

Term paper assignment — Astronomy 183 — Life in the Universe

Your term paper is due by November 24, 2009 – the last Tuesday before Thanksgiving.

You are required to write a term paper for this class. The assignment is very general: Choose a topic that we have covered in this class, do some further research to learn more about that topic, and write what you have learned. Alternately, you may choose some topic that is not covered in this class and *that is related to astrobiology*, research it, and write what you have learned. The goals of this assignment are for you to explore (further) some topic related to astrobiology; for me to learn about some topic related to astrobiology; and for you to practice writing about science. **Your term paper counts 20% of your final course grade.**

You must also turn in a **term paper proposal**. This is due **by Thursday, October 29**. This proposal should be no more than one paragraph (even a few sentences might be okay). You should propose what topic you will write about. It obviously doesn't have to be a polished paragraph or final idea, but it also should not be something you just wrote down on the way to class. I want you to have thought some about your topic and investigated it a little. It is **not** satisfactory to simply parrot one of my term paper suggestions for your proposal – it needs to be more in-depth than that. *On your term paper proposal, please include an email address where I can send you comments and approval of your topic.*

The term paper proposal is worth 5% of your total term paper grade. (This works out to 1% of your total course score.) Additionally, if you don't turn a term paper proposal in, you will have more work to do to finish a good paper! I will read, comment on, and approve (if appropriate) all term paper topics by Tuesday, November 1, perhaps sooner. If you like, you may certainly turn in proposals before the proposal due date.

Paper length. I am looking for 5–10 pages (double-spaced is okay). I will not grade specifically on length: a short, tight, good paper is better than a long, unfocused paper. However, a short, thin paper is not as good as a longer, more thorough paper. Please, please proofread your papers. I do not want to see papers with bad spelling, bad grammar, sentence fragments, or other mishaps. I expect college-level work on all fronts.

Below are some paper topic suggestions. Do not feel at all obligated to use any of these. You can also explore further any other idea or topic we have talked about in class, or research some other astrobiology-related topic that we have not covered in class – whatever you find interesting. Let your curiosity take over! Bear in mind that I am looking for you to move *beyond the material we have covered (or will cover) in class*. It is not sufficient to write only about things we have covered in class. Remember also that *your topic must be relevant to astrobiology* somehow. Lastly, don't be afraid of being critical of things you read!

Naturally, any source you refer to you will cite in your paper. Additionally, you should be cautious with web resources, and be skeptical. Lastly, it is not okay to use only web resources; you must use some non-web resources. Visit your local library – it is a friendly place. I also have a number of relevant books in my office; if something is missing from the library, I might have it.

Please note that I do not want a book report. I want you to think! And learn! I want you to learn something, and I want to learn something too.

I look forward to reading your papers.

Possible ideas for you to develop and use — you're not obligated to use any of these

- Do some more reading on the Miller-Urey experiment. What has Stanley Miller done since then that is relevant?
- Bad science web pages! Find several web pages that seem to be unscientific. Discuss and demonstrate how these web pages' material goes against scientific thought and/or the scientific method. Focus on the astrobiology aspects.
- Read and report on the book *Rare Earth*, especially the astrobiology implications of it. The library has this book, and I have a copy too.
- Research and discuss past, present, and/or future missions to Mars, their experiments, and their astrobiology components. You'll need to go beyond material that we cover in class, so come talk to me about what we'll cover later on in the semester.
- Research and discuss terrestrial biological extinctions. Pay particular attention to mass extinctions that were, or might have been, caused by impacts. Again, you'll have to go beyond material we cover in class, so come talk to me to see what is on the agenda for later on in the class.
- Discuss bioprospecting, especially of extremophiles. What is the relevance to astrobiology?
- Research and discuss habitable zones around stars and habitable moons of extrasolar planets. We'll cover this material later on too, so come talk to me to make sure you go beyond the course material.
- Research and discuss the various techniques being used to search for extrasolar planets. Discuss the advantages and disadvantages of these techniques in light of the search for life in the Universe.
- Do some further reading and research about rooting the tree of life, the techniques used, and the prospects for the future.
- Read and report on the book *Lifting Titan's Veil*, especially the astrobiology implications.
- Research and discuss Antarctica's dry valleys and the implications for astrobiology.
- Read and report on the book *Lonely Planets: The Natural Philosophy of Alien Life* and discuss the astrobiology implications of it.
- Read this paper: <http://arxiv.org/abs/astro-ph/0309415> and discuss the astrobiology implications. I can help you with some of the technical jargon.
- Research the modern arguments for and against panspermia. Make sure you go beyond the course material.
- Read and report on the astrobiology implications of *The quest for alien planets: Exploring worlds outside the solar system*.
- I have a number of other science and pseudo-science books in my office that deal with astrobiological topics. Feel free to come to my office and browse and pick a book you might want to analyze and write about. Alternately, feel free to browse in the library or bookstore to find books that are relevant that you might want to write about.
- Look back through the various web pages for the course material so far. Pick any topic that you like and research it more in an astrobiologically relevant direction.