Statistics 159 & 259 — Fall 2015 Project
Reproducible and Collaborative Statistical Data Science

Form teams	Sept. 17
Project proposal	Oct. 1
Progress presentation	Nov. 3 & 5
Draft report	Nov. 12
Project presentation	Dec. 1 & 3
Project report	Dec. 14

Learning objectives: Working with complex and large datasets; convolution (hemodynamic modeling, smoothing); interpolation (slice time correction, image resampling); optimization (registration, advanced statistics); basic linear algebra (statistics).

Project overview:
This semester the group project will involve reproducing a published result using the analysis of functional Magnetic Resonance Imaging (MRI). Functional MRI (fMRI) allows scientists to localize which parts of the brain are associated with specific cognitive tasks. There is no expectation that you will have a background in neuroscience. You will learn everything you need to know about the method in the course. The intention of focusing on fMRI data is merely to provide a concrete problem domain that exemplifies the types of programming and statistical challenges present in many modern statistical applications. Additionally, the weekly labs will prepare you—through a series of exercises—with the basic skills and background you will need for the group project.

While you will learn the basic methods and tools during lecture and lab, you will be expected to do additional research and reading in the course of working on the group project. For instance, you may need to use a specialized analysis method or a Python package not covered in the lectures or labs.

As part of your final project grade, you will be required to work on your project using GitHub's pull request and code review mechanism. During lecture, I will cover the exact workflow you will be expected to follow.

Forming teams: Teams will need to be decided by **Thursday, September 17th**. Each team should consist of 4 students. Students enrolled in 159 (259) will be required to work with students enrolled in 159 (259). You should ensure that your team is composed of individuals with different strengths. For example, each team will need people with strong computational as well as statistical skills.

Project proposal: Each team will need to submit a project proposal on **Thursday, October 1st**. The proposal should be written in LaTeXand submitted to your team's GitHub repository. Use this template `http://www.jarrodmillman.com/stat159-fall2015/project/proposal.tex`.

Progress presentation: Each team will need to present a 5 minute progress report in class on **Tuesday, November 3rd** or **Thursday, November 5th**.

Draft report: Each team will need to submit a written draft of their final report by 5P **Thursday, November 12th**. For more information see the template `http://www.jarrodmillman.com/stat159-fall2015/project/report.tex`.

Project presentation: Each team will need to present a 5 minute progress report in class on **Tuesday, December 1st** or **Thursday, December 3rd**.

Final report: Each team will need to submit a final written report by 5P on **Monday, December 14**. For more information see the template `http://www.jarrodmillman.com/stat159-fall2015/project/report.tex`.

Additional resources:

- `https://www.coursera.org/course/fmri`