Writing a Research Journal Article: A Brief Guide on How to Get Published

Claudio Ruggieri

Polytechnic Engineering School

University of São Paulo - Brazil

Version 1.0 – March 2023

Preamble

Communication is an integral part of the work performed by a scientist or researcher. A good article serves to gage the quality of the work and, at the same time, to provide a long-lasting body of knowledge from which other researchers and, ultimately, our society can benefit from. However, the task of writing a scientific paper can be a daunting job for graduate students and young researchers whose native language is not English.

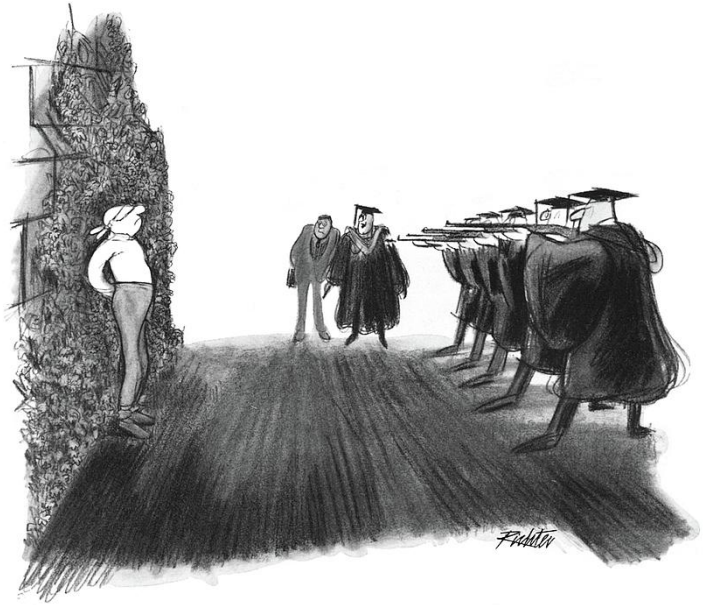
Building upon the author's own experience and his many years as a researcher and visiting scholar in a number of US and UK universities, this brief tutorial aims to help those graduate students and young researchers to write more effectively as a scientist and researcher, specifically in the English language, so that they can succeed in getting their research work published.

Outline

- The Basics: Why Write a Research Paper?
- A Few Things Before You Start
- The General Structure of a Good Research Paper
- The Writing Process: How to Write
- The Review Process
- Closing

Why Publish a Research Paper ?

The Publish or Perish Dilemma



"It's publish or perish, and he hasn't published."

Mischa Richter, New York Cartoons

- *It should be the rule for serious researchers: if you don't publish you may not succeed in your academic career.*
- *Quantity does not matter. Focus on quality!*

