Preparing a Research Paper in IEEE Format

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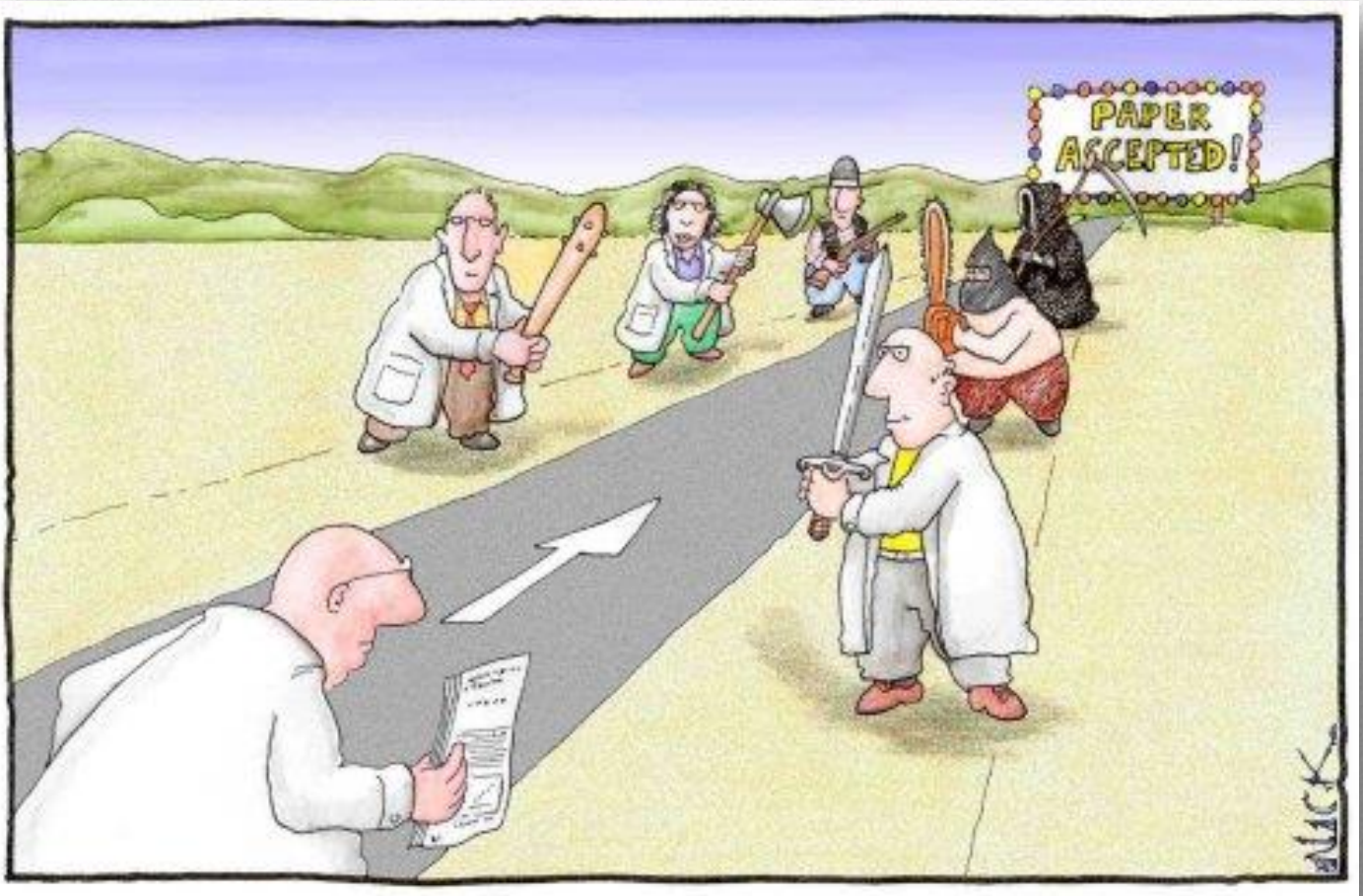
UNLV Howard R. Hughes College of Engineering



Most scientists regarded the new streamlined peer-review process as 'quite an improvement.'

