



The University of Texas at Austin  
Cockrell School of Engineering

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# STARTING TIPS: WRITING/REVISING A PAPER

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Wang Materials Group Meeting Tutorials

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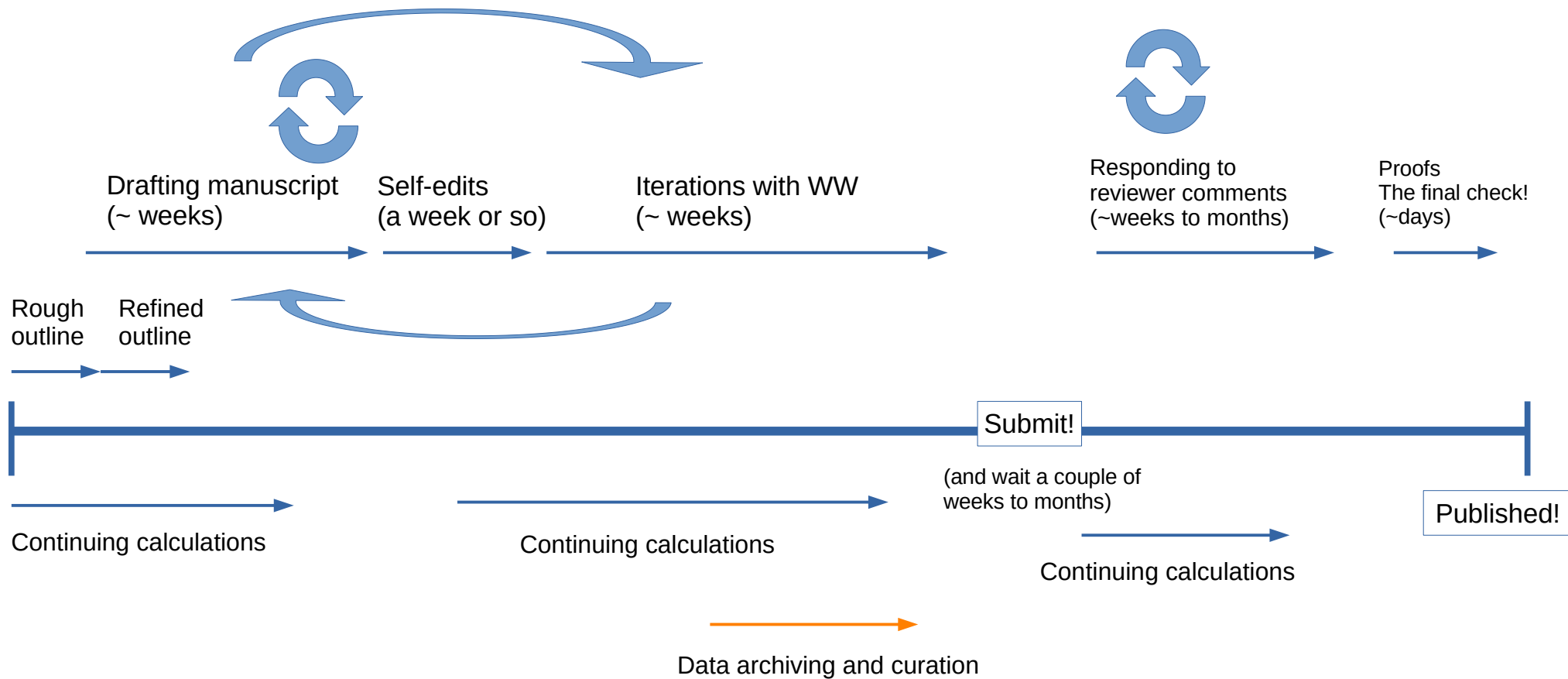
You have spent the last few months  
collecting and analyzing a bunch of data.

# What now?

Write a paper!

