy storage for decades. Her work on battery technology has consistently achieved breakthrough results. Recognising Australia's critical need to increase energy storage

capacity, Maria championed the establishment of BatTRI-Hub, a centre for battery design and development. She also leads StorEnergy, a research centre uniting 11 organisations across government and industry with five Australian universities. Her team is now researching sodium battery technology given its strong potential for inexpensive large-scale energy storage at grid level to help smooth intermittent renewable energy supplies. Sodium is a successor to lithium for safety, sustainability and ethical supply reasons. In corrosion science, Maria focuses on mitigation, minimising environmental toxicity, and extending infrastructure lifetimes.

## Dr Elizabeth (Beth) Fulton FTSE FAA

Senior Principal Research Scientist,  
CSIRO Oceans and Atmosphere (TAS)



Dr Beth Fulton is a trailblazer in the sustainable management of marine environments. Her whole-of-system modelling tools are considered world-best by the UN Food and Agricultural Organization. Beth's influential doctoral thesis set out the theory and

rules for large-scale marine ecosystem modelling. It is required reading for fisheries graduate courses globally. She is acclaimed for developing Atlantis, the first marine systems model to span microbes and nutrient dynamics, through the food web, to human decision-making and management processes. Beth collaborates widely and is helping to push for greater First Nations involvement in research at CSIRO. Hailed as a 'once in a generation scientist and thinker', Beth advises governments and global institutions. At mid-career, she is already a global leader.

## Professor Xiaojing Hao FTSE

Professor, School of Photovoltaic and  
Renewable Energy Engineering, UNSW (NSW)



Professor Xiaojing Hao is a world expert in solar technology and has helped establish Australia's global leadership in this field. Silicon solar panels represent 95% of the market. While silicon is almost ideal for converting light into electricity, thin flexible materials are also

needed in applications where silicon isn't suitable. Xiaojing has set five world records for solar cell efficiency using thin film kesterite materials. More clean electricity can be generated by incorporating thin film cells into coatings for the sides of buildings or moulding them onto vehicles. Also, layering thin film cells onto silicon cells can generate 20% more electricity from the same area. Xiaojing led the development of numerous kinds of such thin film cell alternatives maximising the chances of success for next-gen solar cell technologies. Xiaojing has won the Australian Academy of Science's Pawsey Medal and the Prime Minister's Prize for Science: Malcolm McIntosh Prize for Physical Scientist of the Year.

## Janine Herzig FTSE

Executive President and Director,  
CEEC International (SA)



Janine Herzig is a metallurgical engineer with 30 years' experience in the resources sector, community relations, and environmental, social, and governance (ESG). She has inspired, mentored and developed countless young professionals, facilitated career roadshows,

university and high school engagements and community outreach. Currently, Janine's work focusses on collaborative research to identify opportunities to unlock value, improve energy and water efficiency and reduce environmental impact. During Janine's ten years on the Board of the Australasian Institute of Mining and Metallurgy, two as President and Chair, she fostered a more inclusive membership base, built stakeholder trust, and modernised systems and structures that are authentic and resonate with our future leaders. She is a champion of sustainability, elevating the standing of social and environmental issues which transcended all existing technical competencies. Janine brings together diverse groups of professionals to seek understanding and new approaches to solving challenges.



## Professor Mark Howden FTSE

Director, Australian National University's Institute for Climate, Energy and Disaster Solutions (ACT)



Professor Mark Howden is an international force in climate change science. He's been a member of an extraordinary 20 Intergovernmental Panel on Climate Change processes since 1991, sharing the 2007 Nobel Peace Prize with other IPCC participants and Al Gore. Mark has been articulating

the scale of climate impacts and how to manage them since the 1990s, influencing the global discourse. He helped develop the national and international greenhouse gas inventories that inform the Paris Agreement. He has a rare capacity to link climate science with food/nutrition security and other threats, connecting these into broader sustainable development pathways. Mark is passionate about educating the wider community and government, giving a huge number of presentations, briefings and interviews each year.