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Steps in writing a technical paper

1. Know your audience
2. Organize your thoughts
3. Follow the journal's style guide
4. Pay close attention to copyright and ethics issues
5. Refine your work
6. Know when to stop writing
7. Grammar and punctuation errors common to engineers

- Knowing your audience is critical to writing a good technical document – or any written material, for that matter.
- If people think you do not understand who they are and what they are interested in, then:
- They simply won't read your work.

Know your audience

The Writing Process

- Peers in your specific field?
- Peers in your general field?
- Technical people not in your field?
- A non-engineering but professional audience?

Decide who is your primary audience.

Understand who are your secondary audiences.

Know your audience

http://www.ieee.org/publications_standards/publications/journmag/journals_magazines.html

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A - C

› Access, IEEE
› Aerospace and Electronics Systems Magazine, IEEE
› Aerospace and Electronic Systems, IEEE Transactions on
› Affective Computing, IEEE Transactions on
› Annals of the History of Computing, IEEE
› Antennas and Propagation, IEEE Transactions on
› Antennas and Propagation Magazine, IEEE
› Antennas and Wireless Propagation Letters, IEEE
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› Audio, Speech and Language Processing, IEEE Transactions on
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Standard Outline for a Technical Paper

Abstract

Introduction

Background or Literature Review

Methods and Materials

Data and Results

Discussion

Conclusion

Acknowledgements

References

Organize your thoughts

Standard Outline for a Technical Paper

Abstract	▪ The problem ▪ How the study addresses this problem ▪ Key results
Introduction	Write this last
Background or Literature Review	The most difficult part of the paper to write
Methods and Materials	Straightforward
Data and Results	Straightforward
Discussion	Your ideas on what the data means
Conclusion	▪ Summary of the findings ▪ Limitations of the study ▪ Recommendations
Acknowledgements	Especially grant sources
References	Pay special attention to the journal guidelines for references

Organize your thoughts

For help on Literature Reviews:

Literature Review:
How to Search, How to Write

Your thesis, dissertation, papers, and reports all require literature reviews. How do you conduct a quality literature review? Sue Wainscott, STEM Librarian, will show you how in this workshop. How do you write up your literature review in a professional manner? Julie Longo, the Technical Writer at the College of Engineering, will show you what to do.

- **Presenters:** Sue Wainscott, STEM Librarian and Julie Longo, COE Technical Communications
- **Date:** Friday, Nov. 13, 2015
- **Time:** 9 a.m. to 12 noon
- **Location:** SEB Classroom 1243

No walk-ins accepted; please register:

http://www.unlv.edu/event/technical-writing-workshop-2?delta=0

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Follow the journal's style guide

You **must** check the style guidelines of the journal or conference paper.

- This is the first thing that the editors of the journal or conference will check – and ***reject*** if you don't comply.
- Suggested strategy:
  - Find out and understand the style of that journal or proceedings.
  - Write your paper freely; don't be overly concerned about the style at this point.
  - Once you have written and edited your paper, then format it according to style guidelines.

Every journal and conference has some kind of style guide they want you to follow.

The style guide includes:

