

WRITING A SCIENTIFIC ABSTRACT

UNDERGRADUATE RESEARCH IN COMPUTATIONAL ASTROPHYSICS



SIX EASY STEPS...

- 1. Background on topic**
- 2. State the problem**
- 3. Summarize why everybody else is wrong**
- 4. Explain why you can do it right**
- 5. Summarize what you will do**
- 6. Define the goal of your research**

INTRODUCTION

In one sentence, what's the topic? Phrase it in a way that your reader will understand. If you're writing a research proposal, your readers are the reviewers – assume they are familiar with the general field of research, so you need to tell them specifically what topic your research addresses. Same advice works for scientific papers – the readers are the peer reviewers, and eventually others in your field interested in your research, so again they know the background work, but want to know specifically what topic your paper covers.

STATE THE PROBLEM

What's the key research question? Again, in one sentence. Remember, your first sentence introduced the overall topic, so now you can build on that, and focus on one key question within that topic. If you can't summarize your research in one key question, then you don't yet understand what you're trying to write about. Keep working at this step until you have a single, concise (and understandable) question.

SUMMARIZE CURRENT STATE

Summarize (in one sentence) why nobody else has adequately answered the research question yet. Your proposal will have an entire section covering what's been done previously in the literature. Here you have to boil that down to one sentence. But remember, the trick is *not* to try and cover all the various ways in which people have tried and failed; the trick is to explain that there's this one particular approach that nobody else tried yet (hint: it's the thing that your research does). But here you're phrasing it in such a way that it's clear it's a gap in the literature. So use a phrase such as "previous work has failed to address...".

WHAT CAN YOU DO?

Explain, in one sentence, how you will tackle the research question. What's your big new idea? What do you have that nobody else has?



WHAT WILL YOU DO?

In one sentence, how will you go about doing the research that follows from your big idea. Will you run experiments? Build a piece of software? Carry out case studies? This is likely to be the longest sentence – after all you’re probably covering several years (weeks) worth of research. But don’t overdo it – we’re still looking for a sentence that you could read aloud without having to stop for breath. Remember, the word ‘abstract’ means a summary of the main ideas with most of the detail left out. So feel free to omit detail! This sentence might be an elaboration of sentence 4 – explore the consequences of your new perspective.

WHAT IS YOUR GOAL?

As a single sentence, what's the key impact of your research? Here we're not looking for the outcome of an experiment. We're looking for a summary of the implications. What's it all mean? Why should other people care? What can they do with your research?

In widgetology, it's long been understood that you have to glomp the widgets before you can squiffle them. But there is still no known general method to determine when they've been sufficiently glomped. The literature describes several specialist techniques that measure how wizzled or how whomped the widgets have become during glomping, but all of these involve slowing down the glomping, and thus risking a fracturing of the widgets. We propose a new glomping technique, which we call googa-glomping, that allows direct measurement of whiffalization, a superior metric for assessing squiffle-readiness. We describe a series of experiments on each of the five major types of widget. In each case we will measure the rate of googa-glomping relative to other techniques, and quantify the squiffliness of glomped widgets. We expect this new approach to dramatically reduce the cost of squiffled widgets without any loss of quality, and hence make mass production viable.

PROOFREAD, EDIT, REPEAT

Read your abstract all the way through:

- add transition words to tie ideas together,
- eliminate unnecessary content, add things that are missing,
- correct errors in mechanics, and
- proofread.

Content from Steve's blog: <http://www.easterbrook.ca/steve/?p=1279>

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