\* for the sake of description, this presentation will break a WW cardinal rule of minimal text on a slide

# An example timeline



# Make an outline

- Helps to see the overall flow of the paper and how each section flows into the other
- **An outline makes it easier to see whether the paper flows logically**
- Structure according to how you would write a paper (see following slides)
- Imagine the figures that would be included
  - Include a caption for better visualization
  - Made a figure that doesn't quite flow with the rest of the paper? Consider putting it in the Supplementary Information (SI)
- For each figure, what is the thing or set of things you want the reader to understand?
- Your goal is to clearly communicate that main point(s) of what you learned/did and present a convincing case using the data
  - Anything that detracts from this should be moved to SI, taken out, or addressed in a future paper

Journal Publication =  
**communication** of scientific results

If a complete stranger with  
reasonable background in the topic  
area were to read your manuscript,  
would s/he understand  
the **flow of logic**?

# Understand the anatomy of a paper

**Abstract:** self-contained, main message, make sure abstract is consistent with flow of main paper; often is only part people will read

**Introduction:** set up the motivations and setting

**Methods and Approaches:** what and how you did the research

**Results/Discussion:** detailed analysis and presentation of results; contains interpretation of results

**Conclusions:** self-contained, main message, not a repeat of abstract; often is the second-most frequently part people will read

See also, e.g., :

<https://www.elsevier.com/connect/infographic-how-to-read-a-scientific-paper>

<https://www.elsevier.com/connect/11-steps-to-structuring-a-science-paper-editors-will-take-seriously>

<https://web.stanford.edu/class/ee384m/Handouts/HowtoReadPaper.pdf>

Whiteside's: Writing a paper <https://onlinelibrary.wiley.com/doi/10.1002/adma.200400767>

Strunk & White, Elements of Style <https://www.amazon.com/Elements-Style-Fourth-William-Strunk/dp/020530902X>

# You don't have to write in the order something is presented

**Abstract:** map out early, but often useful to write last

**Introduction:** coincides with your literature search

**Methods and Approaches:** often is easiest part to write

**Results/Discussion:** describe your figures (low barrier to writing) and then interpret them (more nuanced and will take more iterations to refine);

**Conclusions:** write around the same time as abstract, but separated temporally to avoid repetitive phrasing



# Understand the anatomy of a paper

Tips on writing the **Abstract**:

- Follow word or character count limits, usually 1-2 paragraphs
- If in doubt, look at examples in the literature for how to structure
- Condensed, concentrated, self-contained version of paper
- Often helpful to write last
- Approximate structure (will also depend on the type of paper!)
  - 2-3 sentences of background- what is the paper about and why is it important?
  - 1-2 sentences of methods- what was done and how?
  - 2-3 sentences of main findings
  - 1 sentence of conclusions

# Understand the anatomy of a paper

Tips on writing the **Introduction**:

- Set the stage
- Cite most salient old literature and most relevant current literature
- Make sure to cite any prominent (and still relevant) authors who have published or are actively publishing
- What is the motivation for the paper?
  - Knowledge gap? Conflicting interpretations? Lack of something?
  - Why is this study important (scientifically, technically, methodologically, ...)
- Preview what the paper is about
  - What are some things that
  - Depending on the paper, it may make sense to dedicate a paragraph to how the paper is structured

# Understand the anatomy of a paper

Basic anatomy of the **Introduction**:

- Opening sentence: something that the reader may not know
- Set the stage
  - What is the context?
  - Why is this an important problem?
- Current knowledge – key citations here
- Gap in knowledge/lack of something
  - What are the challenges/controversies/conflicts/gaps in knowledge?
  - How are these addressed with this paper?

# Understand the anatomy of a paper

Tips on writing the **Methods**:

- Write what you did and how you did it
  - Include codes, versions, relevant calculation parameters
  - Relevant input parameters
  - Any assumptions made
  - This will also be present in the archived data for the paper
    - Workflow and scripts preserved
- Often where equations are included (but not always!)
- Sometimes the bulk of methods goes to the SI

# Understand the anatomy of a paper

Tips on writing the **Results**:

- Describe your figures- no part of the figure should be extraneous
  - Side note: a figure in paper may be relatively dense with information (but still clear); **however, that same figure cannot and should not be directly translated to a presentation**
- As you collect and refine data, put yourself in the position of the reviewer and pre-empt any potential questions s/he may ask
  - What is your justification for the methodology, data analysis?
  - What other information (e.g., another calculation, a literature result) would confirm or validate your result?
  - Are the other potential interpretations of the data possible?
  - Sometimes you do not need to explicitly include anything to pre-empt something the reviewer may bring up, but it is good to have it on hand

# Understand the anatomy of a paper

Tips on writing the [Discussion](#):

- The interpretation and physical significance
  - Why was this result important?
  - What was learned from this result and the potential impact?
    - A new mechanism, a different result from the literature?
    - Connect back to motivations of introduction
  - What is the significance of this result?
- In general: Be ambitious in the data collection/analysis/research but conservative in interpretation; do not speculate!!
- It is ok to say something is outside the scope of the current paper and will be a topic of future investigation, but it must make sense within the context of the paper.

