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**Title of the course:** Brain Imaging and Cognition (or “How I learned to think critically about fMRI”)  

**Detailed syllabus of the course, with topics addressed in each 90 minutes lecture (less than 2 pages):**  

**Background information on the web (optional):**  

**Short CV (less than half page):** [http://community.frontiersin.org/people/VaibhavDiwadkar/5904](http://community.frontiersin.org/people/VaibhavDiwadkar/5904)  

**Important publications (5-10):**  


**Anything else (course requirements, readings list, etc):** See syllabus
Brain Imaging and Cognition (or “How I learned to think critically about the value of fMRI”).

Instructor:

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Prospectus. In vivo functional imaging of the brain has dramatically enhanced researchers’ ability to examine the neural correlates of cognition and behavior. In particular functional Magnetic Resonance Imaging (or fMRI) is a particularly attractive technique. fMRI relies on the physical and magnetic properties of brain tissue (in particular blood) which change under conditions of neural activity. This Blood Oxygen Level Dependent (BOLD) contrast is endogenous to the brain and unlike Positron Emission Tomography does not demand the injection of radioactive contrast agents. fMRI (based on BOLD) is therefore a perfectly safe technique for studying brain function, can and is easily applied to the study of diverse populations (including children), and has reasonable spatial (“where in the brain”) and temporal (“how quickly is something in the brain changing”) resolution.

In this segment of the Budapest Seminar in Cognitive Science we will:

a) Examine the physical and physiological bases of fMRI. That is we will review the physics and technology that makes it possible to measure the fMRI signal and how this signal is correlated with electrophysiological activity in the brain;
b) Review experimental techniques and designs for fMRI. That is, we will learn how to design experiments for fMRI to answer questions of interest relating to perception and cognition;
c) Understand how fMRI data is processed before we can reach a stage where we can draw inferences from it.

Next, we will consider domains of human cognition where fMRI has particularly enhanced our understanding of the brain, and has extended previous understanding gained from other techniques (including animal studies, experimental psychology, and neuropsychology).

Suggested Text Book:


