

NeuroImaging: Fall 2006

Psychology 607: Functional Magnetic Resonance Imaging

Instructor: Scott H. Frey, Director Lewis Center for Neuroimaging & Assistant Professor of Psychology

Contact information: shfrey@uoregon.edu; ph. 346-0389

Office Hours: By appointment.

Time and Location: Tuesdays, 9am – 11:30am in the conference room at the Lewis Center for Neuroimaging.

Objectives. This is a course about functional brain imaging as undertaken with magnetic resonance imaging (fMRI). At the end of the course you should have an understanding of the history of these methods, how and why they work, their strengths and limitations. You will be introduced to techniques for effective design, issues in data preprocessing, analysis and interpretation. Along the way you will learn some basic human neuroanatomy and physiology and nuclear magnetic resonance (nmr) physics. Because this is a very young and rapidly evolving approach, I will also endeavor to share with you some heuristics and practical insights gleaned through my own experiences with these techniques.

What you will not get here is hands-on experience using data analysis programs. With only 10 weekly meetings, there is simply not enough time to do it all, and gaining a critical understanding what you are doing and why is vastly more important (and more challenging). Should you choose to undertake research using these techniques, you will find the time here was well spent. For those seeking a hands-on accompaniment to this course, I can point you to information on accessing software tutorials and sample data sets on your own.

Readings. Two books are available at the UO Bookstore.

Required. The primary text will be *Functional Magnetic Resonance Imaging*, by Huettel, Song, and McCarthy (2004). Sunderland, MA: Sinauer.

Recommended. For those desiring a more technical treatment the following book is recommended: *Functional MRI: An Introduction to Methods*, Edited by P. Jezzard, P.M. Matthews and S.M. Smith, (2001). Oxford University Press.

Journal Club. In addition to text readings, we will read and discuss peer-reviewed manuscripts during the final 20-30 mins of each class. Teams of two students will volunteer to lead these informal discussions and readings will be provided in advance.

Class Presentations. On the last class meetings (Nov. 21 & 28th), each student will make one 10 min. formal presentation of a research paper that employed fMRI to address a question of their own choosing. This is your opportunity to use what you are learning to critically evaluate work in the field. Each presentation will be followed by 5 mins. for questions. Details on the organization of these presentations will be provided.

Grades. Final grades will be based on class participation (20%), class presentation (20%), and performance on the comprehensive final examination (60%).

Self Evaluations. Though not graded, you will be given a weekly set of questions designed to help you evaluate your own progress in the course.

Schedule

1. Introduction to Neuromaging: Concepts & History	Sept. 26
2. Anatomy, Physiology and the BOLD Response	Oct. 3
3. Physics I	Oct. 10
4. Physics II	Oct. 17
5. Experimental Design	Oct. 24
6. Safety Lecture & Real-time fMRI	Oct. 31
7. Image Pre-processing	Nov. 7
8. Statistical Analysis I	Nov. 14
9. Statistical Analysis II & Class Presentations I	Nov. 21
10. Class Presentations II	TBA