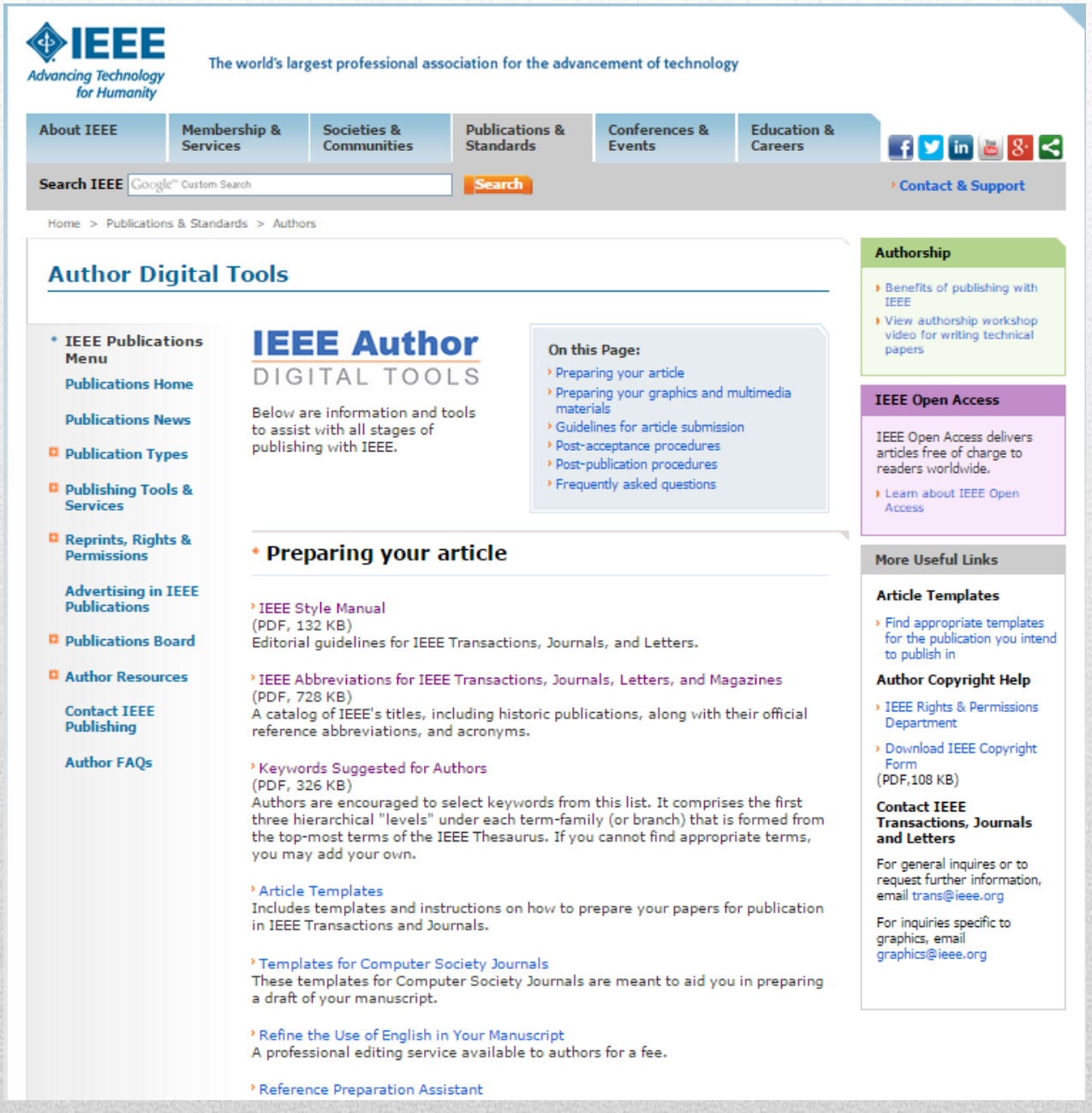
- Font type and size
- Double space, single space, etc.
- The way headers should look
- Indent or spaced paragraphs
- Abstract word count
- Keywords? Highlights?
- Page length of paper
- How to submit artwork and tables

Read the style guide for that publication very, very carefully.

