ME 498 Engineering Spectroscopy Projects

The hands-on part of this class should be hopefully fun and interesting as well as educational. Last time I ran the class, projects turned out really nicely. Over 30 years of teaching, I've accumulated lots of spectrometers (more than 25 now) and cameras and detectors, as well as light sources and optics. There's lots of stuff, most of which is generally unusued or rarely used, though it served a purpose at one time. We can leverage that equipment for this class to do some neat projects that demonstrate spectral data collection and analysis, and provide some new results on systems that actually contribute to the state-of the-art.

I've come up with 14 potential projects that use equipment we have in setups we either have ready or can be made ready with some simple modifications. Each person will work on one project. During the 2nd half of the semester after the mid-term, we'll have less homework, and so you can devote that time to the project. Here are the steps:

1) **List your project preferences.** I've provided a list of projects with descriptions and links to one or two papers that discuss the area. Use the project preferences form to list your top five preferences. Projects will be one or two people. For a two person project, we can expand the scope a bit and assign each person a specific piece, while some of the work will be done in collaboration. If you want to be paired with a specific person, let me know in the email when you email me the filled-in preferences spreadsheet.
2) **I'll assign projects based on preferences**. Timely response will assist you getting the project of highest preference, but for projects where multiple people want the project and the team is full, I'll generally select at random. I'm sorry if you don't get a high preference project, but I think all the projects will be fun and interesting. I hope to assign projects by the end of September so people can start planning and reading.
3) **If there's a different project that you want to do, you can run a proposal by me.** If I have the equipment, and it seems like something that I can accommodate, I will help you put a project outline together, and you can do that project. I'm skeptical of this approach, but I will be as open as I can to the idea. In general, I want people to choose a project that's different from their research area. So if you're doing TDL for your dissertation, don't do the TDL project. These are meant to add breadth to your skillset.
4) **The first stage, in October, will be doing the background reading and writing up an introductory section to the project with the literature review.** We'll meet individually to discuss the project, and I can help guide you to the right papers. We'll also discuss the experimental setup. I'll start getting all the equipment together, and late in the month, we can go over all the operational info. You'll write up the experimental section.
5) **Probably in November, you'll do the testing**. Timelines are rough – in general you can work on this whenever you have time. I'll need to be there for a lot of the testing, so we'll have to schedule the times. But we'll have at least a week where we don't have class and just work on projects. With a lot of students in the class, we'll have to be aggressive in planning, so not waiting until the end of the semester is going to be critical.
6) **You'll write up the results as a report, as if it were a manuscript.** Last time around we had one of the projects turn into a publication, and I think several of the projects this time would be good candidates if successful.

Let me know if you have questions. Looking forward to working with you all.