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How to write a technical paper (and get it published)

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Personal editorial background

2017–2019: Co-Editor in Chief IEEE Trans. on Microwave Theory and Techniques

2015–2017: Associate Editor of the IET Electronic Letters

2014–2016: Associate Editor IEEE Trans. on Microwave Theory and Techniques

2011–2016: Associate Editor Int. Journal of Microwave and Wireless Technologies

2010–2013: Associate Editor IEEE Microwave and Wireless Components Letters

June 2015: Guest Editor Int. Journal of Microwave and Wireless Technologies

Jan. 2015: Guest Editor IEEE Trans. on Microwave Theory and Techniques

2006: Co-editor of the book *Periodic Structures*, Research Signpost

Active reviewer of many international journals

Author of 400+ papers in international journals and conferences



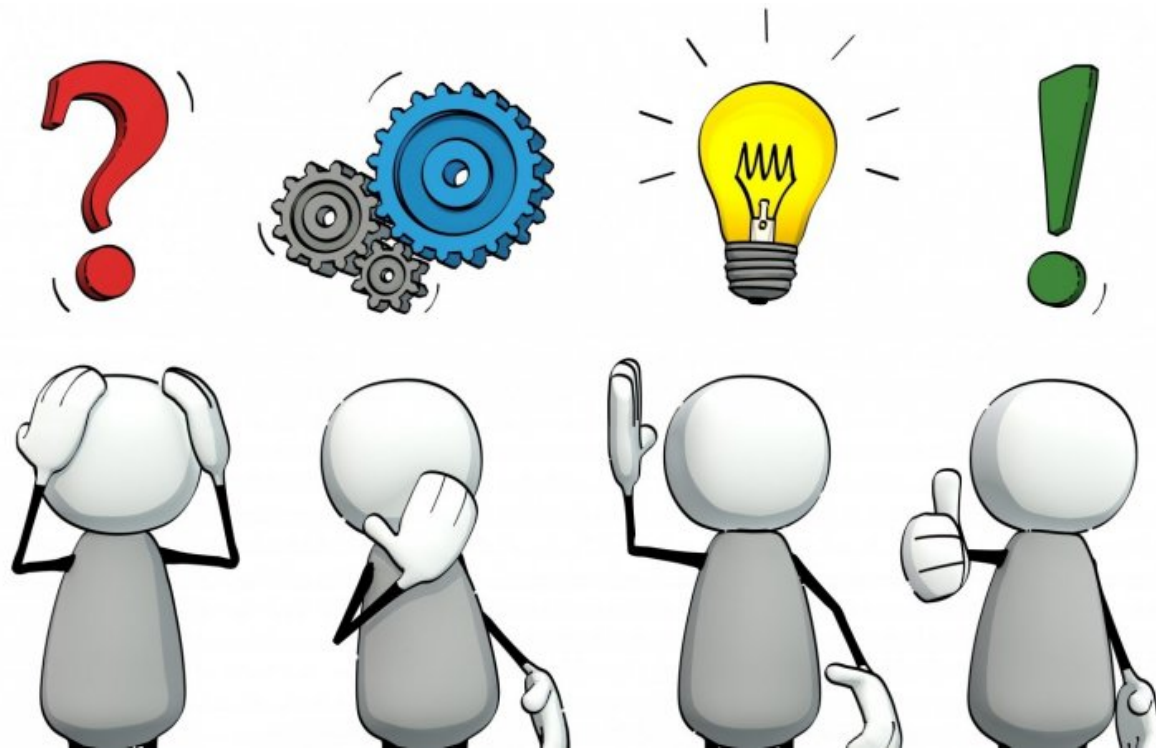
Why to write a paper?

- Publish new scientific results, spread the knowledge
- Allow other researchers to confirm your results
- Allow other researchers to extend your results
- Clarify difficult concepts for other scientists and general public
- Establish priority
- Publicize (advertise) new technology capability
- Career advancement
- ...

What do you need to write a good paper?

A problem and a good idea to solve it!

Problem: how to make an egg standing?



