QIMR Berghofer
Medical Research Institute

POSITION DESCRIPTION

POSITION TITLE:	Bayesian Computation Research Fellow (Research Officer)
CLASSIFICATION:	RO2-RO3
EMPLOYMENT:	Full-time fixed term, 3 years
GROUP:	Systems Neuroscience
LOCATION:	Herston

POSITION OBJECTIVES

This research fellow will develop new systems for model selection and model-based prediction, combining large data sets from patient neuroimaging and intracranial recordings, with biophysical forward models of brain dynamics.

ORGANISATIONAL CONTEXT

QIMR Berghofer is a statutory body under the QIMR Act (1945). The mission of QIMR Berghofer is to promote the wellbeing of humankind through medical research, to maintain within the State of Queensland an internationally recognised Centre for Medical Research, to develop that Centre as the primary focus of Medical Research within the State and to co-operate with, and where possible assist the work of other medical research establishments within the State and throughout the world.

The Systems Neuroscience Group (SNG) is an independent research team within QIMR Berghofer. The SNG is a multi-disciplinary group that seeks to combine innovative data analysis with computational modelling of the brain in health and clinical neuroscience.

REPORTING STRUCTURE

This position reports to Professor Michael Breakspear.

PRIMARY RESPONSIBILITIES

- Contribute to the design of systems for Bayesian inference on large data sets, to perform model selection, parameter estimation, data assimilation and prediction using forward models of brain dynamics.

- Implement these methods on GPUs and/or high performance computing clusters, and collaborate in applying these to clinical and neuroscience research, including an application to diagnosis and treatment of epilepsy.
- Perform innovative analyses of high-dimensional neurophysiological and neuroimaging data.
- Contribute to experimental design and prepare manuscripts for related studies.
- Participation in intra-mural group activities, including presentation at lab meetings and collaboration with other lab members and clinicians.
- Ensure work practices comply with the requirements of the *Work Health and Safety Act* related legislative requirements, the Institute's WH&S polices and procedures.

KEY SELECTION CRITERIA (Qualifications, Experience, Skills, and Abilities)

Essential

- PhD in mathematics, physics, statistics, bioengineering, computer sciences or related field
- Demonstrated ability to implement mathematical methods in code
- Evidence of strong oral and written communication skills

Desirable

- Published track record in applying computational Bayesian methods, such as Sequential Monte Carlo, MCMC, Variational Bayes
- Previous experience with GPU programming or high performance computing clusters
- Previous experience in neuroscience research
- Expertise in time series analysis or signal processing