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# PSYC 589/888

Neuroimaging: from Image to Inference

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Spring 2019  
Tuesdays 10:05am - 12:50am  
Room: Hamilton 238  
Chris Rorden  
rorden@sc.edu 803.404.2573  
Office: 227 Discovery

## Description

Functional magnetic resonance imaging is a recent and powerful tool for inferring brain function. This technique identifies brain regions that are activated by different tasks – for example we can find the brain regions that activate when someone sees a familiar face. This course is designed to give students an understanding of the potential and limitations of this technique, and the ability to critically evaluate the inferences that can be drawn from fMRI. The course describes all stages of an fMRI study – from the design of the behavioral task (e.g. asking the participant to view faces), to the image processing (e.g. correcting images for head movements that occurred during scanning), through to statistical analysis (identifying brain regions that are activated by a task).

## Assessment and Assignments

The final grade is weighted 30% quizzes, 40% on homework assignments and 30% on the essay, with letter grades assigned as follows A = 90-100%, B = 80-90%, C = 70-80%, D = 60-70%, F = <60%. Graduate students (PSYC888) must also teach a 45 minute class presentation on a research article that uses brain imaging in a topic of their interest. This presentation is scored as pass or fail that modifies the grade on the essay by x1.0 (pass) or x0.5 (fail), so that a perfect essay (100%) with a failed presentation (x0.5) yields a weighted score of 50%. Information from this lecture will be included in the quizzes, so undergraduates will want to pay close attention to these lectures.

Quiz Description: Students will complete 3 quizzes. These include multiple choice and short answer questions.

Homework description: Students will submit regular homework assignments, which are due at noon on their due date. Assignments are due in the students' dropbox folder unless otherwise specified.

Essay description: Students will write an essay that describes the merits, limitations and potential of a current or potential technique used to infer brain function. Essays should extend beyond the information in the course.

## Textbook

Functional Magnetic Resonance Imaging by Huettel, Song, and McCarthy.

## Dates:

15 Jan  
22 Jan  
29 Jan  
5 Feb  
12 Feb  
19 Feb  
26 Feb  
5 March  
<12 March Spring Break>  
19 March  
26 March  
2 Apr  
9 Apr  
16 Apr  
23 Apr

**Web site**

<http://www.mccauslandcenter.sc.edu/crnl/psyc589888>

## **Learning Outcomes**

- Understand the basic elements of neuroimaging.
- Understand strengths and limitations of complementary tools used in cognitive neuroscience.
- Ability to evaluate how contemporary methods can be used to understand cognitive functions.
- Practice software for viewing, preprocessing and statistically analyzing brain imaging data.
- Practice writing in the form of scientific report that relates behavioral and biomedical constructs.

## **Attendance**

Attendance throughout class is required. By registering for this class you are confirming your availability during class. If you must miss a class, you should talk to the instructor ahead of time. For emergencies (flu, car trouble) it is strongly preferred that you send a text message to the instructor at the time of the class. Failure to meet the “10 percent rule” will have homework assignment scores diminished by the proportion of the absences across the term (e.g. missing 15% of classes will mean your final score reflects 85% of your homework score).

## **Plagiarism**

University policy regarding plagiarism, cheating and other forms of academic dishonesty is followed explicitly [See Carolina Community: Student Handbook and Policy Guide, Academic Responsibility]. Any case will be reported to the Dean of the College of Arts and Sciences. Plagiarized assignment will count as a zero score or automatic failing grade in extreme cases.

## **Disabilities**

Students who have disabilities must have certification from the Office of Disability Services and must make clear during the first week of class what accommodations they expect. Students with disabilities must complete the same exams and assignments as other students in order to get course credit.

## **Software**

MRICron <https://github.com/neurolabusc/MRICron/releases>

MRICroGL <https://github.com/neurolabusc/MRICroGL/releases>

FSL <https://fsl.fmrib.ox.ac.uk/fsl/fslwiki>