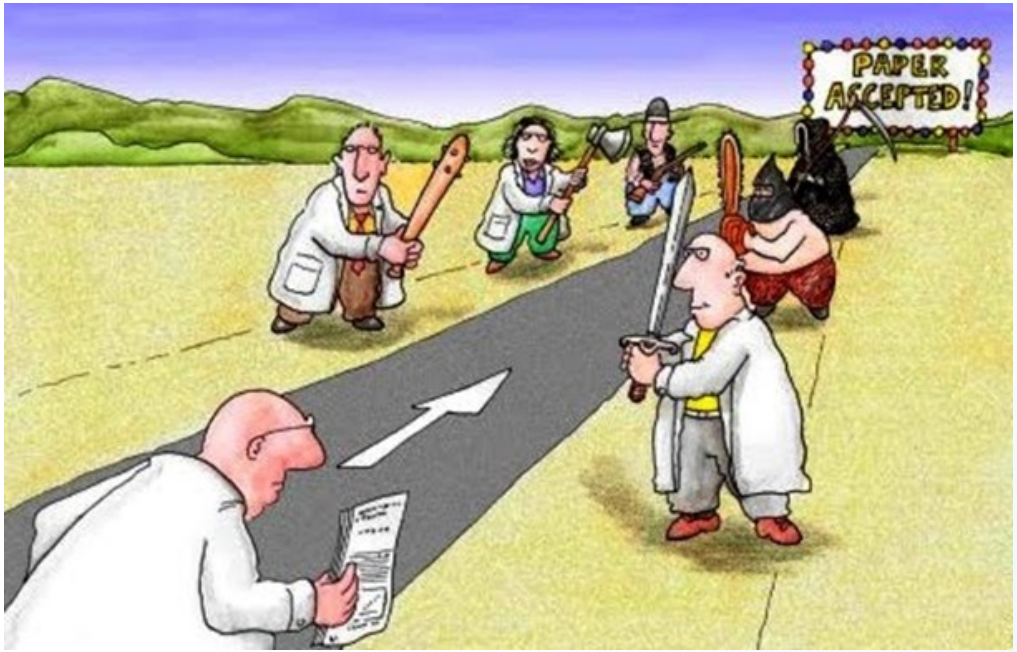
Importance of Writing a Research Paper

- **Writing a research paper (and publishing it) is the primary channel for passing on knowledge to scientists and researchers working in the same or related fields.**
- **Research papers are a highly effective platform to disseminate and popularize the research work to a general or specific audience, thereby contributing to further developments and applications of the findings.**
- **Moreover, writing (and presenting/communicating) is an essential part of an academic career.**

The Pressure to Publish Academic Work

- **It doesn’t matter whether or not you think it is fair (but who said that life is fair?): if you are an academic or young scientist/researcher, your publishing record will have a crucial impact on your career.**
- **Publishing good research papers can profoundly affect your prospects for climbing the academic ladder, opening the avenues for getting research grants and for gaining the respect of your peers.**
- **While the publication rate is not the only metric of an academic performance, the number of peer-reviewed articles and the number of citations are generally a good reflection of an academic reach.**

The Ruthless Darwinian Process of Publishing



The Conversation Newsletter, 2013. Cartoon by Nick Kim, Massey University, Wellington

The Bright Side of Writing ☺

- **The goal of research is the discovery of new knowledge and solving problems that no one has solved before.**
- **Scholarly publication is the act of presenting the results of your research to the community in writing, so that all can benefit from the new knowledge generated.**

Keith D. Hjelmstad, What Paper Are You Working On? Advice on how to do research. 2002

Before You Start

The Article Content

- **Spend some time thinking about the article content and write down some ideas to create a general outline for the paper (using a top-down approach generally works well).**
- **Consider asking yourself a few key questions:**

  What is the message of the paper?

  Are there new results or contributions?

  Is the paper worth writing?

Know Your Audience

- **Scientific and technical writing should focus on a specific audience and not be written as a general purpose document.**
- **Consequently, you should choose (and perhaps adapt) the style and level of writing, which may also include the structure of the paper, that is consistent and appropriate to your audience.**
- **Assess whether the topic of the paper is within the scope and format of the chosen journal and whether it would be consistent with the intended audience.**

Deciding Which Journal to Publish In

- **Make sure your work fits the aims and scopes of the journal.**
- **Moreover, several journals covering similar fields focus on different aspects of those fields. For example, one journal may focus primarily on theoretical aspects while others may favor experimental work and applications.**
- **Consider the journal's impact factor and whether the journal may perhaps be classified as a *predatory journal*, i.e., it accepts articles for publication (along with authors' fees) without any acceptable review process, thereby seriously compromising the article quality.**

The Structure of a Research Paper

Basic Structure

The Abstract

- **A single paragraph preceding the main body of the article that summarizes the content and may serve as its index, thereby helping in the library database search.**
- **The abstract should inform the reader in a concise manner about the focus (i.e., what the article is about) and the major contributions under discussion.**

The Introduction

- **It is perhaps the most important section in the article as it will provide the motivation and relevance of the work, bring attention to the reader and pave the way for the developments and contributions that follow in the article.**
- **The introduction should also be broken down into smaller sub-sections (each one usually associated with one or two paragraphs) following a logical presentation, as briefly illustrated next.**

Subdividing the Introduction

- **The first paragraph should clearly bring attention to the reader by starting with a general topic and then narrowing down the problem.**
- **After introducing the problem, the middle paragraphs serve to describe more specifically, if needed, the problem addressed in the article and, at the same time, provide a literature review.**
- **The introduction ends with a *road-map* description than can either give a general outline of the contribution or a specific, section-by-section breakdown of the remaining article.**

Methods and/or Theoretical Background

- One or more sections detail the methods and/or theoretical background used in an objective and sound manner.
- They should be specific and provide the necessary background to support the results and conclusions.
- Moreover, the reader should be able to interpret and assess the quality of the results presented in the article.
- Depending on the intended scope, the description of methods or theoretical background can be presented in subsections covering more specific topics.

