



From Research to High-Impact Publications

Francesca Cavallo (she, her, hers)

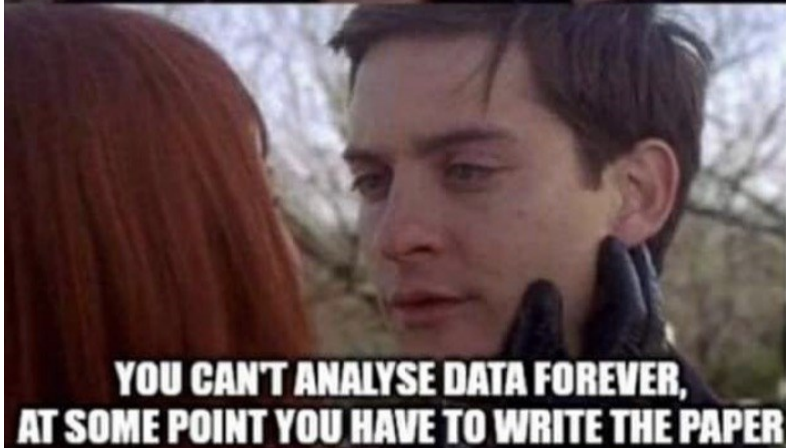
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<https://sites.google.com/view/cavallo-research-group/home>

<https://chtw.unm.edu/>





Why should you
publish your
research?

Why Should You Publish Your Research?

Altruistic Motivation

- To advance a field or create new fields.
- To put your research into a larger context.
- To facilitate applications of your research.
- To help the public in understanding a research question.

Self-interested Motivation

- To earn Intellectual credit, recognition, prestige.
- To advance your career as you are considered for academic appointments and promotions.
- To establish you as an expert in your field of knowledge, which is useful when applying for a grant, a high-profile job in industry/labs, and a green card.

Plan and Execute Research with Publication in Mind

- Create a stack of slides to keep track of your research goals and your results.
- Write down your research objectives and hypothesis on the first slide.
- Take a comprehensive set of high-quality data.
- Maintain a well-organized logbook.
- Prepare figures ASAP after you have taken the data.
- Include the figures in your slides.
- Include screenshots of the first page of relevant publications in your slides.

When is the Right Time to Publish?

When is the Right Time to Publish?

When you have enough data to put together a good story

How can you find that out?

- Reevaluate your research goal/questions.
- Have a compilation of your most significant data ready.
- Survey the literature and determine whether your results advance knowledge in your field.
- Ask yourself: *“What is the key message of your paper?”*

If you can't articulate the key discovery or accomplishment in a single sentence, then you're not ready to write a paper.

Selecting the Journal



Indexed Journals and Databases

- In order to be known as an authoritative source of scientific information journals must increase their visibility, availability, and readership.
- One of the ways by which journals can achieve this is by getting their publication indexed by one or more leading databases.

