

Astrobite and Pop Talk Project Description

PHYS 2701 - Foundations of Modern Astrophysics
with Prof. Cara Battersby, Fall 2021

As detailed in the syllabus, the Astrobite + Pop Talk project will constitute 15% of your final grade. A very non-complete list of possible topics for consideration is at the end of this document.

Astrobite

For this class you will write a short, fun, informative piece, an **Astrobite**, on the topic of your choosing related to this class. The idea is for you to have a chance to dive into an astrophysics topic that we will not be covering in great detail. The final Astrobite should be about 1000 words in length, between about 1-2 pages. The final Astrobite should give a comprehensive and informative overview of the topic (**scope**), be factually accurate with few or no errors (**accuracy**), and be clearly communicated, *fun* to read, and easily understood by your college peers (**communication**). Often times people try to cram *too much* material in and make the paper too complex and hard to follow. Or people will write a beautiful piece, but it is just not very fun or exciting to read. For great examples, check out astrobit.es.org, aasnova.org, and to see **excellent** past Astrobite submissions from my class, check out <https://astrobit.es.org/?s=battersby>.

Your final Astrobite should be submitted in PDF format on HuskyCT and should include scientific references. The reference style is up to you, but you must choose one and be consistent, and be sure to include all information necessary to find the source. A good starting place to look for good scientific sources is the Astrobites website itself (astrobit.es.org), your textbook, any scientific agency or university (e.g. you can google your topic with “site:nasa.gov” to search for that topic anywhere on NASA’s website), and Wikipedia and the original sources contained within it.

Your Astrobite should have a title and you can include a figure if you would like (but of course, be sure to include a reference for it!).

The **deadlines** for various stages of the project are:

Oct. 5th: Present on Astrobite topic choice

Oct. 26th: First draft of Astrobite due for internal peer-editing

Nov. 16th: Final* Astrobite due to Prof. Battersby on HuskyCT

Nov. 30th and Dec. 7nd: Astrobite “pop talks” (more on this below)

Detailed Grading Rubric for your Astrobite:

Score	Scope	Accuracy	Communication
0-4	Astrobite exists and is somewhat coherent. You did it!	Astrobite exists and is somewhat coherent. You did it!	Astrobite exists and is somewhat coherent. You did it!

5-6	Astrobite misses some key overarching points of the topic and includes no or few legitimate scientific references (< two)	Significant factual or conceptual errors presented. An expert in the topic would not have agreed with fundamental points made. Many grammatical errors and typos	Astrobite was difficult to read, did not draw interest in the subject or connect with the current state of the field in astrophysics, and was not fun to read.
7-8	Astrobite covers of the key points of the topic but does not give a broader perspective on the topic. Cites some legitimate scientific references (two - four)	An expert in the topic may have pointed out a few minor factual or conceptual errors. Astrobite contains numerous grammatical errors and typos	Astrobite was overall coherent, but was dense or difficult to understand in some places. The astrobite did not draw substantial interest in the subject, connect with the current state of the field in astrophysics, and/or was not fun to read
9-10	Astrobite covers the key points of the topic, including a historical perspective and the current state of the field. Cites many legitimate scientific references (> four)	Astrobite contains no factual or conceptual errors. Astrobite is grammatically correct with very few or no typos	Astrobite was strongly coherent, informative, and clearly understood by peers in the course. The paper drew interest in the subject, connected with the current state of the field in astrophysics, and was fun to read.

Pop Talks!

You will give a short (1-2 min) talk about your Astrobite topic in class. You can use a visual aid if you would like to (prop, slide, or something you draw on the board) but this is not necessary and sometimes the talk is better without! If you do include a slide I have a two slide maximum limit. This talk should be fun and clearly communicate the main points of your topic. It is practice giving an “elevator pitch” which comes up pretty often in the real world. Here are some examples of very good pop talks from the Communicating Science Conference, comsicon (<https://comsicon.com/comsicon15-videos>). Please let me know if you have further questions or concerns!

Detailed Grading Rubric for your Pop Talk:

Score	Scope	Accuracy	Communication
0-4	You gave a Pop Talk. It was not offensive! You did it!	You gave a Pop Talk. It was not offensive! You did it!	You gave a Pop Talk. It was not offensive! You did it!

5-6	Pop talk lacked substance and did not give any useful information on the topic	Significant factual or conceptual errors presented. An expert in the topic would not have agreed with fundamental points made. Many errors	Pop talk was difficult to understand, did not draw interest in the subject or connect with the current state of the field in astrophysics, and was not enjoyable to watch
7-8	Pop talk gave some useful information on the topic but was not deep, meaningful, or thorough	An expert in the topic may have pointed out a few minor factual or conceptual errors. Pop talk contains numerous errors	Pop talk was overall coherent, but was dense or difficult to understand in some places. The Pop talk did not draw substantial interest in the subject, connect with the current state of the field in astrophysics, and/or was not enjoyable to watch
9-10	Pop talk conveys useful and meaningful information on the topic	Pop talk contains no factual or conceptual errors. Pop talk is well-spoken with no errors	Pop talk was strongly coherent, informative, and clearly understood by peers in the course. The talk drew interest in the subject, connected with the current state of the field in astrophysics, and was enjoyable to watch

A very non-complete list of possible topics

compiled very randomly by Prof. Battersby. So many more as well! Come talk to me if you're having trouble coming up with an idea or narrowing in on a specific topic in a general area.

- planets as wanderers and retrograde orbits
- comparing the geocentric and heliocentric model, the complexity of epicycles and the ptolemaic model.
- What are these 5 perfect solids from Kepler??
- how do we know the earth is moving ?
- the history of tycho brahe and/or johannes kepler
- Lagrange points — where do we put our telescopes and why?
- Where else have we sent missions? What is the farthest away human-made device?
- The Voyager Record (and its message for aliens)
- Astronomy conventions and how to change them (magnitude system, cgs units, misleading names of objects, e.g. “planetary nebula” ...)
- Interstellar travel

- Project “breakthrough starshot” (sending a probe to the nearest star)
- Project “breakthrough listen” - searching for evidence of civilizations beyond earth colonies in space
- Dyson sphere
- Trappist-1 system and its discovery
- Future space telescopes (WFIRST, JWST, (possible future ones: Origins, Luvor, Lynx, Habex)...))
- The Astro2020 Decadal survey
- The biggest star (we know of) or The farthest away galaxy (so far)
- Choose an exoplanet system to study
- The “Harvard Computers” — the women who mapped the stars
- Cepheid variables and their importance for distance (and/or the history of their discovery by Henrietta Swan-Leavitt)
- The discovery that the Sun is mostly hydrogen! (by Cecilia Payne-Gaposchkin)
- Using Type Ia supernovas to determine distances
- The Event Horizon Telescope — mapping the event horizon of our closest supermassive black hole!
- Why there is no minimum wavelength for light (and more fun in special relativity)
- Hawking Radiation
- Why do galaxies have spiral arms?
- What is a quasar?
- Why do we think that there is dark matter?
- Could the entire universe be a black hole?
- What are the largest scale structures in the Universe?
- Special relativity - how to “time travel”
- General relativity - how much did the movie “Interstellar” get right or wrong?
- So many more!!