Quick guide to research

In just 1000 words...

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This is a short guide to help you get started on scientific research that will eventually be published. It provides some motivation, a suggested tool-kit and some more tips. This document is intended to be an open work-in-progress, so all feedback to improve it is welcome!

Writing

So you did some interesting scientific work, and the question looms in your mind: is it worth being published? The answer is a definite yes! Writing is the way to express your ideas in a way useful to other people. Your own personal learning is greatly impaired if you do not distill your work by putting it in writing.

Publication types

Not all publications achieve the same goals. The better and more mature your work is, the more people you want to find out about it. The following is a publication type list, ordered by increasing exposure:

- Technical report (for a course or for an internal project);
- Workshop paper;
- Conference paper;
- Journal paper;
- Book chapter;
- Book.

With greater exposure also comes greater scrutiny from peer reviewing, a process that helps authors meet the standards of their discipline and of science at large. This is good, because this means that someone else who knows what you are talking about will look at your work and critique it. Always try to learn as much as you can from a review, and do not take it personally if it is not as good as you expected it. You should be the first to know that there are always things to improve! Also, understand that your work will evolve. First try to publish in a workshop, then in a conference and finally in a journal or book.

Citing

Even if you never thought about it, your work is only possible because of previous work done by others. It is only fair to acknowledge their work by referencing it. In academic work keeping track of references is very important, because it tells how solid your work actually is. In your scientific publication you should only make two kinds of claims: ones that are substantiated by your work; and ones that are substantiated by someone else's work. This means that stating something like *"X is better than Y"* must be demonstrated either by your results or by someone you cite.

Reading

There are several reading modes when looking at a paper that might be interesting:

- Ultra-fast - read title and abstract, look at figures;
- Fast - read title, abstract, introduction, figures, conclusion;
- Normal - read all sections and check the most interesting references;
- Thorough - read everything and check all references.

Using the fast modes you can go through a pile of papers in no time, and then focus on the few that actually matter.

Structuring your paper

A typical paper outline is something like:

1. Introduction
2. Problem
3. Proposal
4. Evaluation
5. Conclusion
   a. Main contributions
   b. Future work

This is just an example. The ones that are always there are the Introduction and the Conclusion. At all levels - section, chapter, and paper – apply the rule of 3-tells: "tell what you'll tell; tell; tell what you have told" without being boring. This helps the reader keep their bearings.

In a longer work, like a dissertation, it can be helpful to do an early, preliminary version (think of it as a "trailer" for your "movie"). It should include a short state of the art with the core concepts, facts and, mainly, good references. State the goals of your work. These will be crucial to give a way to know if your dissertation is completed or not. We suggest the [Swales](#) approach:

- Establish the field in which you are writing.
- Summarize related research.
- Define a research issue.
- Provide the answers.
- Identify the structure of your writing.
- Complete your introduction.

Essential tools

References are important, but their value does not come without the cost of keeping track of them. So, the first tool to set-up is the reference repository. Keep a references file store. Assign unique and easy to remember identifiers to each publication (e.g. concatenate last name of first author with publication year). We recommend the BibTeX format and the JabRef software.

For the text processing itself use LaTeX. It is widely used, produces great looking documents that follow all guidelines and has built-in support for complex mathematical expressions. It is also great at generating your references list automatically! There are distributions for all major computing platforms like MiKTeX for Windows. Texmaker is an excellent editor.

If you don't want to learn LaTeX, you should! The learning curve is steep, but it is worth it. If you really don't want to learn LaTeX, use Word or equivalent using styles consistently (Title, Heading1, Heading 2, etc.) and always paste text without formatting. Word can be intuitive at first but without strict styles you can find yourself struggling with its formatting glitches. Another advantage of LaTeX over Word is that is allows you to focus on the writing and not in the layout.

More tools

Keep a shared calendar with your publication targets. List them by submission deadline because it's the date that matters to you as an author! You can find targets suitable for your work by looking at your own references and seeing where they were published. Your work will probably fit there too. Also check if it is a good target... you can tell by the sponsor list (look for ACM, IEEE, AAAI, etc.) and also if it is indexed by ISI Web of Knowledge.

Feedback

Feel free to email us with comments and suggestions. We look forward to hearing from you!

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Links

IEEE	http://ieeexplore.ieee.org
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Texmaker	http://www.xm1math.net/texmaker/
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