How to Write and Publish an Experimental Research Paper

Where to Publish?

- Scientific journals
- Conferences and workshops
  - Conference proceedings
  - Posters
  - Talks
- Books
- Book chapters
- Technical reports
- Seminar presentations
- Popular science magazines

Scientific Journals

Publications in scientific journals

- are the most effective way to inform the scientific community about your work,
- are scientists' most important productivity outcomes (measure for hiring, tenure, promotion),
- rely on anonymous review by peer scientists,
- involve a long delay from submission to publication (often > 1 year, sometimes 2 years),
- May require several (serial) submissions to different journals if rejected.

Impact Factor

In a given year, the impact factor of a journal is the average number of citations to those papers that were published during the two preceding years.

For example, 2003 impact factor:

A = # of times articles published in 2001 and 2002 were cited by indexed journals during 2003.

B = total number of "citable items" (articles, reviews, proceedings) published in 2001 and 2002.

2003 impact factor = A/B

Impact Factor

Publications in journals with high impact factors are thought to be more prestigious.

Examples:

Nature: 31.4
Vision Research: 2.1
Typically, impact factors > 1 indicate "good" journals

A better measure of the impact of an individual publication may be the number of journal citations that it receives.

However, note that a weak paper could be cited by many other publications that point out its flaws.

Conferences

Publications in conference proceedings

- are a faster way to disseminate research findings (usually about 6 months from submission to publication)
- use an accelerated peer-review system with no substantial revisions before publication,
- are thought to be less prestigious than journal publications,
- can still be important in disciplines such a computer science, where fast publication is crucial.

How to Write a Research Paper

Most experimental research papers have a very similar structure, the parts of which will be discussed in the following slides.

They greatly differ in their length – conference papers are often shorter (5-8 pages) than journal papers (10-15 pages).

However, some journals also accept short papers of 4-8 pages with an accelerated review process so that important findings can be published quickly.

Please look at the example paper on the course homepage (6-page conference paper).

(1) Abstract

- Every paper starts with an abstract of about 100 – 150 words.
- The abstract is important, because people read it to decide whether they want to read the entire paper.
- The abstract also appears in electronic databases such as pubmed.gov.
- Therefore, some effort needs to be put into writing the abstract.
- Tip: Write the abstract after writing the actual paper so that you know precisely what you want to emphasize.

(2) Introduction

- The introduction should start with a literature review about related research, with many citations of other researchers' work (and possibly your own).
- Then you need to motivate why you did your study and why it is significant, i.e., adds new, important knowledge to the field.
- You should "tell a story" that readers can easily follow and understand why the study was conducted.

(3) Method

Describe in detail what you did, e.g.:

- **Subjects:** Number, age, gender, patient groups, etc.
- **Apparatus:** Specifications of devices used in the study
- **Materials:** Displays, sounds, movies, etc.
- **Procedure:** Instructions for the subjects, sequence of stimulus presentation during a trial, sequence of trials, etc.

Often, if a study includes multiple experiments, each experiment gets its own Method section.

(4) Results and Discussion

- Required for each reported experiment
- Can be separate sections, but a combined section is easier to follow
- Present all measurements together with their statistical analysis
- Interpret each result, i.e., describe what it means with regard to the "story" that you are telling.

(5) Conclusions

- If only one experiment is reported, this section should be titled "General Discussion" instead.
- Complete the "story" that you have been telling: What do the results tell us?
- Speculative interpretations of the results can also be included, but must be indicated as such.
- Explain which important questions have not been answered yet.
- You could include an outlook on further research that you think should be conducted.