

**ECE 645 Spring 2021**  
**Project Guidelines**  
Friday February 19, 2021

The purpose of the project is to allow you to specialize your course effort on some aspect of statistical signal processing of personal interest or particular relevance to your research. It is also intended to help you write about detection or estimation algorithms and explain their performance.

I am thinking that the effort required would be equivalent to working out all of the problems in one or two of our homework assignments, perhaps 20-30 hours of work spread out over the semester.

As for the topics they could be almost anything of interest in statistical signal processing, machine learning, and applications of statistics. Allowable projects could include summarizing a research paper of interest along with some numerical verification or minor extension of the work. Also of interest would be an in-depth study of some 645-style topics, which we don't have time to properly cover in class, e.g., connections between information theory and statistics, spectrum estimation, probability density estimation, sequential detection, nonparametric and robust detection, Wiener filtering, Kalman filtering, etc.

### **Important Dates**

1. March 5: Deadline to send an email describing your project idea (optional).
2. March 22: Project proposal deadline. 1 page + 0.5 page references.
3. April 19: Project report deadline. 5 pages + 1 page references.
4. April 21: Youtube link for project presentation deadline.  $\leq 8$  minutes. These will be played in class on April 23, 26, 28, and 30. Please be present to answer questions.

**Email (optional).** Send email if you would like some quick feedback. Include the following: 1) Tentative title, 2) A very short summary, and 3) References you plan to use.

**Proposal (20%).** Include the following elements: 1) Project title, 2) Motivation, 3) Uniqueness – what will you add to the knowledge contained in the reference material you are using, e.g., a minor extension, a new simulation, a verification of a simulation, 4) Tasks needed to accomplish your goal, 5) Expected outcome, and 6) References.

**Final Report (40%).** Include the following elements: 1) Project title, 2) Introduction, 3) Literature Review, 4) Results, 5) Conclusion. Please follow the style suggested for an IEEE conference submission such as ICASSP. The grading of the final report will be based on clarity, novelty, completeness, and soundness of the writing. Please self edit your writing and polish!

**Youtube presentation (40%):** We will play youtube presentations in class. Please attend if you are in the synchronous class and ask questions. If you cannot attend, please send questions via email or in the class presentation chat. The presentation should be a summary of the final report, which hits the highlights and is targeted to a listener unfamiliar with the material.