Follow the journal's style guide

IEEE Author Digital Toolbox

http://www.ieee.org/publications_standards/publications/authors/authors_journals.html



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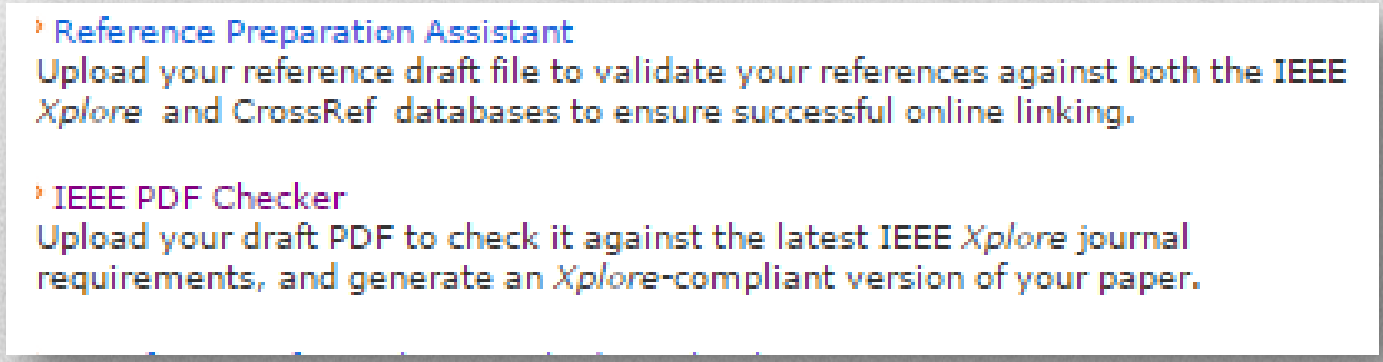
http://www.ieee.org/publications_standards/publications/authors/authors_journals.html

Heads up:

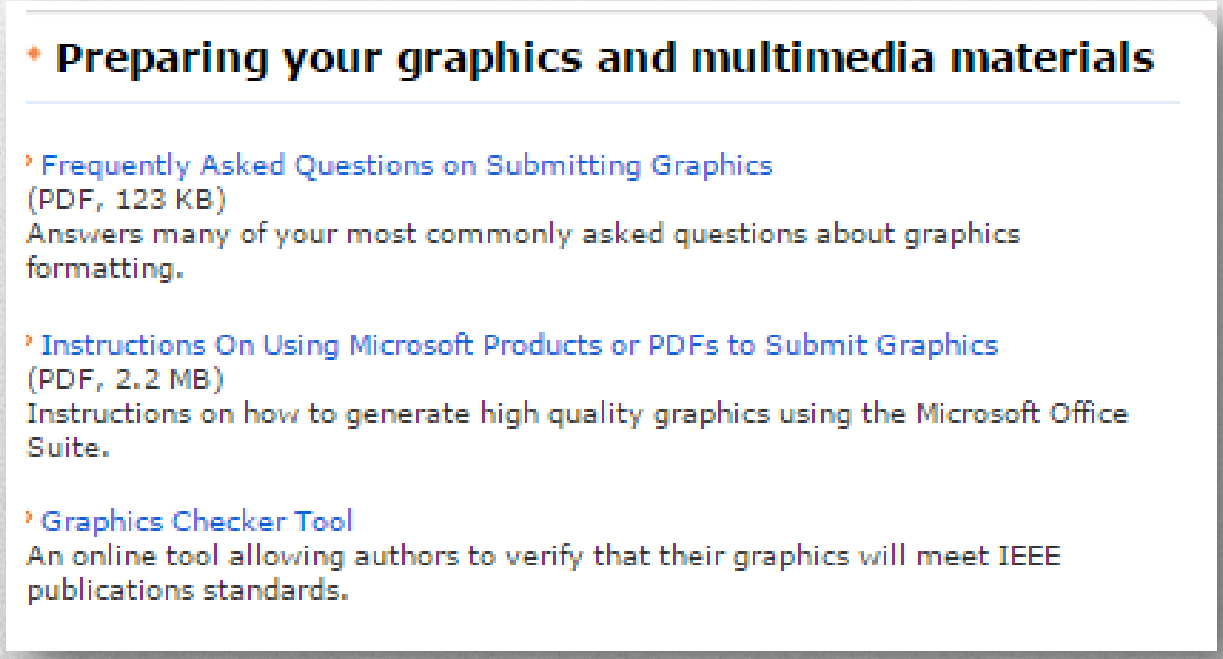
- **IEEE has software (IEEE PDF Checker) to make sure you have complied with their style guidelines.**
- **They will send your paper back to you – *or reject it* – if you do not meet with their guidelines.**



IEEE Author Digital Toolbox

http://www.ieee.org/publications_standards/publications/authors/authors_journals.html

In addition, IEEE has software to help you by compliant with their guidelines for graphics (figures).



