How to Read and Write a Research Paper?

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Why to write a paper?

- Publish or perish :(
- Writing is still the best way of scientific communication
- They are a lasting reference
- Stand up on the shoulders of the giants
- Papers improve your visibility
- Good papers build your reputation over time
- Bad papers harm your reputation

Literature Review

- You need to read hundreds of papers
- It is a good habit to be selective on what you read
- There is different levels of reading:
  - Just looking at the title/abstract (Searching)
  - Skimming main results, checking figures and conclusion (Focusing)
  - Reading full paper, saving for future reference (Understanding)
  - Printing in paper, reading many parts, highlighting important parts (Being Critical)
- Use online tools
  - **IEEEXplore**
  - **Google Scholar**
  - **Mendeley**

IEEEXplore

- Know how to search
- Author/Journal Search
- Limit with years
- Aim for high quality review papers in the early stage of your research
- Travel to the past: References of a paper
- Travel to the future: Citing papers (great way to find newest articles)

Google Scholar

- Patent search is also possible
- Indexes more journals than IEEEXplore
- Great way to follow an author
- Set up a Scholar Alert to get notified of new papers!

Learn Academic Publishing Terms

- Citation
- Reference
- H_{index}
- I_{index}
- SCI, SCI-E,
- Journal Rankings
  - Scimago
  - Clarative

How to Write a Paper?

Before you even start:

- What is your message? What point are you making?
  Most papers should make a single point.
- Why is this message important?
  Why should the reader take his precious time to read your paper?
- How are you going to make your point?
  What experiments can you run? What theorems can you prove?
- Has this point been made before?
  How is your contribution different from what has been said a thousand times before?

Writing Process: 1st Draft

- Find a distraction free area/time
- Write the paper outline first (just the section, short descriptions)
- Write the first version in pencil
- It is ok to write some parts in Turkish
- Don’t stuck in a sentence, just move on
- Aim to write the main structure, never mind the figures, equations etc.

Writing Process: 2nd Draft

- Only get to the PC screen once you finish the paper version
- Write down the sentences (in LaTeX but don’t bother compiling)
- Make sure the paragraphs and sentences are complete
- It is ok to have blank sections
- Write down the equations
- Don’t put the figures/tables yet, but think for each figures content and place

Writing Process: 3rd Draft

- Put the figures and tables in place
- Now you can start editing the appearance of the paper
- Write the abstract in this version
- DO Spell check! (There is also spell check in LaTeX)
- Read the sentences loud.
- Get a printed copy and edit your sentences with pen
- Find a friend to read your paper and tell you what he/she understood
- Then send it to your supervisor for check

Main Structure

- Tell them what you're going to tell them, tell them it, then tell them you've told them it.

- Break your text into edible chunks, and make them into sections, subsections or subsubsections as appropriate.

- Use numbered units as much as possible, to make it easy for the reader to identify parts of your text.

The Title

- The title should be as informative as possible and yet not too cumbersome or too long.
- Give an answer to why the reader should read your paper
- Avoid mathematical equations
- DUAT: Do not use acronyms in titles.

Abstract

- Some people will only read the abstract, so keep it informative
- Abstract is the place you convince reader to read the rest of your paper. You need to SELL your paper
- Usually around 200 words, no more than 350 words
- A short summary of your paper (including main results)
- Preferably a single paragraph, or two paragraphs at most
- DUAA: Do not use acronyms in abstracts

*One or two sentences providing a **basic introduction** to the field, comprehensible to a scientist in any discipline.*

*Two to three sentences of **more detailed background**, comprehensible to scientists in related disciplines.*

*One sentence clearly stating the **general problem** being addressed by this particular study.*

*One sentence summarising the main result (with the words "**here we show**" or their equivalent).*

*Two or three sentences explaining what the **main result** reveals in direct comparison to what was thought to be the case previously, or how the main result adds to previous knowledge.*

*One or two sentences to put the results into a more **general context**.*

*Two or three sentences to provide a **broader perspective**, readily comprehensible to a scientist in any discipline, may be included in the first paragraph if the editor considers that the accessibility of the paper is significantly enhanced by their inclusion. Under these circumstances, the length of the paragraph can be up to 300 words. (The above example is 190 words without the final section, and 250 words with it).*