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Solution 1:

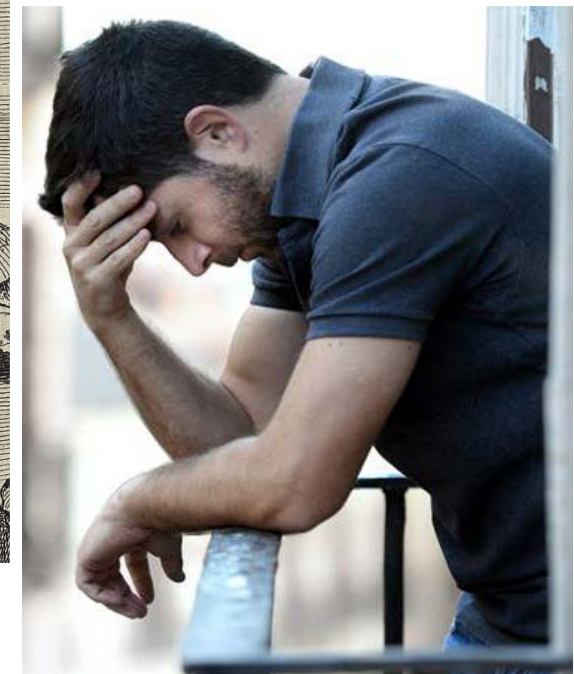
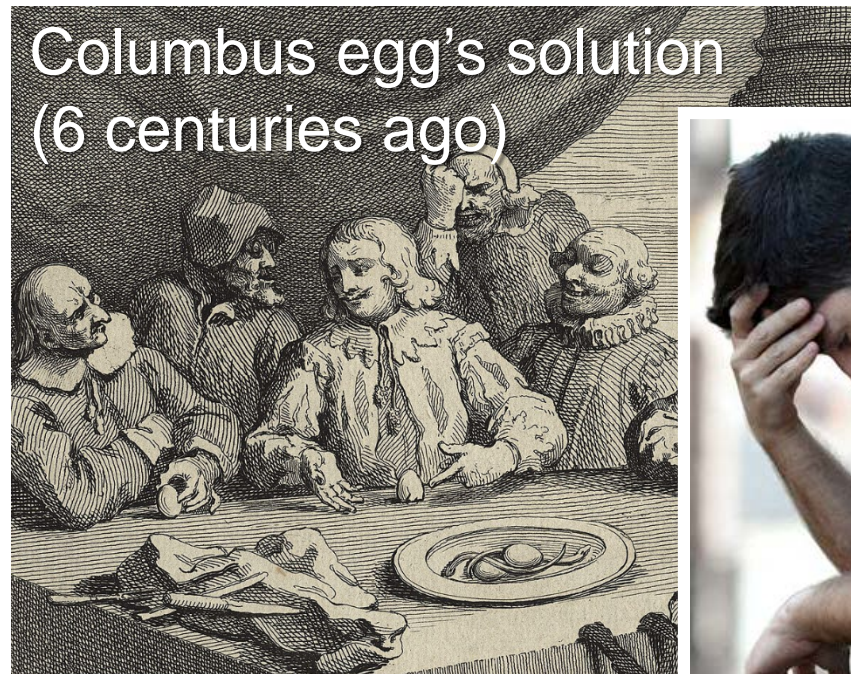


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Solution 1:



What do you need to write a good paper?

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Solution 2:



What do you need to write a good paper?

A problem and a good idea to solve it!