Results and Discussion

- **Presentation of results in a separate section allows for more flexibility in terms of organization and content as they are simply results – therefore, this is not the place for drawing conclusions.**
- **However, the results are often combined with the discussion in the same section, which enables interpretations and potential implications in the same section.**
- **While several journals require the results and discussion to be in separate sections, putting them together avoids repetition and facilitates interpretations in parallel with the results.**

Summary and Conclusions

- **The summary and conclusions should be short and as specific as possible to highlight important outcomes regarding elements that were previously presented and discussed.**
- **As a rule of thumb, this section should contain two or three paragraphs. The first paragraph provides an overview of the various sections discussed in the article, whereas the second paragraph (and possibly the third paragraph) draws the important conclusions.**
- **It may be a good idea to conclude the section by including future research directions that follow naturally from the article.**

Acknowledgements

- **The acknowledgments are given at the end of the article to formally recognize institutions, funding agencies and individuals that contributed to the work.**
- **Always acknowledge financial support of the research by, for example, giving the name of the funding agency and grant or contract number.**
- **Acknowledge research contributions by people other than the authors, including those who gave scientific guidance and further insights or shared unpublished results and thoughts.**

References

- The references in your work also demonstrate your knowledge in the field which the article relates to.
- All the cited reference works must appear as a list that should follow the formatting requirements of the journal in which the article was submitted to.
- Refereed journal articles, books, refereed conference proceedings and research monographs and reports are preferred.
- If possible, avoid including references written in a language other than English.

How to Write

First Things First

- **Bear in mind that mastering the English language, albeit very important, does not necessarily guarantee the success of a journal article since writing a good scientific paper is almost an art. It takes a lot of persistence and a lot of time to prepare a single paper for publication.**
- **Thus, you need to have a writing strategy and develop your research paper in a structured and organized way.**

scientificwritingtips.wordpress.com

Before Starting Writing

- Do not just describe your work. Plan what you are going to write.
- Even well-written manuscripts are rejected due to lack of novelty. Ask yourself what is new and relevant in your work. Emphasize the contribution of the work.
- Outline the article by structuring and organizing the contents into smaller blocks of related topics
- Focus on high quality data not quantity or volume of data. Including irrelevant data does not add to the quality of the manuscript and deviates the reader's attention. Moreover, focus on the effectiveness of the communication.

Focus on the Reader

- **The primary purpose of a technical writing is to disseminate ideas and research results. Thus, write it clearly and concisely.**
- **Provide clear and accurate explanation, particularly in the case of key topics of the article, without ambiguities. Never let the reader guess what is under discussion or being presented.**
- **Put yourself in the reader's place and ask yourself whether you would interpret what is written correctly.**
- **Use plain and simple English with good writing flow.**

Make Your Work Interesting to the Reader

www.nature.com

- *Many scientific papers fail to usefully communicate research work to their audience. They focus on the authors instead of on the readers by failing to clarify the motivation for the work or by including unnecessary details.*
- *Effective scientific papers, in contrast, are interesting and useful to many readers, including newcomers to the field.*

How to Make Your Writing Flow

- **Good writing flow is essential to the quality of your article by ensuring solid coherence of the key points and proper word choice.**
- **Ensure that paragraphs have a clear organizational and solid structure.**
- **Use transition words, such as “thus” or “however”, to signal the reader that the next sentence has some relation to the previous one.**
- **Although very long sentences are not recommended, it is also a good idea to use varied sentence lengths and structures to break up the monotony of the text.**

Illustrations and Figures

- **Illustrations represent a key ingredient to your article because figures and tables are the most efficient way to present results.**
- **Moreover, good results are THE driving force of your article. Consequently, even if what you wrote in the article is sound and well developed, the review of the article may be severely penalized by poor illustrations, including graphs and plots.**
- **Captions and legends must be detailed enough to make figures and tables essentially self explanatory.**

General English Writing Tips I

- **Poor English makes it difficult for the editors and, particularly, reviewers to understand your work and ultimately your article. This might lead to rejection of your paper.**
- **Common English mistakes include (but not limited to):**

  Poor sentence construction

  Incorrect tenses and too much passive voice

  Inaccurate grammar

  Use of words with different meanings. Here, use a good dictionary such as, for example, the Merriam Webster.

