WRITING, PUBLISHING & PRESENTING YOUR RESEARCH
RESEARCH IS WRITING

"if you didn't publish it, it didn't happen"
STEPS TO PUBLISHABLE WORK

1. Frame your work in the context of related research.
   • Study the hierarchy of papers on recent similar research. Read lots of papers, and read the references cited by those papers. Prepare a dossier of prior work on your topic.
   • Practice active reading: how would you repeat the described research? When appropriate, actually repeat activities that have relevance to your work.
   • Identify and rank venues for conference and journals papers in your research areas. Prepare a table of upcoming conferences, their locations and their deadlines. Set goals; plan your research work around
STEPS TO PUBLISHABLE WORK

• 2. As you begin your work, write the introduction to a paper.

  • Plan the expected sections and results that are needed to make a good paper.

  • Conduct your research as needed to fill in the paper's sections.

  • Actually do the research -- a paper can't just be a list of hopeful ideas. You need concrete results. In other words, you publish what you've done, not what you're going to do.
3. Step through multiple review/revision phases with your co-authors.

- Make sure everyone has a chance to review and edit your work. Your first revision should be done early in your research work, because it may affect the direction of your activities.

- Check all of your work for correctness and completeness. Accept serious critical review from your peers.

- Anticipate objections. There must be something you didn't check, some test you didn't perform, some design step that you avoided, or some alternative that
STEPS TO PUBLISHABLE WORK

• 4. Submit your work for formal peer review.

  • Deadlines are firm.

  • Reviews usually take one to four months.

  • Conferences will provide one to three reviewers, journals may provide five reviewers. They will all make recommendations and give detailed criticism.

  • Usually you must satisfy all reviewers' complaints before your work can be published. Be prepared for a lot of editing and additional research steps.
STEPS TO PUBLISHABLE WORK

5. Respond to reviewers and revise your paper.

- For conferences, you will be asked to make certain revisions, but these are usually "on-your-honor" and will not be reviewed a second time.

- For journals, you must prepare a detailed point-by-point response outlining how you satisfied each of the reviewers' concerns.

- In some cases, a reviewer's complaint may be incorrect. You may argue your case in the response, but be cautious. Usually you must persuade the reviewer to change his mind before your work can be
TYPES OF JOURNAL ARTICLES

• **Letters and notes**: short articles, from one to four pages. Includes minimal details and one-paragraph literature review. Mostly focused on results. Bibliography includes only most recent, relevant papers.

• **Briefs and correspondence items**: also short, up to five pages. A slightly longer literature survey (three paragraphs), more details, still heavy on results. Bibliography is larger but not more than a page column.

• **Full papers**: up to 15 pages, depending on journal. Usually include author biographies and photos. Literature review is more comprehensive, may span one or more pages. Significant, repeatable detail is
• Full papers are usually preferred because they represent a complete body of solid work.

TYPES OF FULL PAPERS

• There are three types:

  1. Original research. The paper must be filled with your own novel work and considerable new results on a problem, method or design.

  2. Review/survey paper. This type of paper provides a summary of the most important recent work in an area. These papers are often invited and written by someone already recognized in the area. They are good to read and well-cited, but don't plan on writing one of these (yet).

  3. Tutorial. Similar to a review article, a tutorial paper
• Any conference paper should be written as a prelude to a larger journal article.

• Conference papers are short, 4 to 6 pages. A journal paper may contain results from multiple previous conference papers by the same authors.

• **Self-plagiarism:** The journal paper cannot cut-and-paste from previous conference publications. The journal article must add substantial new results beyond what appeared in your conference papers. You must cite your previous conference publications and explain what is new in the journal paper. You may include a tutorial survey of your past work, but it cannot stop there.
1. The basic theory and a small demonstration with simulated results.

2. A more complex demonstration with practical applications and simulated results.

3. An analysis of optimization and tradeoffs using the new method.

- These conference papers may be merged as a foundation for a new journal paper. The new paper may include:
  - A detailed review of the methods and results published in the three previous conference papers.
  - To satisfy the requirement for additional content, you may produce an actual hardware demonstration with
• Most papers are written using MS Word or LaTeX.

