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

Form teams ..... Sept. 17
Project proposal ..... Oct. 1
Progress report ..... Nov. 3 & 5
Project presentation ..... Dec. 1 & 3
Project report ..... Dec. 18

**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 graded exercises—with the skills and background you will need for the group project.

**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 `proposal.tex`.

**Progress report:** Each team will need to submit a written progress report before class on **Tuesday, November 3rd**.
Additionally, each team will need to present a 5 minute progress report on **Tuesday, November 3rd** or **Thursday, November 5th**.

**Project presentation:**

**Final report:** Each team will need to submit a final written report by 5P on **Monday, December XXX**. For more information see the template.

**Potential papers:**
OpenfMRI `https://www.openfmri.org/` is a good resources for publicly-available fMRI datasets. Here is a list of potential papers and suggested topics:

- Haxby et al. (2001): Faces and Objects in Ventral Temporal Cortex (fMRI)

  use the data set to show regions more involved in face processing versus scenes/ object processing - check that this about the region that was used to predict the condition in this paper ...

  For more information see: `http://dev.pymvpa.org/datadb/haxby2001.html`

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### Additional resources:

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