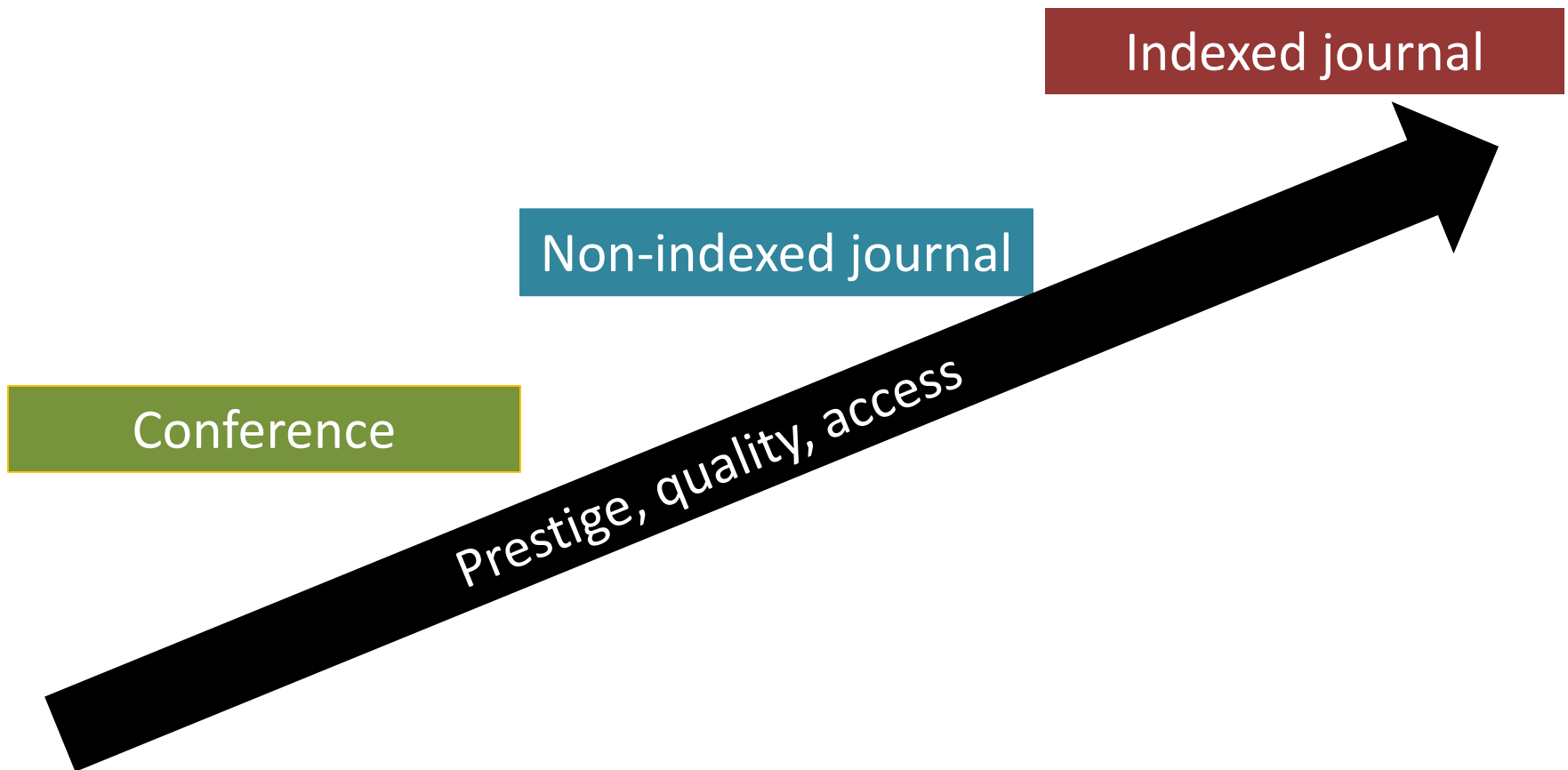


Indexed Journals and Databases

- Journals must go through and pass a review process before they are included in a leading database.
- General criteria used to evaluate a journal's suitability for indexing are quality of content published, publishing timeliness, and journal workflow and processes.



The benefit of Indexed Journals vs. Other Publications



Types of Articles

- **Original research article**: Comprehensive reports of novel research work.
- **Letter/Communication**: Brief reports of significant findings that merit rapid publication.
- **Review articles**: Summary of recent developments in a research field.
- **Preprints**: pre-publication versions of articles. They are on a specialist preprint server such as arXiv (general science, but especially physics), BioRxiv (biomedical sciences) or ChemRxiv (chemistry); a University repository or on an author's own website.

Types of Articles

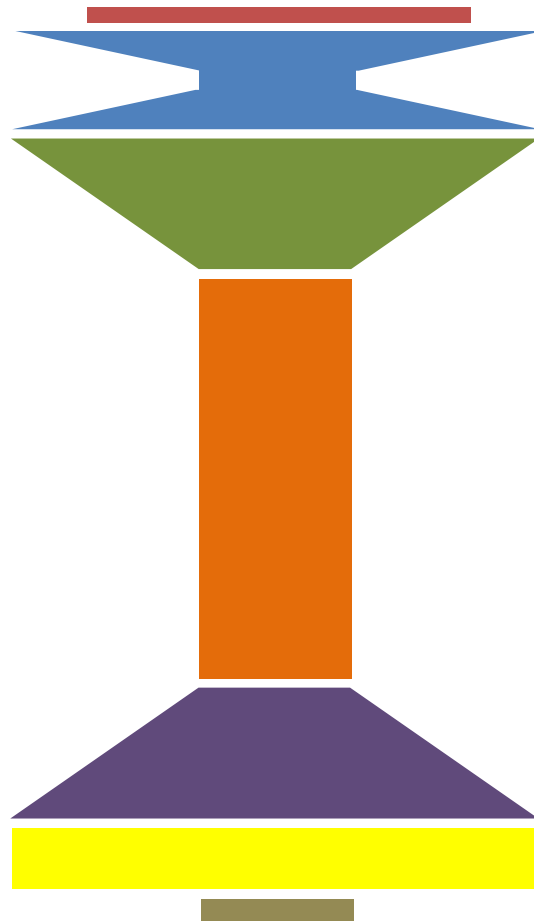
- **General Interest article:** Articles aimed at a broader audience.
- Need to be more accessible. One will need to simplify concepts to explain them, but not so much as to lose all useful meaning. Illustrations and tables vital.



Types of Articles

- **Original research article**: Comprehensive reports of novel research work.
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- **Preprints**: pre-publication versions of articles. They are on a specialist preprint server such as arXiv (general science, but especially physics), BioRxiv (biomedical sciences) or ChemRxiv (chemistry); a University repository or on an author's own website.

Parts of the Paper



TITLE

ABSTRACT

INTRODUCTION

BODY (RESULTS & DISCUSSION)

