How To Get Your Systems Paper Accepted?

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Why Does It Matter?

Scientific writing

One of the most important things that you learn as part of your PhD

- In your career, you'll be writing *emails*, *research reports*, *technical specifications*, *whitepapers*, *patents*, *blogs*, *client presentations*, ...
- Crucial to communicate your ideas to other people—only that much can be done orally
- You want your papers to get rejected because of the *science* and not the *presentation* (eh, wait...)
  - Aim to always get the comment: *"this is a well-written paper"*

Quality of writing improves with practice, ie write and get feedback

Caveats

- My personal views/opinions/pet peeves acquired over the years
- This will not get your paper accepted every single time
- Some variation is good

Overview

Presenting Your Research

Keep the reader interested

- Not just a report of what has been done
  - Distributed systems research is not maths or physics
- Always explain why certain decisions were made
- Keep the momentum in the paper

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Make the research accessible

- You don't want the reader to work hard to understand your work
- Always follow a **top-down** presentation
- Clearly state your contributions
- Figures and examples are your friends

Writing Style

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Avoid **any** repetition

- Readers who read sections back to back will notice it
- Feels condescending to reader (goldfish memory?)
- Although you want to restate key points/message with additional detail

Structuring your Content

Structure your outline before writing

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Example structure

- *Motivate problem*
  - *The Internet crashes without wibble*
  - *Billions of dollars are lost and we will all die*
- *Key idea*
  - *Implement wibble as part of each Internet router*
  - *Can be done within the existing switching plane*
- *Detailed contributions*
  - *Describe the wibble algorithm*
  - *Explain interactions with switching plane*

Grouping Content with Paragraphs

Paragraphs

Paragraphs are essential to structure your material—use them!

- Each paragraph should express a single *thought*, *point*, *argument*, ...
- First sentence of a paragraph is important: **lead sentence**
  - Should contain the message of the paragraph or summarise it
  - Start with high-level overview and then provide detail
- Make sure your paragraphs are balanced in length

A single paragraph spanning an entire columns is not a good idea!

Grouping Content with Sentences

Sentences

Control the length and complexity of your sentences

- Don't complicate sentences needlessly—shorter is better
- Long sentences are hard to parse
- Don't start every single sentence with an adverb:

  "Therefore, [...]. However, [...]. Although [...]."

- Avoid breaking the flow by using *parenthesis* or *footnotes*

A single sentence spanning an entire paragraph is not a good idea!

Choice of Words Matters

Scientific Language

Use precise and formal language—every single word should add to the meaning

- Readers **will** notice hand-wavy language—you can't sweep issues under the carpet
- Always define *terms*, *abbreviations* and *variables* before using them
- Be consistent in the choice of words:
  "the system" vs. *"the prototype"* vs. *"our architecture"* vs. *"our approach"*

Words To Avoid

Avoid informal/unscientific words

- Don't use contractions: *it's*, *don't*, *aren't*, ...
- Don't use words that convey your judgement: *very*, *bad*, *poor*, *fortunately*, *unusually*, *clearly*, *excitingly*, *it should be noted*, ...

Avoid "weasel words"

- Don't use words that are vague or ambiguous: *rather*, *arguably*, *relatively*, *often*, *probably*, *some people*, *many*, *in most respects*, ...

Common Mistakes

That vs. which

"That" is defining but *"which"* is non-defining:

- *"The wibbles that are easy to implement are based on lists."*
- *"The wibbles, which are easy to implement, are based on lists."*

- Be careful about what *"it"*, *"this"*, *"that"*, ... refers to
- Avoid using *etc.* unless the other items are obvious
- Spell out numbers less than ten

Spell-checking & proofreading

You should **never** have spelling errors—always run a spell-checker before submission

Figures

Figures and text should be self-contained on their own

- Make sure that each figure is referred to and explained in the text
- Readers should be able to skip figures without missing content
- Refer to line numbers in pseudo-code

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Captions

- Two schools of thought:
  1. **Descriptive captions**: *"Throughput of the Wibble Prototype"*
  2. **Message caption**: *"Wibble has a higher throughput than a centralised message server."*
- Ensure consistent capitalisation of captions (either way is fine)

Graphs

- Plots should have more than one line but less than 4–5 lines
  - Readers like to compare things
- They must be readable when printed in black and white
- It should be easy to see what the main features of a graph are

