

Astronomy 401 Fall 2013 Guidelines for the Outline

The assignment due this week is:

Completion of an outline of the paper indicating major data and arguments which will be used, and how they will fit into the development of the major theme of the paper. The outline will be reviewed by the instructor and revisions made as necessary. Further changes may be warranted as the paper develops.

Some additional guidelines are in order.

The purpose of the outline is bring into focus the *structure* or framework of your paper. That is,

1. You will map out the *rhetorical* structure, that is, the *content* (observations, theory) you wish to cover, and the *order* in which it is presented.
2. In doing so, you will want to think about and indicate the *logical* structure of the paper—that is how the points you make, and the flow of your presentation work together to build a coherent argument.

To do this, your outline should mention, in order, each section that will appear in your paper. For each section, you should include a brief summary (1-3 sentences or enumerated entries should do it) of what the section will contain. You should also be sure to indicate (again, very briefly) how each section fits into the overall scheme of your paper—what it adds, how it flows from the previous discussion.

In very general terms, some common features of papers are as follows (you will want to compare this sketch with what you see in the papers you are reading).

- *Introduction.* This lays out the question(s) you'll be addressing, put them into the larger context of astrophysics, and give an indication of how your paper will address these questions.
- If your article is primarily theoretical, there usually a section which summarizes data. If it is primarily observation, there is usually a section which summarizes theory.
- *Methods.* Main techniques are discussed here.
- *Results.* Summarize the main results.
- Confrontation between theory and data appears either in the results or discussion section.
- *Discussion and Conclusions.* Discussion of what the new results teach us, and how models/theories are constrained/supported/ruled out on the basis of the data. Then there is some concluding discussion, summarizing what has been learned,

how this sheds light onto the larger picture mentioned in the introduction, and directions for future work. The conclusion section can be part of the discussion section but sometimes is separate.

Again, the sketch I have just made is a very generic one meant to help to begin thinking. It is not a rigid formula to follow slavishly, and you will want to modify it and specialize it for your own discussion, which will have its own peculiarities.

Some other tips:

- As noted above, the paper *must* include discussion of *both* theory *and* observation/experiment. The balance between the two depends on the subject, but always both should be addressed, and the paper should make clear how each illuminates and/or challenges the other. Also, it is always important to be clear about what are the data and what are interpretations of the data. That is, what do we actually observe, and how is that understood in terms of theory.
- Be sure to give the paper a *title*. You can change it later if you wish, but please do make one now, if you have not already. Also, please do indicate your authorship—i.e., don't forget to write *your name*.
- *Bibliography*. Please do include your bibliography—whichever papers were in the justification you gave last time, as well as any more you have found since. You need not cite them in the outline, but go ahead and include them as a working bibliography.

Citation formatting: please use the style of the Astrophysical Journal (ApJ), info about which can be found at the ApJ "Instructions for Authors" website, linked on the ASTR401 course webpage. Note that any ApJ articles you are using will naturally be in this style, so you can find examples there too.

If you have any questions, please don't hesitate to let me know.

Due date: Submit on Compass by Monday Sept. 23. It is *much* better to get something turned in than wait to give me something perfect. As noted in the assignment statement, I'll give you feedback if the outline needs fleshing out. If you have already turned in an outline, that's fine, but you can amend it if you want.