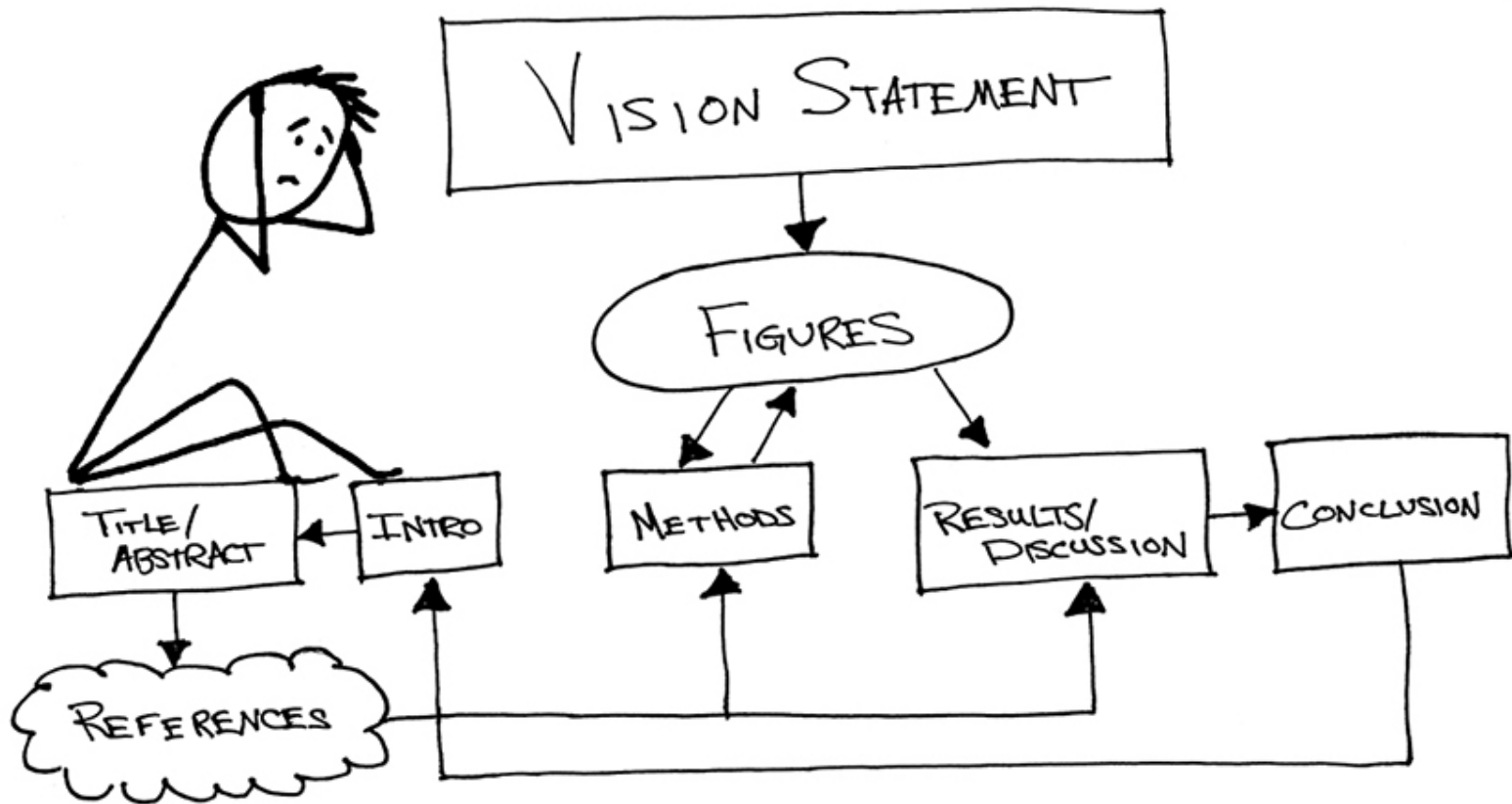
CONCLUSION

REFERENCES

METHODS

Step-by-Step Guide to Write a Scientific Paper

Don't start at the beginning!



A. M. Armani, SPIE, Jan 2020

Step 1: Write a Vision Statement

1. Explain what the key message of your work to someone in one minute.
2. Ask what he/she/they think your work is about.
3. Repeat 1 and 2 until you two agree on the key message of the work.
4. Articulate the key message of your paper in 1-2 sentences and write it down.



Step 2: Prepare and and Storyboard your Figures

- Prepare and lay out your figures on (virtual) boards. This can be done using software like PowerPoint, Prezi, or Keynote.
- To start, simply include all data, without concern for order or importance.
- Subsequent passes can evaluate consolidation of data sets (e.g., forming panel figures) and relative importance (e.g., main text vs. supplement).
- The figures should be arranged in a logical order to support and deliver your key message.
- If you're missing data, it should become obvious at this point.

Prepare Your Figures

- Prepare figures in the allowed height and width from the selected journal.
 - In general
 - Width= 8-8.5 cm (single-panel figure)
 - Width= 16-17 cm (double-panel panel figure).
 - Use ONE typesetting (Sans-serif) such as Arial.
 - Use ONE font size no lower than 9 pts.
- Keep in mind that figures must be self-contained units. They must deliver the information to the reader without him/her/they having to read the main text of the manuscript.
- The caption must be as detailed as possible.

Types of Graphics and Master Software to Create Figures

Your figures will be an assembly of different types of graphics

- Cartoons, schematics, block drawings
- Image data
- Graphs.

These graphics will be generated using different software and will need to be edited and combined in a paper-ready figure.

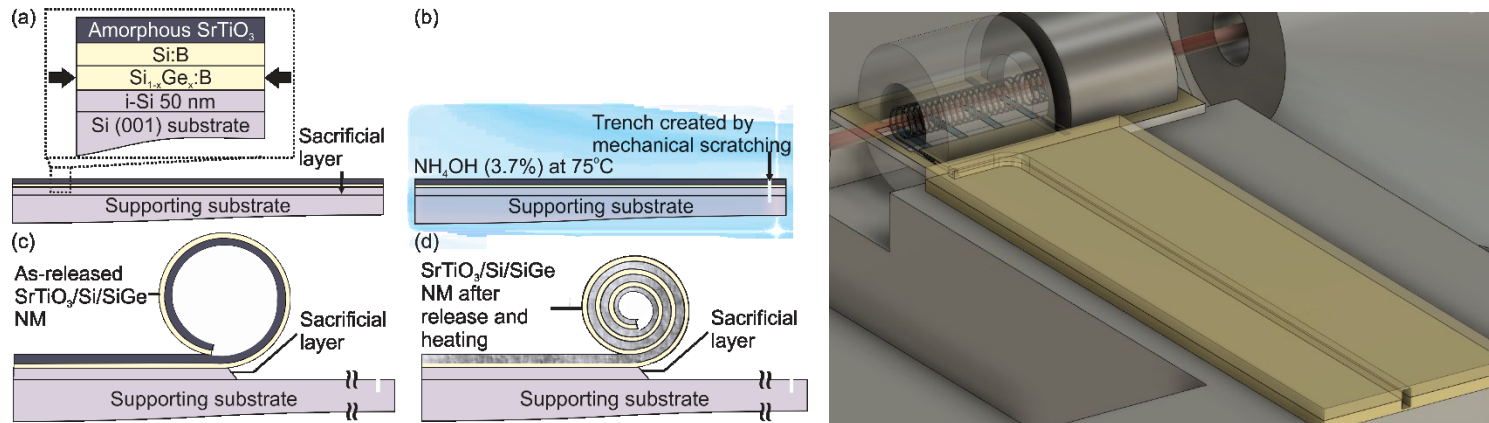
A master software is needed to create your figures