During cell division, mitotic spindles are assembled by microtubule-based motor proteins[1,2]. The bipolar organization of spindles is essential for proper segregation of chromosomes, and requires plus-end-directed homotetrameric motor proteins of the widely conserved kinesin-5 (BimC) family[3]. Hypotheses for bipolar spindle formation include the 'push–pull mitotic muscle' model, in which kinesin-5 and opposing motor proteins act between overlapping microtubules[2, 4, 5]. However, the precise roles of kinesin-5 during this process are unknown. Here we show that the vertebrate kinesin-5 Eg5 drives the sliding of microtubules depending on their relative orientation. We found in controlled *in vitro* assays that Eg5 has the remarkable capability of simultaneously moving at ~20 nm s^{-1} towards the plus-ends of each of the two microtubules it crosslinks. For anti-parallel microtubules, this results in relative sliding at ~40 nm s^{-1}, comparable to spindle pole separation rates *in vivo*[6]. Furthermore, we found that Eg5 can tether microtubule plus-ends, suggesting an additional microtubule-binding mode for Eg5. Our results demonstrate how members of the kinesin-5 family are likely to function in mitosis, pushing apart interpolar microtubules as well as recruiting microtubules into bundles that are subsequently polarized by relative sliding. We anticipate our assay to be a starting point for more sophisticated *in vitro* models of mitotic spindles. For example, the individual and combined action of multiple mitotic motors could be tested, including minus-end-directed motors opposing Eg5 motility. Furthermore, Eg5 inhibition is a major target of anti-cancer drug development, and a well-defined and quantitative assay for motor function will be relevant for such developments.

Introduction

- Give the background information
- Present existing work (literature review)
- Describe the motivation and research question of the paper
- Convince the reader the work is necessary and novel
- Prepare the author for the research method

Main Text

- Make your research papers easy to skim by using meaningful section headers, bullet points and simple figures.
- Use descriptive figures and tables
- Don’t be afraid to repeat information
  - Repeat the main test/simulation parameters in figure captions
  - Repeat acronym definitions
  - Emphasize main outcomes in different sentences

General Tips: Don’t Forget Editing

- When you think you’re done, read your work aloud to yourself or a friend.
- Find a good editor you can trust and who will spend real time and thought on your work.
- Try to make life as easy as possible for your editing friends. Number pages and double space.

General Tips: Minimalism

- Use minimalism to achieve clarity.
- While you are writing, ask yourself: is it possible to preserve my original message without that punctuation mark, that word, that sentence, that paragraph or that section?
- Remove extra words or commas whenever you can.

