QUBIC
The Australian Research Council Centre of Excellence in Quantum Biotechnology

Determining Properties of Quantum States

Institution	The University of Melbourne
Project details	The purpose of this project is to investigate certain states and families of states to determine what intrinsic characteristics define them and how they are correlated. Recent work has produced an efficient technique utilising tensor networks, specifically matrix product states (MPS), for producing quantum circuits to encode arbitrary data. Current work involves conducting research into what properties of data determine the difficulty of preparation on a quantum computer. This work will, ideally, involve running experiments on real quantum computers, to assess results. As such, we are seeking a student with strong programming experience in Python, and strong quantum mechanics knowledge, with an interest in quantum computing and quantum information theory. The work will involve researching the literature on currently known quantum states, writing code to implement these states and assess them, and determining the correlations present, if any. The main aim of this research is to gain insight into quantum states.
Who can apply	Students with strong knowledge of quantum mechanics, i.e. strong results in Quantum and Thermal Physics, Quantum Physics, and strong Python programming skills
Contact / Project supervisors	**Primary:** Dr. Floyd Creevey **Secondary:** Prof. Lloyd Hollenberg