**OPTION A: TECHNICAL REVIEW**

**Instructions**

1. Submit your report (750 words maximum) to Canvas. Include all figures in the main text.
2. This exercise is only for students taking STAT 436 for Honors credit.

**Description**

One of the best ways to learn the details of a new method is to try explaining it using your language and examples. In this exercise, you will explore a multi-omics method in-depth, preparing a readable introduction to your peers. Your write-up will have three main sections: problem context, method description, and code analysis.

In the problem context, summarize the scientific motivation behind the proposed method and the data sources that are typically available. What is the interpretation of these data? How are the scientific goals formulated as a statistical problem? What were some of the methods that have previously been applied to the problem, and why are they unsatisfactory? Imagine that the reader has taken this class but is not familiar with your chosen method.

In the second section, describe the mechanics of the proposed method. You may sacrifice tertiary details to emphasize the main ideas of the approach. You are encouraged to either develop a visual summary (hand-drawn is okay) of the method or prepare a toy example using highly reduced data. Rather than repeating the explanation from the original publication for the method, try to independently organize, interpret, or simplify the relevant concepts.

For the final section, skim some technical supplementary material associated with the report. For example, for a more theoretical paper, this can include helper definitions and propositions, while for a computational paper, this might include an existing software implementation. Relate your algorithm description from the previous section with specific elements of this supplementary material (e.g., variable or function names). Did you notice any technical steps that were not discussed in the main report? What important aspect of this supplementary material did you find confusing at first, and how did you eventually understand how it works?

**Rubric**

You will be given feedback according to the following criteria, but this assignment is not graded.

Problem Context: Fully researched and developed discussion of the context.

Method Summary: Clearly and creatively describes the method of interest.

Technical Analysis: Fluently relate topics in the main paper with implementation details in either code or theory.

**OPTION B: SCIENTIFIC JOURNALISM**

**Instructions**

1. Submit your report (750 words maximum) to Canvas. Include all figures in the main text.
2. This exercise is only for students taking STAT 436 for Honors credit.

**Description**

In this option, you will prepare a short, accessible article describing a recent research paper on a topic of your choice. Your article should target a general audience (e.g., an intellectually curious college freshman) and be similar in spirit to the reports that appear in venues like [eLife](https://elifesciences.org/articles/insight), [Nature](https://www.nature.com/research-analysis) , or [Quanta](https://www.quantamagazine.org/) magazines.

Structurally, your article should include a main text and an explanatory illustration. The main text should provide some background about the research community surrounding the selected paper and the specific problem that the paper addressed. Consider closing with some directions researchers are now exploring, given the paper's result. The illustration should describe the main ideas of the paper using simplified figures and annotation. For this assignment, a hand-drawn figure is sufficient (in the real world, you could send your drawing to a professional illustrator).

I encourage you to be creative with this assignment. For example, many articles in eLife or Quanta have interesting opening "hooks" (specific images or descriptions of people that catch our attention) or valuable metaphors.

This is a playful exercise, but I have more serious reasons for assigning it. First, researchers need to be able to explain their work to audiences that are not immediately familiar with their topic — this is important in grant applications and seminar presentations, for example. Second, the long-term vitality of a field depends on how well it can spark the interest of beginners. Finally, to understand the essence of a research problem, it is helpful to step back in the way this exercise encourages.

**Rubric**

You will be given feedback according to the following criteria, but this assignment is not graded.

Depth: Fully developed discussion of the relevant research community and results.

Organization: Includes a logical opening, development, and conclusion.

Accessibility: Discusses the topic in a way that is accessible to a general audience.

Illustration: Provides an appealing and self-explanatory illustration of the research.