



*The Royal Society of New South Wales
& Learned Academies Forum*

OUR 21ST CENTURY BRAIN

Thursday 2 November 2023

8:45am–5:00pm AEDT

Government House Sydney + live streaming



Australian
Academy of Health and
Medical Sciences



Australian
Academy of the
Humanities



Australian
Academy of
Science



ACADEMY OF
THE SOCIAL SCIENCES
IN AUSTRALIA



Australian Academy of
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& Engineering



The Royal Society of New South Wales acknowledges the generous support by Her Excellency the Honourable Margaret Beazley AC KC, Governor of New South Wales, the Office of the New South Wales Government Chief Scientist and Engineer, and Haus Holdings.



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OUR 21ST CENTURY BRAIN

Thursday 2 November 2022

Government House, Sydney

The brain underpins our basic instincts and needs, and behavioural responses to the world around us. The brain mediates our compassion, reason, and imagination that are reflected in great works of the arts and sciences. Yet our brain is also the source of distress, dysfunction, and malice. Despite centuries of recurring impacts of tribalism, racism, dehumanization, and exclusion of ‘outsiders’, we continue to inflict suffering on others.

At the same time, the 21st century brings new challenges that extend well beyond immediate threats to very complex societal challenges such as global security, climate change, massive demographic shifts, resource management, information overload, and artificial intelligence.

Have we reached the edge of our human capacity to respond effectively as either individuals or collective groups?

The context and demands on our brains have been transformed by the very tools we have created, including new information technology platforms, and rapidly developing and deployed forms of artificial intelligence. Diseases of the brain are increasingly prevalent in our ageing population, as are the

increasing mental health challenges that are evident across the human lifespan.

Considerable progress across the sciences and humanities has deepened our understanding of genetic, environmental, and social factors that underpin brain development and function. Rising demands on our capacity to respond appropriately to globalised threats bring an urgent need to apply our scientific understanding to the development of just and sustainable solutions.

This year’s Royal Society of New South Wales and Learned Academies Forum focusses on recent progress in unravelling the workings of the brain and opportunities to use our emerging understanding to promote human wellbeing well beyond the 21st Century.

The Forum is held under the auspices of Her Excellency the Honourable Margaret Beazley AC KC, Governor of New South Wales. The Royal Society of New South Wales acknowledges the generous support by Her Excellency, the Academies, the Office of the NSW Chief Scientist and Engineer, and Haus Holdings.



OUR 21ST CENTURY BRAIN

	OPENING	
	Official Opening	Her Excellency the Honourable Margaret Beazley AC KC Governor of New South Wales
	Welcome and Acknowledgements	Susan Pond AM FRSN FTSE FAHMS President, Royal Society of New South Wales
08:45– 10:00	Keynote presentations	<p>MODERATOR Scientia Professor George Paxinos AO DistFRSN FAA FASSA FAHMS NHMRC Senior Principal Research Fellow, Neuroscience Research Australia, and The University of New South Wales</p> <p>SPEAKER Professor Lucy Palmer Viertel Senior Medical Research Fellow, Florey Institute of Neuroscience and Mental Health, University of Melbourne <i>The enigmatic brain: from synapses to neural networks</i></p> <p>SPEAKER VIA VIDEO Dr Joshua Gordon Director, National Institute of Mental Health, USA <i>Lessons from developmental and cognitive neuroscience</i></p>

SESSION I — THE DEVELOPING MIND

William Wordsworth, a British romantic poet, in 1802 used the expression, “The child is the father of the man.” Psychologists have borrowed such poetry to emphasise the outsized influence of early experiences. Speakers in this session will discuss our contemporary understanding of early life influences on the anatomy and physiology of the brain and the development of human cognitive, emotional, and social capabilities.

10:00– 11:15	<p>MODERATOR Professor Penny Van Bergen Head of School of Education, Faculty of Arts, Social Sciences and the Humanities, University of Wollongong</p> <p>SPEAKERS</p> <p>Professor Anne Castles FRSN FASSA ARC Laureate Fellow, Australian Centre for the Advancement of Literacy, Australian Catholic University</p> <p>Professor Adam Guastella Michael Crouch Chair in Child and Youth Mental Health, Sydney Children’s Hospital at Westmead and the Brain and Mind Centre, Faculty of Medicine and Health, University of Sydney</p> <p>Associate Professor Kate Highfield Discipline Lead for Early Childhood Education, University of Canberra</p> <p>Professor Sharynne McLeod FRSN FASSA Professor Speech and Language Acquisition, Charles Sturt University</p>
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SESSION II — THE BRAIN: SOCIAL, CULTURAL AND PHILOSOPHICAL PERSPECTIVES

The human brain has evolved an extraordinarily efficient information storage and processing capacity, arguably in response to the increasing social complexity of human life but is also subject to more immediate environmental influences that are social, cultural, and technological in character. In this session, we consider what we know of these influences and their individual and societal impacts, and what they mean for human capability.

