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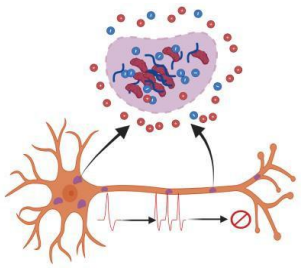
Investigating stress granule properties and their role in neuronal dysfunction in MND using novel quantum tools.

Institution	University of Wollongong
Project details	In neurodegenerative diseases, including motor neuron disease (MND), neuronal signalling becomes dysfunctional before neurodegeneration occurs. MND is a multifaceted condition, in which the biochemical pathways that cause motor neuron degeneration differ between patients. However, there are common pathologies and symptoms that are shared across cases. One well- documented feature observed in patients is a change in electrical signalling, where neurons no longer respond normally to stimulation. Another hallmark of MND involves the formation of stress granules, which are temporary structures that normally help cells cope with stress but can become abnormal and persistent in diseases like MND. When stress granules persist, they can interfere with normal cellular processes. Emerging studies suggest the physical properties of stress granules can alter the local cellular environment that facilitate the transmission of electrical signals in neurons. This raises a central research question: do the physical properties of stress granules directly influence neuronal electrical signalling, and could this interaction be a key driver of motor neuron dysfunction in MND? To address this question the specific aims of this project are to: 1. Characterise the biophysical properties of stress granules using novel quantum tools. 2. Identify whether altered stress granule properties contribute to neuronal dysfunction in MND.  Fig. 1. Stress granules with altered biophysical properties may alter neuronal excitability in MND motor neurons
Who can apply	An undergraduate student training in cell and molecular biology, biotechnology and/or neuroscience, with experience in a practical wet lab setting (undergraduate biology and/or chemistry labs)
Contatct / Project supervisors	Dr Dzung Do-Ha - dzung@uow.edu.au Dr Luke McAlary - lmcalary@uow.edu.au Prof Lezanne Ooi - lezanne@uow.edu.au

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