# Understand the anatomy of a paper

Tips on writing the Conclusions:

- Should be a standalone summary of the paper
- Is often the section that people will read after the abstract before delving (or deciding to delve into) the rest of the paper
- What are the main points to learn from this paper

# Useful tips and tools

- LaTeX- often templates available from journals
- grammarly
- BibTeX, Zotero- reference management
- See Figure Making tutorial for tools related to making figures
- Maybe ChatGPT- but be careful here!
  - ChatGPT is a language model, meaning its output looks plausible but may or may not be true!



# In the writing process

- Keep timely communication with **\*all\*** co-authors
- Establish your own process (**group wiki**)
- Do multiple passes of edits
- Ask others to read your draft
  - A wider variety of people = wider variety of feedback

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# In the writing process

# Bigger items to check

- Overall flow of paper
  - Does the text flow logically? Are there appropriate transitions?
  - Is it appropriate for the journal?
- Correctness of the data collection and analysis
  - Have you processed all parts of the data correctly?
  - What other types of calculations are still waiting? Will these affect the overall conclusion?
- Ambiguous or unspecific sentences
  - Something is large, small, etc. → Quantify that and compare
- Equations
  - Correctness of form
  - All variables are described
- Correct Acknowledgments of funding/computer hours!

Avoid generalities

Always ask yourself  
when writing,

Can I make this  
statement more  
specific?

# Smaller (but still important) items to check

- Grammar and spelling: some common errors
  - Run-on or overwordy sentences
  - Unspecific demonstrative pronouns (“this”, “that”)
  - Hyphens between two words that are both adjectives
  - Subject-verb agreement
- Correct citations in place (e.g., correspond to correct reference)
- Figures, tables, equations, sections are appropriately numbered and correctly referenced
- Author names and affiliations are correct and up-to-date
  - May need to collect ORCIDs
- A polished paper communicates carefulness to the reviewer!

# Data curation and archiving

- **F**indable **A**ccesible **I**nteroperable **R**eusable (FAIR) data principles
- See minimum working example of data curation: [group tutorial](#)

# Iterations with WW

- We will track internal edits using an external (rich text) document
- This is useful for very detailed discussions that cannot be resolved with a quick edit
- **Comments file template** (\*.docx, \*.odt)

# Submitting a paper

- Think about what journal to submit to
  - Look to your references and literature for example journals to submit to
- Make a list of potential reviewers (discuss with WW as well)
  - Contact info, brief sentence as to why s/he would be an appropriate reviewer
- Different journals appeal to different audiences and serve different purposes
  - Review journals
  - Software journals
  - Methodology journals
  - General topic area, e.g., PRB
  - Rapid dissemination, e.g., letters and communications



# Submitting a paper

- To actually submit a paper, you will need:
  - Cover letter to editor (send a draft to WW)
  - Pdf version of the manuscript
  - Editable version of the manuscript
  - (sometimes) separate high-resolution versions of figures
  - Authors names, emails, affiliations
  - (often) publishing agreement
- This can take a couple hours to do, surprisingly

# Responding to Reviewers

- Group wiki
- Be courteous, acknowledge good things the reviewer identifies
- Understand that often times, the reviewer knows nothing of your project but usually has domain-specific knowledge
- Imagine a tired and stressed reviewer reading your paper (relatively quickly, i.e., in a couple of hours at most) late at night after a long week
- Answer exactly what the reviewer asking
- Answer reviewer comments point by point, and include the changes made to the manuscript- make it easier for the editor and reviewer to see what has changed in the manuscript
- An example (internal group Box)
- Many journals have an option to make reviewer comments public
  - e.g., Nature
  - Another example