11:45– 1:00	<p>MODERATOR Professor Phillipa Pattison AO FRSN FASSA Emeritus Professor, University of Sydney and University of Melbourne</p> <p>SPEAKERS</p> <p>Professor David Braddon-Mitchell FAHA Discipline of Philosophy, School of Humanities, The University of Sydney</p> <p>Professor Andrew Chanen Chief of Clinical Practice and Head of Personality Disorder Research at Orygen; Professorial Fellow, Centre for Youth Mental Health, University of Melbourne</p> <p>Dr Jennifer Kent DECRA and Robinson Fellow, Urbanism Discipline Research Lead, The University of Sydney School of Architecture, Design and Planning</p> <p>The Hon Dr Andrew Leigh MP FASSA (by video) Assistant Minister for Competition, Charities and Treasury, Federal Member for Fenner in the ACT</p> <p>Professor Jakelin Troy FASSA Director Indigenous Research, University of Sydney</p>
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SESSION III — THE BRAIN DISEASE BURDEN IN ADULTS

This session will consider two of the major syndromes affecting the brain in adult life, dementia and long COVID. Each has physical, psychological, social, and economic impacts for the patient, their families, carers, and society. Each has inadequate treatments. Today there are ~400,000 people with dementia in Australia. This number is expected to double by 2060. Dementia is already the leading cause of death. Long COVID is a multisystem illness that includes ‘brain fog’, which can persist for weeks or months following COVID infection. It is often diagnosed in the mid-adult age group with comorbidities.

2:00– 3:00	<p>MODERATOR Professor Anthony Cunningham AO FRSN FAHMS Director, Centre for Virus Research, Westmead Institute for Medical Research; Vaccine Theme Leader, Sydney Infectious Diseases Institute, University of Sydney</p> <p>SPEAKERS</p> <p>Associate Professor Lucette Cysique Cross-disciplinary neuropsychologist, St. Vincent’s Applied Medical Research Centre, Peter Duncan Neuroscience Unit, UNSW Australia The Kirby Institute and School of Psychology</p> <p>Professor Glenda Halliday FAA FAHMS NHMRC Leadership Fellow, Faculty of Medicine and Health, Sydney School of Medical Sciences, Brain and Mind Centre, University of Sydney</p> <p>Professor Sharon Naismith Leonard P Ullman Chair in Psychology, National Health and Medical Research Council (NHMRC) Leadership Fellow, University of Sydney</p>
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SESSION IV — TURBOCHARGING HUMAN INTELLIGENCE WITH ARTIFICIAL INTELLIGENCE

It is argued that one of the major factors which drove the growth in size and complexity of our brains over millennia has been the need to deal with increasingly complex social environments, and increasingly intelligent other members of those social environments – an “arms race” of sorts driven by social interaction. If instead of natural intelligence, we are faced with dealing with increased complexity from the interaction with Artificial Intelligence, what are the changes that we face as humans, and what implications do they have for the long-term development of the human brain?

3:00– 4:00	<p>MODERATOR</p> <p>Professor Ian Oppermann FRSN FTSE New South Wales Government Chief Data Scientist; Industry Professor, University of Technology Sydney</p> <p>SPEAKERS</p> <p>Professor Lyria Bennett Moses Associate Dean (Research), Faculty of Law and Justice, Director of the UNSW Allens Hub for Technology, Law and Innovation, University of New South Wales Sydney</p> <p>Professor Sally Cripps Director of Technology, Human Technology Institute and Professor of Mathematics and Statistics, University of Technology Sydney</p> <p>Ms Stela Solar Director, National AI Centre, Commonwealth Scientific and Industrial Research Organisation</p>
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SESSION V — RAPPORTEUR REMARKS: IMPLICATIONS FOR THE FUTURE

This session will bring together the insights emerging from Sessions 1-IV and explore their implications for the future. It will consider what actions are likely to be necessary, and what Governments and communities need from research and scholarship to take effective action.

