While cosmology today includes the idea that roughly 21% of the Universe’s energy is in the form of dark matter, no one has ever found a particle of this mysterious substance. However, there are many ongoing experiments that are attempting to detect and/or explain dark matter in the Universe. In class, we read Jenny Hogan’s *Nature* article *Welcome to the Dark Side*, on the current status of the search for dark matter.

For this assignment, you will imagine that you are a scientist working on one of these projects. Funding is tight, but you’ve received an invitation to apply for a grant from a foundation. This foundation is funded by a very wealthy benefactor, who is not a scientist but is very interested in cosmology (in fact, perhaps this person has read some of the very same books you have for Astro 1109!). And money is no object -- IF you can convince this patron that your project is interesting, worthwhile, and most of all, worth the money.

**Write a proposal to use these private funds to continue/fund ONE search for dark matter.** Your proposal will explain to a nonscientist reader what dark matter is, and why it is important to discover its form (you may use Essay 4 to help you!). Then, you will describe your dark matter detection experiment, including information on who is involved with the experiment, how the experiment works, what forms of dark matter it would be able to detect or give us valuable information about, and what would be a successful conclusion to the experiment. Remember that funding proposals make specific requests; see the end of this sheet for some hints. You may choose from the following experiments: either the Large Hadron Collider, or the PAMELA satellite. I’d recommend PAMELA only for those of you with a physics background who are looking for an extra challenge or to learn something a little outside the scope of the class, but grading will of course be based on the same criteria for either option.

Your proposal may be written in the form of a letter written to the foundation, or as an essay. Bear in mind that while your reader is a nonexpert, as in Essays 3 and 4, this is an extremely formal piece of writing, so your tone and style will need to be different while still avoiding jargon, explaining scientific concepts, etc. Your proposal may also include images, but they may not take up more than one half of one page, and they must be cited and utilized properly (see Easy Writer, or me, for more details). For this **one essay only**, it would be appropriate to use sub-sections for each portion of the proposal if you so choose. However, bulleted lists are sometimes acceptable in proposals (as are other ways of not using full, formal sentences) but your essay should be written in paragraphs with full sentences and no bullets.
For the final assignment in this class, you will need to find your own articles to use as sources. To help get you started on this path, I will provide a bibliography of sources that you will use for this essay. Feel free to add or expand, but keep in mind that there are certain inappropriate sources (including Wikipedia) that you should not use. On March 5th, we will have a library session, and you will have the chance to find and download appropriate sources from the bibliography.

In your proposal, you must use parenthetical documentation and include a works cited page. This is the standard for proposals written in this field and many others!

We will have individual conferences to discuss this essay and any problems you may be having with it, over the week of March 9th (before spring break).

**Some hints on funding proposals:**

1. You want to convince your reader, above all else, that your project would be a great investment.
2. Proposals explain their scientific motivation. What is the underlying cosmological problem? What is dark matter? Why should your reader care about it and invest a large sum of money in looking for it? What is the **main goal of the project**, specifically? How does it help solve the dark matter mystery?
3. Proposals include a clear and concise description of the project. Why is your way the best way? What advantage does your dark matter detection proposal have over the competition?
4. Proposals make a specific request. What will you need as far as money, equipment, a team, and time to finish?
5. Often, scientists are proposing to funding agencies that are staffed by other scientists, such as the National Science Foundation (NSF) or NASA. This is not always the case; private foundations often offer money for fundamental research, but the boards/individuals who decide which projects to fund may have never heard of your field before. **For this essay, you are applying for funding in this type of situation.**