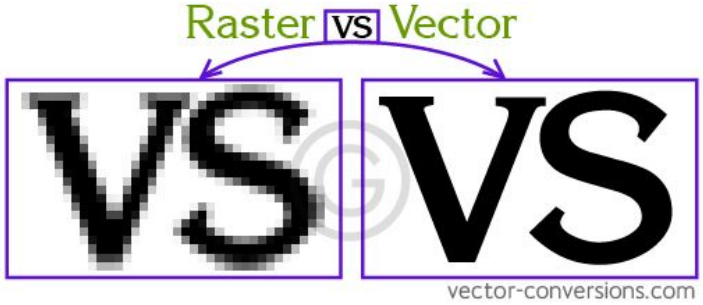
Common Mistakes: Format

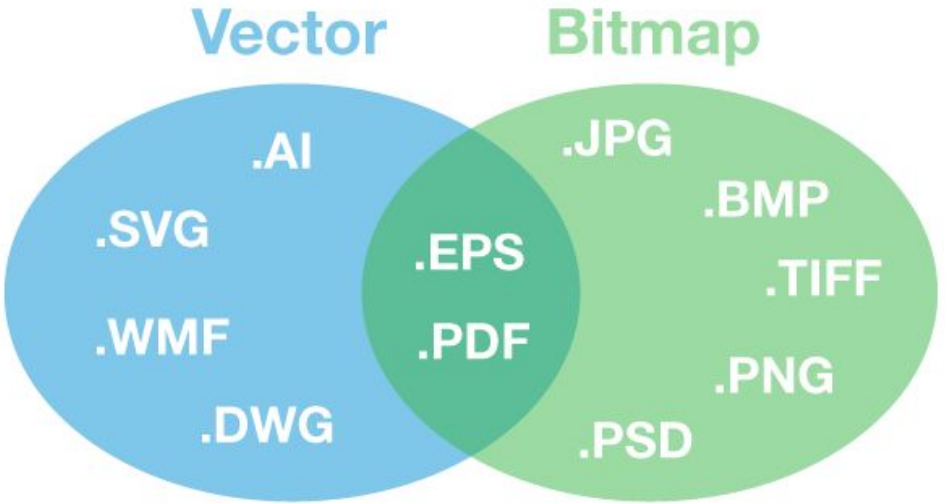
- Avoid widows and orphans in your paragraphs.
- Do not use low resolution images
- Do not use screenshot to capture data
- Use vector file formats (.eps, .svg, .pdf) for graphs, line drawings etc
- .jpg files are only for photos
- Keep the source files in case the reviewers want some modifications
- Do not use unnecessary adverbs and adjectives:
    - Remove every “Very” in your sentences

Common Mistakes: Figures

- Do not use low resolution images
- Do not use screenshot to capture data
- Use vector file formats (.eps, .svg, .pdf) for graphs, line drawings etc
- .jpg files are only for photos
- Avoid unnecessary lines and borders in your graphs. Keep ink to data ratio low
- Keep the source files in case the reviewers want some modifications
- Use consistent fonts, sizes, colour codes across your figures
- Use a template matlab file for journals. There are lots of examples online