## Distinguished Professor Dietmar W. Hutmacher FTSE FAHMS

Chair in Regenerative Medicine, Queensland University of Technology; Co-Director, Max Planck Queensland Centre for the Materials Science of Extracellular Matrices (QLD)



Distinguished Professor Dietmar W Hutmacher is a global leader in scaffold-guided tissue regeneration (SGBR). Patient specific scaffolds are designed and manufactured by using a cutting-edge 3D printing technology platform, then implanted. The SGBR

technology has repaired leg bones and badly damaged skulls and corrected congenital deformities. Approved by US and European authorities, more than 70,000 patients have been treated worldwide. After tissue regrows in the highly porous scaffold architecture, the scaffold material dissolves. Compared to titanium implants this is life-changing because implant removal is not required. This has transformed the treatment of large bone defects, especially for skull defects and related correction surgeries of babies and children. Dietmar's career and work combines academia and industry. His research has led to six spinoff companies. Recently, Dietmar has pioneered ways to integrate tissue engineering technology into cancer research.

## PSM Professor and Scientia Professor Nasser Khalili FTSE

Head, School of Civil and Environmental Engineering, UNSW; Director, ARC Industry Transformation Research Hub for Resilient and Intelligent Infrastructure Systems (RIIS) (NSW)



Professor Nasser Khalili is an international leader in geotechnical engineering, computational geomechanics and unsaturated soil mechanics. His work encompasses roads, tunnels, mines, dams, earthquake engineering and groundwater projects. He has contributed to

projects of national and international interest including the stability assessment of the Olympic Stadium site at Homebush Bay and the seismic hazard investigation for Sydney Airport's third runway. Nasser currently oversees a project diverting 10,000 tonnes of paper and plastic waste into road construction, creating technical leadership in Australian recycling and reducing infrastructure costs. National design guidelines for embankment dams include Nasser's seismic analysis. Nasser's assessment of Hume Dam helped determine the cause of increasing movement in the dam's core-wall and the design of an effective solution.

## Professor Michael Milford FTSE

Joint Director, QUT Centre for Robotics; Australian Research Council Laureate Fellow, Queensland University of Technology (QLD)



Professor Michael Milford is a leading researcher in neuroscience-based robotics navigation. He works closely with industry and government developing high-performance positioning systems for robotics and autonomous vehicles. Michael is at the forefront of

visual place recognition technology, pioneering new methods for use in mission-critical contexts, including collaborations with Ford and Caterpillar. Michael's world-first advancements translating abstract neuroscience into technology for real-world commercial applications were recognised by ATSE in 2019 in awarding him the Batterham Medal for engineering excellence. For more than 20 years, Michael has been creating STEM educational resources for students.

## Professor Ann Nicholson FTSE

Dean, Faculty of Information Technology,  
Monash University (VIC)



Professor Ann Nicholson is a computer scientist specialising in artificial intelligence. She is a respected international expert in Bayesian networks, the dominant technology used to support rational decision-making under uncertainty in complex

situations. Ann has developed models and tools for intelligent decision support for many applications, including fog forecasting, managing and monitoring threatened species, clinical medical diagnosis and treatment, intelligence and security assessments, and bushfire risk assessment. Ann is the first woman appointed into her prestigious role at Monash University. She is a champion for greater Indigenous participation in her faculty and supports many initiatives to bring more girls and women into IT careers.

## Kirsten Rose FTSE

Executive Director Future Industries, CSIRO (WA)



Kirsten Rose is a respected leader in technology and innovation with a career spanning 30 years in the US, UK and Australia. She is a member of CSIRO's executive team overseeing a portfolio encompassing over 2,000 research scientists and engineers and more

than \$500 million in annual research investment. She champions commercialisation of CSIRO science through her support of start-ups and spin-outs to create true impact at scale. Kirsten formerly led Innovation and Sustainable Operations at BHP with global responsibility for driving improvement in climate change commitments. This included influencing BHP's leadership to move from incremental emissions reductions targets to firm science-based net-zero targets. She is a passionate champion for gender diversity and is an active member of Chief Executive Women.