- PowerPoint (Free @ UNM)
- Adobe Illustrator (Free @ UNM)
- Corel Graphic Suite



Cartoons, schematics, block drawings

- For methods, approaches, mechanisms



- Software

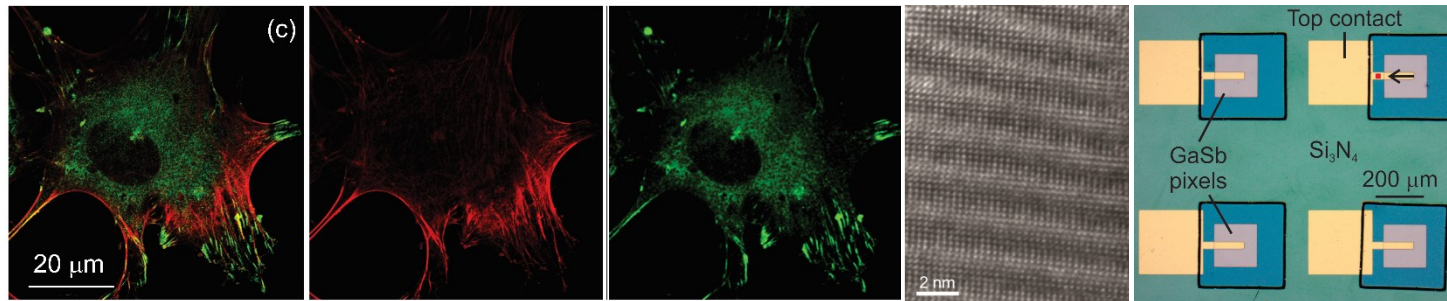
Adobe illustrator, Corel Graphic Suite, PowerPoint, SolidWorks.



Image Data

For results

- Photographs, optical images, electron microscopy images, etc.



Software

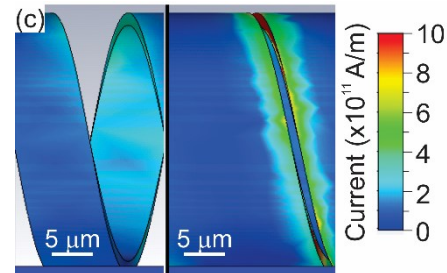
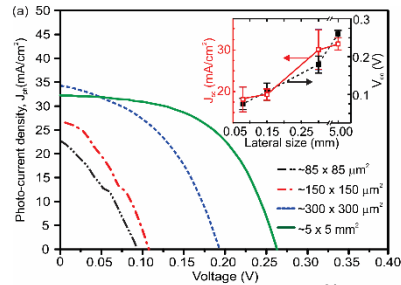
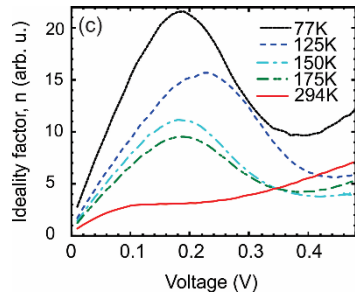
Adobe Illustrator, Corel Graphic Suite, PowerPoint, Image J.



Specific software used for the acquisition of data can sometimes be used to prepare figures.

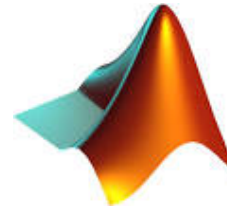
Graphs

- For results
- 1D, 2D, 3D plots of theoretical or experimental data.



WOLFRAM

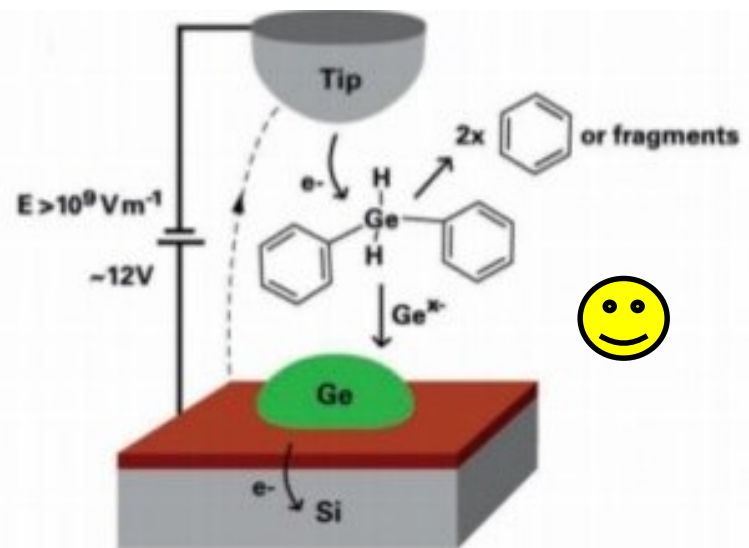
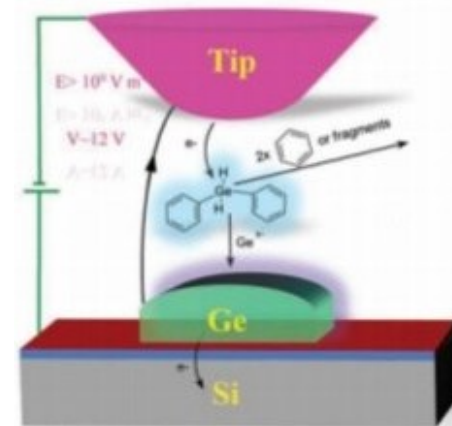
COMSOL
MULTIPHYSICS®



- Export your figure in an editable format in a graphics software (.wmf, .emf, .pdf are the best choices).