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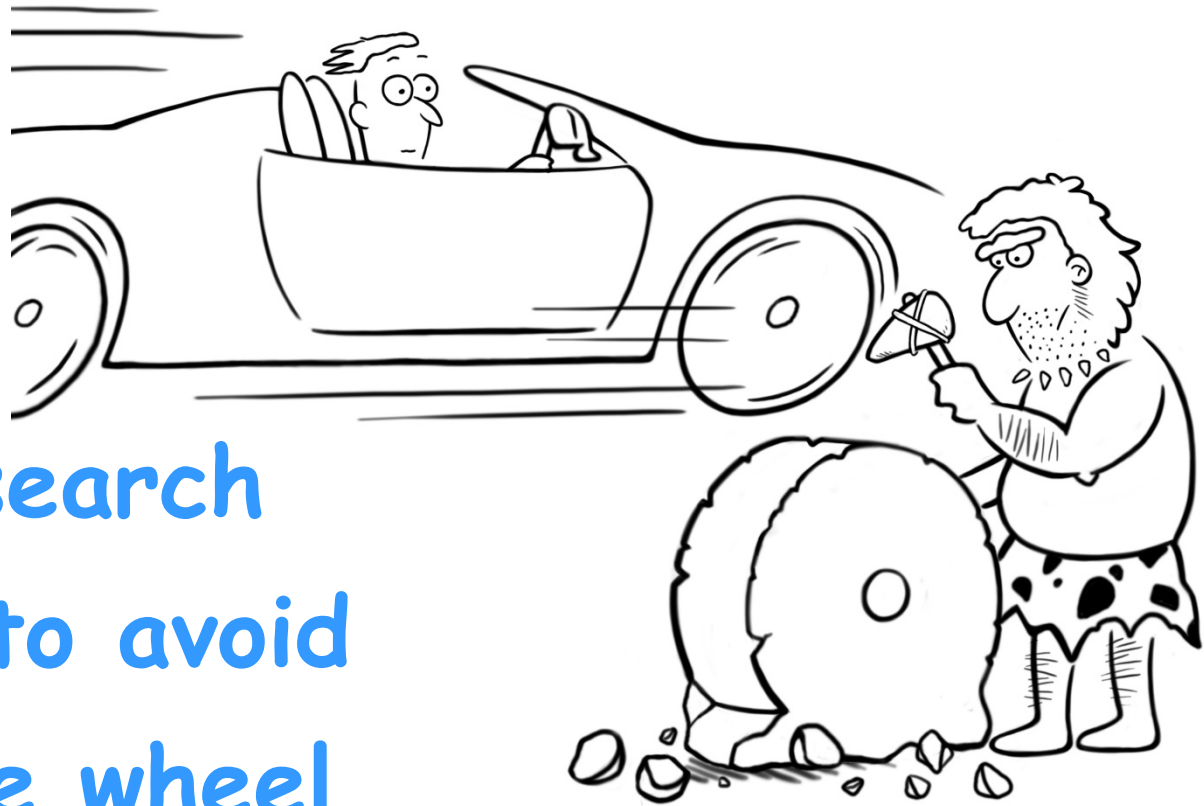
Solution 2:



What do you need to write a good paper?

n open new
A problem and a good idea to solve it!

A careful and
comprehensive
bibliographic search
is mandatory to avoid
reinventing the wheel



Bibliographic search

Very "heavy" in the past



Bibliographic search

More "light" today



ResearchGate

IEEE Xplore

Wikipedia (be careful...)

Many other websites

Google Scholar

Bibliographic search

More "light" today

Really true?

Bibliographic search

IEEE.org | IEEE Xplore Digital Library | IEEE-SA | IEEE Spectrum | More Sites | Cart (0) | Create Account | Personal Sign In

IEEE Xplore®
Digital Library

Access provided by:
UNIVERSITY OF PAVIA
» Sign Out

IEEE

Browse ▾ My Settings ▾ Get Help ▾

All ▾ Enter keywords or phrases (Note: Searches metadata only by default. A search for 'smart grid' = 'smart AND grid') 🔍

Advanced Search | Other Search Options ▾

Search within results 🔍 **power amplifier** | Download PDFs ▾ | Per Page: 25 ▾ | Export ▾ | Set Search Alerts ▾ | Search History

Displaying results 1-25 of 1,829 for **power amplifier**

▼ Filters Applied: IEEE Transactions on Microwave Theory and Techniques x

☐ Journals & Magazines (1,813) **T-MTT** ☐ Early Access Articles (16)

Displaying results 1-25 of 467 for **power amplifier**

▼ Filters Applied: IEEE Transactions on Microwave Theory and Techniques x 1999 - 2008 x

☐ Journals & Magazines (467)

Displaying results 1-25 of 919 for **power amplifier**

▼ Filters Applied: IEEE Transactions on Microwave Theory and Techniques x 2009 - 2018 x

☐ Journals & Magazines (903) ☐ Early Access Articles (16)

443 before 1999 (36 years)
467 from 1999 to 2008 (10 years)
919 from 2009 to 2018 (10 years)

