

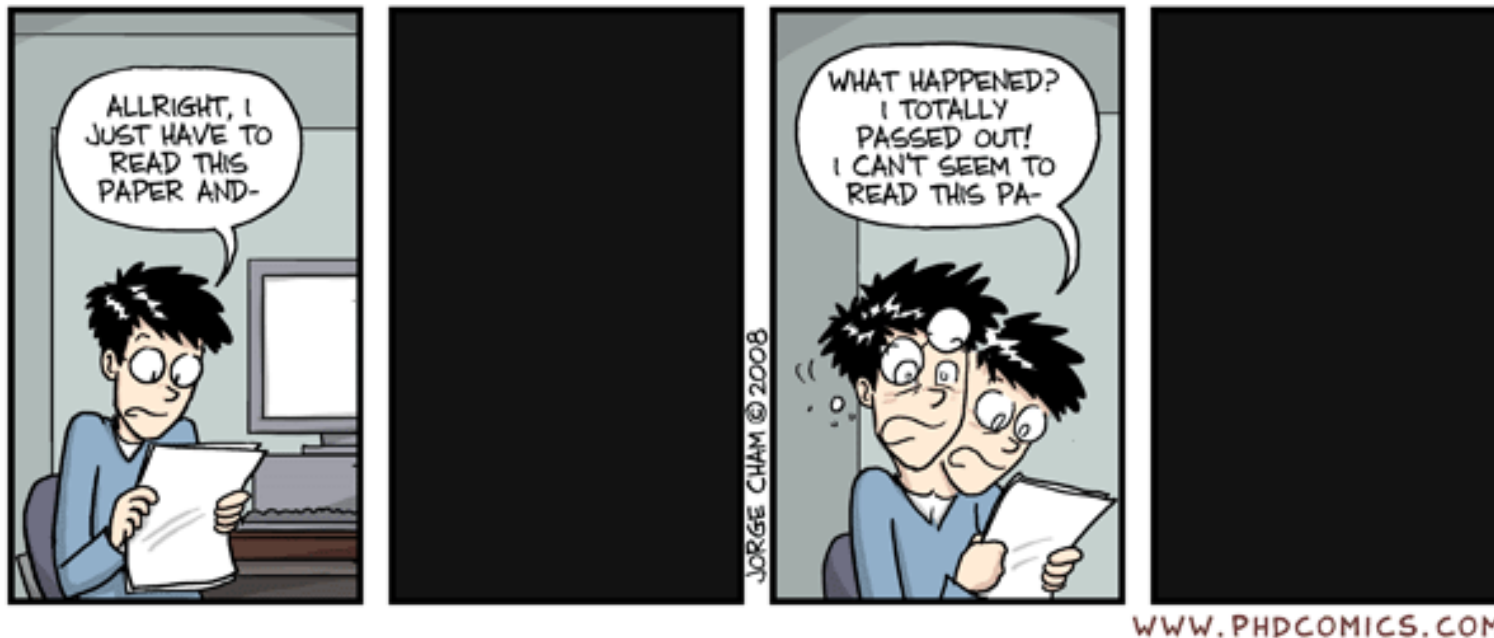
Reading Scientific Papers

In 8 easy steps!



Before we start....

- Realize that everything I tell you is only a SUGGESTION
- Use this as a guide, but feel free to try your own thing



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- Go to Search>Astronomy and Astrophysics
- You can search for different authors, title keywords, abstract keywords, etc
- **Pro Tip:** putting a “^” before an author’s name tells the system to look for papers where that person is the FIRST author

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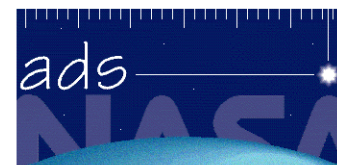
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(MM) (YYYY) (MM) (YYYY)

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General Suggestions

- Take notes and/or annotate
- Note of any words you don't know and **look them up**
- Be mindful of the meaning of words you think you know. For example, “significant” and “non-significant” have a very specific statistical meaning.
- Don't be afraid to use google/wikipedia as you go
- Make notes of important references as you go along so that you can look them up later.

General Structure of Papers

- Abstract
- Introduction
- Methods
- Results
- Discussion/Conclusions

The Abstract

- Really just an advertisement
- Gives a summary of the paper: the, problem, the experiment, and the conclusion
- Used mostly as a way to decide if a paper is what you are looking for
- Avoid reading the abstract in too much detail before you read the paper itself

Abstract MadLibs!!

This paper presents a _____ method for _____
(synonym for *new*) (sciencey verb)
the _____. Using _____, the
(noun few people have heard of) (something you didn't invent)
_____ was measured to be _____ +/- _____
(property) (number) (number)
_____. Results show _____ agreement with
(units) (sexy adjective)
theoretical predictions and significant improvement over
previous efforts by _____, et al. The work presented
(Loser)
here has profound implications for future studies of
_____ and may one day help solve the problem of
(buzzword)
_____.
(supreme sociological concern)

Keywords: _____, _____, _____
(buzzword) (buzzword) (buzzword)

The Introduction

- This is where all the background info is!
- **Step One:** Identify the BIG QUESTION

What is the problem being addressed by the entire field (or sub-field)?

- **Step Two:** Summarize the background in *five sentences or less*

What work has already been done?

What hasn't been done? (or what hasn't been done well enough?)

Why is this work important?

etc...

The Introduction

- **Step Three:** Identify the SPECIFIC QUESTION(S) being addressed

What exactly are the authors addressing?

How does it fit into the bigger picture question(s)?

- **Step Four:** Identify the approach being taken to answer the questions. Usually the introduction will give a brief overview of this.

Methodology

- **Step Five:** Understand as best you can the methods used by the authors to answer their questions.
- This can be very difficult. This section can have a lot of technical details.
- See if you can understand the reason behind each step the authors take in their experiment.

Results

- **Step Six:** Be able to summarize the results of the paper.
- This section is like a story that the authors are trying to tell you.
- Most of the information here should be contained in the figures
- **Step Six-point-five:** For each figure, be able to explain
1) what they are showing, 2) what conclusions can be drawn from them, and 3) what they add to the authors' arguments

Results

- **Step Seven:** Ask yourself, “did the authors succeed in addressing the questions they set out to answer?”
- What conclusions would **YOU** draw and why?
- Ask yourself this **before** you read the conclusion section

Discussion/Conclusions

- **Step Eight:** Read this section. Be able to summarize what the authors conclude and why. Do the author's conclusions make sense based on the data presented?
- Try to connect each conclusion made by the authors to plots or data presented in the "results" section.
- How are these results significant to the big picture question(s)?

Done!

- Hooray! You're done reading the paper!
- **Note:** This is not as linear as it sounds. Expect a lot of flipping back and forth between sections.

What now?

- Look up those references you made note of, then see step one...
- Read it again. Knowing the story already can allow you to catch things you missed before
- Look up papers that cite the one you just read