Dementia is one of the most pressing health concerns affecting aging Canadians today, and yet an easily accessible assessment tool for early detection remains to be developed. It is known that Alzheimer’s disease (AD), the most common cause of dementia, is associated with memory impairments. AD is also accompanied by difficulties in performing complex movements as the disease progresses. These clinical symptoms appear only after there has already been significant damage to the brain, meaning early detection of the disease is essential for the development of preventative measures or treatments for AD.

The current project looks at the development of an early detection tool, and will test the validity of this measure for clinical populations. This research will investigate the neural basis of cognitive-motor integration (CMI) and the effect that neurological disorders have on such behaviour. CMI involves concurrent thought and action, and requires the use of large neural networks in the brain. As early-stage dementia is a disorder in which there is neural network dysfunction, problems with CMI can thus be used to detect dementia in its early stages.

Participants will use CMI to perform an increasingly dissociated visually-guided movement task, where the visual information that guides movement is separated from the movement itself. Imagining data will be collected with a magnetic resonance imaging (MRI) scanner and used to identify and compare the spatial maps of neural networks between age-matched low AD risk and high AD risk participants. If there are deficits in cognitive-motor integration in high AD risk participants as well as a disruption seen in neural network communication, then a simple CMI task can be used to detect AD early without the use of expensive imaging technologies.