Bibliographic search

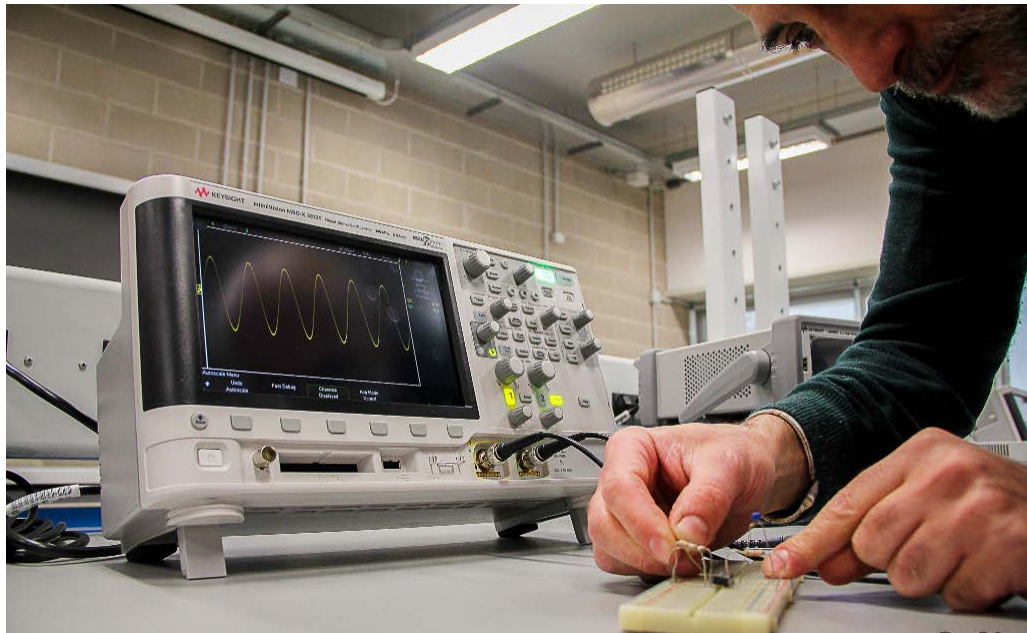
Do your best to identify the **key papers**, i.e., the ones where a particular **theory/technique/technology** was **proposed for the first time**, and give credits to them.

Also identify the **paper proposing state-of-the-art development/results** on the topic of interest, and use them as reference to compare your results.

At the end of the day, in the paper **you must claim (and demonstrate!) some advancement** over the existing literature.

The hard work before the paper...

- The topic has been identified
- The state-of-the-art has been investigated (bibliographic search)
- You found a good idea to overcome some issue/drawback/limitation of the previous works



- Develop your idea, converting it into a new theory/technique/technology
- Write the paper!

Select the venue to publish your study

Conference

- Perfect venue to present preliminary results
- The idea is not fully exploited, the verification is ongoing
- Set priority (quick publication)
- Light review process (accept/reject)
- Discuss with pairs and collect suggestions to improve your work
- Networking (and tourism...)

Select the venue to publish your study

Journal

- The work is mature: the theory/technique is fully developed. The verification was successful
- A more accurate preparation is needed
- Longer and tougher review process: subsequent revisions may be required
- More authoritative publication

Select the venue to publish your study

Journal

Selection criteria:

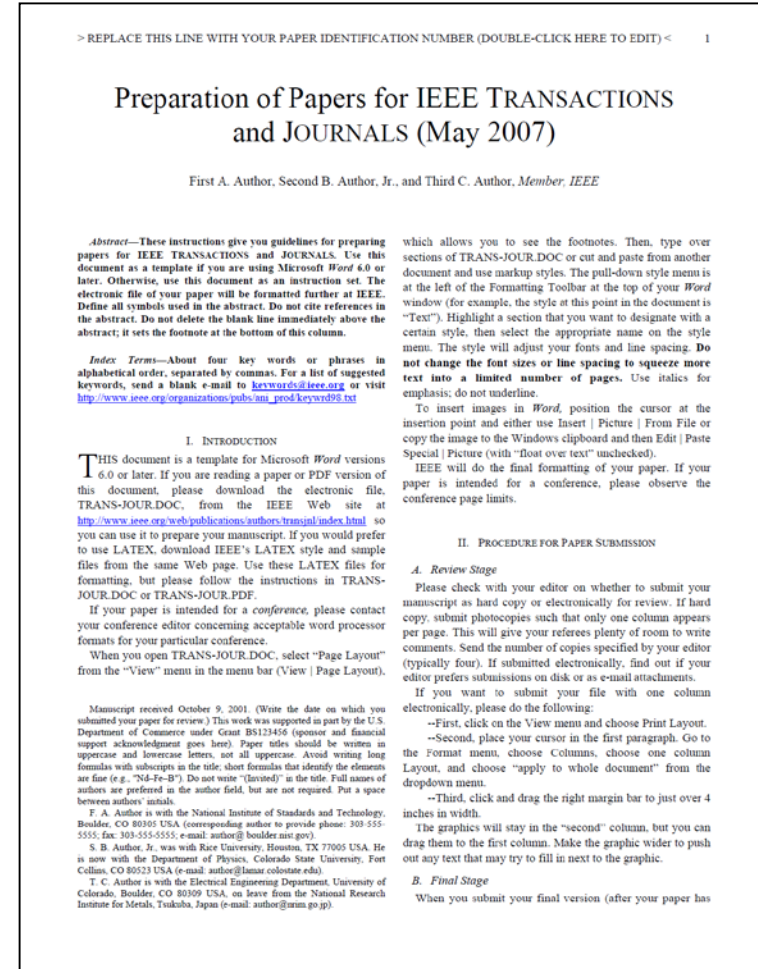
- Reach out the proper target audience
- International coverage
- Habit/previous publication
- Reputation or quality/prestige (rankings, Impact Factor)
- Overall editorial standard
- Publication speed
- Open Access
- ...

