



*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



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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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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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