4:00– 5:00	<p>Professor Ian Hickie AM FRSN FASSA FAHMS NHMRC Senior Principal Research Fellow, Prof of Psychiatry, Co-Director, Health and Policy, Brain and Mind Centre, University of Sydney</p>
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Australian Academy of Health and Medical Sciences



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Thursday 2 November 2023 | 8:30am-6:00pm

OFFICIAL OPENING

**Her Excellency the Honourable
Margaret Beazley AC KC**
Governor of New South Wales



Her Excellency the Honourable Margaret Beazley AC KC is the 39th Governor of New South Wales, commencing her five-year tenure on 2 May

2019. Prior to her appointment, Her Excellency enjoyed a long and distinguished law career spanning 43 years, during which time she served as a role model for women in law at both the state and national level. Appointed Queen's Counsel in 1989, in 1993 she was made a judge of the Federal Court of Australia, the first woman to sit exclusively in that Court. In 1996, she achieved the distinction of being the first woman appointed to the New South Wales Court of Appeal and, subsequently, the first woman to be appointed as its President. She was made a Companion of the Order of Australia in the Australia Day Honours List on 26 January 2020 for "eminent service to the people of New South Wales, particularly through leadership roles in the judiciary, and as a mentor of young women lawyers".

WELCOME AND ACKNOWLEDGEMENTS

Susan Pond AM FRSN FTSE FAHMS
President, Royal Society of New
South Wales



Susan Pond is a physician, scientist, and company director with deep expertise in biotechnology. She has a strong track record of creating impact

by combining disciplines and working at the intersections between them. Susan is non-executive director of two ASX listed biotechnology companies, the Trusted Autonomous Systems for Defence CRC, Phenomics Australia, Sydney Quantum Academy, and a member of the Queensland University of Technology Council. Most recently, Susan was inaugural Chair of the NSW Smart Sensing Network and Director of Sydney Nano, a multidisciplinary initiative at The University of Sydney. She is Adjunct Professor in the Faculty of Engineering at The University of Sydney. Susan has been President of the Royal Society of New South Wales since 2021.

KEYNOTE SESSION

MODERATOR

Scientia Professor George Paxinos
AO DistFRSN FAA FASSA FAHMS
NHMRC Senior Principal Research
Fellow, Neuroscience Research Australia,
and The University of
New South Wales



George Paxinos studied psychology at UC Berkeley, McGill and Yale and is now an NHMRC Senior Principal Research Fellow at Neuroscience

Research Australia and Scientia Professor at UNSW. He identified 94 hitherto unknown regions in the brain of rats and humans and published 57 books on the brain and spinal cord of humans and experimental animals. His first book, *The Rat Brain in Stereotaxic Coordinates*, is the most cited work in neuroscience. His *Atlas of the Human Brain* received the American Association of Publishers Award for Excellence in Publishing in Medical Science and the British Medical Association Illustrated Book Award. He was president of the Australian Neuroscience Society and of the IBRO World Congress of Neuroscience. After a 21-year effort, he published *A River Divided*, a novel with environmental issues at its core, including the question of whether the brain is the right "size" for survival.



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KEYNOTE SPEAKER

Professor Lucy Palmer

**Viertel Senior Medical Research Fellow,
Florey Institute of Neuroscience and
Mental Health, University of Melbourne**



After completing a Master of Science at the University of Minnesota, USA and PhD at the Australian National University, Lucy Palmer

pursued postdoctoral research at the University of Bern, Switzerland and Charite University, Germany before returning to Australia to establish her research laboratory. Professor Palmer uses advanced imaging and electrophysiological techniques to investigate how the brain encodes learning and memory in health and disease. She has published over 35 peer-reviewed articles in high impact journals such as Science, Nature Neuroscience, and Nature Communications and has given over 60 invited talks and won over 20 awards within the past decade.

KEYNOTE SPEAKER VIA VIDEORECORDING

Dr Joshua Gordon

**Director, National Institute of Mental
Health, United States of America**



Dr. Gordon received his MD/PhD degree at the University of California, San Francisco and completed his psychiatry residency and research

fellowship at Columbia University. He joined the Columbia faculty in 2004 as an Assistant Professor in the Department of Psychiatry where he conducted research, taught residents, and maintained a general psychiatry practice. In September of 2016, he became the Director of the National Institute of Mental Health. Dr. Gordon's research focuses on the analysis of neural activity in mice carrying mutations of relevance to psychiatric disease. His work has been recognized by several prestigious awards, including the Brain and Behavior Research Foundation – NARSAD Young Investigator Award, the Rising Star Award from the International Mental Health Research Organization, the A.E. Bennett Research Award from the Society of Biological Psychiatry, and the Daniel H. Efron Research Award from the American College of Neuropsychopharmacology.