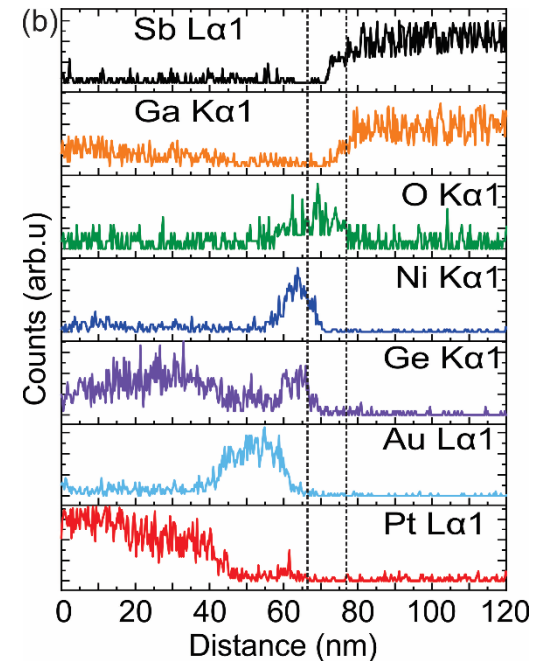
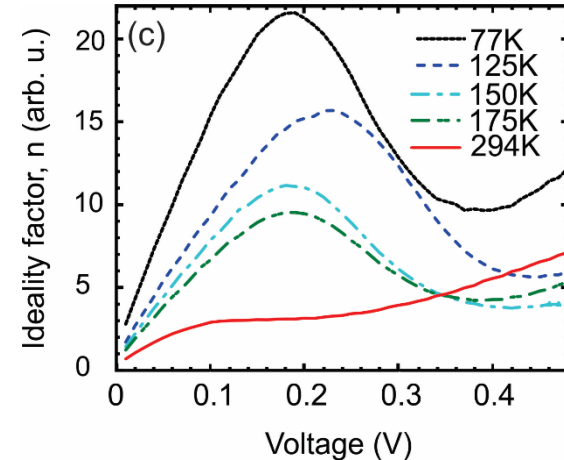
Tips for Cartoons and Schematics

- Avoid used transparency, shadows, gradients, etc.
- Select an appropriate color scheme to make the text legible everywhere in your figure.
- Select a colors that can be distinguished in a black and white or gray scale version of the figure.
- Print-out your figure in B/W, and grayscale to verify that all the graphical elements are visible, and the text is readable.



Tips for Graphs

- Font size must be uniform throughout the graph.
- No frames.
- Optimize number and size of tick marks to enhance visibility.
- Do not label all tick marks.
- Some journals have standards regarding tick marks.
- Symbols and lines must be distinguishable in B/W.
- Legend must be concise and informative.



Step 3-Write the Results and Discussion Section

- Core of the paper
 - It relies heavily on figures and tables
- Preparing and selecting the figures is the majority of the work for this section.
 - Write a few paragraphs about each figure, explaining:
 1. the result (this should be void of interpretation);
 2. the relevance of the result to your hypothesis statement (interpretation is beginning to appear);
 3. the relevance to the field (this is completely your opinion).
 - Be quantitative and specific, especially when comparing to prior work.
 - Only discuss prior work in relationship to yours.

Results and Discussion Section: Tips

- Present the principles underlying any trends shown in your results.
- Point out any exception and any lack of correlation
- Show how your results agree and contrast with previous work. Explain why.
- Discuss the fundamental knowledge generated by your work and any practical applications.
- Sub-sections are useful to orient the reader on the key elements of the discussion (They are allowed by most journals).
- You do not have to write the subsections in order.

Step 4-Write the Conclusion

It presents the outcome of the work by interpreting the findings at a higher level of abstraction than the “Discussion” and by relating these findings to the motivation stated in the “Introduction.” (Nature)

- Restate your research aim
- Summarize your findings
- Highlight the significance of your findings (i.e., discuss any future studies and potential applications that your study will enable).
- DO NOT paraphrase your introduction and your abstract!

