



Biomedical Engineering Department Seminar

Friday, November 9, 2007

Location: Cullimore Hall, Lecture Hall 3

Time: 11:30 AM – 12:30 PM

Opening the Black Box using fMRI: Cortical Control and Neuroplasticity in Saccadic and Vergence Eye Movements

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Traditionally, eye movements have identified cortical involvement using control theory. The visual system can be given known stimuli and the responses can be easily recorded via eye movements. The brain or controller can be inferred from the gain equation (output/ input) or recorded output response divided by visual input. With functional imaging, eye movement research is evolving to begin to understand how different neural centers are involved in cortical control. Specifically, our lab is investigating how oculomotor learning occurs. We have published several findings showing that although visual stimuli are the same, very different behaviors can be recorded depending on the visual environment. This seminar will discuss an overview of the biophysics of functional MRI and how to construct an experiment to study different regions of interest. Results will be presented showing 1) what circuitry is involved in oculomotor learning for two common types of eye movements (saccades and vergence), 2) different cortical locations are dedicated to specific types of eye movements and 3) short-term neuroplasticity can be observed indirectly with fMRI as synchronization and recruitment. Future directions of this work will also be discussed.

Refreshments will be served.