SESSION I THE DEVELOPING MIND

MODERATOR

Professor Penny Van Bergen

**Head of School of Education, Faculty of
Arts, Social Sciences and the Humanities,
University of Wollongong**



Penny Van Bergen is a Professor of Educational Psychology and current Head of School in the University of

Wollongong's School of Education. She is a member of the NSW Council of Deans of Education and the Australian Council of Deans of Education and was formerly Director of the Centre for Children's Learning in a Social World at Macquarie University. She has a particular interest in the influence of positive social interactions and relationships on children's cognitive and socio-emotional development. Across her career she has taught approximately 5,000 pre-service teachers about the psychology of learning, including memory and cognition, emotion and motivation, student-teacher relationships, and concepts of self. Penny has been awarded eleven university teaching awards, including from Australian Government Office of Learning and Teaching and the Australian Psychological Society, for the integration of psychological theories and concepts into educational curricula.



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SPEAKERS

Professor Anne Castles FRSN FASSA
ARC Laureate Fellow, Australian
Centre for the Advancement of Literacy,
Australian Catholic University



Anne Castles is an ARC Australian Laureate Fellow based at the Australian Centre for the Advancement of Literacy (ACAL) at the Australian Catholic University. Her research focuses on learning to read and dyslexia. She has a particular interest in variability within the reading-impaired population, and in the causes of different types of dyslexia, including genetic, cognitive, and language factors. She is a Fellow of the Academy of Social Sciences in Australia and serves on the Editorial Boards of several journals including *Scientific Studies of Reading*, and the *Journal of Experimental Child Psychology*. She served as President of Learning Difficulties Australia from 2017-18.

Professor Adam Guastella
Michael Crouch Chair in Child and
Youth Mental Health, Sydney Children's
Hospital at Westmead
and the Brain and Mind Centre, Faculty
of Medicine and Health, University of
Sydney



Adam Guastella is a clinical psychologist with an established track record in human translational neuroscience. This research has led him to study the neurobiology of social behaviour, development in early life, and methods of support and intervention. He builds collaborative partnerships between researchers, clinicians, and services to ensure that children and families receive the best available assessments and treatments to support well-being. He is the co-lead of the Child-Neurodevelopment and Mental Health Team for the University of Sydney. This team aims to solve complex problems for children with neurodevelopmental conditions and their families with a team of multi-disciplinary professors across the university. He is also Director of the Clinic for Autism and Neurodevelopmental Research.

Associate Professor Kate Highfield
Discipline Lead for Early Childhood
Education, University of Canberra



Dr Kate Highfield is an educator and researcher – exploring young children's engagement with technology, play and learning. Kate is particularly interested in how healthy technology use can enhance learning. Kate has explored research and evaluations in many forms and is currently researching STEM, effective professional learning; child-led and play-based pedagogies. Kate has over 40 peer-reviewed publications in the last ten years and has an interest in research translation with over 100K readers accessing her articles via *The Conversation* in the last year.

Professor Sharynne McLeod
FRSN FASSA
Professor of Speech and Language
Acquisition, Charles Sturt University



Sharynne McLeod's work on communication rights, and child speech development and disorders across languages and cultures has changed children's lives and impacted health and education professionals worldwide. She is a Fellow of the Academy of the Social Sciences in Australia, a Fellow of the Royal Society of NSW, and founding editor-in-chief of the *International Journal of Speech-Language Pathology*. She was the first International Affiliate to receive Honors of the American Speech-Language-Hearing Association and is a Life Member of Speech Pathology Australia. The Australian Newspaper named her Australia's Research Field Leader in Audiology, Speech and Language Pathology (2018, 2019, 2020, 2022) and "best in the world based on the quality, volume, and impact of work" (2019, 2023). She has co-authored 12 books and over 260 peer reviewed journal articles and chapters funded by the Australian Research Council. Her Multilingual Children's Speech website has free resources in 60+ languages.

SESSION II THE BRAIN: SOCIAL, CULTURAL AND PHILOSOPHICAL PERSPECTIVES

MODERATOR

Professor Phillipa Pattison AO FRSN FASSA
Emeritus Professor, University of Sydney
and University of Melbourne



Pip Pattison completed a PhD in psychology at the University of Melbourne in 1980. Her work in quantitative social and psychological sciences has

focused on the development of mathematical and statistical models for social networks and network-based processes. These models illuminate the role of networks in understanding community-level outcomes and have been applied in a wide variety of contexts, including the transmission of infectious diseases and community recovery following bushfire. From 2014 to 2021 Pip served as Deputy Vice-Chancellor Education at the University of Sydney and prior to that was Deputy Vice-Chancellor Academic at the University of Melbourne. In 2023 Pip has stepped in as an Interim Deputy Vice-Chancellor at Swinburne University of Technology.