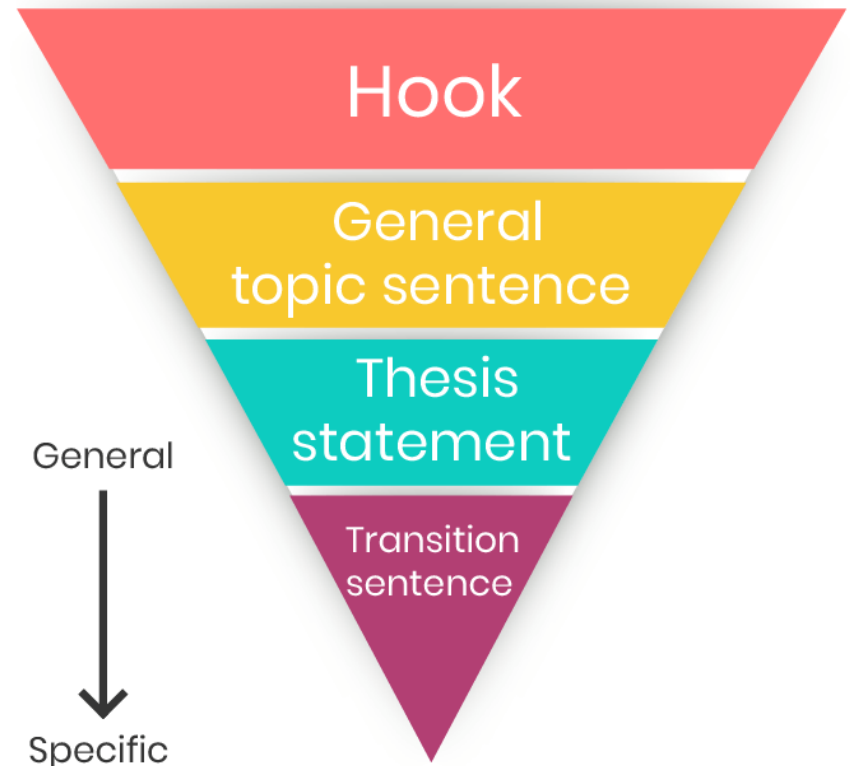
Step 5-Write the Methods Section

- Also called “Materials and Methods” or “Experimental Section”.
- It is either after the “Conclusion” section or between the “Introduction” and the “Results and Discussion”.
- Most important section to write accurately as any results in your paper must be replicable.
- If you've developed an entirely new experimental method, write ALL the details, including setup, controls, and protocols, also manufacturers and part numbers, if appropriate.
- If the method has been previously reported identification and reference are sufficient.
- Organize the method under sub-headings (e.g., Fabrication, characterization, data analysis, etc.)
- Include methods used for statistical analysis.

Step 6- Write the Introduction

3-4 paragraphs (600 words)

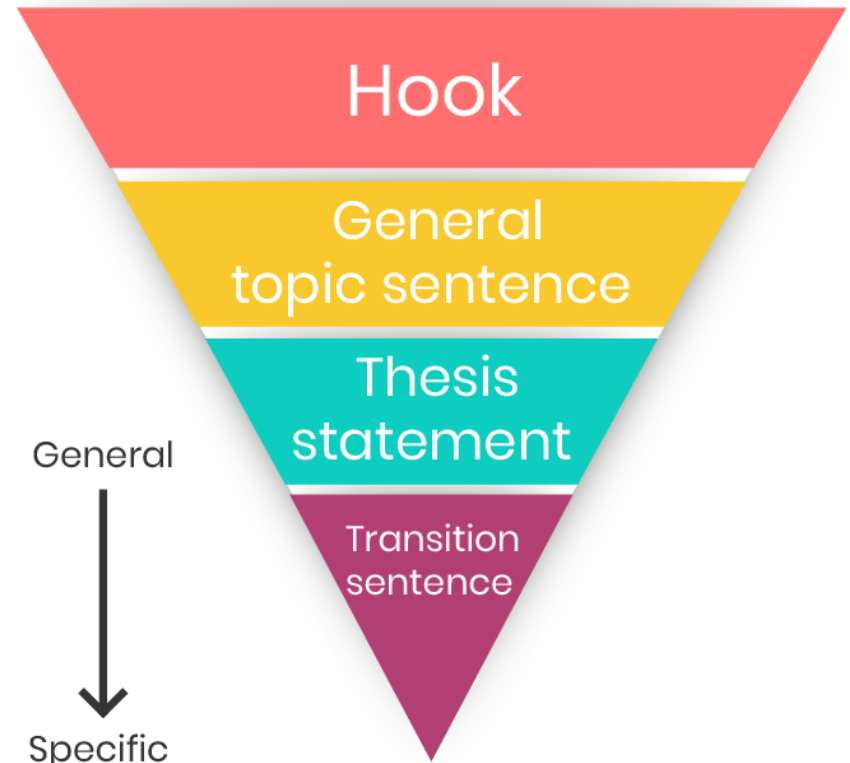
- It defines the problem in the context of a larger field;
- it reviews what other research groups have done to move forward on the problem (the literature review);
- lays out your thesis, which may include your expectations about what the study will contribute to the body of knowledge.
- It provides a roadmap of the body of the paper.



Step 6- Write the Introduction

Answer these questions

- What was I investigating?
- Why is it important?
- What was known about this topic before this study?
- What approach did I take in this study?
- Why did I select this approach?
- How is the body of the paper organized?
- What is the conclusion that study led to to?



Notes on Background Information and Citations in the Introduction

- Don't reach back too far with your background.
- Keep description of previous work brief and relate it to the scope of your work.
- Most of your citations will be in the introduction.



Notes on Background Information and Citations in the Introduction

- Avoid being offensive when citing other people's work



- The problem with X's approach is...
- X's explanation of this effect is questionable...
- The methods used in X's paper were faulty.
- A serious weakness of X's study is...
- X's study was incomplete...



- X's approach is not broadly applicable...
- X's model captures conditions A and B. However, in C, the assumptions of the model are not verified...
- X's study provided understanding of Y. However, in case Z...
- Applications demand the use of different approaches...

Step 7- Assemble References

- 1. References enable a reader to get more detailed information on a topic that has been previously published.** For example, if you state: "The device was fabricated using a standard method." You need to reference that method.
- 2. References support statements that are not common knowledge or may be contentious.** For example: "Previous work has shown that croissants are better than brioche." You need a reference here. Frequently, there are several papers that could be used, and it is up to you to choose. Include papers from 2 -3 different groups.
- 3. References recognize others working in the field.**

References: Tips

- Cite foundational papers (even if they are old).
- Cite current papers (last 1-2 years).
- Avoid citing non-peer reviewed papers, conference papers, and websites.
- Cite papers from the journal that you would like to submit to.
- Cite papers by people that you would like to review your paper.
- Do not cite too many (50-60 are usually a good number for a full research article).

Reference Management Software

Select an electronic reference management software. Check with your PI about what the group is using.

- They have databases including reference formats for different journals.
- They allow searching for manuscripts on the web.
- They update references and citations when you edit the text.
- Some are free (Mendeley and Zotero).
- Some are not free (Endnote).
- The software is not perfect!
- Double-check and edit the references before submitting.