Preparing your graphics and multimedia materials

Frequently Asked Questions on Submitting Graphics
(PDF, 123 KB)
Answers many of your most commonly asked questions about graphics formatting.

Instructions On Using Microsoft Products or PDFs to Submit Graphics
(PDF, 2.2 MB)
Instructions on how to generate high quality graphics using the Microsoft Office Suite.

Graphics Checker Tool
An online tool allowing authors to verify that their graphics will meet IEEE publications standards.

Create your own ‘style sheet’

- As you begin to write, keep track of terms you use so that you are consistent.
- Note when you first use an acronym.
- If the journal or proceedings does not have instructions for headers, captions, or tables, create in your style sheet the format you plan to use.
- A customized style sheet is especially valuable for creating **reports to agencies** – you can create a consistent and professional look to the documents you submit.

Follow the journal’s style guide

Citations and References

You must cite material correctly and provide references according to journal style guidelines

References, Citations, and Referencing Tools

Key to good scholarship is the proper handling of citations and references. This workshop will go over the basics, and also will provide an overview of referencing tools, such as RefWorks and Mendeley

Presenters: Sue Wainscott, STEM Librarian and Julie Longo, COE Technical Communications

Date: Friday, Oct. 16, 2015

Time: 9 a.m. to 11:30 a.m.

Location: SEB Classroom 1243

You must register for this workshop, ***no walk-ins accepted***. Bring your laptop and a paper you are working on.

http://www.unlv.edu/event/technical-writing-workshop-1?delta=0

Follow the journal's style guide

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Ignore style guides at your peril

However -- don’t let the style guide hamper your writing style

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Refine Your Work

- After writing, put the document away for a couple of days.
- Print it out, and use a pen to mark your work up.
- Make a checklist and go through the paper several times for:
  - Flow of thought
  - In-text citations and references
  - Grammar and punctuation
  - Equations, figures, and tables
  - Conformance to the style guide

Specifically for Latex users

- The writing process has two phases:
  - Phase I
    - Original writing (raw)
    - Editing and refining
    - This phase is very fluid and changeable
    - Use some kind of format (MS Word, OpenOffice, text) that allows for easy revisions
  - Phase II
    - Formatting for publication
    - The material is finalized
    - The style is rigid
    - Do not put material into Latex until it is finalized, especially if you plan to work with a technical editor during Phase I

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- An Editor-in-Chief once told me that it could take a lifetime to learn the art of knowing when to stop writing.
- There is a point in your writing – or editing – where you must stop or risk having your material degenerate.
- If there is too much information thrown into a paper – then, perhaps you need to write two or three separate papers…

