Project Instructions

CS 279, BIOE 279, BMDS 245, BIOPHYS 279, and CME 279

Final Report Due: Friday, December 4, 2026 at 11:59 PM

1 Description

The goal of this project is to allow you to explore a topic from the class in more detail. **The project should involve 3D structures of biomolecules and/or spatial organization of molecules within a cell.** It should also involve (or at least relate to) computation. Subject to these requirements, any topic is acceptable. If you are unsure whether your project idea meets these requirements, or if you need help scoping your project, please feel free to discuss with a TA.

You can work **individually** or in groups of **up to three students. The project is meant to involve about as much work *per person* as assignments 2 or 3, regardless of whether you work individually or in a group.** You are of course welcome to do novel, publishable research for your project, but this is by no means expected or required, as this would typically take more time than students can allot to their project.

Each project will likely involve at least one of the following:

- Using existing software to perform computational experiments and analyze the results. You could apply this software to study a biomolecular or cellular system of interest (for example, a particular protein), or you could examine the accuracy/performance of the software.
- Implementing an algorithm or method (for example, one of those discussed in class, or a related method)

We will share additional information soon about project ideas, along with pointers to a number of software packages, servers, and datasets you may find useful. You are welcome to work on other topics as well.

We've also posted several example projects from past years on the course website. Of course, you may not copy these projects (or anyone else's work), but they may provide inspiration. Likewise, the optional readings on the course website may serve as starting points, along with other published papers.

If you try out a computational method and it doesn't "work" in the sense of producing accurate results, that's fine! In that case, please explain what you did, how you evaluated the results, why the methodology you applied may have failed, and what you other approaches you might try if you were to continue working on the project.

2 Project Proposal

Due: Monday, November 16, 2026 at 11:59 PM

To help you think through your topic, datasets, and methods early and identify potential challenges, please submit a short proposal on Gradescope. For group projects, only one member of each group should submit, making sure to tag all teammates. The proposal form on Gradescope asks for:

- Full names and SUNet IDs of all team members
- A descriptive project title
- A description of how the project is relevant to the class (how it involves 3D biomolecular structures and/or spatial organization of molecules within a cell)
- The dataset(s) you plan to use, if applicable
- A brief description of your planned approach and methods

Keep responses brief, about one sentence per question. All complete, on-time proposals will receive full credit. Your plans can change after submission. TAs will not provide individual feedback on proposals, but you are welcome to attend office hours for feedback or questions.

3 Final Report

Due: Friday, December 4, 2026 at 11:59 PM

You are to turn in a written report summarizing the results of your project. In addition, please turn in any code you wrote for your project. The report should be:

- 2–4 pages for individual projects
- 3–5 pages for groups of two
- 4–6 pages for groups of three

with 12-point font, double spaced, 1-inch margins, not including figures, charts, tables, references, and contributions.

No text or images may be copied from any source (including chatbots or large language models) without clear. explicit attribution. Importantly, see **AI policy** below: the prose (text) in your final report must be written entirely by you, without help from AI tools.

Report Structure

The report should consist of the following sections:

- **Introduction:** Identify the problem you wish to solve and the scope of your project.
- **Background:** Include a brief section on the background of the problem: why is it important and what techniques have people used to solve it?
- **Methods:** Describe how you went about solving (or trying to solve) the problem.
- **Results and Analysis:** Present any results and conduct an analysis of your experiments or implementation. Requirements for this section will vary depending on whether you worked on an implementation project or used existing software. Please see the "Results and Analysis" section below for details.
- **Contributions:** If you worked in a group, describe each team member's contribution.
- **References:** Include any sources and datasets used. If you used chatbots, explicitly explain what they were used for.

Results and Analysis

This section will vary slightly between projects that involve significant implementation and projects that use existing software.

In either case, please also make sure to give some explanation of how your project fits into the larger context of the class and computational/structural biology.

Projects Using Existing Software

In the Results and Analysis section, you should include the results of your experiments, as well as an analysis of these results.

- What do the software packages you used do, and how do they do it? Are there other approaches that might work? What are the tradeoffs between these approaches, and why did you choose the one you used?
- What were the results of your experiments?
- Do these results seem reasonable? Are they physically realistic? Do they match your intuition?
- What did you learn by running the experiments?
- What are the "next steps" in the project? That is, if you were to continue working on it, what would you want to do next?

Implementation Projects

In the Results and Analysis section, you should discuss the following.

- Describe the major design decisions in your implementation.
- What challenges did you encounter?
- How well does your implementation work?
- What did you learn through implementing the project? Any major takeaways?
- What are the "next steps" in the project? That is, if you were to continue working on it, what would you want to do next?

You will also be expected to submit your code and a description of how to run or replicate your work. You **must** clearly cite all starter code you used, including code that you wrote for another class.

4 Citing Sources, Starter Code, and AI Tools

Starter code. Starter code is any code you did not write yourself for this project, such as a GitHub repository, a Colab notebook, example scripts that come with a software package, code released with a paper, or code you wrote for another class. For each piece you use, give its source (a link or citation) in your Methods section and state what you changed or added. Please also include this information in a comment at the top of the file. We grade the work you did beyond the starter code, so please make that clear.

Published work. Cite every paper, dataset, and software package you use, in any consistent citation style, in the References section. If your project builds on a published study, cite it in your Background section and say clearly in your Methods section how your work relates to it.

AI Policy You may use AI tools (such as chatbots, large language models, or coding assistants) to help write or run code. All text in the written report, however, must be composed entirely by you; you may not use AI tools to write any part of it.

If you used AI tools for your project, you must explain what you used them for in a section of your report titled "AI Use." No text may be copied from any source without explicit, clear attribution.

5 Sharing a Project Between Classes

If you are simultaneously enrolled in another class that requires a final project, you can do one combined project for both classes (contingent on the agreement of the other course's staff). However, this should not reduce the total amount of work you do for the two class projects. If you choose this option, please specify clearly in your submission which sections of the work were done for each class; the amount of work done for this class should be as much as if you were doing a project only for this class. Please also include your writeup for the other class with your submission.

6 Grading

When grading your project, we will evaluate how well you have met the project expectations as outlined in this handout. We will consider the amount of work per person, clarity as a piece of scientific writing, and relevance to the course (i.e., that the work involves 3D structures of biomolecules and/or spatial organization of molecules within a cell). Rather than using a strict rubric for each of these categories, we will grade holistically based on quality of work and level of effort involved. If you set out to "solve" a problem but are unable to do so, you can still earn an excellent grade on the project, provided you give a thoughtful description of what you did and what went wrong.

7 Final Report Submission Instructions

Your submission will include the following two parts:

- `writeup.pdf`: A written report following the format outlined above. If you worked in a group, please make sure to list all members of your group at the top of your report.
- `code.zip`:
  If you wrote code for your project, please zip your code, together with any data that you used. You should also include instructions outlining how to build/run your code, either as detailed comments inside your code or as a separate document zipped together inside `code.zip`.
  If you did not write any code, please create a text file (`readme.txt`) describing the software packages that you used along with the commands that you ran for the project. Please zip your readme file(s), together with any data that you used.

To submit, go to Gradescope and upload `writeup.pdf` under "Final Project Writeup" and `code.zip` under "Final Project Code and Data".

Only one submission is required per group. If you worked in a group, please add all of your group members to the Gradescope submission.

Lastly, please note that, per the course policies, you **may not** use late days for the project submission.