*Wrong decision:
failure to publish,
time lost*

Organization of the paper

Each journal/conference
has a **template**.

Follow it strictly!



<http://ieeauthorcenter.ieee.org/create-your-ieee-article/use-authoring-tools-and-ieee-article-templates/ieee-article-templates/templates-for-transactions/>

http://ieeauthorcenter.ieee.org/wp-content/uploads/IEEE_Style_Manual.pdf

Organization of the paper

- Title
- Authors
- Abstract
- Keywords
- Introduction
- Technical content
- Conclusion
- References



Organization of the paper

Title:

- Specific and brief description of contents
- Catchy, in a scientific way. Well... if possible
- Precise: the reader shall catch what the paper is about (remember, 900+ competitors in 10 years...)

Organization of the paper

Title:

An improved microstrip filter

= We sell fruits and vegetables

POOR



A novel low-pass step-impedance microstrip filter with improved out of band response

= We sell fresh lemons and apples, and healthy potatoes and fennels

BETTER



Organization of the paper

Authors:

- According to IEEE rules, authors:
 - made a significant contribution: theoretical, experimental, analysis/interpretation of data
 - contributed to drafting/reviewing/revising the article
 - approved the final version for publication
- Contributors who do not meet all of the above criteria may be included in the Acknowledgment
- Omitting an author or including a person who did not contribute is a breach of publishing ethics

Organization of the paper

Abstract:

- Overview of facts, results, conclusions
- Very important: it is read more widely than the article
- Placed at beginning of article, just below the title
- Written in third person, passive voice commonly used
- Should be self-contained. Don't include footnotes, references, ...
- < 10/15 rows

Organization of the paper

Keywords:

- Select few (<6) keywords that better describe the content
- Search engines/indexing databases depend on the accuracy of the keywords (and of the title). Again remember, 900+ competitors in 10 years...
- Try to use standard words as much as possible (an acronym invented by you is useless)

Organization of the paper

Introduction:

- Defines problem, scope, and purpose/objective of the study
- Provides theoretical and historical background.
References are mandatory here! Paraphrase, do not steal other people's wording...
- Outline the adopted methodology (in a descriptive way, no tiny technical details)
- Gives an overview of the organization of the paper

“Sec. II describes the proposed method, Sec. III validates the method, ...”

Organization of the paper

Technical content:

- Typically split into several sections
- Methodology: explain the proposed theory/technique/technology in details. It must be reproducible and verifiable by other researchers
- Results: the goal is to show how your findings satisfy your objectives. Give illustrative examples by using tables and figures, and compare with theoretical/experimental/published results
- Validation of the results is mandatory!

Organization of the paper

Conclusion:

- Briefly remind the addressed problem and the methodology adopted to overcome limitations/drawbacks of existing solutions
- Explain how results confirm the goodness of the proposed approach (do not repeat the results), thus highlighting the significance of your work
- Should be self-contained: no citations, no cross-references to formulas/figures/tables
- < 20 rows

Organization of the paper

References:

- A comprehensive literature review enhances the credibility of your work, as your contribution extends from a solid foundation
- Makes possible for readers to retrace your steps
- Only list resources cited in paper, not general references
- Properly format each biblio item, providing the needed details to easily find it (see template)

Small details matter!

- If multiple mistakes in spelling and syntax, reviewer suspects similar sloppiness in the lab
- Only one idea in a sentence. Keep short: <20 words.
Long sentences: greater risk of grammatical errors



“Prototypes have been designed, manufactured and experimentally validated by adopting a standard commercial laminate, named Taconic TLY-5, with electromagnetic characteristics of dielectric permittivity constant $\epsilon_r = 2.2$ and dielectric loss tangent factor $\tan\delta = 0.0009$.”



“All prototypes have been implemented by adopting Taconic TLY-5 substrate, with dielectric permittivity $\epsilon_r = 2.2$ and loss tangent $\tan\delta = 0.0009$.”



