

Neural mechanisms underlying decision making processes during spatial navigation

Applications are invited for a fully-funded, full time 3 year PhD studentship commencing September/October 2009. The purpose of the project will be to investigate the neural mechanisms that mediate planning and decision making processes during spatial navigation. The project will employ functional Magnetic Resonance Imaging (fMRI) and virtual reality to investigate behavioural processes, patterns of cortical activity and information exchange within the identified systems.

The project will be supervised by Dr. Thomas Wolbers (Centre for Cognitive and Neural Systems, School of Biomedical Sciences, University of Edinburgh; www.ccns.sbms.mvm.ed.ac.uk/staff/people/wolbers_thomas.htm). The Centre (Director: Prof. Richard Morris) has an international reputation for its work on spatial memory in non-human species and has recently launched a new initiative in human cognitive neuroscience. The laboratory has access to a research-dedicated 3 Tesla Siemens Magnetic Resonance Imaging (MRI) scanner and entertains collaborations with animal researchers in the Centre and with members of the Institute for Adaptive and Neural Computation (www.anc.ed.ac.uk). Furthermore, Edinburgh University is part of the Scottish neuroimaging consortium SINAPSE (www.sinapse.ac.uk), which allows the sharing and development of neuroimaging related skills.

The successful candidate will have the opportunity to acquire a specialised understanding of mechanisms of spatial navigation and decision making and the underlying neural mechanisms. Moreover, (s)he will acquire skills in important new methods in cognitive neuroscience. In particular, the student will learn a range of methods to advanced levels, including experimental design for event-related fMRI, Dynamic Causal Modelling to investigate information exchange, Machine Learning and interactive virtual environment technology.

Successful candidates will have a good first or Masters degree in Psychology, Neuroscience, Cognitive Neuroscience, or similar discipline. Prior experience with Matlab and Python programming is desired but not compulsory. Further details about the application procedure can be found here: www.ccns.sbms.mvm.ed.ac.uk/postgrad/procedure.htm

Candidates are encouraged to discuss the project with Dr. Wolbers before submitting their application (twolbers@ed.ac.uk).

Further reading:

Wolbers T, Hegarty M, Büchel C, Loomis JM (2008) Spatial updating: how the brain keeps track of changing object locations during observer motion. *Nature Neuroscience* 11(10): 1223-1230.

Wolbers T, Wiener JM, Mallot HA, Büchel C (2007) Differential recruitment of the hippocampus, medial prefrontal cortex and the human motion complex during path integration in humans. *Journal of Neuroscience* 27(35): 9408-9416.

Wolbers T, Büchel C (2005) Dissociable retrosplenial and hippocampal contributions to successful formation of survey representations. *Journal of Neuroscience* 25(13): 3333-3340.