## Professor Thas Nirmalathas FTSE

Deputy Dean (Research), Faculty of Engineering and  
Information Technology, University of Melbourne (VIC)



Professor Thas Nirmalathas is an expert in communications technologies and networking for optical distribution of broadband wireless signals. He is academic lead at the Wireless Innovation Lab, an industry-university collaboration vehicle aiming to improve accessibility

of ultra-fast wireless communications throughout Australia via next-generation wireless solutions. Thas co-founded the Melbourne Accelerator Program, the first university-aligned Australian startup accelerator. It has assisted more than 200 startups. He also helped establish Translating Research at Melbourne (TRaM). These initiatives gave rise to the Melbourne Entrepreneurship Centre. Thas's work foreshadowed advanced broadband mobile networks like 5G and 6G. It also inspired the development of optical wireless transmission using emerging nano-optical fabrication technologies, creating systems compatible with future virtual reality interfaces.

## Dr John (Jack) Steele FTSE

Director, Science Impact and Policy, CSIRO (NSW)



Dr Jack Steele has driven national initiatives to commercialise scientific research for decades. From 2015, he led the establishment of CSIRO's Main Sequence, an innovation fund commercialising 'deep technology' public sector research. Earlier in his career,

Jack made major contributions to understanding interactions between biological cells and synthetic polymers. His first industrial research project involvement was the development of a biocompatible pacemaker and other implants, and lead to two successful spin-offs. He also led CSIRO's contribution to a multinational project developing an extended wear contact lens. While managing governance for CSIRO's commercial activities, Jack's meticulous work helped CSIRO secure the commercial benefit of its wi-fi patents, after a decade of US litigation. Jack is known for generously sharing his expertise and mentoring numerous people.

## Professor Brian Uy FTSE

Head, School of Civil Engineering,  
University of Sydney (NSW)



Professor Brian Uy is an international authority on steel and composite structures. His research covers all facets of building and bridge construction seeking more efficient safer designs while moving closer to net zero emissions. Brian led the development of

two important Australia–New Zealand Standards for constructing composite steel-concrete buildings and bridges. The standards are world-leading and influenced standards in the USA and Europe. In 2019, Brian was named John Holland Civil Engineer of the Year by Engineers Australia and in 2021 he was awarded their John Connell Gold Medal for Structural Engineering. Brian has also made significant contributions via the Institution of Structural Engineers, through which he drove the establishment of the Collaborative Reporting for Safer Structures Australasia.

## Merryn York FTSE

Executive General Manager System Design,  
Australian Energy Market Operator (QLD)



Merryn York trained as an electrical engineer and has worked in Australia's energy sector for more than 30 years. She focused on electricity because the combination of its technical complexity and community service appealed to her. As head of System Design at AEMO,

Merryn is a key facilitator of Australia's transition to net zero emissions, overseeing the planning, forecasting, analytics and design of Australia's future energy systems. Her leadership in this critical national role rests on strong foundations: expertise in power systems engineering, unique stakeholder engagement and customer focus, deep understanding of regulatory reform, and long experience delivering major transmission projects. Merryn is an outstanding role model and actively supports the development of women in STEM, particularly into engineering.

## Richard White FTSE

Chief Executive Officer and Founder,  
WiseTech Global



Richard White founded WiseTech Global in 1994, growing it into a \$19 billion ASX listed company that is a leading global supplier of logistics execution software, servicing over 18,000 customers across 170 countries. With over 30 years' experience in software development,

Richard is passionate about developing Australia's future technologists. Having established the WiseTech Academy in 2019, Richard recently announced the establishment of his STEM Education Foundation, to which he is personally donating \$50 million, to build an education platform available free of charge to Australian primary, secondary and tertiary students. He is also actively collaborating with educational institutions to promote technology learning, including the launch of WiseTech's innovative 'earn and learn' software development degree at UTS.