Know when to

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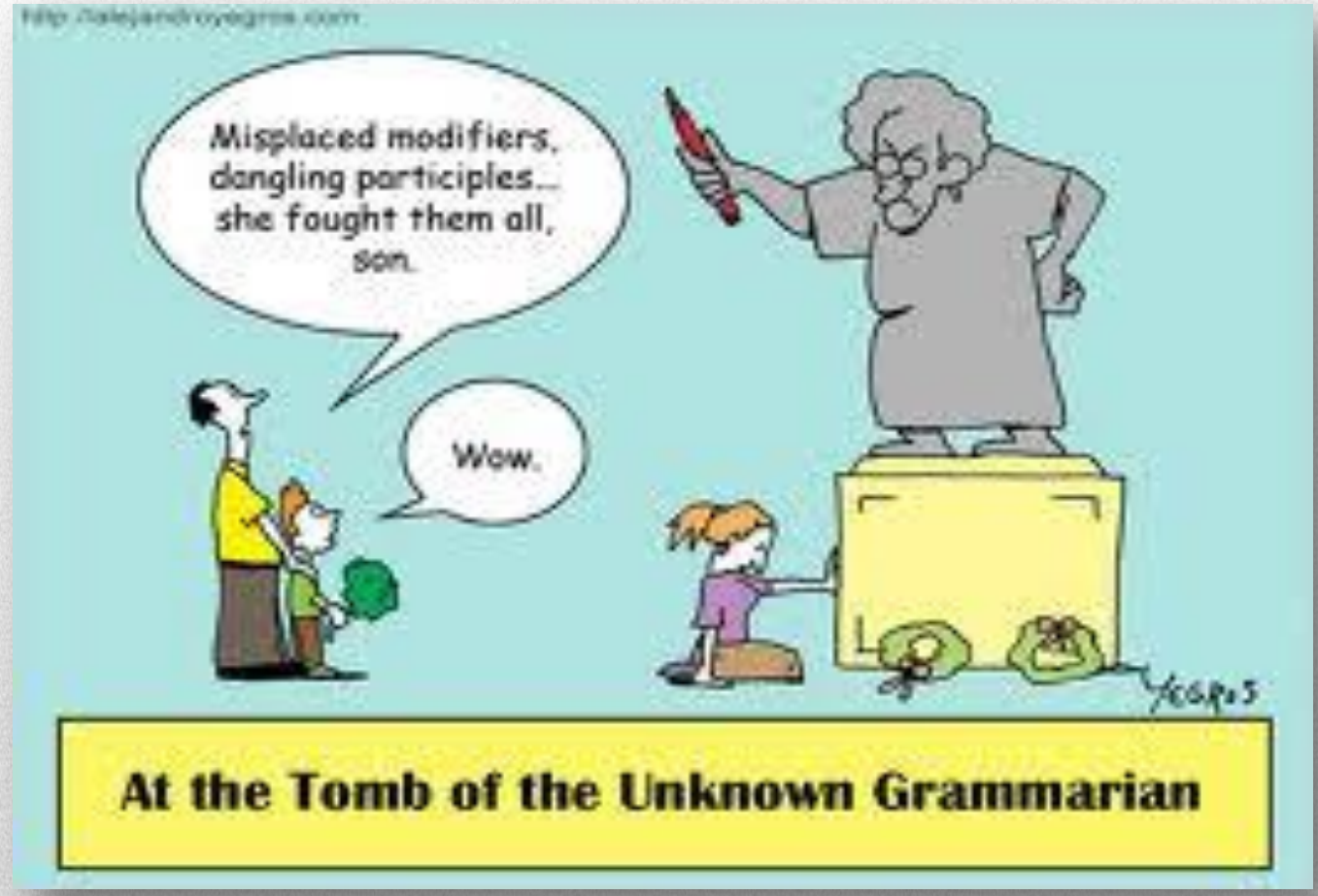
Errors common to engineers…



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Grammar and Punctuation Basics

Acronyms

- You **must** write out an acronym the first time you use it in the body of the paper.
- Write the term first and then put the acronym in parentheses.
- Also write out the acronym in the abstract. However, you also must write it out again when first used in the body of the paper.
- If you have a great many acronyms, and you use them frequently throughout the paper, it is a courtesy to your readers to provide a Glossary list at the end of your paper.

IEEE Style for Math

- Variables are set in italic; vectors and matrices are usually boldface italic.
- Remove commas around variables in text.
- Always add a zero before decimals, but do not add after (e.g., 0.25).
- Spell out units in text without quantities (e.g., where the noise is given in decibels).
- Numbers and units used as compound adjectives should be hyphenated only if needed for clarity (e.g., 10-kV voltage; 5-in-thick glass).
- Use thin spaces (instead of a comma) between numbers in tens or hundreds of thousands (e.g., 60 000, 100 000, but 4000).
- Use zeroth, first, nth, (k+1)th, not 0th, 1st, 2nd, 99th, n th , (k + 1)st.
- Use the word “equation” at the start of a sentence only, but in text just use the number [e.g., in (1)], unless describing an equation, e.g., see “Darlington equation (1).”
- The slash is used in place of the word “per” when it leads to the clarity of the sentence (e.g., the ratio of 16 samples/s to 35 samples/s as compared to…).
- Use “indices” instead of “indexes” when referring to subscripts.
- Plural variables have an “’s”.

