Each student must propose a project which aims to take $\sim$ 20+ hours. Projects can basically be anything one desires (hopefully at least somewhat connected to non-parametric estimation/classification). In my mind, projects will be directed at either an applied analysis, a method (or software implementation of a method), or a theoretical problem. Methods/theory projects can be aimed at extending (or implementing) existing methods/theory or an in-depth study to understand a method/theoretical result/framework. Please work on something that you find interesting/exciting! That is the point of the course (and this project). Project proposals should be under 1 page in length. Some potential ideas:

- Implement a method we have discussed (or that you have read about) efficiently (with a nice API) as a `Julia` package
- Build an efficient loess solver for 2+ dimensions in C++ with k-d trees.
- Investigate entropy based rates (propose a section to work through and summarize in van de geer)
- Learn about, implement, and compare various modern Lasso solvers (and Group Lasso solvers)
- Use non-parametric regression to reanalyze data from a paper which uses parametric modeling

In proposing the project, please give some details about your plan. eg."I plan to reanalyze the data of .... The data are... The original analysis used the following parametric model... This seems like it potentially biases results because... Instead, I will use..."

If you want to do something exciting and vastly different... That's great! Just chat with me about it first.

Group Projects: I strongly encourage you to do this project as a group. Different types of projects will look different when engaged with as a group vs individual. eg. an applied analysis would be relatively straightforward to do as a group: You could break up, and each do different pieces of the analysis [and submit a single final report]. Investigating a theoretical topic could also be done very fruitfully as a group, however, likely each person would submit their own writeup summarizing their synthesized understanding of the material. If you choose to do a group project, please include in your writeup how you will each demonstrate your contribution to the project (and the "deliverable(s)" that you will each turn in [or turn in as a group]). The 20ish hours that you should each aim to spend on the project can include time collaborating/coordinating etc for the group project.

If you intend to do a group project each person in the group should submit an identical proposal on canvas. I encourage you to work in groups of no more than 3 people (unless you have a specific reason to work in a larger group — there could be great projects involving larger groups, but you will have to be very careful to ensure everyone's contributions are clear). IF you choose to work in a group, please select your own group-mates.