SPEAKERS

Professor David Braddon-Mitchell
FAHA
Discipline of Philosophy, School of
Humanities, The University of Sydney



Prior to joining the University of Sydney, Professor Braddon-Mitchell held appointments at the Australian National University, University of Auckland, Simon Fraser University, and University of Michigan at Ann Arbor. His research interests are in the philosophy of mind, philosophy of cognitive science as well as in the philosophy of science more generally, especially the nature of time and of our perception of it. He has occasionally and with some trepidation trespassed on the territory of meta-ethicists. He is perhaps most well-known for two things. One is his work on functionalist and



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post-functionalist theories of consciousness, especially for defence of these physicalist perspectives against the new dualism about the mind proposed as a solution to the hard problem of consciousness. The second is the discovery of the epistemic objection to dynamic theories of time, according to which if many kinds of 'dynamic' theory of time (such as the growing block theory, which allows for the reality of the past but not the future. He has published books with OUP and the MIT Press, and articles in the leading philosophy journals, including *Mind*, the *Journal of Philosophy*, *Nous*, *The Philosophical Review*, *Erkenntnis*, *Synthese*, and the Australasian journal of philosophy.

Professor Andrew Chanen
Chief of Clinical Practice and Head of Personality Disorder Research at Orygen; Professorial Fellow, Centre for Youth Mental Health, University of Melbourne



Professor Andrew Chanen established and directs an internationally recognised program of research, treatment innovation, and service development in youth mental health and early intervention for severe mental disorders in young people. He established the field of early intervention for personality disorder and is a leading global advocate for effective, evidence-based policy. He has over produced over 220 scientific publications in high-impact international journals and received over \$30 million in competitive grant funding. He serves on the Editorial Boards of several journals, and expert national and international groups. He is Past President of the International Society for the Study of Personality Disorders. His work has been recognised with several awards, including the 2023 Royal Australian and New Zealand College of Psychiatrists' Ian Simpson Award and the 2017 Award for Distinguished Achievement in the Field of Severe Personality Disorders from the Borderline Personality Disorder Resource Centre and Personality Disorder Institute, New York.

Dr Jennifer Kent
DECRA and Robinson Fellow, Urbanism Discipline Research Lead, University of Sydney School of Architecture, Design and Planning



Jennifer Kent's research interests are at the intersections of urban planning, transport and health. She specialises in combining quantitative and qualitative data with understandings from policy science to trace the practical, cultural and political barriers to healthy and sustainable cities. Issues examined to date include parenting and private car use, companion animals and transport, the links between cities and loneliness, and the interpretation of health evidence into planning and transport policy. Her work is funded by external agencies, including the Australian Research Council, Transport for NSW, the NSW Ministry of Health, and the National Heart Foundation. Her findings have been incorporated into state and national urban planning agendas. She publishes regularly in highly ranked scholarly journals across the fields of planning, public health, and transport, and her work is widely cited within these disciplines.

The Hon Dr Andrew Leigh MP FASSA
(by video)
Assistant Minister for Competition, Charities and Treasury, Federal Member for Fenner in the ACT



Andrew Leigh is the Assistant Minister for Competition, Charities and Treasury, and Federal Member for Fenner in the ACT. Prior to being elected in 2010, Andrew was a professor of economics at the Australian National University. He holds a PhD in Public Policy from Harvard, having graduated from the University of Sydney with first class honours in Arts and Law. Andrew is a past recipient of the Economic Society of Australia's Young Economist Award and a Fellow of the Australian Academy of Social Sciences. His books include *Disconnected* (2010), *Battlers and Billionaires: The Story of Inequality in Australia* (2013), *The Economics of Just About Everything* (2014), *The Luck of Politics* (2015), *Choosing Openness: Why Global Engagement is Best for Australia* (2017), *Randomistas: How*

Radical Researchers Changed Our World (2018), *Innovation + Equality: How to Create a Future That Is More Star Trek Than Terminator* (with Joshua Gans) (2019), *Reconnected: A Community Builder's Handbook* (with Nick Terrell) (2020), *What's the Worst That Could Happen? Existential Risk and Extreme Politics* (2021) and *Fair Game: Lessons from Sport for a Fairer Society & a Stronger Economy* (2022).

