Hamilton Institute

Structural Modelling of the Whole Head for Electrical Impedance Imaging and Deep Brain Stimulation

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Abstract:

The use of deep brain stimulation (DBS) for clinical treatment for various neurological disorders, particularly movement disorders such as Parkinson's disease is on the increase. However, the mechanism by which this electrical stimulation acts on neuronal activity is unclear. Experimental in situ investigation of the mechanism of DBS in animal models or patients has clear limitations due to the multi-factorial nature. Our aim is to produce an accurate computational model to simulate the current flow produced by DBS. This will increase the understanding of the precise effects of the injected current on the surrounding neural tissue. It will also allow us to predict optimum dynamic injection and measurement protocols required to maximise the effects of DBS in a defined region of the brain. To address this problem we have adapted a bio imaging method known as electrical impedance tomography (EIT) for DBS by extending the forward problem to create models of the whole human head to simulate the dynamic electrical field distribution during deep brain stimulation.

Venue: Seminar Room, Hamilton Institute, Rye Hall, NUI Maynooth

Time: 2.00 - 3.00pm (followed by tea/coffee)

Travel directions are available at www.hamilton.ie

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