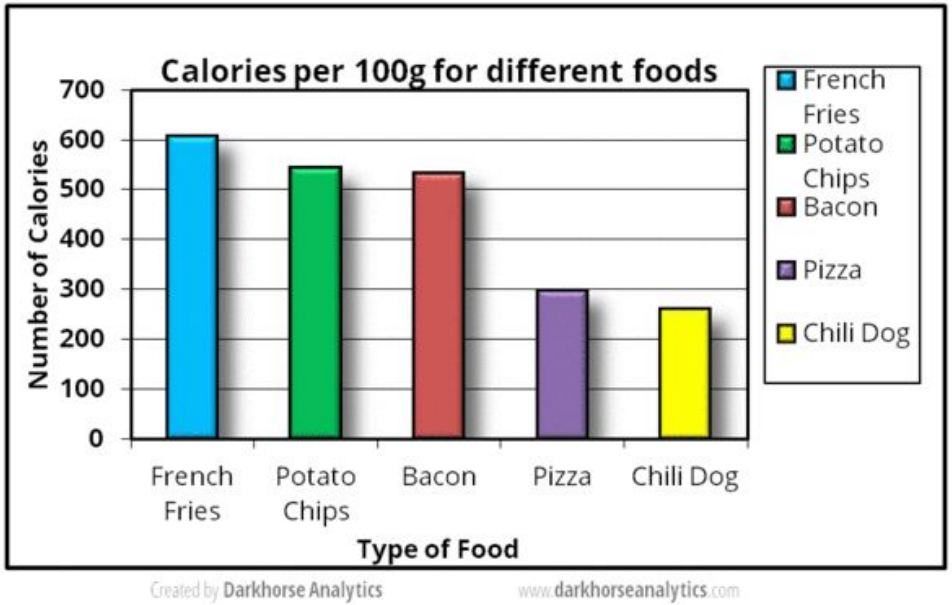
Common Mistakes: Figures



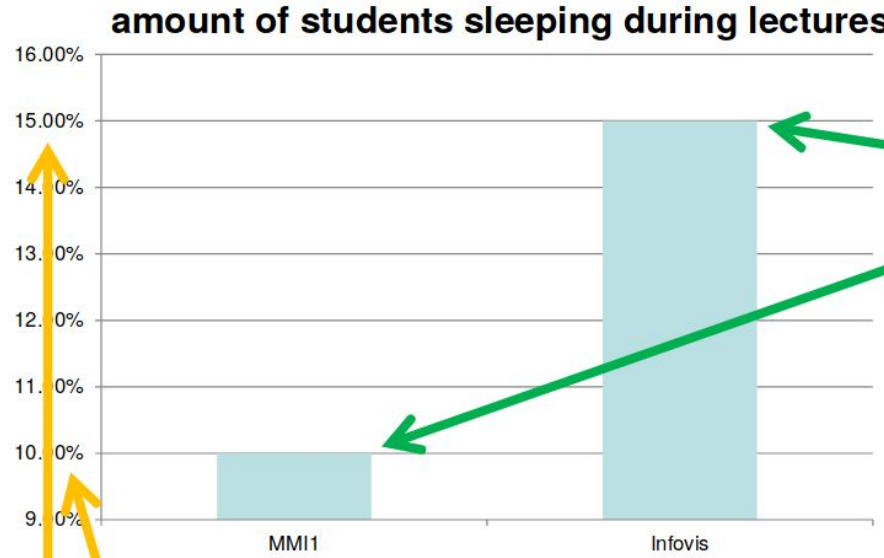


- Avoid unnecessary lines and borders in your graphs.
- Keep ink to data ratio low

Remove redundant labels



Beware of Lie Factor



size of effect in graph

$$\frac{|6-1|}{1} = 5$$

$$\frac{|15-10|}{10} = 0.5$$

size of effect in data

$$\textit{Lie Factor} = \frac{5}{0.5} = 10$$

Common Mistakes

- Using .etc is not good in papers
- Never use e.g. and i.e at the beginning of a sentence
- E.g. is short for “exempli gratia”, which means “for example”
- I.e. is short for “id est”, which means “in other words”
- Use quotes properly: “Bla Bla”
- Using .etc is not good in papers

Common Mistakes

- Avoid sentences in the form of “An X is Y”
  - BAD:Using .etc is not good in papers
  - Bad: An important method for internal sorting is quicksort.
  - Good: Quicksort is an important method for internal sorting, because. . .

  - Bad: A commonly used data structure is the priority queue.
  - Good: Priority queues are significant components of the data structures needed for many different applications.

Common Mistakes

- Use verbs. Not unnecessary words
  BAD: We made use of categorization
  Good: We categorized
- Don’t use unnecessary long numbers. Learn about significant digits
- Avoid UA (useless acronyms).
- Use only acronyms for words that repeat several times in the paper
- Use Figure references properly
  - BAD: The figure above shows...
  - GOOD: Fig-13 shows...

Common Grammar Mistakes

- Learn the differences between that, which and “,which”
- “That” Clauses Are Restrictive/Essential
- “Which” Clauses Are Nonrestrictive/Nonessential (Need comma)

    - The classrooms [that were painted over the summer] are bright and cheerful.
    - The classrooms, [which were painted over the summer], are bright and cheerful.

General Tips: Avoid Long Paragraphs

- Limit each paragraph to a single message. A single sentence can be a paragraph. Each paragraph should explore that message by first asking a question and then progressing to an idea, and sometimes to an answer. It’s also perfectly fine to raise questions in a paragraph and leave them unanswered.
- The words, sentences, paragraphs and sections are the needlework that holds it together. If something isn’t needed to help the reader to understand the main theme, omit it.
- Use lists, bullet points to make your paper more readable

General Tips: Avoid Long Sentences

- Keep sentences short, simply constructed and direct.
- Concise, clear sentences work well for scientific explanations.
- Minimize clauses, compound sentences and transition words — such as ‘however’ or ‘thus’ — so that the reader can focus on the main message.

