

Much ado about scientific papers

What kinds of scientific writing are there?

- All kinds, of course.
- Popular science writing (newspapers, magazines, popular websites, ...)
 - Audience is not knowledgeable to any significant extent in the particular area, often not in science at all.
 - Purpose is general interest
 - Details are few and often wrong
 - Rigor is approximately zero
- Journal articles
 - Original research reports
 - Scientists reporting on original (= brand new, no one has done this before) work they have done
 - Usually very narrow topic/single result
 - Usually written for people very well versed in a sub-discipline
 - This is the primary way results are communicated among most scientists
 - Peer reviewed
- Review articles
 - Expert in a field providing an overview of the current state of the field/topic
 - Broad
 - Often written for scientists in same discipline, but maybe not the same sub field (=slightly more general)
- Many more (books, textbooks,)

Why should you read a journal article?

- If you are working in a field, it's how you get relevant, rigorous, up-to-date info on what folks in the field are doing
 - Understanding
 - Idea generation— “hmm...I wonder what would happen if I did x instead of y...”
 - Improvement—I can make that measurement much better than they did using my technique
 - Correction—scientific knowledge is conditional. We expect folks to be honest and clear, but people make mistakes and corrections need to be made/results confirmed/checked

How to read a journal article?

- Who here has read a journal article on original research? Was it easy going?
- Often highly specialized/technical
- Often dense (page charges...)
- Often written poorly (various historical/human failing related reasons)
- Still, some simple steps will help immensely

Journal Article structure

- Many journal articles follow a fairly similar structure—this can help you read them
- Here's a paper—don't read it, just look at it.
- What do you notice first?
- What makes up the paper?
- What fraction of paper is figures/tables/graphs?
- What's the last part of the paper?
- What's the second last thing?

- <https://www.lib.purdue.edu/help/tutorials/scientific-paper>

General recipe

- Read abstract first
- Conclusions/summary second
- Figures/graphs (w. captions third)
- Introduction
- Methods/details **last**

- Will you be able to understand every paper you pick up using that approach? 'Course not
- Unless you are an expert in the field, there will always be some paper you just won't have the background to read.
- Happens to us all the time:

[New Kaluza-Klein instantons and the decay of AdS vacua](#)

Hiroshi Ooguri and Lev Spodyneiko

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By performing clever manipulations of complicated equations of motion, the authors obtain new instanton solutions of eleven-dimensional supergravity. These results support a previously proposed conjecture that all non-supersymmetric anti-de-Sitter (AdS) vacua must be unstable.

Should you start out with such a journal article?

- Probably not in general, but you should always follow the trail back to the original research that you find out about in other sources.