

ASTP 720 - Final Project

Presentations Thursday, December 3rd (or later)

Feedback Due Wednesday, December 9th

In our course, we've covered a number of numerical and statistical computational methods. For your final assignment, you will perform some calculation at the level of a homework problem on the topic of your choosing. Examples of possible topics to consider include:

- a calculation of binary mass transfer,
- growth of dark matter overdensities,
- analysis of stellar properties,
- a radiative transfer solver,
- fitting zero mass age sequences to stellar clusters,
- exoplanet transit timing variations,
- recreating the Toomre & Toomre simulation,
- constraining Hubble's law with distance and redshift measurements,
- or really just anything we haven't covered in the homework.

Of course, these are only some ideas thrown out there; feel free to chat with me about your project ideas.

The point of this project is not to do something complicated. The point is to do a little exploration on a topic of your own interest and to present what you've learned as you would in a real scientific venue. You should feel free to use other packages that might help you in building your simulations. For example, to simulate the galaxies for your N -body solver, I used the `powerbox` package, which can also be used for cosmological simulations.

In addition to your code, which you must write cleanly, document, etc., for the project, you will be presenting (~15 minutes including questions) your work. You should have some introductory material (e.g., the history of the problem with some references), your methods, your results (or the results for as far as you got, which is okay!), and future directions with potential modifications for your code. You should also include a direct link to your code in the presentation.

In addition to your own project, you will examine your fellow classmates' codes. In a *short* write-up, of order one or two paragraphs for each classmate, you should describe how easy it is to make modifications to the code based on the future directions they described. For example, if someone performs a calculation with 1 solar mass stars but says that this can be applied to stars of other masses, how easy is it based on their paper/presentation and the documentation in order to do this? Imagine that you read a paper or saw a presentation in real life and wanted to try to use someone's linked code. Is their code organized? Documented? Readable? If you did your own analysis, would it have been easy to start? Your statements will be required for *your* grades but will *not* impact theirs, so please write honestly and do not just write "this code was well written and easy to use" each time. Your feedback may be incorporated into my own general feedback for each of you but I will not share your specific feedback (unless you want me to).

Our final project slot is Thursday, December 3rd, 8:00 - 10:30 AM. I do not anticipate needing to start that early. If we can find a common time to meet a bit after this, I am fine with that, so we can discuss in the future. The feedback on your other classmates will be due Wednesday, December 9th at 11:59 PM. Your classmates will need time to evaluate your work, and the latter is a hard deadline as I will need time to make sure grades are in. If you cannot make one or both of these deadlines, you must come talk to me in advance so we can organize an alternative. I am happy to do so but unless something drastic comes up, we will try to stick to this schedule.