Professor Jakelin Troy FASSA
Director, Indigenous Research, University of Sydney



Professor Troy's research interests are currently focussed on documenting, describing and reviving Indigenous languages. She has a new focus on the Indigenous languages of Pakistan, including Saraiki of the Punjab and Torwali of Swat. She holds two Australian Research Council Discovery Projects – one with Prof John Maynard on the history of Aboriginal missions and reserves in eastern Australia and the history of Aboriginal people who were not institutionalised. The other Discovery Project is about the practice of 'corroboree' by Aboriginal people in the 'assimilation period' of the mid C20 in Australia. Professor Troy is interested in the use of Indigenous research methodologies and community engaged research practices. She is an Aboriginal Australian and her community is Ngarigu of the Snowy Mountains in southeastern Australia.



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SESSION III THE BRAIN DISEASE BURDEN IN ADULTS

MODERATOR

**Professor Anthony Cunningham AO
FRSN FAHMS**
Director, Centre for Virus Research,
Westmead Institute for Medical Research;
Vaccine Theme Leader, Sydney Infectious
Diseases Institute, University of Sydney



Professor Anthony (Tony) Cunningham is a highly experienced viral immunologist, infectious diseases physician, clinician and scientist, well

known internationally for his research on the immunology of HIV and herpes viruses, his work on vaccine development and trialling, especially for shingles and herpes, and as an antivirals expert. He is the Director of the Centre for Virus Research at The Westmead Institute for Medical Research (WIMR); Professor and vaccine theme leader in the Sydney Infectious Diseases Institute of the University of Sydney; and Director of the Australian Centre for HIV and Hepatitis Virology Research (ACH4). He is also Chair of the NSW and ACT Branch and a Council Member, of the Australian Academy of Health and Medical Sciences. Tony has published more than 430 papers, with ~25,000 citations and is one of the top cited herpes vaccinologists internationally.

SPEAKERS

Associate Professor Lucette Cysique
Cross-disciplinary neuropsychologist,
St. Vincent's Applied Medical Research
Centre, Peter Duncan Neuroscience Unit,
UNSW Australia The Kirby Institute and
School of Psychology



Associate Professor Lucette Cysique is a cross-disciplinary neuropsychologist with extensive neuroimaging training and long-term

experience with neuro-, viral and immune biomarkers. She leads a research program into the neurocognitive complications in major infectious diseases (COVID-19, HIV) and their main comorbidities: brain pathological ageing, cardiovascular diseases, and

depressive disorders. Her appointment in the Viral Immunology Systems Program at the Kirby Institute involves the overseeing the Australian Partnership for Preparedness Research on Infectious Disease Emergencies (APPRISE) Long COVID Initiative. Working in global epidemics, Dr. Cysique has extensive experience in cross-cultural neuropsychology. Dr. Cysique has held major international and national research responsibilities, with associated funding. She has led the research on more than 40 national and international cohort studies/trials as a neuropsychology or neuroimaging leader.

**Professor Glenda Halliday FAA
FAHMS**
NHMRC Leadership Fellow, Faculty of
Medicine and Health, Sydney School of
Medical Sciences, and the Brain and Mind
Centre, University of Sydney



Glenda Halliday is a career neuroscientist specialising in neurodegeneration. She has been a Fellow of the National Health & Medical Research Council

since 1990 at the University of NSW and now at the University of Sydney. Her research has focussed on understanding brain structure and function in people, research that has shaped international standards for neuropathological diagnosis of neurodegenerative diseases, particularly Lewy body diseases and frontotemporal dementias. Her contributions have been recognised by fellowship to the Australian Academy of Science and the Australian Academy of Health and Medical Sciences and through a number of awards; 2022 NSW Scientist of the year; 2021 Robert A. Pritzker Prize for Leadership in Parkinson's Research; 2020 and 2014 NHMRC Elizabeth Blackburn Awards; 2016 Cozzarelli Prize National Academy of Sciences USA; 2013 NHMRC high achiever in Australian Health & Medical Research; and the 2011 Nina Kondelos Prize of the Australian Neuroscience Society.

Professor Sharon Naismith
Leonard P Ullman Chair in Psychology,
National Health and Medical Research
Council (NHMRC) Leadership Fellow,
University of Sydney



Prof Naismith is a Clinical Neuropsychologist, National Health and Medical Research Council (NHMRC) Leadership Fellow, and holds the Leonard P Ullman Chair

in Psychology at the University of Sydney. Her work focuses on the mechanisms by which modifiable risk factors for dementia including depression, sleep disturbance, and cardiovascular disease impact on the brain and how best to treat them. She has authored more than 350 papers and her work has attracted awards from the Society of Mental Health Research, Australian Psychological Society and the International Neuropsychological Society. She leads the NHMRC Centre of Research Excellence to Optimise Sleep in Brain Ageing and Neurodegeneration (CogSleep), and the Australian Dementia Network Memory Clinics Initiative, aiming to improve equity of access and improved health services for older Australians experiencing cognitive decline and dementia.