General English Writing Tips II

- **Avoid using long structures when they can be replaced by short ones.**

  For example, instead of writing "In order to generate the numerical solutions for …", simply use "To generate the numerical solutions for …"

- **Avoid writing in passive voice.**

  For example, instead of writing "It can be seen in the plots …" or, even worse, "It has been shown in the plots …", simply use "The results displayed in the plots show …"

General English Writing Tips III

- In a scientific paper, a general rule is to use verb tenses (past, present, and future) exactly as you would in ordinary writing.
- Use the past tense to report what happened in the past: what you did, what someone reported, what happened in an experiment.
- Use the present tense to express general truths, such as conclusions (drawn by you or by others) and atemporal facts (including information about what the paper does or covers).
- Reserve the future tense for perspectives: what you will do in the coming months or years.

General English Writing Tips IV

- **Alternatively, when referring to previously published work, it is fine to refer to it in present tense:**

  Johnson and Lambert provide a numerical method to solve the nonlinear system of partial differential equations.

- **Moreover, when describing your own work or study, refer to it in past tense:**

  In previous work, we developed an improved numerical method to solve the nonlinear system of partial differential equations.

General English Writing Tips V

- **To WRITE in English, it is best to THINK in English and not in your foreign language.**
- **That is because a foreign language most likely uses concepts not present in the English language or that are present in the English language in a different way or to a different extent.**
- **Several examples include the correct use of prepositions, verbal tenses and words that have similar forms but different meanings.**
- **Always double check whether the sentence construction, the verbal tense or the use of a preposition are correct.**

The Review Process

What to Expect

- **Before sending your article out to a journal, revise and edit it thoroughly even if it appears time consuming.**
- **Most journals will require that your article be reviewed by 2 to 4 reviewers, who will primarily focus on the scientific merit, novelty and contribution. However, while they will likely not correct English grammar or poor sentence construction, these will negatively influence their judgment on the scientific merits and contribution of your work.**
- **By writing your article with good literary English and good writing flow, you will increase the chances of a favorable review, since the reviewers will focus on what really matters, which is the article's scientific merit.**

Reaching the Reviewer

- **Do not underestimate the review process since most reviewers will really go through your paper in detail only if they can form a good opinion about the work. The rejection rate in many typical engineering journal is ± 30%.**
- **Firstly, they read the abstract to see if the paper is interesting. Then, they skim through the Introduction to form a first opinion about the paper.**
- **Next, they read the rest of the paper searching for evidences that support the quality of the work and the results.**
- **Depending on the structure, organization, writing and results, by the time they get to Section 2 or Section 3, they may have already formed their opinion whether to accept or reject the paper.**

Your Paper is Accepted: What Now?

- **Once the article is accepted and the final version is published, it will hopefully achieve one of its primary objectives, which is to present your research and associated results to a broader audience.**
- **Bear in mind, however, that once your paper is published, there is no going back! What was published stays there for the whole world to read it.**
- **Consequently, carefully review all equations, tables, figures and data that were provided in the article. In general, the reviewers will not check the correctness of every equation and, certainly, will not check the consistency of all data provided in the tables and figures of your article.**

Closing

A Final Word

Despite the daunting task of writing a scientific article about your research work, it is an undeniable great achievement not only to see your words in print, but, perhaps more importantly, to receive the recognition of your work by your peers.

Thus, the need to publish should not lead to despair, but, on the contrary, it should be a pleasure, not a pressure. It should be a focal point in which good ideas and solid research work converge to produce scientific and technological knowledge which the entire society can benefit from.

Thanks!

claudio.ruggieri@usp.br

The search for truth is in one way hard and in another way easy, for it is evident that no one can master it fully or miss it wholly. But each adds a little to our knowledge of nature, and from all the facts assembled there arises a certain grandeur. (Aristotle, 384 BC-322 BC)

About the Author

Claudio Ruggieri is Professor of Structural Engineering and Fracture Mechanics at University of São Paulo (USP), Brazil and principal investigator of the Fracture Mechanics and Structural Integrity Research Group (NAMEF) at USP. He was a visiting researcher at University of Illinois at Urbana-Champaign (1994-1997), University of California at Santa Barbara (UCSB) from 2014 to 2015 and at University of Manchester (UK) in 2018. Prof. Ruggieri is also a Research Fellow with the Brazilian Research Council (CNPq 1A) and a member of various committees and editorial boards, including Committee E08 (Fracture and Fatigue) of the American Society for Testing and Materials (ASTM), Editorial Advisory Board for Engineering Fracture Mechanics, the European Structural Integrity Society (ESIS) and the Brazilian Society of Mechanical Sciences (ABCM). He is currently a visiting researcher at Texas A&M University, Texas.