BIMS 8380
Statistics for Biomedical Scientists 1
Final Project

This final project is the culmination of your first module in biostatistics! Although you have not learned all there is to know about biostatistics, you have learned so much! Now is your chance to use all of your knowledge and apply it to a research question of your choosing.

Please work with one partner.

Your final products will be:

1) A digital "poster" that you will present during an asynchronous scientific conference style poster session (also submitted digitally)
2) A ~5 minute recording walking the audience through your analysis
    a. Both you and your partner should feature in the video
    b. PLEASE test the video to make sure it works (audio and video) before submission
    c. Both Zoom and Powerpoint have recording capabilities
3) An RMarkdown report of your statistical analyses (submitted digitally)
4) Substantive feedback to evaluate 4 of your classmates' projects
    a. Please include positive feedback and critical feedback to help your peers improve.

Due dates:

- Upload your recorded presentation to Collab by midnight Monday March 28 (earlier is nicer so your classmates have more time to offer feedback)
- Offer feedback on 4 assigned classmate presentations by midnight Tuesday March 29
    - Assignments of whom to review will be emailed

Dataset: If you have data from your graduate work, by all means, please use data that are relevant to you. If you do not have your own data, please consider borrowing data from a colleague, lab mate, or from your PI. If that is not an option, please search the internet for a dataset relevant to a topic of your choice. As always, if you need assistance finding a dataset or figuring out how to analyze your research question, please do not hesitate to contact us.

Poster:

- You will present your "poster" from your laptop
- As such, please break your poster into sections and place each section onto a separate slide / page
    - Ensure that each slide / page is beautifully designed
    - Keep words to a minimum (no paragraphs!)
- **Focus on the statistical analyses you performed**
    - Your project should refer to the statistical principles and concepts

we learned in class and focus on the statistics rather than the biology. A brief introduction to the biology is warranted so we can follow why you are studying the topic and what it means, but please spend the vast majority of time on the statistical analysis. The hypothesis tests we learned in class answer questions that compare 2 group means:
    - independent samples pooled variance t-test
    - independent samples unpooled variance t-test
    - paired samples t-test
    - Wilcoxon-Mann Whitney U test
- Keep your audience in mind. Your peers are engaged in a wide variety of research topics so please remember to zoom out and start at the beginning so that we may follow along with your research story.

<u>Components of the poster should include:</u>

- *Introduction:* Why did you choose this project? What is known about the variables already? Why are these variables and this question important?
    - *Hypotheses:* Be explicit – this is a stats course. What were you expecting to find?
- *Methods:* Where do these data come from? How did you take the raw data and create the results? Explain any data cleaning steps that you took (subsetting for certain variables or certain cases, excluding missing data, etc.). What statistical test did you use and why? When you checked the assumptions of the statistical test you conducted, were they met? How do you know? What did you do about any problems you identified if the assumptions were not met?
- *Results:* Explain what you found out in the context of the results of the statistical analysis. Were there significant differences in groups? Which group was higher? **You must include at least one properly labeled plot here showing your results.**
- *Discussion:* What do these results tell us? Why are these results important? Can you explain any unexpected results? Are there recommendations you can make for what types of data or analyses you should collect or perform next?

<u>The RMarkdown analysis report should:</u>

- Be made in RMarkdown and then knit into a report style document (PDF)
- Intersperse R code, headings, code comments, and prose
- Have code that is fully functional and complete. We should be able to read through your entire code and see all of the output and plots that you created
- Be fully commented. Please tell us what you are doing for each chunk of code so that we can follow along.
- Be Beautiful. Use spacing and headings to separate chunks of code so that it is easily readable. If you open the file and don't want to read what you wrote, chances are neither do we!