## Professor Wei Zhang FTSE

Research Director, Marine Bioproducts Cooperative  
Research Centre; Founding Director, Centre for Marine  
Bioproducts Development, Flinders University (SA)



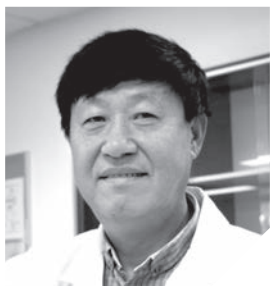
Professor Zhang is an inspiring leader in marine biorefinery and bioproduct development technologies, and he has passionately pursued an overarching career driving translational research with industry impacts. An entrepreneurial academic champion,

Wei's vision to connect formerly disparate marine bioproducts research and commercial sectors led to growing Australia's industry R&D capability and market impacts into a new 3rd-Gen marine bioproducts industry, sustainably utilising Australian untapped marine bioresources. He was the driving force behind ground-breaking work in functional foods, nutraceuticals, cosmetics and biomaterials, leading to the successful \$270m Marine Bioproducts CRC. Wei's advanced bio-refinery technologies allow Australia to use untapped unique marine bioresources sustainably, creating new sectors for Australia's research ecosystem and economy.



## Professor Huijun Zhao FTSE FAA

Director, Centre for Catalysis and Clean Energy,  
Griffith University (QLD)



Professor Huijun Zhao is an eminent researcher in sensing technology. He has developed innovative chemical, microbiological and nano-technological approaches to understanding pollutants in aquatic environments and soils. Huijun's sensing tools enabled dramatic

improvement in water quality monitoring. His PeCOD® sensing technology has been patented worldwide and recommended by Health Canada's Drinking Water Guidelines for monitoring organic matter in drinking water. Working with major Australian water utilities and state government, Huijun has also developed new analytical tools for efficient wastewater source control and management. Huijun was awarded the prestigious R H Stokes Medal in 2017 for distinguished research in electrochemistry.

## FOREIGN FELLOW

### Dr Rajendra Paroda FTSE

Chair, Trust for Advancement of Agricultural  
Sciences (Delhi, India)



Dr Rajendra Paroda is an acclaimed agricultural scientist specialising in plant genetics and breeding. His contributions to plant breeding and genetic resource management are globally recognised and include establishing the first modern national genebank in India. As

Secretary, Department of Agricultural Research and Education, he modernised India's agricultural research system, creating more than 30 new research institutes. The resulting innovations doubled India's food grain production from 130 million tons in 1980 to 260 million tons in 2011, underpinning food security for a rapidly growing population. Rajendra's outstanding contributions have strengthened agricultural research and innovation internationally, particularly in Asia and the developing world. He established and then led key international bodies, including the Global Forum on Agricultural Research (GFAR) and the Asia-Pacific Association of Agricultural Research Institutions (APAARI). Rajendra has a long association with Australian scientists and organisations, including CSIRO. He served on the Advisory Council of the Australian Centre for International Agricultural Research.

## HONORARY FELLOW

### Professor the Hon. Kim Carr FTSE

Former Senator for Victoria (VIC)



Professor the Honourable Kim Carr was a Senator for 29 years. A former tech-school teacher, he was drawn to politics by the transformational possibilities of science and education. Kim was appointed Minister for Innovation, Industry, Science and Research in 2007,

a cabinet post he held for most of Labor's previous six-year term in government. He also served as Minister for Manufacturing, Defence Materiel, Human Services, and Higher Education. He is currently a Vice Chancellor's Professorial Fellow at Monash University. Kim made a significant national contribution to policy in these areas, through the important reforms he introduced while in government, his scrutiny and incisive questioning of government policy while in opposition, and the unparalleled longevity of his close engagement in these issues. Praised by both sides of politics for his unstinting advocacy of Australian innovation and industry, Kim's resignation from Parliament in 2022 elicited accolades from leaders in higher education, research and manufacturing, particularly for his profound understanding of and appreciation for the interconnectedness of these sectors. Kim has been one of the strongest supporters of Australian manufacturing, technology and science in the history of the Australian Parliament.



Elected by their peers,  
ATSE's 2022 new Fellows  
represent an extraordinary  
breadth of expertise  
across technological sciences  
and engineering in Australia.

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