“Prototypes were based on Taconic TLY-5 substrate ($\epsilon_r = 2.2$, $\tan\delta = 0.0009$).”

Small details matter!

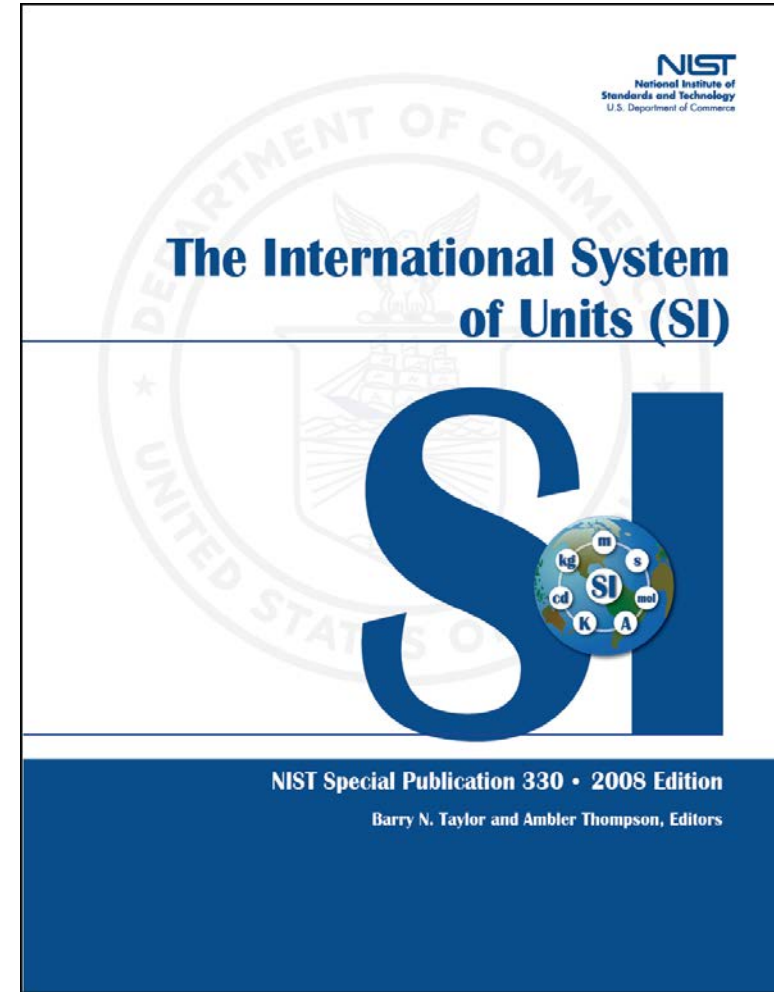
- Measurement units: there are rules, follow them!
- Examples:
 - numbers are never italic
 - measurement units are never italic
 - add a space between the number and the meas. unit

wrong!

10cm
50 ohm
200Kv

correct!

