**What is really going on with anti-Bayesian effects in perception?**

Sensory neurons in early retinotopic cortex are tuned to basic stimulus characteristics such as local orientation. However, the distribution of tunings is not homogeneous with respect to orientation, thought to reflect a visual environment enriched in features with cardinal, rather than oblique orientations. The oblique effect refers to a phenomenon wherein (i) sensitivity to cardinal orientations is greater than sensitivity to non-cardinal orientations, and (ii) orientation perception is biased relative to the nearest cardinal.

Bayesian observer models conceptualise the latter feature as a prior on orientation, wherein perceptual judgements are biased by the prior (Girshick, Landy, and Simoncelli 2011). In theory, bias towards the prior should be proportional to the uncertainty of the stimulus, i.e. to its signal-to-noise ratio. However, some recent studies have reported the opposite effect, and have even found repulsive biases (i.e. away from the prior) under certain noise conditions (Wei and Stocker 2015).

This project will examine such ‘anti-Bayesian’ effects and assess which among different models (e.g. differential response and perceptual biases vs efficient coding) are best able to account for experimental findings.

Avoid anti-bayesian talk!

Clinical hook? Schizophrenia and priors etc

Do AQ and EQ scores

Slides to christph tomorrow afternoon or cocme in Wed

**References**

Girshick, Ahna R., Michael S. Landy, and Eero P. Simoncelli. 2011. ‘Cardinal Rules: Visual Orientation Perception Reflects Knowledge of Environmental Statistics’. *Nature Neuroscience* 14 (7): 926–32. https://doi.org/10.1038/nn.2831.

Wei, Xue-Xin, and Alan A. Stocker. 2015. ‘A Bayesian Observer Model Constrained by Efficient Coding Can Explain “anti-Bayesian” Percepts’. *Nature Neuroscience* 18 (10): 1509–17. https://doi.org/10.1038/nn.4105.