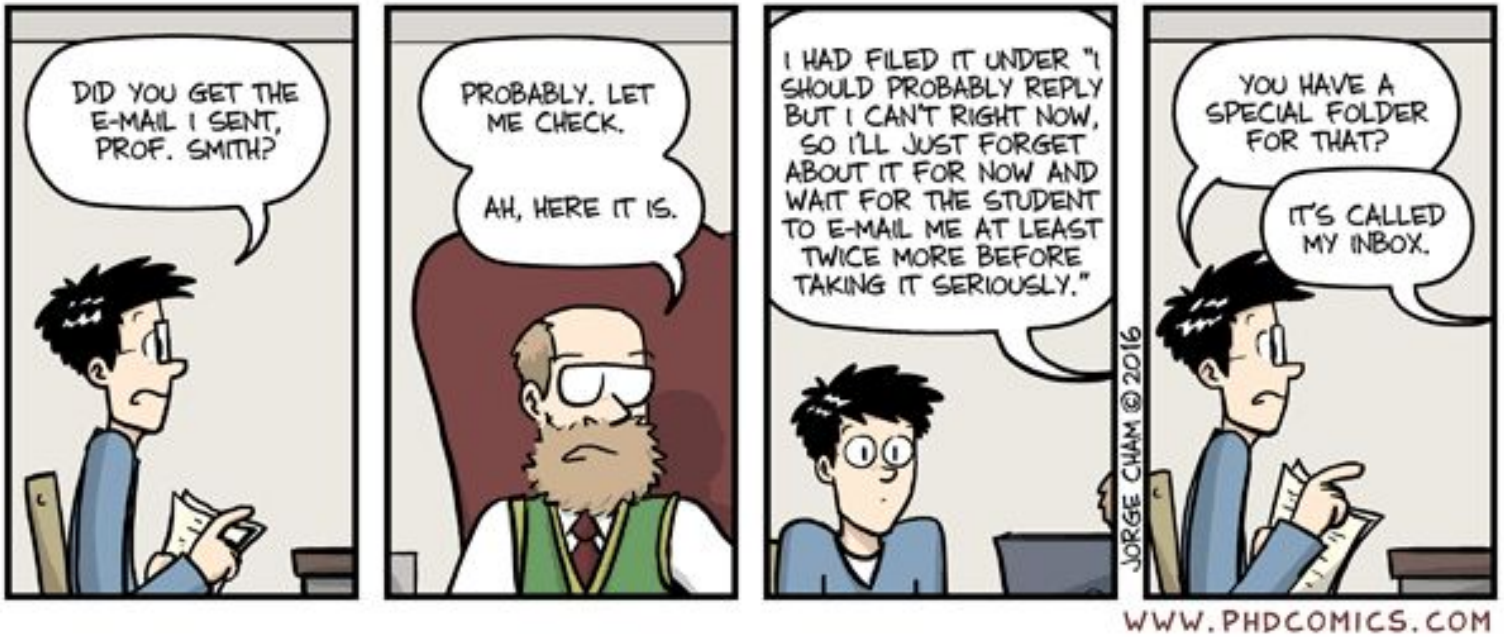
Common Mistakes

- Do not use unnecessary adverbs and adjectives:
  - Remove every “Very” in your sentences
- Be precise in your comparisons
  - BAD: “Method A is much better than method B.”
  - GOOD: “Method A is 60% faster than method B.”

  - BAD: “The speed of test A depends on X.”
  - GOOD: “Test A is faster when X is larger.”

  - BAD: “Algorithm A might be the best approach.”
  - GOOD: “Algorithm A is fastest in all our tests.”

Sharing it with your supervisor



Microsoft Word (Meh)

- I keep pressing SPACE until the text is aligned
- I keep pressing ENTER to start a new page
- I adjust the space manually
- I write figure numbers manually
- I put my references manually

Microsoft Word (Meh)

Use a Bibliography Management Tool

- Mendeley
- Zotero
- EndNote
- JabRef

LaTeX

- **Benefits of LaTeX**
- **Word vs LaTeX**
- **The beauty of LaTeX**
- **Why LaTex is better than Word?**

LaTeX Tips

- Start with online tools (e.g. Overleaf)
- For your thesis compilation in your PC is faster
- Use a separate .tex file for every chapter and keep a main.tex for compilation
- Use unbreakable space with units: Not 3T, Not 3 T, but 3~T
  In Word it is (ctrl + Space)
- Don’t compile your document every few minutes, you can deal with the format later, focus on the context
- Start a new line at each sentence. It is very quick to skim later on for version control

Quick Tips for LaTeX Newbies

- LateX Tutorial
- LaTeX for Beginners
- LaTeX Basics
- Beginners Tutorial
- LaTeX for Beginners
- LaTeX Mathematics
- Detexify