General Paper/Thesis Structure

1. Abstract
2. Introduction
3. Background/Related Work
4. The Meat
5. Evaluation
6. (Related Work)
7. Future Work & Conclusions

It's fine to deviate a little bit based on your material

Abstract

- Should be self-contained
- Can't be too long; short is good
- Should encourage the reader to read on
- Think about its structure

Abstract template

Problem/Motivation	*(1–2 sentences)*
Solution (Key idea)	*(1–2 sentences)*
More detail on contribution	*(2 sentences)*
Some evidence (eg evaluation results)	*(1–2 sentences)*

Introduction

- Make the reader **excited** and keep them **interested**
  - Cut to the chase
- Should be summary of entire paper
- Write first and then revisit at the end

Introduction Structure

Introduction template

1. *Context/Motivation*
2. *Problem*
   - *Why this is a hard/open problem?*
   - *State-of-the-Art*
3. *Key idea/insight*
   - *Solution overview/some detail (bigger picture)*
4. *Summary of research*
   - *Details of contribution*
5. *Evidence of successful solution (eg evaluation results)*
6. *Summary of contributions*
7. *Paper outline*

It's fine to vary some parts

Background

- Anything the reader needs to know to understand the contribution
- Provide more detail on the problem
  - Include some quantitative evidence that illustrates problem or key idea
- If there is lots of related work, discuss related work early to differentiate your own work

Careful

- Do not take **momentum** out of the paper
- Do not bury your **contributions** here

Related Work

- Make sure that you include all relevant work
  - Always easy to get rejected based on missing citations
- **Compare/contrast** with your own work—don't just enumerate
  - Don't be dismissive
  - Refer to references by author or project names:

    "Skywalker et al. [1] propose ...."
    "Wibble [2] is a system ...."

  - Avoids reader having to consult bibliography to understand [1]
  - It's not *"related works"*, always *"related work"*

The Meat

- Divide this into 2–3 sections
  - eg "Design/Architecture" and "Implementation" details
  - ... but avoid generic section titles
- Start with high-level overview of solution (**top-down**)
  - Give the reader the bigger picture first
  - Figure with overview of system architecture works well
  - Roadmap helps as well
- Give examples and make them consistent (eg a *running example*)

Evaluation

Choice of experiments

- Think carefully about what the experiments are supposed to show
- What questions will the reader have?
- Discuss all results and draw relevant conclusions

Evaluation template

1. *Evaluation goals*
2. *Evaluation methodology*
   - *Overview of experiments*
   - *Evaluation metrics*
3. *Experimental set-up*
4. *Experiments*
5. *Discussion of key insights*

The Rest

Future Work & Conclusions

- Can be separate sections
- Emphasise the key results of the work
- Conclusions not just summary—try to draw insightful conclusions

Bibliography

- Make sure entries are listed consistently

Layout and Type-setting

Golden Rule

Make your layout choices consistent!

Why Does It Matter?

- Raises confidence in the quality of the work
- Authors paying attention to layout details will also pay attention to scientific details

LaTeX Pet Peeves

Use protected spaces (~) to avoid bad line breaks

- `Figure~\ref{fig:arch}`, `Section~\ref{sec:intro}`, `Wibble~\cite{wibble11}`, ...
- `4~MB/s`, `10~nodes`, ...

Type-setting multi-character variable names in math mode

- `$varname$` $\Rightarrow$ *varname* (effectively typeset as $v * a * r * \ldots$)
  - compare to `$v a r n ame$` $\Rightarrow$ *varname*
- Instead use `$\mbox{varname}$` $\Rightarrow$ varname

Type-setting numbers and units

- In general, don't put numbers in math mode
- Math mode: 42 vs. text mode: 42
- Units always use roman font: use `\mathrm{...}` or `\mbox{...}`

Resources

[a] *"The Elements of Style"*, William Strunk Jr. and E.B. White. Macmillan Publishing Co., New York, 1979.
`http://www.bartleby.com/141/strunk5.html`

[b] *"Writing Technical Articles"*, Henning Schulzrinne
`http://www.cs.columbia.edu/~hgs/etc/writing-style.html`

[c] *"Tips for Writing Technical Papers"*, Jennifer Widom, January 2006
`http://infolab.stanford.edu/~widom/paper-writing.html`