

**W3440x: Issues in Brain & Behavior**  
class hours: Thurs. 4:10-7

Fall, 2005  
Neurological Institute  
room B43

Instructors  
Joy Hirsch

office  
Neurological Institute—Basement- fMRI Center

Office Hours  
Fri. 10-12  
and by app't  
(jh2155@columbia.edu)

Don Hood

415 or 301 Schermerhorn

Mon. 4:30-5:30  
and by app't  
(dch3@columbia.edu)

**Techniques for the noninvasive assessment of human brain activity are considered with emphasis on functional MRI measurements. The use of the functional MRI in laboratory and clinical science is explored.**

**Readings:**

HSM: Heutel, SA, Song AW and McCarthy, G. (2004) Functional magnetic resonance imaging. Sinauer Associates, Inc. Sunderland, MA.

KSJ: Kandel, Schwartz, & Jessell (2000) Principles of Neural Science, 4th Ed. (in both Bio & Psych. Lib.)

Other readings will be from primary sources available as pdf files.

**Grades:** grades will be based upon class participation, class preparation, and a paper (written and presented in class). This is a seminar. UNEXCUSED ABSENCES WILL HAVE A SIGNIFICANT NEGATIVE IMPACT ON YOUR GRADE.

**Paper:** will be on a topic that we will assign and will include a brief review of the literature and a proposal for a fMRI experiment. We will agree on topics no later than Sept. 29, an annotated outline/bibliography is due no later than Oct. 20, a first draft is due by Nov. 17 and the final paper of less than 15 pages is due by Dec. 1.

**Date**                      **TOPIC AND READINGS**

Sept. 8                      **Introduction to the Course**

15                      **Intro to the Physiological Bases of Behavior/ Review of Anatomy and Physiology (Visual System)**

readings for week: **KSJ: Ch 1&2; Ch 25 (496-505; understand well Fig. 25-12); Ch26 (508-510 & 516-521); Ch27 (understand well Fig. 27-20); Ch 28 (548-553)**

Note: make a list of terms/issues you don't understand. Email us the list by 6 a.m. on Thursday. PLUS set up a time to discuss paper topic.

Lab: No lab

22                      **Introduction to the scanner, fMRI safety considerations and human subject consent procedures.**

readings for week: **HSM Ch 1 & 2 and Read for your project.**

Note: Email us questions you may have about your project.

Lab: No lab

29                      **Fundamentals and Introduction to fMRI**

readings for week: **HSM Ch 3,4 & 5 (skim/optional); read for your project**

**note: if you want additional background on basics of fMRI physics see Newhouse & Wiener (1991) or Buxton (2003)**

Note: make a list of terms/issues you don't understand. Email us the list by 6 a.m. on Thursday.

lab: Experiment 1 (Checkerboard and retinotopic mapping).

- Oct. 6      **Experimental Design of fMRI Experiments**  
 readings for week: **HSM Ch 6,7 & 11**  
 Note: make a list of terms/issues you don't understand. Email us the list by 6 a.m. on Thursday.  
 lab: **Analyze data.**
- 13      **Reading the fMRI literature and a Discussion of Your Projects**  
 readings for week: **HSM Ch 12 (322-329; 333-336); Ch 13; Buccino et al (2001); be prepared to discuss your topic**  
 Note: By 6 a.m. on Thursday email us: 1. a list of terms/issues you don't understand. 2. a brief summary of the Buccino et al results referring to Fig. 1-4. 3. the abstract of a good article on your topic.  
 lab: **Run Exp. 2 retinotopic mapping on 1 or 2 others.**
- 20      **Relating fMRI Activity to Neuronal Activity and Discussion of Your Projects**  
 readings for week: **Logothetis et al (2001) & Mukamel et al (2005)**  
**HSM: review Ch7, read Ch 8 & 15.**  
 Note: Be prepared to explain what is plotted in each of the figures of the Logothetis paper as well as what the figure is meant to illustrate. Make a list of terms/issues you don't understand. Email us the list by 6 a.m. on Thursday.  
 lab: **No lab.**
- 27      **Mapping Visual Regions with the fMRI and Analysis of Exp. 1 (visual areas)**  
 readings for week: **HSM Ch 12(329-332)**  
**van Essen (2004, p. 1-5 and 8-14)**  
**Wandell (1999, p. 150-156 & Fig. 8)**  
**Engel, Glover & Wandell (1997) – ignore Appendix--** Make sure you can explain each of the figures in Engel et al. What is plotted? How would you describe the finding?  
 Note: make a list of terms/issues you don't understand. Email us the list & a summary of your topic and AN ANNOTATED BIBLIOGRAPHY AND A DRAFT OUTLINE OF YOUR PAPER by 6 a.m. on Thursday..  
 lab: **Analyze data from Exp. 2 (visual areas).**
- Nov. 3      **Experimental Design and Higher Order Functional (Dr. Egner)**  
 readings for week: **HSM: Ch 13(377-385); Ch 12 (esp. terms and concepts in Egner & Hirsch)**  
**Egner & Hirsch (2005)**  
**Optional: browse SPM website (<http://www.fil.ion.ucl.ac.uk/spm/>)**  
 Note: make a list of terms/issues you don't understand. Email us the list by 6 a.m. on Thursday. DRAFT OF INTRODUCTION AND METHODS FOR YOU PAPER IS DUE.  
 lab: **Run Exp. 3 (faces and places)**
- 10      **Functional specificities: Faces and Places**  
 readings for week: **Grill-Spector et al (1998)**  
**Halgren et al (1999)**  
 Note: make a list of terms/issues you don't understand. Email us the list by 6 a.m. on Thursday. Article for your presentation due.  
 lab: **Analyze data from Exp. 3**
- 17      **Student Presentations**  
 readings for week: **to be assigned**  
 Note: DRAFT OF PAPER DUE.  
 lab: **No lab.**
- 24      THANKSGIVING**
- Dec. 1      **Student Presentations**  
 readings for week: **to be assigned**  
 lab: **Possible class generated experiment.**  
 Note: FINAL VERSION OF PAPER DUE on Dec. 1.
- 8      **Student Presentations & Dinner**  
 readings for week: **to be assigned**

lab: Analysis of possible class generated experiment.