"FINAL".doc


FINAL.doc!
FINAL_rev.2.doc
FINAL_rev.6.COMMENTS.doc
FINAL_rev.8.comments5.
CORRECTIONS.doc
track changes
FINAL_rev.18.comments7.
corrections9.MORE.30.doc
FINAL_rev.22.comments49.
corrections.10.#@$%WHYDID
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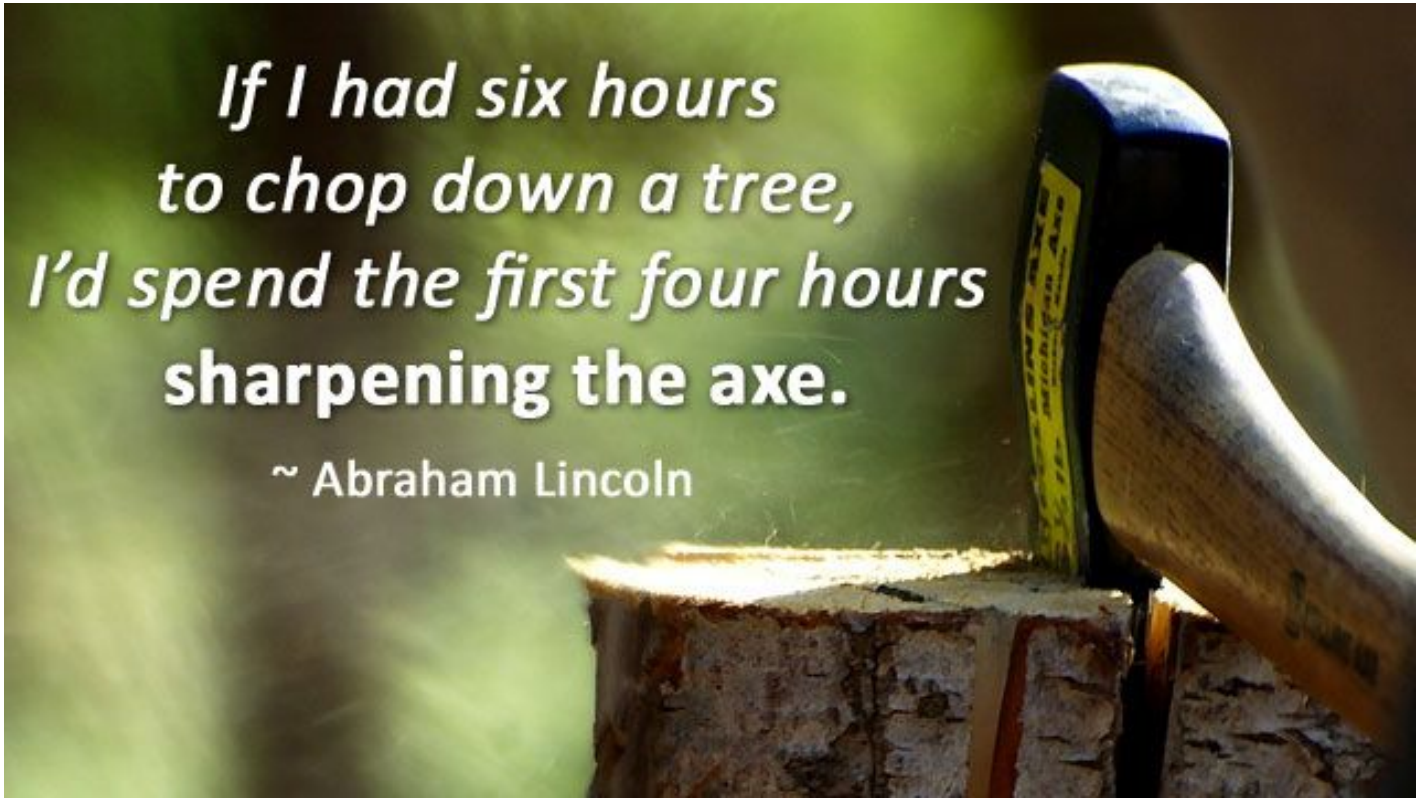
Version Control

- **Versiyon Kontrolü nedir?**
- **Sürüm kontrolü hakkında**
- **Versiyon Kontrol Sistemi Nedir?**
- **A Visual Guide to Version Control**

Useful Links

- My Website: http://keysan.me/tips
- My Website: http://keysan.me/is500
- Write an effective research paper
- Grammar Exercises
- How to read a paper?



- You can access this presentation from: http://keysan.me/presentations