Please upload your proposal as a single PDF to Gradescope by 11:59 pm on **Sunday, Oct 19**.

The proposal should be approximately **1–2 pages** for undergraduates and at least **2 pages** for graduate students, *excluding references*.

You can access the LaTeX source here:

TDA Project Proposal Guidelines

Purpose. The project proposal is a short document outlining your plan for the final project. It should demonstrate that your idea is well-motivated, feasible within the semester, and meaningfully involves tools from topological data analysis (TDA).

What to include:

1. **Title and Team Members**
   Provide a short, descriptive title and list all team members.
2. **Motivation / Research Question**
   What problem will you study? Why is it interesting, and why is TDA an appropriate approach? You may justify your choice by referencing prior work that addressed similar questions using TDA, or by explaining why the structure of the data makes topological information particularly insightful.
3. **Data and Resources**
   Describe your dataset (source, size, and format). If synthetic, explain briefly how you will generate it. If external, include a link or citation.

   Optionally, mention any expected preprocessing or challenges (e.g., noise, dimensionality).
4. **Methods**
   Describe which TDA techniques you plan to use (e.g., persistent homology, Mapper, persistence landscapes, persistence images). You may also include any complementary approaches, such as dimensionality reduction, clustering, or statistical tests.

   Optionally, list software (`ripser`, `persim`, `giotto-tda`, `GUDHI`, Python, etc.) you intend to use.
5. **Expected Outcomes (Optional)**
   What do you expect to produce? Examples include persistence diagrams, barcodes, bottleneck distance plots, classification results, or a comparative survey of existing methods.
6. **Timeline**
   Provide a brief timeline or list of milestones (e.g., data collection, implementation, analysis, writing). Your plan should indicate that the project is manageable before the final report deadline.
7. **Additional References (Optional)**
   In addition to the papers that motivated your project, list any relevant papers, datasets, or resources that further inspire or support your proposed approach.

Notes:

- If you use AI tools in preparing the proposal (e.g., for brainstorming, drafting text, or generating code snippets), include a one-line acknowledgment explaining how they were used. See an example below.
- Projects may be applied, theoretical, or survey-based in nature.
- For future, code-based projects must include a GitHub repository (public or shared) with a clear README and usage instructions.
- For accessibility or data-related concerns, contact the instructor early.
- If you are unsure about your topic, bring one or two ideas to office hours for discussion and feedback.

Acknowledgment of AI assistance: This document was partially drafted and revised with the help of ChatGPT (OpenAI, 2025) to improve clarity, organization, and formatting consistency.