Course Description & Syllabus
Topical Seminar on Functional Magnetic Resonance Imaging
Fall, 2006

GENERAL INFORMATION

Course Designation: Psychology 708, Section 001, CRN 089562

Instructor: **Dr. Jason Chein**
825 Weiss Hall ~ 215-204-7314 ~ jchein@temple.edu
Office hours: Tuesday 10:00-12:00, Thursday 11:00-12:00, and by appointment

Class Schedule: Wednesday 10:30am-1:30pm, Weiss Hall 640, and seminar room TBA

Course Web Page: On "Blackboard" accessed through TUportal - http://tuportal.temple.edu/ or http://blackboard.temple.edu. Course is listed as "Psych 708: Topical Seminar on FMRI"

Required Text: Huettel, S.A., Song, A.W., & McCarthy, G. (2004). ***Functional Magnetic Resonance Imaging.*** Sunderland, MA: Sinauer Associates Inc. (Textbook is available at the Temple University Bookstore).

Additional readings will be posted on the Blackboard course site in PDF format.

Prerequisites: None

Students with Special Needs: This course is open to all students who meet the academic requirements for participation. Any student who has a need for accommodation based on the impact of a disability or other special circumstance should contact the instructor privately to discuss the specific situation as soon as possible. Contact Disability Resources and Services at 215-204-1280 in 100 Ritter Annex to coordinate reasonable accommodations for students with documented disabilities.

Statement on Academic Freedom: Freedom to teach and freedom to learn are inseparable facets of academic freedom. The university has adopted a policy on Student and Faculty Academic Rights and Responsibilities (Policy # 03.70.02) which can be accessed through the following link: http://policies.temple.edu/getdoc.asp?policy_no=03.70.02

Course Goals & Methods

Neuroimaging methods, particularly functional magnetic resonance imaging (fMRI), have become a very important tool in the study of human brain function and its relationship to human behavior. This course is intended to provide a comprehensive introduction to the technique of functional magnetic resonance imaging (fMRI), with weekly course topics covering a range of issues relevant to the implementation and interpretation of human fMRI studies. Topics will include examination of the basic physics and biological principles underlying fMRI, the machinery and technology used to support it, fMRI experimental design, issues in human subject running and data collection, fMRI data processing and analysis, and fMRI safety and ethics. The course will also include a visit to an fMRI facility (and perhaps data collection), reviews of exemplary and flawed papers, and a discussion of the

merits and limitations of neuroimaging as a tool for psychological neuroscience. The weekly course meetings will combine seminar discussion, lectures, and hands-on laboratory exercises.

After successfully completing this course, students should:

1. Have a cursory understanding of the physics and biological principles underlying fMRI
2. Understand issues relevant to neuroimaging design and methods
3. Feel comfortable reading and critiquing articles that use brain imaging methods
4. Know how to propose an fMRI experiment and present fMRI findings

Course Structure

Discussions & Readings

Weekly discussion topics, each based on a set of readings from the primary literature, will cover a range of issues relating to fMRI methodology and research. All students in the class are expected to complete these readings in advance of the class in which they will be discussed, and to submit (via the course website) a question or commentary relating to each reading.

Lectures

Lectures will be given to supplement the discussions, and to introduce key issues in fMRI research. The lectures will generally coincide with readings from the course textbook, but not all material in the text will be covered (and vice versa). The lectures will also frequently complement the weekly discussion topic, but not always.

Lecture slides. To reduce your writing burden, copies of the slides used in each lecture will be provided on the course website. The slides will provide only an outline; they are not intended to serve as comprehensive notes on the information presented. Supplementary learning materials will also be made available via links included in the "external links" section of the course website; it is strongly recommended that you take advantage of these resources.

Hands-On Exercises

The course will include several laboratory-style exercises designed to give you practical experience relating to the collection, design, analysis, and interpretation of fMRI data. In addition to exercises carried out in the computer lab in Weiss Hall 640, the class will visit an active fMRI facility, and, if all goes well, will participate in the collection of data for a class-designed experiment.

Course Requirements

Questions/Commentary On Readings

Each student in the class is expected to read each of the weekly selected articles, and to submit a thoughtful question or commentary on each article via the discussion board found on the course website. Questions/comments must be submitted at least 24 hours before the relevant class meeting so that they can be considered by the students presenting the articles. Questions/comments should focus on "big-picture" issues that will stimulate group discussion (comments or questions regarding minor details of the articles should be avoided). I will set up a thread for each of the articles on the course website, and will check the threads regularly for activity.

Presentation of article

Each student will be required to read, present, and lead discussion on one (or maybe two) of the articles selected to support weekly discussion topics. The presentations may be formal or informal, but each should offer an in-depth consideration of the relevant topic/issue and a response to the questions/comments submitted by other students in the course. While the chosen presenter will have primary responsibility for leading discussion regarding the article, everyone in the class is expected to read the articles in advance, to submit relevant questions/commentary, and to come prepared to participate in discussion.

