

Symposium 27: Towards a causal understanding of motor learning in humans: a role for non-invasive brain stimulation

Theme: Sensory and motor systems

Wednesday 12th April, 13:20 – 15:00

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Human neuroplasticity in general, and the acquisition of new motor skills in particular, is of relevance to many delegates for the BNA Festival of Neuroscience, linking as it does two of the major themes for the 2017 Festival. Studying learning processes in humans is difficult as measurements have to be non-invasive and therefore are often not able to inform us of causality. This symposium highlights novel approaches in the field of non-invasive brain stimulation (NIBS), which seek to overcome that limitation and fundamentally change our understanding of the mechanisms subserving human neuroplasticity, using motor skill learning as an exemplar.

The speakers have all made a significant impact in their field. Charlotte Stagg (Oxford) has pioneered the use of non-invasive quantification of neurochemicals, in combination with NIBS, to study the mechanisms underlying human motor plasticity. Sheena Waters (UCL) is an early career researcher whose substantial influential data precisely detailing the role of the primary motor cortex in skill learning has changed our understanding of how learning occurs in the motor system. Joseph Galea (Birmingham) has made fundamental progress in understanding network-level connectivity and the role of functional interactions between anatomically distinct brain regions, particularly cerebellar-cortical interactions, in motor learning. Edwin Robertson (Glasgow) has long led the field in studying not only how we learn skills while performing the task but also how we can continue to improve and retain those skills after the task has finished, vitally important for converting neuroscientific understanding into meaningful clinical interventions.

Chair: Dr Charlotte Stagg (University of Oxford)

Co-chair: Professor Edwin Robertson (University of Glasgow)

Speaker 1: Dr Charlotte Stagg (Oxford)

'Combining non-invasive brain stimulation with magnetic resonance imaging and spectroscopy to probe motor learning'

Speaker 2: Dr Sheena Waters (University College London)

'Using non-invasive brain stimulation to study the role of primary motor cortex in motor learning'

Speaker 3: Dr Joseph Galea (University of Birmingham)

'Non-invasive brain stimulation to dissociate the roles of the cerebellum and motor cortex in motor learning'

Speaker 4: Professor Edwin Robertson (University of Glasgow)

'Understanding the regulation of memory consolidation using non-invasive brain stimulation'