

SAMUEL G. EWING, ENGD

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RESEARCH INTERESTS

My principle research interests lie in the field of deep brain stimulation (DBS) and its potential role in the treatment of psychiatric disease. Currently I am investigating the effects of high frequency stimulation of the nucleus accumbens on network oscillatory activity.

My future research plans are to (a) further explore the therapeutic potential for DBS in disease states associated with aberrant frontal cortex function (particularly OCD and schizophrenia) and by doing so to (b) elucidate the mechanism(s) of action by which DBS affects its therapeutic benefit.

EDUCATION

- 2005-2009 **EngD, Medical Devices**
Combating cortical hypofrontality. Deep brain stimulation of the cortico-limbic-thalamic loop: implications for the treatment of schizophrenia
University of Strathclyde, Bioengineering Unit
Through an interdisciplinary collaboration between bioengineering, electronic engineering and pharmacology I have developed a system for the stimulation of discrete brain regions in the awake, freely moving rat. This system has been used to study the molecular, electrophysiological (EEG, ECoG & LFP) and behavioural effects of DBS on the mediodorsal thalamic nucleus in rats.
- 2000-2004 **MPhys, Masters in Astrophysics (2:1)**
The University of Edinburgh
My undergraduate studies included a broad range of modules providing thorough proficiency in experimental and theoretical methods, including: mathematics, statistics, computing and electronics.
- 1993-2000 The Manchester Grammar School
A levels: Physics (A), Maths (B), Art (A)

ACADEMIC EXPERIENCE

- 2010-Present **Post-doctoral research associate**
University of Pittsburgh, Department of Neuroscience
As part of a multi-center research project (Conte Center for Research in OCD) I am exploring the consequences of chronic DBS of sub-territories of the nucleus accumbens, particularly alterations in oscillatory activity in cortico-basal ganglia-thalamo-cortical loops.

PUBLICATIONS

Ewing, S, & Grace, A. 2010. High frequency unilateral deep brain stimulation of the nucleus accumbens induces alterations in local field potential oscillations in regions both ipsilateral and contralateral to stimulation in awake, freely moving animals. *2010 Neuroscience Meeting Planner, Program No. 162.13*, San Diego: Society for Neuroscience, 2010. Online.

Ewing, S, & Pratt, J. 2010. Deep brain stimulation of the mediodorsal thalamic nucleus and its implications for the treatment of schizophrenia. *J. Schres. Abstr.*, **117**, 277–278.

Ewing, S, Waddell, C, Porr, B, & Pratt, J. 2008. Combating Cortical Hypofontality. Deep brain stimulation of the corticolimbothalamic loop: implications for the treatment of schizophrenia. *2008 Neuroscience Meeting Planner, Program No. 101.20*, Washington, DC: Society for Neuroscience, 2008. Online.

Ewing, S, Porr, B, & Pratt, J. 2009. Combating Cortical Hypofontality. Deep brain stimulation of the mediodorsal thalamic nucleus: implications for the treatment of schizophrenia. *British Neurosci. Assoc. Abstr.*, **20**, P61.10.

TECHNICAL SKILLS

- Electronic:** Manufacture of DBS devices and electrodes suitable for small animals, including proficiency in PCB design (**eagle** software) and fabrication using tiny SMD components.
- Surgical:** Stereotaxic implantation of electrodes into deep brain nuclei in rats. Implantation of subcutaneous stimulation devices in rats.
- Electro-physiology:** Recording of EEGs, ECoGs and LFPs in anaesthetised rats. Analysis of oscillatory activity (spectral analysis (Fourier methods and wavelet techniques), Granger causality and partial coherence).
- in vivo:** Deep brain stimulation in anaesthetised and conscious rats. Behavioural assessments in stimulated animals, including: open-field and PPI.
- ex vivo:** Cryostat sectioning of brain tissue, *in situ* hybridisation for the expression of immediate early genes and optical densitometry using MCID.
- Computing:** C programming, signal processing in **scilab** and **MATLAB**, statistical analysis in **GraphPad**, **SPSS**, **MATLAB** and **R**., document preparation in **L^AT_EX**, website construction (www.orionguitars.com) and vector graphics preparation for visual presentations.

CONFERENCES & COURSES

- Aug 2009 Scottish Neuroscience Group 2009, Invited speaker.
- April 2009 British Neuroscience Association 2009, Poster presentation.
- Nov 2008 Society for Neuroscience 2008, Poster presentation.
Abstract selected by the Neuroscience Public Education and Communication Committee for inclusion, by way of a “lay summary”, in Neuroscience 2008 media materials.

PROFESSIONAL MEMBERSHIPS

- British Neuroscience Association, Postdoc member
Society for Neuroscience, Postdoc member

PRIZES & AWARDS

Jan 2009 1st Prize for “best poster” at The University of Strathclyde, Faculty of Engineering, Research Presentation Day.

PERSONAL INTERESTS

I am an avid sportsman. Fencing: having won gold at the Scottish student beginners and bronze at the Scottish adult intermediates I have since captained the University of Strathclyde’s men to a bronze medal position in the Scottish university’s teams. I now fence with the University of Pittsburgh’s fencing club, coaching sabre as required. Squash: I compete to an intermediate level in the Pittsburgh squash federation. Mountaineering: I climb regularly and have recently trekked in the central high Atlas mountains, the Pyrenees and the Dolomites. I am also a skilled luthier and build my own guitars which I use to write music in various projects.

REFEREES

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