10 cm
50 Ω
200 kV

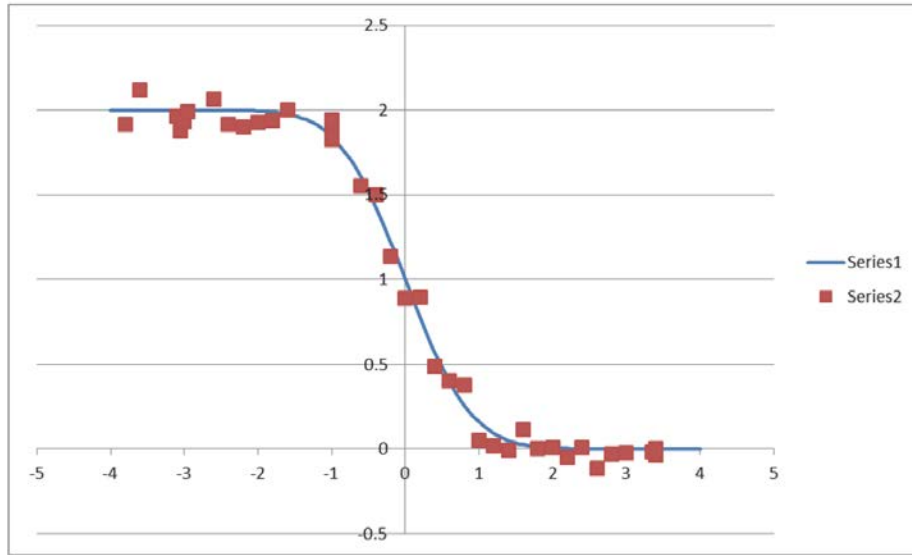


<https://www.nist.gov/sites/default/files/documents/2016/12/07/sp330.pdf>

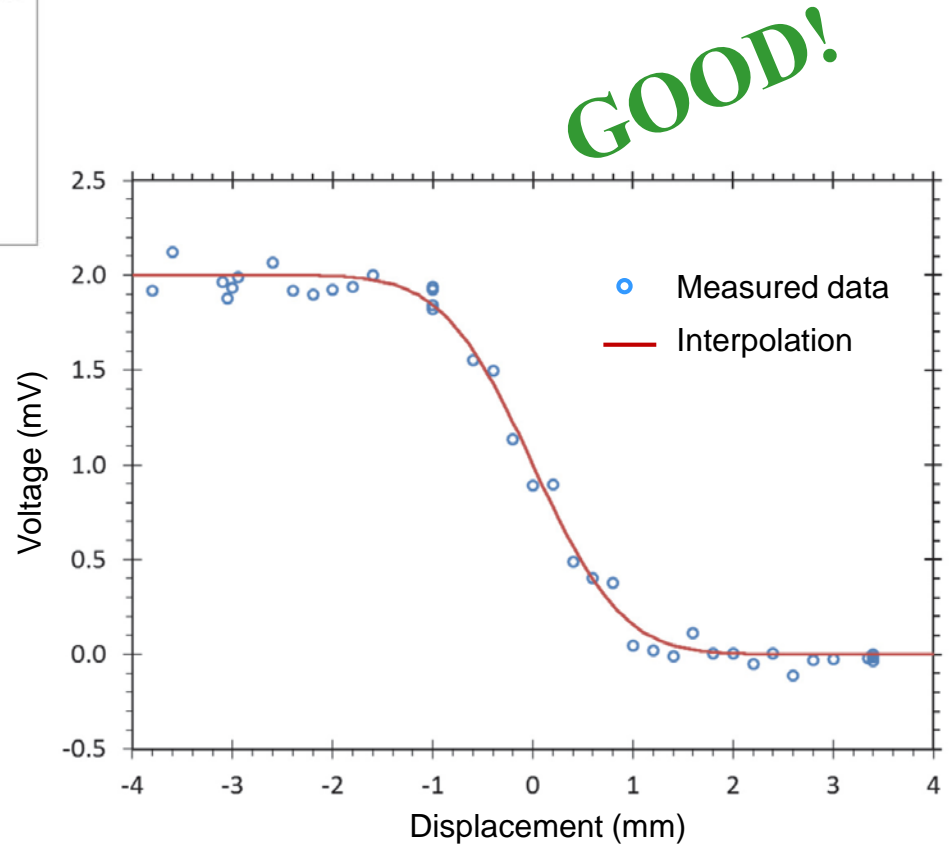
Small details matter!

- Figures and tables are the most efficient way to present results. Proper formatting significantly improves readability
- Dimension the figures to be included without resizing. Use the same size of the text
- The symbols in the figures shall have the same appearance as in the text and formulas.
- Captions are descriptions of tables/figures: explain clearly what is shown, and include the details necessary to understand the item

Small details matter!



BAD!



GOOD!

