Towards computational understanding of the neural basis of consciousness

This PhD project will:
1. record neuronal activity with multi-electrode arrays implanted in rats and non-human primates under awake and anesthetized conditions; and
2. analyze the recorded activity using a framework of the integrated information theory of consciousness.

The underlying hypothesis that the PhD candidate will explore is if sensory-evoked and spontaneous neuronal activity under the awake condition is more integrated and differentiated compared to the anesthetized condition. This has relevance to our understanding of consciousness, and is also clinically relevant for quantifying the depth of anaesthesia. Neuronal recordings will be supervised by Dr Price (Physiology) and data analysis will be supervised by A/Prof Tsuchiya (Psychology). More specifically, throughout their PhD, they will acquire the necessary skills to perform neuronal recordings (e.g., electrode implantation, stimulus programming, etc) and will learn advanced signal processing (e.g., multi-taper methods), functional connectivity (e.g., coherence, Granger causality, integrated information, etc) and multi-variate classification and regression analyses using techniques in machine learning. As a result of the PhD, the candidate will be an electrophysiologist with strong computational skills or a computational neuroscientist, who is familiar with the real experimental environment. This combined skill set will be regarded highly in the interdisciplinary field of neuroscience.

For further information, please contact

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Note that a student must have a APA or equivalent scholarship in 2015 in order to be eligible for the top-up.