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SESSION IV TURBOCHARGING HUMAN INTELLIGENCE WITH ARTIFICIAL INTELLIGENCE

MODERATOR

Professor Ian Oppermann FRSN FTSE
New South Wales Government Chief Data Scientist; Industry Professor, University of Technology Sydney



Ian Oppermann is the NSW Government's Chief Data Scientist working within the Department of Customer Service. He is also an Industry Professor at the University of Technology Sydney. He heads the NSW government's AI Review Committee and Smart Places Advisory Council. Ian is a thought leader in the Digital Economy and a regular speaker on "Big Data", broadband enabled services and the impact of technology on society. Ian has an MBA from the University of London and a Doctor of Philosophy in Mobile Telecommunications from the University of Sydney. Ian is a Fellow of the Institute of Engineers Australia, a Fellow of the IEEE, a Fellow of the Australian Academy of Technological Sciences and Engineering, a Fellow and Immediate Past President of the Australian Computer Society, a Fellow of the Royal Society of NSW, and is a graduate member of the Australian Institute of Company Directors.

SPEAKERS

Professor Lyria Bennett Moses
Associate Dean (Research), Faculty of Law and Justice, Director of the UNSW Allens Hub for Technology, Law and Innovation, University of New South Wales Sydney



Lyria Bennett-Moses explores issues around the relationship between technology and law, including the types of legal issues that arise as technology changes, how these issues are addressed in Australia and other jurisdictions, and the problems of treating "technology" as an object of regulation. She is on the NSW Information and Privacy Advisory Committee, the Executive Committee of the Australian Chapter of the IEEE's Society for the Social Implications of Technology and is a Fellow of the Australian Academy of Law. Lyria also co-leads the Law and Policy theme in the Cyber Security Cooperative Research Centre and Faculty Lead, Law and Justice in the UNSW Institute for Cyber Security.

Professor Sally Cripps
Director of Technology, Human Technology Institute and Professor of Mathematics and Statistics, University of Technology Sydney



Sally Cripps is an internationally recognised scholar and leader in Bayesian Machine Learning (ML) and Artificial Intelligence (AI). In addition to her role as Director of Technology at the Human Technology Institute, she is a Professor of Mathematics and Statistics at the UTS. Sally was also cofounder and co-director of the University of Sydney's Centre for Translation Data Science (CTDS), founder and Director of the Australian Research Council's Industrial Transformation Training Centre (ARC ITTC) Data Analytics for Resources and Environments (DARE). Most recently Sally was Research Director of Analytics and Decision Science and Science Director of the Next Gen AI Training Programme in CSIRO's Data61. Sally's research focuses on the development of new foundational methods in AI to address global challenges. In recognition of the quality of her research, Sally was awarded an ARC Future Fellowship and is a visiting scholar fellowship to the Alan Turing Institute in the UK.

Ms Stela Solar
Director, National AI Centre, Commonwealth Scientific and Industrial Research Organisation



Stela Solar is the Director of Australia's National AI Centre hosted by CSIRO, with the mission to accelerate positive AI adoption and innovation that benefits business and community. She has previously held roles at Microsoft including Global Director of AI Solution Sales, as well as roles across IT distributors and technology startups. Over the past 15 years, Stela has led business model transformations which enable organisations to capture new revenue opportunities and build competitive advantage with emerging technologies such as Cloud, IoT and AI. With a background in sustainability and creative industries, Stela thrives in ambiguity, change, and purpose-led organisations. Outside of the technology arena, Stela enjoys the challenge of competitive sailing and tries to find time to play cello and piano.

SESSION V IMPLICATIONS FOR THE FUTURE

MODERATOR & RAPPORTEUR

Professor Ian Hickie AM FRSN FASSA FAHMS
Prof of Psychiatry, Co-Director, Health and Policy, Brain and Mind Centre, University of Sydney



Professor Ian Hickie a global leader in mental health research and digital innovations in care. He was an inaugural NHMRC Australian Fellow (2007-2012), then Senior Principal Research Fellow (2013-2017 and 2018-22), and now is supported at the highest level of personal Investigator Grants (2023-27). He was an inaugural Commissioner on Australia's National Mental Health Commission (2012-18) overseeing enhanced accountability for mental health reform and suicide prevention. He is an internationally renowned researcher in clinical psychiatry, with reference to digital innovation, youth mental health care and adolescent-onset mood disorders, notably depression and bipolar disorder.