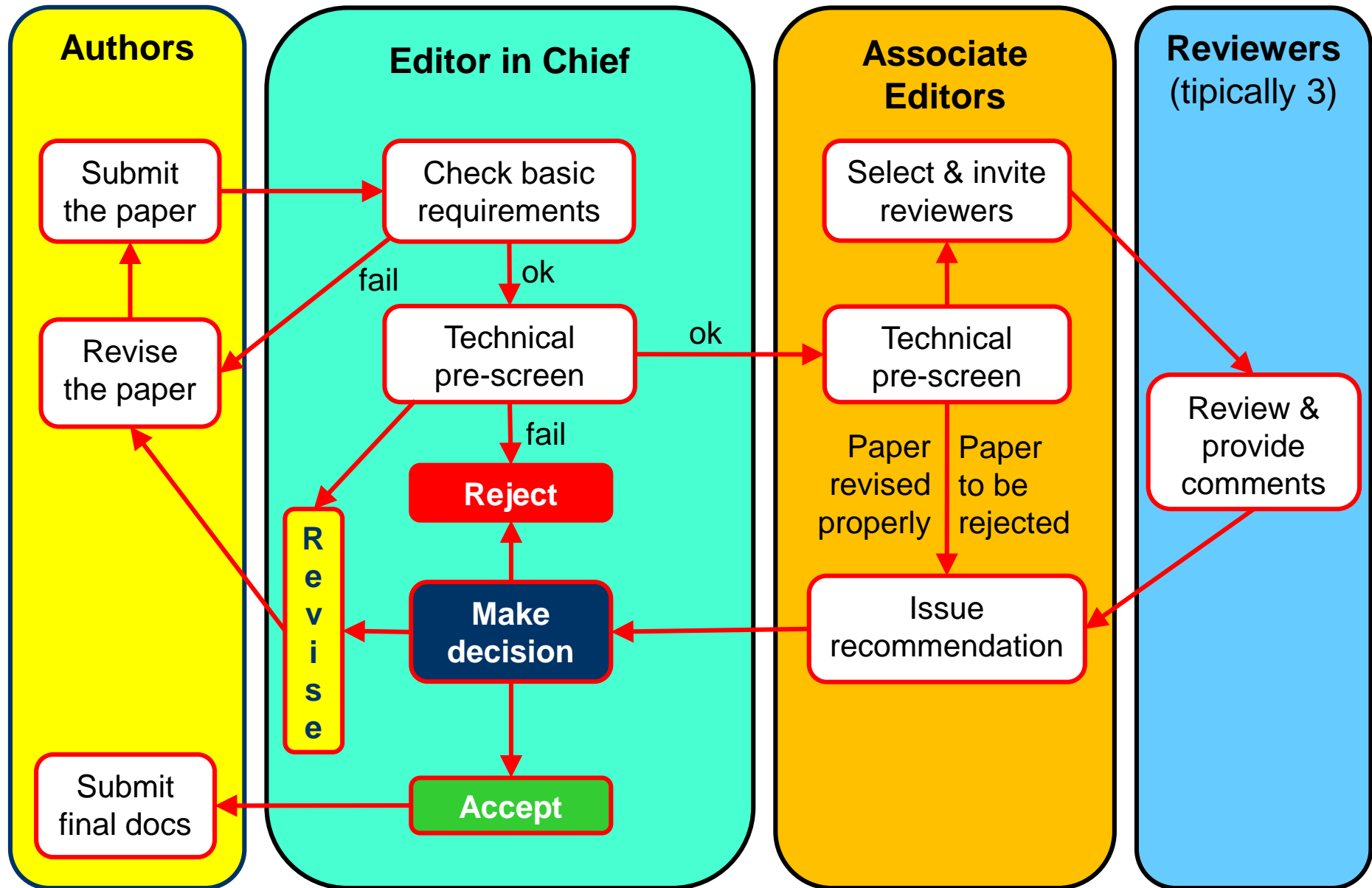
Ethics of scientific writing

- Avoid double publication of the same matter
- Avoid contemporary submission of the same matter to different journals and/or conferences
- Don't use the work of others without appropriate attribution (plagiarism may lead to ban the authors)
- List only those co-authors who contributed substantially to the work

The review process

- Science depends on the peer review process to assess paper technical correctness, novelty, significance
- The review process is an important step to further improve your work
- Keep in mind that reviewers are the first readers of your paper. If they believe something is unclear, do your best to make it understandable
- Do not fight with reviewers, use their comments to improve your work

The review process



Prepare the revised manuscript

- Return the revised manuscript to the editor with a point-by-point response to the reviewers' comments and a version with all the changes duly highlighted (e.g., by color)
- Keep in mind that reviewers are the first readers of your paper. If they believe something is unclear, do your best to make it understandable
- Do not only reply to the reviewers. Modify the manuscript to clarify their doubts

Production and publication

- Upload the required documents (read carefully the instructions to avoid delays)
- Complete the copyright form (e-copyright for IEEE)
- Read the proof sent by the production and ensure that everything is okay
- Return the proof back approved/commented before the deadline
- Wait to see the article posted online and/or printed



What if the paper is rejected?

- IEEE policy allows resubmission of rejected manuscripts
- If the manuscript was **rejected for technical reasons** (e.g., missing validation, errors in the theory, ...) **you can revise and resubmit** to the same journal. However, if the EiC judges the revision not satisfactory, the paper is rejected upfront
- If the manuscript was **rejected for lack of novelty**, you should try to **re-orient your research** activity to address a more hot topic

Personal view of the review process

- The review process is not a matter of accepting/rejecting papers
- It is a fundamental contribution of the whole scientific community to elevate the quality of any research study
- If properly conducted by editors and reviewers, and correctly perceived by the authors, it will help tuning the study to make it worth publishing

Thank you

