

OVERVIEW

Research by the Neuroscience Group falls into five core areas:

1. **Sensory and Perceptual Neuroscience** - vision, audition, touch and chemical senses – incorporating the development, plasticity and evolution of sensory systems.
2. **Cognitive Neuroscience** - directed at understanding the neural bases of high level cognitive functions such as attention, learning, memory, language processes, planning and decision-making and how these processes are affected by development over the lifespan, neurological conditions and psychopathology.
3. **Affective Neuroscience** - self report measures versus objective measures of emotion. Studies helping to better understand the distinction between unconscious emotion and subjective feeling.
4. **Neuroimmunology** or how neural by-products can influence peripheral immunity and how activity in the immune system has consequences for neural function.
5. **Developmental Neuroscience** - basic experimental studies aimed at contributing to the understanding of mechanisms of normal and abnormal neural development.

In addition to conducting basic research, the research group has a number of applied interests such as understanding the neural basis of cognitive and sensory abnormalities, exploring the neural circuits that underpin cognitive deficits in those with psychosis and in healthy aging.

Other applied research being undertaken by the Neuroscience group includes investigating the role of brain reorganisation in stroke recovery and the impact of early life events such as exposure to bacteria, on lifelong susceptibility to disease.

Finally, the Neuroscience Group has a strong applied interest in marketing, advertising and product development. The brain knows more than it admits.

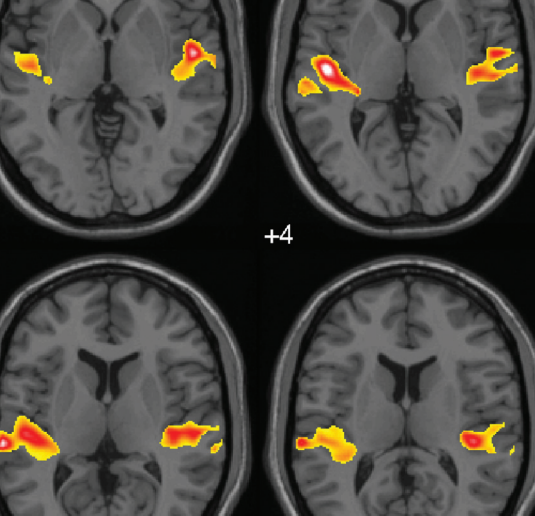
OBJECTIVES

A major challenge for Science in the 21st Century is understanding the human brain by measuring neural activity while observing behavioural performance. Only the simultaneous investigation of physiology and behaviour will lead to success in this endeavour. It will enhance human potential, lead to improved preventative strategies and treatments for a variety of neural disorders, and a better health outcome for the nation.

Most importantly, increased access to subconscious information processing will help to improve our knowledge about the brain.

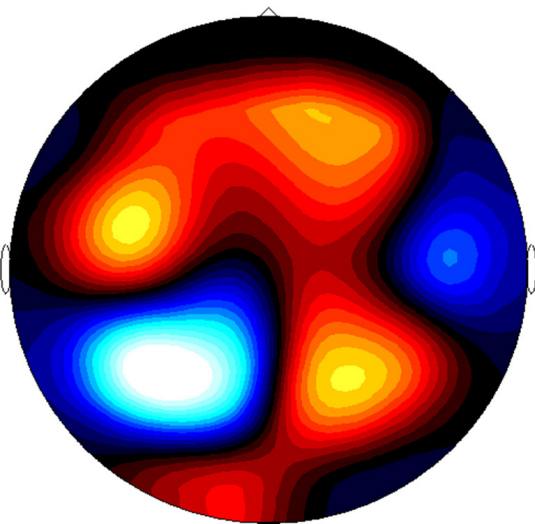
The probability of success has been greatly enhanced in recent years by the development of new techniques for imaging the structure and function of the human brain, and increasingly realistic animal models of disorders involving complex genotype-environmental interactions.

The Neuroscience Research Group in the School of Psychology in recent years has invested heavily in the development of both brain imaging and animal behaviour facilities for assessment of brain function. It is now well positioned to address key research questions in understanding motor-, cognition- and emotion- related brain functions as well as peripheral sensory information processing and neural development.



EXAMPLES OF CURRENT PROJECTS

- Auditory processing deficits in schizophrenia
- Psychoacoustic and neuroanatomical investigation of auditory temporal processing
- Priming versus Implicit memory
- There is more to emotion than subjective feeling
- Multiple subconscious aspects of self awareness
- Somatosensory brain reorganisation in acute stroke recovery
- Precursors of psychosis in an at-risk population
- Developmental trajectories of cognitive control across the life span
- Optical, neural and biochemical processes underlying myopia and the developing retina
- Behavioural and neural mechanisms that underpin social learning in birds
- Prenatal infection predisposes toward anxiety, behavioural and psychiatric disorders
- Multi-modal characterisation of structural and functional dynamics of cognitive control



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RESEARCH SUPPORT

- International Sciences Linkage Program
- Australian Research Council
- NHMRC Project, Complementary and Alternative Medicine, and Enabling Grants
- Hunter Medical Research Institute
- University of Newcastle Centre for Brain and Mental Health Research
- National Institutes of Health
- VISDEX Corporation
- Australian Academy of Science
- Scientific Visits to Europe
- Schizophrenia Research Institute

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