Last updated April 10, 2018 to clarify final project grading

Structural and Functional MRI Methods and Application (PSY:6280:0001)
Spring 2018 Syllabus

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Office hours: T/TH 2-330pm

Teaching Assistant: James Kent
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Office hours: TH 1-4pm

Time and place of class:
Monday and Wednesday 2:30-3:45pm at 109 Stuit Hall

Course description: The goal of this course will be to give students an in-depth background and hands-on experience with the methods of MRI and fMRI with an emphasis on applications in cognitive and health psychology. Topics covered include an understanding of image acquisition and basic properties of the physics of MRI and fMRI, introduction to the neurophysiology of the BOLD/fMRI signal, creating tasks that optimize the strengths of fMRI, preprocessing and analysis of structural and functional images, and measuring structural and functional connectivity. Through applied problem sets you'll also gain familiarity with common programming tools/environments used in fMRI processing (e.g., bash, python; FSL, AFNI), and get hands-on practice with basic image manipulation, data preprocessing, and analyses. The course will culminate with group projects that include data collection in the scanner and analysis of this data. Students will give a final presentation and write an analysis report in a Jupyter notebook based on their project. We assume no background in programming or MRI, but we do assume basic knowledge of statistics.

Course website: https://github.com/uiowa-mri-course-2018

- The course site contains our schedule which is where you can download lectures find links to readings, videos, and labs.
- The schedule will be updated as we go depending on our pace in lectures and labs.

Class structure:

- Monday will primarily be lectures, and on Wednesday we will practice working with data through structured labs.
- Labs will be completed using jupyter notebooks within your virtual machine environment. You will access labs through our course site. Using github will make it easier to give feedback, and it will be a useful skill to learn.
- Github repositories for all students will be private, so only Michelle and James can see your work!

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Course materials

- There is no primary course textbook, but readings will be made available on the course website. Many readings will come from The Handbook of Functional MRI Data Analysis, available at our library by clicking here. This book will be referred to as "Handbook" on the schedule.
- We will use a "virtual machine" for tutorials and analyses. A virtual (i.e., stand alone) computer will make it easier to bypass installation of major softwares and provide a common working environment for everyone to learn with. You will download and get this running on your computer the first week of class. By the end of the class, if you still want to pursue imaging independently, we hope you'll have learned the technical skills to get a similar environment working yourself!

Assignments and grading (50 points)

- **Labs (30 points)**
    - Each Wednesday we will begin a new lab. There are 12 labs in total throughout the course.
    - We will complete the exercises in class together. At the end of each lab there will be practice problems that you complete on your own. In some cases we may even have time for you to start the problem sets in class.
    - Each week you will submit your completed lab to github by the following Saturday at 5pm. The labs will be graded based on participation in the exercises and completion of the problem sets based on a 1-3 scale explained below. Your lab grade will be based on the average of your best 10 labs.
        - 3 = class exercises complete and problem sets are answered accurately
        - 2 = either class exercises or problem sets have major errors or many minor ones
        - 1 = both class exercises and problem sets have major errors, many minor ones, or are incomplete
- **Final project (20 points)**
    - You will work with at least one partner to develop an fMRI task. Exceptions must be approved by Dr. Voss. You will collect data on classmates, and analyze and write up your results. You will be encouraged to design the project with your partner(s) and receive feedback from classmates and instructors.
    - The final project is worth 20 points and will be graded based on 5 components (1. Rationale and discussion; 2. Description of procedures, imaging acquisition, and quality control; 3. Preprocessing; 4. First-level analyses; 5. Group analyses and inference). Each component is worth 4 points (4=all complete and accurate, 3=several minor errors, 2=several major errors and/or many minor errors, 1=many major errors or incomplete).

Course Policies

Administrative Home

The College of Liberal Arts and Sciences is the administrative home of this course and governs matters such as the add/drop deadlines, the second-grade-only option, and other related issues. Different colleges may have different policies. Questions may be addressed to 120 Schaeffer Hall, or see the CLAS Academic Policies Handbook at https://clas.uiowa.edu/students/handbook.

Electronic Communication

University policy specifies that students are responsible for all official correspondences sent to their University of Iowa e-mail address (@uiowa.edu). Faculty and students should use this account for correspondences (Operations Manual, III.15.2, k.11).

Accommodations for Disabilities

The University of Iowa is committed to providing an educational experience that is accessible to all students. A student may request academic accommodations for a disability (which includes but is not limited to mental health, attention, learning, vision, and physical or health-related conditions). A student seeking academic accommodations should first register with Student Disability Services and then meet with the course instructor privately in the instructor's office to make particular arrangements. Reasonable accommodations are established through an interactive process between the student, instructor, and SDS. See https://sds.studentlife.uiowa.edu/ for information.

Nondiscrimination in the Classroom

The University of Iowa is committed to making the classroom a respectful and inclusive space for all people irrespective of their gender, sexual, racial, religious or other identities. Toward this goal, students are invited to optionally share their preferred names and pronouns with their instructors and classmates. The University of Iowa prohibits discrimination and harassment against individuals on the basis of race, class, gender, sexual orientation, national origin, and other identity categories set forth in the University's Human Rights policy. For more information, contact the Office of Equal Opportunity and Diversity, diversity@uiowa.edu, or visit diversity.uiowa.edu.

Academic Honesty

All CLAS students or students taking classes offered by CLAS have, in essence, agreed to the College's Code of Academic Honesty: "I pledge to do my own academic work and to

excel to the best of my abilities, upholding the IOWA Challenge. I promise not to lie about my academic work, to cheat, or to steal the words or ideas of others; nor will I help fellow students to violate the Code of Academic Honesty." Any student committing academic misconduct is reported to the College and placed on disciplinary probation or may be suspended or expelled (CLAS Academic Policies).

CLAS Final Examination Policies

The final examination schedule for each class is announced by the Registrar generally by the fifth week of classes. Final exams are offered only during the official final examination period. No exams of any kind are allowed during the last week of classes. All students should plan on being at the UI through the final examination period. Once the Registrar has announced the date, time, and location of each final exam, the complete schedule will be published on the Registrar's web site and will be shared with instructors and students. It is the student's responsibility to know the date, time, and place of a final exam.

Making a Suggestion or a Complaint

Students with a suggestion or complaint should first visit with the instructor (and the course supervisor), and then with the departmental DEO. Complaints must be made within six months of the incident (CLAS Academic Policies Handbook).

Understanding Sexual Harassment

Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff. All members of the UI community have a responsibility to uphold this mission and to contribute to a safe environment that enhances learning. Incidents of sexual harassment should be reported immediately. See the UI Office of the Sexual Misconduct Response Coordinator for assistance, definitions, and the full University policy.

Reacting Safely to Severe Weather

In severe weather, class members should seek appropriate shelter immediately, leaving the classroom if necessary. The class will continue if possible when the event is over. For more information on Hawk Alert and the siren warning system, visit the Department of Public Safety website.