Title: Using non-invasive brain stimulation to investigate age-related changes in the neural control of movement

Where: ECL Postgraduate Teaching Space (460.2.031)
When: 13:30 – 14:30, Friday 9th August 2019
Host: Dr Hakuei Fujiyama

Abstract:

Ageing is associated with a decline in voluntary movement control—movements become jerky, less coordinated, and slower as we age. Like movement control, cortical structure degrades across the lifespan, but there is a mismatch: the age-related decline in movement control manifests much later than the age-related decline in cortical structure. Therefore, it is important to understand the functional changes in the cortical motor network that might underlie the age-related decline in movement control. To address this aim, we completed a series of studies using transcranial magnetic stimulation to measure activity in the cortical motor network in younger and older adults. First, we investigated inhibitory and facilitatory processes acting within in the primary motor cortex, which are important for the execution of finely controlled movements. These studies showed that the balance between inhibition and facilitation is affected by age, and that a balance favouring inhibition is associated with better fine motor control than a balance favouring facilitation. Second, we investigated the asymmetry in inhibitory processes between the two primary motor cortices, which might underlie the asymmetry in manual dexterity. These studies showed that neither the asymmetry in long-acting inhibition nor the asymmetry in fine motor control that is evident in younger adults is evident in older adults. Finally, we investigated interactions between the supplementary motor area, which is important for the control of rhythmic bilateral movements, and the primary motor cortex. This study showed that the strength of the interaction between the supplementary motor area and the primary motor cortex is reduced in older compared to younger adults, and the strength of this connectivity is positively associated with performance on bilateral motor tasks. Together, these studies provide evidence for altered function within the primary motor cortex and between cortical motor areas in older adults, which might underlie the age-related decline in voluntary movement control. Taken together, the results of this project fundamental neurophysiological knowledge that could underpin the development of targeted interventions to improve disordered movement, thereby increasing older adults’ ability to perform tasks of daily living and decreasing the risk of falls, injury, and loss of independence.

Biography:

Please refer to http://profiles.murdoch.edu.au/myprofile/ann-maree-vallence/ for Dr Ann-Maree Vallence’s full research profile.

Meeting the presenter:
To arrange a meeting with the presenter, please contact the host.