Written Proposal & Presentation

Students taking the course for credit will prepare a written proposal (max length 12 double-spaced pages, due on 11/29) describing a potential fMRI experiment. The proposal should include a) a brief review of the literature (from neuroimaging or other domains) in the topic of interest, b) a description of a new question that could be addressed with fMRI (or an old question that could be addressed by a better design), c) a proposal of the experimental design and data acquisition methods to be used, and d) a description of the proposed analysis procedure. During the last 2 meetings of the class, each student will give a short (15 minute) overview of their proposal, followed by 5 minutes of discussion. Students will be expected to incorporate ideas discussed during the course (e.g. experimental design, analysis techniques, etc.), into the written proposal and its presentation.

The weighting of each of the course components in your final grade will be as follows:

Component	Questions	Article Presentation	Written Proposal & Presentation
% of grade	20%	20%	60%

Course Policies

Grading. Final course grades will be computed by accumulating the proportion of the maximum attainable points you have earned for each requirement of the course (as explained in the table above). All grades will be posted on the course website as soon as they are available and in a manner that respects student privacy. Your final letter grade for the course will be based on the following grading scale:

A	**93-100**
A-	**90-92**
B+	**87-89**
B	**83-86**
B-	**80-82**
C+	**77-79**
C	**73-76**
C-	**70-72**
D+	**67-69**
D	**63-66**
D-	**60-62**
F	**<60**

Feedback. You should contact me any time during the term if you have questions regarding your performance or evaluation. Occasional grading errors are inevitable, as are misunderstandings, so please bring to my attention (privately) any specific concerns you have regarding your course grades.

Class Attendance. Your progress and success in this course will significantly benefit from your regular attendance and active in-class participation. It is expected that you will make every effort to be present at every class session. Please be courteous to your instructor and fellow classmates and arrive promptly. Disruption in class of any kind will not be tolerated. I hope that the class will be both informative and entertaining, and expect your cooperation in maintaining an environment that is conducive to both. If for any reason you must miss a class, you are responsible for any of the information discussed or presented in class that day.

Academic integrity. It is of utmost importance that the assignments you complete for this course are the result of your own work and reflect your own understanding of the material. It is your responsibility to be familiar with Temple's policies on academic integrity, cheating, and plagiarism (see undergraduate bulletin, or the following website: http://www.temple.edu/bulletin/Responsibilities_rights/responsibilities/responsibilitieshtm#honesty). Unless explicitly told otherwise, you can discuss assignments and readings with others, but be aware that presenting (intentionally or unintentionally) someone else's work as your own constitutes a breach of the academic integrity policy, and will be dealt with very seriously. If you have any questions or concerns about whether your behavior could be interpreted as cheating or plagiarism, please ask me before submitting the work.

Communication. The course website on Blackboard is the primary place where you can find course announcements, lecture slides, useful links, and information about assignments, deadlines, procedures and policies. For specific questions that are not answered on Blackboard, you are encouraged to send email (jchein@temple.edu). I check my email regularly, and you can expect a reply within 48 hours. If you prefer to discuss your concerns with me directly, you may do so during the office hours listed above. You may also send an email to schedule a separate appointment with me.

PRELIMINARY COURSE SCHEDULE

DATE	TOPIC	TEXTBOOK READINGS	IMPORTANT DATES
8/30	Course overview L: Introduction to neuroimaging	HSN: 1, 2, 15	
9/6	D: FMRI: Major advance or modern day phrenology? L: Basic MR physics & Image formation	HSN: 3 & 4	
9/13	L: Contrast mechanisms & The BOLD response D: From neuron to brain E: Introduction to AFNI/Navigating Datasets	HSN: 5, 6 & 7	
9/20	L: Experimental design & Practical limitations D: The trouble with baselines	HSN: 11	
9/27	L: Event-related designs in depth D: MR safety E: Group experiment design session		
10/4	L: Spatial and temporal limits of fMRI D: Mental chronometry and spatial topography	HSN: 8	
10/11	L: Sources of signal & noise E: Preprocessing of fMRI data	HSN: 9 & 10	
10/18	L: Statistical Analysis – GLM D: Dealing with the problem of multiple comparisons E: Individual subject analysis using the GLM	HSN: 12	**SFN conference**
10/25	L: Statistical Analysis – Advanced techniques D: Interpretation and interpretive challenges E: Visualization and Event-Related Averaging		
11/1	L: Structural and functional anatomy D: Beyond flag-planting – testing psychological theories with fMRI E: Spatial transformation and group analysis		
11/8	D: Applications of fMRI	HSN: 13	
11/15	D: The future and ethics of fMRI E: Analysis free-time		
11/22	NO CLASS – THANKSGIVING SWITCH		**No Class**
11/29	D: Emerging methods Student Presentations		**Proposals Due**
12/6	Student Presentations		

D = DISCUSSION TOPIC/DEMONSTRATION
L = LECTURE TOPIC
E = EXERCISE