2016

# Three different projects: autism, brain stimulation and defining the LGN on anatomical images.

The work of Dr Rebecca Lawson, a post-doc with Prof Geraint Rees, largely concerns sensory expectations and their violations. Current questions include how culture affects perceptual expectations, how non-invasive brain stimulation affects sensory learning and how ‘low-level’ visual regions may represent ‘higher-order’ expectations.

Projects on offer

1. Eye gaze perception in autism spectrum disorders

This project will involve running behavioural tasks in adults with autism and matched controls. The project concerns how adults with autism represent different eye gaze directions and tests predictions from computational models suggesting that a failure of divisive normalisation may underlie difficulties processing eye gaze in autism. Literature here:

<https://www.ncbi.nlm.nih.gov/pubmed/23583965>

https://www.researchgate.net/profile/Ari\_Rosenberg/publication/280534517\_A\_computational\_perspective\_on\_autism/links/55b83c0808ae092e965880bd.pdf

1. Brain stimulation studies of sensory learning

This study will use brain stimulation techniques (tDCS) to modulate sensory learning in healthy adults. Computational models (Hierarchical Gaussian Filter) of behaviour (Reaction Times) will be used to quantify tDCS induced changes in learning under uncertainty. Relevant literature here:

<http://www.jneurosci.org/content/30/9/3210.short>

<http://journal.frontiersin.org/article/10.3389/fnhum.2014.00825/abstract>

1. Defining the Lateral Geniculate Nucleus in human neuroimaging studies

This project will involve working with high-resolution anatomical images of the human brain (data already collected). The LGN will be manually delineated and the size, volume and average location of the LGN will be quantified. The resulting project will resemble the following paper:

<http://www.ncbi.nlm.nih.gov/pubmed/22986224>

An exceptional student *with previous experience of pattern classification analysis*, may also be given the opportunity to analyse the BOLD imaging data that accompanies these structural images using multivariate decoding techniques. E.g: <http://www.nature.com/neuro/journal/v18/n4/full/nn.3967.html>

Requirements

All projects require commitment, independence, good time keeping, organisational skills and a basic working understanding of statistics. Knowledge of Matlab – or a strong willingness/ability to learn - is highly desirable.

Please send a CV to: rebecca.lawson@ucl.ac.uk and write a few words about the sort of project you might be interested in. **website** [bit.ly/beckyneuro](http://t.co/CnL0rqFSzw)