Step 8- Write the Abstract

- Elevator pitch of the paper
- It markets the paper to the editor and the reader

Content

- Scope of the study (1 sentence).
- Methods (1-2 sentences).
- Results (1-3 sentences).
- Principal conclusion (1-2 sentences).
- Statement regarding the broad impact of the work. (1-2 sentences).

Abstract: Structure and Format

- Self-contained and engaging summary of the paper.
- Not written in first person.
- 4-5% of the article (i.e., 200-500 words).
- It must be written in one paragraph.
- It must not include information that is not discussed in the paper.
- It does not include references.
- It may use past and present tenses.

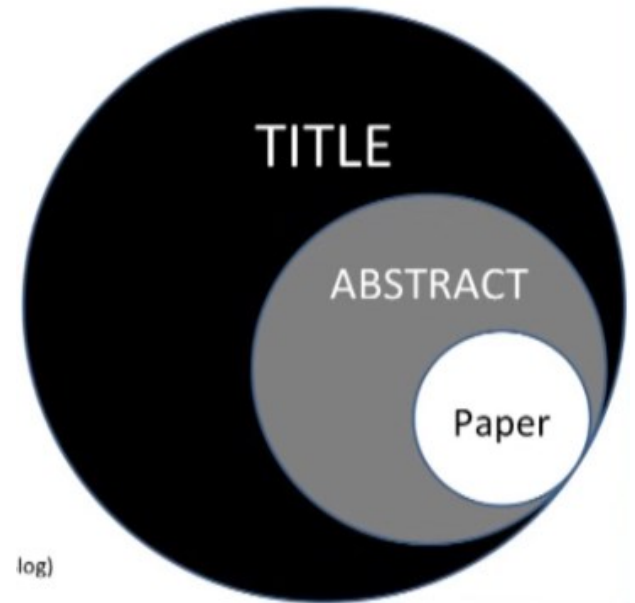
Step 9-Write the Title

**The title is your prime marketing tool.
Do not let it be an afterthought!**

Condense the paper into a sentence summarising the finding

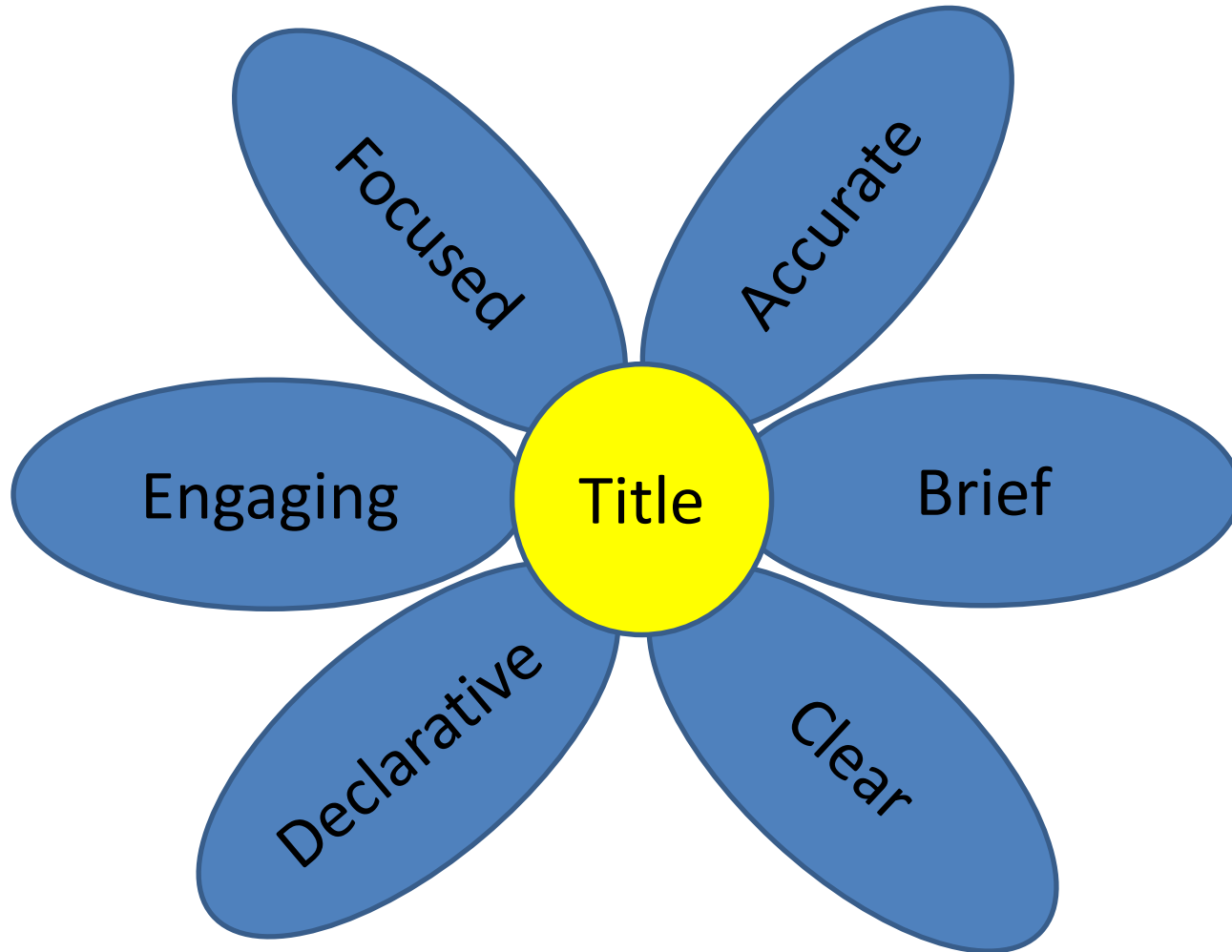
Capture the reader's attention

1 key message



Relative number of reads.
Source: <http://blogs.nature.com/>

The ABC+ of the Title



<http://blogs.nature.com/>

Title: Dos and Don'ts

Do

- Keep it to 10-12 words
- Obsessively check the syntax, grammar, and spelling.
- Select a scheme for capitalizing words in your title and stick with it.
- Include searchable keywords.
- Use action verbs.