Colons and Semi-colons

- This is a very common issue with engineering documents.
- Because most papers and proposals include difficult concepts and equations, it is very important to use commas and semicolons correctly in order to help the reader.
- Avoid the overuse of parentheses – again, this will cause ‘brain freeze’ in deciphering a lengthy and difficult sentence.
- After you have written your paper, read it as if you were the audience and try to break up the longer, more difficult sentences and paragraphs.

Hyphens

- If a noun is the object of the sentence, then the modifier before it is not hyphenated:

The diameter of the glass tube was 10 mm.

- If the noun is part of a modifying phrase, then hyphenate:

The glass tube had a 10-mm diameter.

i.e. and e.g.

- Engineering writing is very complex and hard to follow.
- In Latin, ‘i.e.’ means ‘that is’ and ‘e.g.’ means ‘for example.’
- It will be easier on the reader if you simply use the English words instead of the Latin acronyms.

That and Which

- "**That**" is used with restrictive phrases – phrases that are essential to the sentence.
- "**Which**" is used with nonrestrictive phrases – phrases that are not essential to the sentence.
- When you use 'which,' a comma precedes it.

Different and Various

- ‘Different’ is best used in the context of two dissimilar items. Ask yourself: different from what?

  Two entirely different methods were used to analyze the process.

- ‘Various’ is best used to describe the use of several types of items, some similar, some not so similar. This term is used in lieu of ‘variable’.

  Various studies in the literature alluded to this issue.

Please try to avoid:

Long, long sentences

- Rule of thumb: read it aloud, and if you have to take a breath to finish it, it is too long.
- Try to break up long sentences – your readers will thank you.

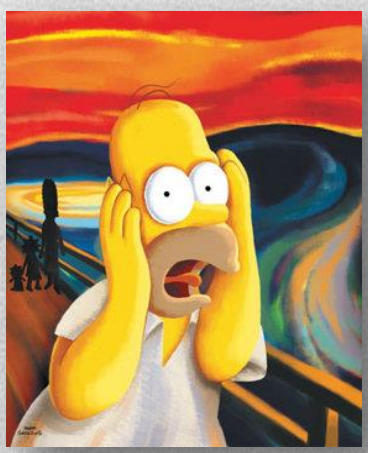
Long, long paragraphs

- One paragraph for one thought idea.
- If your paragraphs are too long, a key idea might be missed.
- Also, your readers give up trying to it.

Build-A-Phrase

Sometimes, you can have one too many nouns modifying an object, confusing the reader.

Category 1	Category 2	Category 3	Object
local	binary	pattern	**perator**
discrete	time-lumped	parameter	**model**
wideband	direct	sequence	**measurements**
data	analysis	evaluation	**mechanism**
cost	estimation	probability	**model**
modified	full-scale	real-time	**requirements**
proposed	controlled	online	**study**
sustainable	variable	alternative	**process**
traditional	operational	derived	**framework**
potential	optimized	distribution	**criteria**
effective	dual	threshold	**formation**
relevant	intensive	testing	**capabilities**



Build-A-Phrase

Sometimes, you can have one too many nouns modifying an object, confusing the reader.

Example:

"in a tap-water-filled pan."

C'mon guys!

"in a pan filled with tap water."

In Conclusion

- When writing technical papers, reports, and proposals take as much care as your actual research
- Keep your reader in mind at all times
- Comply with the journal style guidelines
- Editing and refining your writing is a key part of the process

Thank you for your attention!

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