

How to write papers and give talks that people can follow?

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1 Introduction

The goal of research is to communicate your ideas. However, it's not easy to write papers and give talks that people can follow. This document is a summary of the talk by Derek Dreyer on how to write papers and give talks that people can follow at CMMRS 2024.

As a researcher, you have to do three things mainly:

- Do research
- Write paper
- Give talks

We will focus on the last two points and see how to do them effectively.

1.1 Writing papers

When you write, the ideas really crystallize.

Sometimes, you may think you just lack the technical sophistication to understand the paper. But, it's not you, it's the paper.

Benefits of writing a good paper: People will enjoy reading them, will learn something, papers get accepted to top conferences.

The curse of knowledge: Once you know something, it's hard to imagine what it's like not to know it.

Principles: Based on how readers process information. **Book:** *Style: Toward Clarity and Grace* Norman Ramsey Course on Technical Writing. **Talk** by Simon Peyton Jones on how to write a great research paper.

1. Sentences and Paragraphs:

- (a) Flow: Be clear how each sentence and paragraph is related to the previous one.
Old to new: Begin sentences with old information, end with new information: Create link to the earlier text. Also places new info in position of emphasis (natural tendency as the focus is towards the end).
 - (b) Coherence: Should be clear how each sentence and paragraphs relates to bigger picture.
One paragraph, one point: A para should have one main point expressed in a single point sentence.
Theorem-proof model (start with theorem and explain about it/provide evidence).
 - (c) Name your baby: Give unique names to things and use them consistently.
 - (d) Just in time: Give information precisely when it is needed, not before.
 - (e) Short subjects: Subject of sentence should be at most 8 words long.
2. Structure of the research paper: Program Committee is diverse (your reviewer might not be "experts"). Review period is short (often 1 day to review a paper).
 - (a) Top-Down: Explain your work at multiple levels of abstraction.
Start with the big picture, then zoom in on the details.

- (b) Tell them what they want to know: How is your work important? How is your work novel? How is your work interesting?
- (c) A Structure that works:
 - i. Abstract (1-2 para, 1000 readers)
 - ii. Intro (2-4 pages, 100 readers)
 - iii. Key Idea (4-6 pages, 50 readers)
 - iv. Technical Meat (8-12 pages, 5 readers)
 - v. Related Work (1-3 pages, 100 readers)
- (d) Abstract/Intro: Follow CGI model: Context (set the stage, motivate the general topic), Gap(specific problem and why existing work doesn't adequately solve it), Innovation(what have you done that's new and explain how it helps fill the gap)
- (e) Key Idea: Use concrete illustrative examples. This forces you to have a takeaway (something interesting), many readers only care about the takeaway and not technical details and even for those who want the technical details, the key ideas are still useful as "scaffolding".
- (f) Related Work: It goes at the end of the paper. Give real comparisons, not a laundry list.

2 Giving Talks

How is it different from writing papers? You have a lot more attention from the audience than you do from the readers of your paper.

Entertain your audience: Keep them engaged. Put on a show.

1. What is your main goal in giving a conference talk? To get people to read your paper? No, talk \neq paper. The main goal is **give people positive feelings** about you and your work!
2. How is a conference talk different from a paper? Conference talks are great advertising for you and your paper. But there are minus side too:
 - You can't say much
 - Your audience is diverse - may or may not care about your work
 - Even those who care will easily get lost
 - Slides are a visual medium
3. Main parts of the talk (20 mins): Intro (8 mins), Key Idea (11 mins), What else is in the paper (1 min)
4. Stage the motivation: First get to a problem (general version of the problem: 2mins), then get to the problem. Motivate and explicitly state your specific problem.
5. Tell what you did: State your contributions! Follow immediately with a crisp statement of your key ideas (take home message for the audience).
6. Flow and Coherence
7. Visual medium: You have a visual medium, use it well. Make it clear where to look! Make it focused. Smooth animations, changing slides
8. How to make your slides interesting:
 - Don't put a lots of text on slides just so they are readable independently of what you say. Instead, use slides to illustrate what you are saying. Use slides to show pictures, diagrams, animations, etc. Use slides to show the structure of your talk.
 - Vary the look of your slides: Some text-only are fine, but if there are too many, it gets boring and people fall asleep.

General tips: **Rehearsal** is also very important. Rehearse a lot. Use keynote presentation note but don't be too dependent on it because Murphy's law.