



PSYCHOLOGY 349

Research Experience in Cognitive Neuroscience

Focus: Functional Neuroimaging

Term: Spring 2003

Time: MW 1:30-3pm

Course Website: <http://www.amishi.com/courses/psy349>

Instructor: Dr. Amishi Jha

Email: apjha@psych.upenn.edu

Phone: 215-573-0210

Office: 3810 Walnut Rm. 307

Office Hours: Thurs 10-11am

Teaching Assistant: Melissa Ranucci

Email: ranucci@psych.upenn.edu

Phone: 215-573-6156

Office Hours: by appt. only

Course Description and Format:

This research experience course aims to provide you with an opportunity to conduct cognitive neuroscience research and gain familiarity in the techniques of acquisition, analysis, and interpretation of functional MRI (fMRI) data. To this end, lectures will convey the fundamental principles of experimental design, data structure, quality assurance, MR physics, safety, and data analysis approaches. In addition, lectures will review recent findings in the literature.

Each week, students will participate in a lab activity requiring the analysis of existing fMRI data. These lab sessions are training for the type of analysis that will be performed on the data that you will collect later in the term. Students will form 2 groups (comprised of 4 students in each group). Each group will perform an fMRI experiment (including the design, data collection, and data analysis). At the end of the term each group will give an oral presentation of their work. In addition, each student will submit a written paper describing the project that was conducted.

Course Requirements:

Attendance: Attendance for each class is mandatory and will be taken at the beginning of each class. Missing class will lower your grade.

Weekly Readings: There will be 2-3 readings available in pdf format at the course website (<http://amishi.com/lab/courses/psy349>). The readings are a mix of academic journal articles and popular press articles. Please read these papers prior to arriving to that day's lecture or lab session.

Lab and Discussion Participation: All students are expected to fully engage in lab activities.

Short Papers: Two short papers are required (~1000 words each). Each paper should be review of a single assigned reading from Weeks 2-6. Your paper should review the journal article using the QLMRI method (Question, Logic, Method, Results, and Interpretations).

Rough Drafts: To provide you with an opportunity to get feedback on your project paper, you will be required to submit a rough draft of your introduction and methods, as well as your results and discussion. Since your project will be conducted with other students, it is acceptable for all members of a group to submit a single copy of the methods and results. The introduction and

discussion, however, should be done INDIVIDUALLY by each member of the group. Although you will not receive a grade on the rough drafts, their submission is mandatory.

Presentation: On the final 2 class days, each group, comprised of 4 students, will give a presentation of the functional MRI experiment that was conducted. This presentation will present relevant background that motivated the study, methods, results, discussion of the results. To find helpful guidelines on talk preparation visit:

<http://www.uphs.upenn.edu/ins/Talk%20Preparation.htm>

Final Paper: A 15-pg final research paper is to be submitted at the end of the semester. This paper should be in publication-ready format (using the Journal of Neuroscience guidelines:

http://www.jneurosci.org/misc/ifa_organization.shtml)

- i. Abstract
- ii. Introduction
- iii. Methods*
- iv. Results*
- v. Discussion
- vi. References
- vii. Figures*

* It is acceptable to for all members of a single group to submit a single draft of ONLY these sections.

Grading Policy:

Late Policy: Papers must be submitted at the beginning of class on the day they are due (1:30pm). Any paper received after this deadline will receive a full letter grade reduction. Any assignment submitted more than 48 hrs after it is due will not be graded.

Academic Integrity: All students are expected to follow the highest standards of academic integrity.

Academic Dishonesty Definitions: (from: <http://www.upenn.edu/osl/acadint.html>)

Plagiarism: using the ideas, data, or language of another without specific or proper acknowledgment. Example: copying another person's paper, article, or computer work and submitting it for an assignment, cloning someone else's ideas without attribution, failing to use quotation marks where appropriate, etc.

Fabrication: submitting contrived or altered information in any academic exercise.

Example: making up data for an experiment, fudging data, citing nonexistent articles, contriving sources, etc.

Final Grade:

20% Short Papers (best grade out of 2)

30% Discussion and Lab Participation

50% Final Presentation and Paper

Schedule of Lectures and Assignments:

Week 1:

- 1/13: Class overview, Student background survey and MR Screening,
Lecture (Jha): Introduction to Functional Neuroimaging
- 1/15: Lab (Banerjee and Ollinger)
Introduction to Linux
Managing your user accounts

Week 2:

- 1/20: Martin Luther King Holiday- No class
- 1/22: Lecture (Jha)

Week 3:

- 1/27: Lecture (Jha)
- 1/29: Lab (Jha)
Introduction to Voxbo
 - Downloading your data
 - Creating a condition function
 - Data quality assurance
 - Motion Correction

Week 4:

- 2/3: Lecture (Jha)
- Short Paper 1- Due @ 1:30pm.**
- 2/5: Lab (Jha)
 - GLM
 - performing contrasts
 - functional regions of interest

Week 5:

- 2/10: Lecture (Jha)
- 2/12: Lab (Jha)
 - statistical analyses
 - anatomical regions of interest
 - extracting time series data

Week 6:

- 2/17: E-Prime Lab (Ranucci)
- 2/19: Project Preparation
- Short Paper 2- Due @ 1:30pm**

Week 7:

- 2/24: Project Preparation
- 2/26: Project Preparation

Week 8:

- 3/3: fMRI Data Collection
- 3/5: fMRI Data Collection

Week 9:

- 3/10: Spring Break- No class
- 3/12: Spring Break-No class

Week 10:

- 3/17: fMRI Data Collection

3/19: fMRI Data Collection

Week 11:

3/24: fMRI Data Analysis

3/26: fMRI Data Analysis

Rough Draft of Introduction and Methods due @ 1:30pm

Week 12:

3/31: fMRI Data Analysis

4/2: fMRI Data Analysis

Week 13:

4/7: fMRI Data Analysis

4/9: fMRI Data Analysis

Week 14:

4/14: fMRI Data Analysis

4/16: Project Preparation

Rough Draft of Results and Discussion due @ 1:30pm

Week 15:

4/21: Project Presentation (Group 1)

4/23: Project Presentation (Group 2)

Week 16:

4/28: Reading Period- No class

4/30: Reading Period-No class

Week 17:

5/5: **FINAL PAPERS DUE @ 5pm.**

Important Dates:

2/3/03—Short paper 1 Due at 1:30pm

2/19/03—Short paper 2 Due at 1:30pm

3/26/03— Rough Draft of Results and Discussion due @ 1:30pm

4/16/03— Rough Draft of Results and Discussion due @ 1:30pm

4/28/03—Project Presentation

4/30/03—Project Presentation

5/5/03—Final Paper Due at 5pm