• I strongly recommend LaTeX.

• The IEEE has an excellent LaTeX template that can be used for both conference and journal papers.

• Get a book on LaTeX, and use a specialized editor such as:

  • LyX (all platforms, highly recommended)
  • Emacs with TeX mode (*nix)
  • WinEDT (Windows)
  • TeXshop (Mac)
PAPER ORGANIZATION

• Abstract

1. Introduction

2. Review of key theory and methods

3. Design details

4. Results

5. Discussion

6. Conclusions
ABSTRACT

• State the problem, identify the novelty, and state the results.
INTRODUCTION

• Detailed problem statement, including application areas that may benefit from solving the problem.

• Brief review of literature. Describe any of the author(s) previous papers on the topic, and state what is new about this paper. Why should someone read this paper?

• Preview the paper's organization.
• Here you can provide a tutorial review of any previous conference publications.

• Define any important terms and symbols. Summarize any algorithms or methods to be used.

• If you are using well-known methods and standard symbols, then you may omit this section.
DESIGN DETAILS

• The paper's novelty usually lives in this section.

• Here you are doing something different from everything published before. Explain what it is.

• If writing a full paper, try to provide enough information for your design to be repeated by a competent professional, without filling up too much space.
RESULTS

- Evaluate, measure and quantify your design in every way that is conceivably relevant.

- Provide reference results for designs that use alternative or standard techniques. Your design should be demonstrably better (or else your paper won't make it).
DISCUSSION

• Here is where you make arguments, give interpretations, and speculate about disagreements between predicted and measured performance (there is often not a perfect match).

• Benchmark: Compare your design's performance against the reference design, and explain how yours is quantitatively better.

• Note: You can't just say your design is better. It has to actually be better.
• Avoid bitmapped formats.
  • BMP
  • GIF
  • JPG
  • PNG

• Use vector formats
  • EPS (with latex)
  • PDF (with pdflatex)
PREPARING FIGURES

• Make sure your EPS or PDF files have fonts that are both **embedded** and **subset**.

• IEEE publications will not accept articles that fail to meet this requirement.

• On Linux, you can test this by using the "pdffont" command.

• On Windows there is an official method to test compliance using the Adobe Reader.
PREPARING FIGURES

• Software that is known to produce compliant figures:
  • Xfig (linux)
  • Omnigraffle (Mac)
  • Matlab (but not always...)
  • The Mac "Preview" application can convert non-compliant EPS files to compliant PDF files.

• Any others?
PREPARING FIGURES

• Figures should generally be made in black-and-white.

• Plots should use symbols and line-styles (not colors) to distinguish curves.

• All plots should be prepared with identical dimensions (width and height) using the same tool. Generate plots using a script. Adjust plot settings within the script, not manually, so that they can be correctly reproduced during later revisions.

• Some applications are designed just to produce good plots (e.g. the "Plot" application for the Mac). These can be very useful for preparing controlled, high-quality,
• A good bibliography manager will save your life.

• If using Word, there are several expensive options like EndNote which will help keep your citations organized and numbered.

• If using LaTeX (which you should be), you should use BibTeX to handle automatic numbering and formatting of your bibliography. There are also several free BibTeX database managers:
  
  • JabRef (java-based, runs anywhere)
  
  • BibDesk (a Mac application; I mostly use this)
COLLABORATING

• The best work usually comes from two or more authors.

• Co-authoring can be difficult, especially if there are several authors.

• One approach: each author is responsible for a different section. The lead author is responsible for making the sections flow together smoothly, and for matching the style in different sections.

• Another approach: each author contributes something to each section. This requires passing the document around from one author to the next.
USING REVISION CONTROL

• LaTeX is very much like a programming language.

• When authoring source code, we commonly use revision control software like SubVersion to manage simultaneous edits by multiple authors.

• SubVersion can also be used for LaTeX files. It is able to merge edits from multiple authors working on the same file.

• If you know how to use SubVersion, it can really speed up the process of editing with several co-authors.