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WITH GRATITUDE

The Royal Society of New South Wales expresses its gratitude to all members of the 2023 Annual Forum Planning and Program Committees

RSNSW PLANNING COMMITTEE

Susan Pond AM FRSN FTSE FAHMS
Lindsay Botten FRSN
Hans Coster FRSN FTSE
Robert Marks FRSN

PROGRAM COMMITTEE

Ian Hickie AM FRSN FASSA FAHMS, Co-Chair
Philippa Pattison AO AO FRSN FASSA, Co-Chair, Academy of Society Sciences in Australia
Tony Cunningham AO FRSN FAHMS
Australian Academy of Health and Medical Sciences

Ian Oppermann FRSN FTSE
Australian Academy of Technological Sciences & Engineering
George Paxinos AO DistFRSN FAA FASSA FAHMS Australian Academy of Science
Hans Pols FRSN FAHA FASSA Australian Academy of the Humanities

Lindsay Botten FRSN



Lindsay Botten is an Emeritus Professor at the Australian National

University (ANU) and the University of Technology Sydney (UTS), and presently serves on the Council of the Royal Society of NSW (RSNSW) and as its Webmaster. He was the foundation Director of National Computational Infrastructure (NCI) at ANU (2008–17) where he led the development of the Australia's highest performance and most highly integrated research supercomputing and data service, positioning NCI at the vanguard of international advanced computing. Previously, he was Professor of Applied Mathematics at UTS, where he established a reputation as an international authority in theoretical optics and photonics and led the computational modelling team of the ARC Centre of Excellence, CUDOS. He is active as a consultant in high-performance computing nationally, and in RSNSW where he leads the development of its information technology, audio-visual, and social media modernisation. He is a Fellow of the Optical Society of America and the Royal Society of NSW.

Hans Coster FRSN FTSE



Hans Coster is an Emeritus at the University of New South

Wales (Physics) and the University of Sydney (Chemical and Biomolecular Engineering). He developed a method for manipulating cells using radio frequency electric fields and published the first direct demonstration of electrical breakdown (electroporation) in cell membranes that is now commonly used for gene insertion and in animal cloning. He also developed a method of electro-fusion of cells on a one-on-one basis. Hans pioneered the method of impedance spectroscopy for membranes and thin films. This patented technology was manufactured by INPHAZE Pty Ltd in Australia. He co-founded the Centre for Membrane Science and Technology at UNSW which became an ARC Centre of Excellence in 1989 and awarded UNESCO status in 1992. He won UNESCO medal for outstanding contributions to Science in 1998 and the Sir Rutherford Robertson Medal for Biophysics in 2002. Hans is a Fellow of the Australian Academy of Technological Sciences and Engineering, the Royal Society of NSW and the Australian Institute of Physics.

Robert Marks FRSN



Emeritus Professor Robert Marks graduated in 1968 as an engineer. After

completing a Master's degree at Melbourne University, he won a CSIRO Overseas Studentship, and studied at M.I.T. and Cambridge University before completing a Ph.D. in economics at Stanford. He was a foundation lecturer at the Australian Graduate School of Management and editor of the Australian Journal of Management. He was a pioneer in using computer simulations in economics (he won the Second M.I.T. Competitive Pricing computer tournament in 1987), and his research has been in strategic market interactions and decision-making under uncertainty, as well as in energy and environmental policy. Robert is the Editor of the Journal & Proceedings of the Royal Society of New South Wales.

Hans Pols FRSN FAHA FASSA



Professor Hans Pols, Faculty of Science, University of Sydney is

interested in the history, sociology, and anthropology of psychiatry and mental health. He is currently engaged in a large ARC-funded research project on the history of community mental health in Australia. Previously, he investigated the history of colonial and postcolonial medicine in the Dutch East Indies and Indonesia – the results can be found in his *Nurturing Indonesia*. Hans is also involved in several projects focusing on improving mental health services in both countries. The participation of consumers of mental health care in mental health services and the role of consumer organisations hold his special interest. Hans earned his BA(Hon) in psychology from the University of Groningen (The Netherlands), an MA in psychology from York University (Canada), and his PhD from the University of Pennsylvania through the Department of History and Sociology of Science. He is a Fellow of the Australian Academy of the Humanities, the Academy of the Social Sciences in Australia, and the Royal Society of New South Wales.



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