Don't

- Use abbreviations and jargon.
- Use generic words.
- Include a question mark.
- Use adjectives, buzzwords, and superlatives.
- Have “fun” with your title.
- End with a period.

Creating Your Title: a Six-Steps Guide

1. Answer some basic questions about your paper.

- What is your paper about?
- What methods/techniques did you use to perform your study?
- What was the subject of your study?
- What were your results and findings?

Creating Your Title: a Six-Steps Guide

- 1. Answer some basic questions about your paper.**
- 2. Identify and list keywords and short phrases in your answers.**
- 3. Write one long sentence with these keywords.**
- 4. Delete generic and unnecessary words, superlatives, and jargon.**
- 5. Rephrase to place keywords at beginning and the end; reduce the number of words if higher than 10-12; break in two parts if needed.**
- 6. Format and review.**

Capitalization Schemes

- **All Caps:** All letters are capitalized.
 - *Example:* THIS IS IN ALL CAPS
- **Title Case:** Capitalize the first and last word of the title and all major words (lowercase articles, prepositions, and conjunctions).
 - *Example:* This is a Title in Title-Case Capitalization
- **Sentence Case:** Capitalize only the first word and any proper nouns.
 - *Example:* This is a title in sentence case

Strong and Weak Titles

Will Any Crap We Put into Graphene Increase Its Electrocatalytic Effect?



How Graphene Is Cut upon Oxidation?



All-silicon, low-cross-talk terahertz waveguide crossing based on effective medium



Phase-Programmable Gaussian Boson Sampling Using Stimulated Squeezed Light



Fantastic yeasts and where to find them: the hidden diversity of dimorphic fungal pathogens



Step 10- Write the Acknowledgement

Acknowledge

- any outside financial assistance, such as grants, contracts or fellowships.
- any significant technical help that you have received from any individual in your lab or elsewhere the source of special equipment, cultures, or any other material.
- anyone that you had fruitful discussions with.

Academic Writing Software

Microsoft Word
Google Docs
Overleaf (Latex)
OpenOffice
LibreOffice
Scrivener
DropBoxPaper
Grammarly
Quillbot



<https://www.ref-n-write.com/trial/academic-writing-tools-and-research-software-a-comprehensive-guide/>

General Advice

- Start writing before the experiment or theoretical study is finished.
- Use the past tense to refer to what was done and what was found at each stage of the research.
- Use the present tense to comment on the significance of your research/ findings.
- Use active verbs whenever possible, e.g., ‘the study tested’ instead of ‘it was tested by the study’.
- Passive voice can be used in the Methods section.
- Use non-evaluative language: report not comment on what you have done.

General Advice

- Set a time of the day to work on your manuscript and do it EVERY DAY.
- Set goals for each day, i.e., finish Figure 1 or write section 1.2.
- Download templates from the publisher's website.
- Use a writing assistant that reviews spelling, grammar, punctuation, clarity, engagement, and delivery mistakes.
- Give the co-authors time to read the paper.
- Respect internal deadlines.
- Write, read, edit, wait, and repeat.

Additional Documents

- Cover letter
- Response to the reviewers
- Other communications with the editor
(Appeal, Comments on reviewer's report,
follow-up, etc.)

Cover Letter

- Address the letter to an editor that will understand and appreciate your work (Do your homework).
- Introduce the work
 - Title, authors, and one sentence summarizing what the paper is about.
- Describe the novelty and the significance of your work.
- Explain why you believe the article is within the scope of the journal.

Cover Letter



Your Name
Your Title
Department/Center
Address

Date

Editor's Name
Editor's address

Dear Dr. X,

I am submitting our manuscript "**Title**," by *First author's name et al.*, for publication in *Name of the Journal*. In this work, we address xxxxx...

Summary of the main results

Statements about novelty and impact

Statement about the article fitting the scope of the journal

Sincerely,

Signature

(Name, Title)

Response to Reviewers

Response to Reviewers of “Title of the manuscript” (Research Article, No. Manuscript I assigned by the journal)

Your name, your e-mail address

Date|

We would like to thank the referees for their careful reading of our manuscript. Our responses to their comments and the corresponding changes to the manuscript are in sections 1-3. Additional minor corrections are in section 4. The changes appear in red type in the revised version of the manuscript.

We believe that these responses and corresponding changes in the manuscript address the referees’ concerns and thus hope that the revised version will be suitable for publication.

1. Referee 1

“Positive comment”

Answer: Thank you for these supportive comments.

2. Referee 2

Comment 2.1. “ ”

Answer: We agree with the reviewer thatHowever....“ ”

Comment 2.2. “ ”

Answer: We agree with the reviewer thatHowever....“ ”

3. Referee 3

Comment 3.1 “ ”

Answer: Thank you for pointing out this error. We have corrected it in the revised manuscript. Please see the excerpt of the revised manuscript below.\

“.....”

4. Additional Changes

We have renumbered all figures and references to them throughout the manuscript to reflect the insertion of an additional figure in the “Introduction” section (i.e., Figure 1).

On p. 26 we have corrected “mbar” in “Torr”

- Be polite but firm.
- Respond to all comments.
- Breaking up longer comments helps you make sure that you answer all points.
- Include revise portion of the manuscript addressing the comments.

Thank you!

