

***IMAGING THE HUMAN MIND, 200.312***

***Fall Semester 2008***

***<http://www.psy.jhu.edu/~courtney/200.312/>***

*Instructor:* Dr. Susan Courtney

Office Hours: Mondays 1:30pm-2:30pm, Thursdays 9:00am-10:00am, Ames 227

Email: Courtney@jhu.edu                      phone: (410) 516-8894

*TA:* *Arnold Bakker*

Office Hours: By appointment

Email: abakker@jhu.edu

***REQUIRED READING***

Book: *Functional Magnetic Resonance Imaging, by Huettel, Song, and McCarthy*

Electronic Library Reserves: *Brain Mapping: The Methods (2<sup>nd</sup> edition, Toga and Mazziotta)*

*Chaps 5, 8, 10, 18                      Password = COU312*

Original research articles: TBA online

Recommended, on reserve in the library:

Brain Mapping: The Methods (2<sup>nd</sup> edition, Edited by Toga and Mazziotta)

Brain Mapping: The Systems (Edited by Toga, Mazziotta, and Frackowiak)

Brain Mapping: The Disorders (Edited by Mazziotta, Toga, and Frackowiak)

- Sept. 4      History. Why study/do functional neuroimaging? What are we measuring?  
 Cognitive neuroimaging experimental design goals and pitfalls  
               Huettel, Chaps. 1, 9, 11, 13  
 How to evaluate a published neuroimaging study.  
               Huettel Chapters 1, 13
- Sept. 11     Quick overview of statistics and neuroanatomy,  
 Defining “signal” and “noise”  
 Cognitive subtraction, additive factors, parametric designs  
               Huettel Chap. 12 and Box 6.2 on page 149  
               Brain Mapping: The Methods, Chap. 22
- Sept. 18     Relationship of neuroimaging to single cells, neuropsychology, and TMS  
               Huettel Chaps. 8, 1, 15  
               Recommended: Chap. 11 and 25, Brain Mapping: The Methods  
 ERPs, MEG, electrophysiological recordings  
               Huettel, Chapter 15 pgs. 443-462  
               Brain Mapping: The Methods, 2<sup>nd</sup> edition, Chapters 8 and 10, on reserve
- Sept. 25     **Choice of topic for experiment design term project due**  
 Neural activity, metabolism, blood flow and blood oxygenation  
               Heuttel, Chapter 6  
 Optical imaging, Positron emission tomography  
               Brain Mapping: The Methods, 2<sup>nd</sup> ed., Chap. 5 and 18 on reserve  
 Spatial and Temporal resolution, comparison of imaging methods
- Oct. 2        Review and examples  
**Quiz 1**
- Oct. 9        **Literature review for project due**  
 Magnetic resonance imaging  
               Heuttel, Chapters 2, 3, 4  
 MR Contrast Mechanisms, Blood Oxygen Level Dependent Functional MRI  
               Heuttel, Chapters 5 and 7  
               Recommended: Brain Mapping: The Methods, Chaps. 12 and 13

- Oct. 16      **List of 3 papers for potential group discussion due.**  
 More MRI  
 Voxel-based morphometry, diffusion tensor imaging, perfusion imaging  
 Getting past the hemodynamic response constraint with MRI
- Oct. 23      Review and examples  
**Quiz 2**
- Oct. 30      **PDF of paper for group discussion due, draft of cognitive task design due**  
 Cognitive neuroimaging experimental design goals and pitfalls, revisited  
                 Huettel, Chaps. 1, 9, 11, 13  
 Advanced data analysis methods, interpretation of results  
                 Chapters 11, 12 revisited  
                 Recommended: Chap. 22, Brain Mapping: The Methods
- Nov. 6        Discussion of neuroimaging papers
- Nov. 13      Discussion of neuroimaging papers
- Nov. 20      Student presentations of experimental designs
- Nov. 27      Thanksgiving
- Dec. 4        Student presentations of experimental designs
- Dec. 15      Term project due at noon, 227 Ames Hall or Dr. Courtney's mailbox 232A Ames**
- Grades:      Quizzes (25% each)  
 paper presentation (10%),  
 term project (topic= 3%, literature review= 5%, draft of design (includes revisions of  
                 topic and lit review) = 7%, class presentation= 9%,  
                 final revised paper= 11%) = 35% total  
 attendance at paper discussions and student project presentations (5%)

## STATEMENT ON ACADEMIC ETHICS

*The strength of the university depends on academic and personal integrity. In this course, you must be honest and truthful. Ethical violations include cheating on exams, plagiarism, reuse of assignments, improper use of the Internet and electronic devices, unauthorized collaboration, alteration of graded assignments, forgery and falsification, lying, facilitating academic dishonesty, and unfair competition.*

*In addition, the specific ethics guidelines for this course are:*

- 1) In preparation for the in class discussion of the research articles, you are **encouraged** to use any and all resources, including discussing the articles with other classmates or professors.*
- 2) The experimental design for your term project must be created by you. You must not copy from the existing literature or from on-going experiments in which you may be participating or otherwise have knowledge of. You may consult any resource (written, electronic, or person) for ideas and advice, but the final design must be your own. You must cite any source of information used in writing your term project, with complete citation information including authors, year of publication, title, journal title if applicable, volume and page numbers. If you do not understand how to properly cite sources, ask a librarian or the Professor.*
- 3) The quizzes are closed book. You may not use any external resource during the taking of any of the quizzes.*

*Report any violations you witness to the instructor. You may consult the associate dean of student affairs and/or the chair of the Ethics Board beforehand. See the guide on "Academic Ethics for Undergraduates" and the Ethics Board web site (<http://ethics.jhu.edu>) for more information.*