

How to Read

SSL Professional Development Talk

by Tim Wood

Research Papers

Why do people write research papers?

For the glory

- Lets other people learn your great ideas

For the future

- Makes a lasting record of an idea

For themselves

- Writing a paper crystalizes your ideas

Why Read?

Why should you read papers?

To keep up with your research community

- Shows you what **problems** others think are important

To inspire your own work

- Find better **solutions** by leveraging other smart ideas

What to Read?

Papers from the top conferences in your field

- Browse the program once it is available
- Look at previous years to understand what types of papers are accepted there

Papers that are cited frequently

- Find the authors that repeatedly appear in your bibliographies

Old papers that are the basis for your field

- Becoming easier to find with things like google scholar
- Ask your advisor for suggestions

How do *you* read...

A novel?

A magazine?

A research paper?

Phase 1: Skim

- 1) Read the abstract and introduction
 - Highlight each contribution they claim
- 2) Look at the title of each section/subsection
 - Guess what it will be about, but don't read it carefully
- 3) Examine the figures and tables
 - Understand what metrics they will evaluate
- 4) Read the conclusion and any parts that stand out

You now know:

- Paper type: theoretical, modeling, implementation, measurement
- The main goals of the paper
- What evaluation the authors think is important

Abstraction

What to do if you don't understand something?

Read more background or related work

Treat the idea/tool/algorithm/theorem as a **black box**

- What are the inputs?
- What are the outputs?
- What is the overall goal?
- You may not need to understand the details of how it does these

Practice time!

Randomly pick a paper

Read for 10 minutes

Discuss with group for 5 minutes

Phase 1: Skim

What do you know?

What do you not yet know about the paper?

Phase 2: Understand

From skimming you know **what** they have done

Now read the paper to understand **how** and **why**

- Skip non-essential implementation details, proofs, etc.

Make notes as you read

- Summarize main points
- List questions you have
- Circle references that you need to look at for background

You now should clearly understand the problem and the proposed solutions

Phase 3: Critique

The goals of reading a paper:

- Learn about new tools/problems/algorithms
- Critique the paper's science
 - Not its grammar or figure colors, unless you are a reviewer

Third phase: judge the paper's details

- Skip the background that you have already read
- Analyze the assumptions being made
- Consider how you would solve the problems and compare
- Think about what is missing (evaluation, assumptions, proofs...)

(This can be combined with Phase 2 once you have enough practice)

Read a lot

Practice will let you read more efficiently

Knowing the strengths and weaknesses of other papers will help you improve our own ideas

Knowing the hot problems in your community is crucial for guiding your own research

- Most papers don't fully solve a problem or don't solve it perfectly!

Set yourself a goal:

- Skim 3 papers a week and pick one to read thoroughly
- In a year you will know the basic idea behind 150 papers!

Be Organized

Have a scheme to manage the papers you read

- If you can remember all of them, you aren't reading enough
- Ideas cycle; 5 years from now you may want to recall an old one

I use Zotero

- Browser plugin + application
- Imports/exports bibtex
- Stores PDFs
- Searchable, tagable, notable, shareable

How to cheat

Discuss papers with others

- Find someone else who has already read the paper
- Explaining a paper is the best way to really understand it
- You should have at least done a Phase 1 skim through the paper

Watch conference presentations

- Some conferences now post videos of all sessions
- Warning: a conference presentation does not give all the details!

Read conference reports

- Some conferences provide summaries of papers
- *Usenix Login* magazine has these every few months (free online)
- A good way to find which papers in a session are worth reading

Reviewing

As a PC Member:

- 5-10 papers to review (depends on conference)
- PC meeting in person or online to discuss and produce final rank

As a student helping your advisor:

- Given one paper to look at
- Limited context of what other submissions are like
- May not know the relative quality of this conference

How to Review

Purpose of a review:

- A judgement of a piece of work to decide whether to accept it
- A way to formalize your thoughts on a paper so you can discuss it more clearly and efficiently
- A chance to give feedback to the authors

Contents of a review:

- Summary of paper and its contributions
- List of strengths and weaknesses
- Specific comments: novelty, completeness, correctness, evaluation, grammar, style

Tone: be gentle, constructive, and detailed

How to write your own paper...

if your readers and reviewers are going to follow a reading process similar to this?

How to Write

Make incredibly clear:

- Problem statement
- Contributions
- Outline of approach
- How you fit relative to related work

Most of your readers will only skim the paper

Learning to be a good writer will make a big difference on your career

- but it's hard, and I'm not really sure how to teach you

Summary

Reading is important!

- Skimming is better than not reading
- Reading and understanding papers in your area is crucial

3 Phase Approach:

- Skim to understand the purpose and overall approach
- Read to understand details of how they solve the problem
- Critique the contributions to understand their limits, flaws, or potential to affect your own work

When you write, remember that your readers are busy, bored, lazy, both stupider and smarter than you