

A guide for writing a scientific paper

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1 Introduction

As editors of Studia UBB Informatica we have noticed that many papers contain some frequent errors. The best way to change this situation, to improve the quality of Studia papers, is to underline these frequent errors [Fre10]. And also, to offer a guide for writing papers for the Studia UBB Informatica journal, which we try to do here.

We have noticed that authors tend to pay less attention on details they should take care of before sending the paper to the journal. We have identified at least four types of errors: linguistic errors, scientific content errors, paper style errors, LaTeX related errors.

We underline from the beginning that the rules from this guide are well known, and we mention their sources. But we consider useful to have these rules in a single place, with our specific preferences, in a form we expect to be obeyed by authors publishing in the Studia UBB Informatica journal. They are recommended to all authors publishing in Studia UBB Informatica.

2 Structure of a paper

A scientific paper must contain the following sections:

- Title
- Abstract
- Introduction
- Main contribution
- Conclusions and Future Work
- References.

Also, each paper should have the names of the authors, keywords, ACM [ACM] and AMS [AMS] classifications, and authors' addresses. These must be present in all papers. If the author(s) consider, an acknowledgement section may follow the conclusions [Day79, Tis*1, ***1].

The **title** must briefly reflect the contents of the paper. It must be as short as possible, and should clearly reflect the paper content.

The **Abstract** should present the basic results obtained by the author and contained in the paper. It must clearly and concisely present these results, in no more than 250 words. No other information about existing results must be written in the abstract, and no references are cited here.

The **Introduction** should present the purpose of the author, the subject approached in the paper and the results obtained. Also, the importance of these obtained results should be underlined. These results are presented by comparison to the existing work, which must be described and all other papers used should be cited and presented in the References part.

When this description of existing results is consistent and needs a greater space, it may be a separate **Background (Related work)** section.

The **Main contribution** part must present the author's original contribution, his methods, experiments and reasoning, with all results obtained. If there are some important results, they may be presented in separate sections. The author must present clearly, completely, with sufficient detail and rigour, what he has done. All hypotheses, experiments, deductions, and results, and their interpretation must be described. The statements must be clear, long sentences must be avoided, and ambiguities eliminated.

This part may use tables and figures to facilitate understanding. They should be sequentially numbered. Their place in the paper is immediately after the paragraph where they were cited, or on the next page. Each of them should have a short legend describing it. But avoid including data that is not strictly necessary. Also, the tables and figures must be cited in the paper [Mal01].

The **Conclusions and Future Work** section must state exactly, and must agree with what has been done in the paper. But do not repeat the sentences from the abstract or from introduction [Boc07, Nad05]. The author's results and their importance should be underlined. Also, the superiority of these results to the existing work, and other aspects that have not been said in the introduction, may be written here. Finally, the author may finish with some open problems, and some thoughts for future work.

The **References** part should contain all papers that were used by or influenced the author in writing that paper. All of them must be cited inside the paper referred to by their numbers in the references list. References in the list must be arranged / ordered lexicographically.

A reference should contain all information needed to discover that paper; the journal or proceedings where it was published, the volume, number of issue, and pages inside. For clarity an example of a reference - paper in a journal is [Day75], of a paper in web is [Ler96], of a paper in a conference proceedings is [Pop09], and of a book or monograph is [Zob97].

Appendices may complete the contribution section with proofs and experiments that were mentioned there. They are useful for interesting readers to follow completely the author's reasons, but are considered burdensome for some other readers. The details of proofs and of experiments, important data used, other useful information for a thorough / complete understanding of the paper should be given in appendices.

3 Language correctness

The use of English in scientific papers has been extensively studied. In [Tis*1] there is a section on word usage in scientific writing. Past, present, and future tenses are discussed in [Mal01]. The paper [Amo77] deals with linguistic problems in scientific papers. We are covering in this guide the most important problems that authors seem to have.

There are two different situations that involve the use of **“I”, “we” and “one”**. When there are paper sections discussing known results, the passive voice, neutral subjects or “we” are recommended. When there are paper sections discussing original results written by

authors, the use of “we” is recommended. “I” is to be used in exceptional cases only. As well, “you” should not be used. The reader should not be addressed directly in a scientific paper.

Care should be taken when using pairs of words with similar meaning. The words **“Which”** and **“that”** should be used appropriately. Restrictive clauses are introduced by “that” and are not separated from the rest of the sentence by commas. Non-restrictive clauses are introduced by “which” and must be separated by commas from the rest of the sentence to indicate parenthesis.

Similar words, whose use is quite difficult for a Romanian person, are **“can”** and **“may”**. “Can”, as a verb, refers to “ability”. “May” has to do with “possibility” and “permission”.

Colloquial versions **“don’t”**, **“can’t”**, **“aren’t”**, **“won’t”** must not be used in scientific papers, as they induce a form of familiarity to the reader. The unabridged forms “do not”, “can not”, “are not”, “will not” have to be used.

British or American English language should be used consistently in the paper. A paper should not mix words with British spelling with words with American spelling. In Computer Science, the choice for the use of British or American spelling should be easier, since almost all API’s (for instance) follow American spelling. As an example, it would be strange to read in a paper “... the *colour* identified using the *v.color* attribute”.

All **variables** should be written in italics and all matrices and vectors should be written in boldface. Reading that “... the variable *a* is defined ...” is strange. Use instead “... the variable *a* is defined ...”.

4 LaTeX style and typesetting errors

There is a diverse array of LaTeX errors our authors make on a general basis. First and foremost, the papers should be (directly) written in LaTeX, and not in another WYSIWIG editor and converted afterwards. The use of such conversion features indicate the lack of LaTeX knowledge of authors and their choice to let the redaction be concerned with the aspect issues of the paper. Not only that this indicates lack of respect, this is as well an unacceptable behavior.

The Studia UBB Informatica editors have prepared a simple example file to be used by the authors. Not all of them use this model. We have received LaTeX papers using other style files or, even, using standard LaTeX styles. The example LaTeX file and the Studia style file are not there for our fun, but as a rule to be obeyed by authors.

A frequent LaTeX error has been the improper use of references and citations. Both should be done using LaTeX bibliographical features. Instead, quite a lot of papers use simple lists for references and square brackets for citations. In case of need please read a good LaTeX documentation, manual or book [Bla99].

Very frequent LaTeX errors are related to text justification, fonts and sizes. The paper title is sometimes very long. The same stands with authors’ name. The authors should use LaTeX syntax to produce a short title and short names for papers heading, such that the headers do not overlap with the page numbers. Authors should make sure their text is

correctly justified and that there are no words, equations, tables or figures left outside the text frame, on the right side of the page. As well, the official text size and fonts used by the journal are not to be replaced. We had a number of papers whose authors have changed the fonts to other fonts, more to their liking. Again, this is an unacceptable behavior.

Authors should make all effort to integrate the figures with their captions in the LaTeX document, using the standard LaTeX commands. As well, all numberings should be generated automatically. The papers should have automatic numbering features for sections, figures, tables, equations, references. In case of need, as always, you are sent to your preferred LaTeX documentation, manual or book [Bla99].

5 Studia Style

As Lange [Lan07] said, it is useful for each Journal to have a published guide that should be followed by the authors. And this is true for many journals [And09, Mal01].

It would be very useful the authors will read those 21 suggestions made by Lertzmann [Ler96]. One of them would be suitable to some of our authors:

“Do not think to publish the first draft”.

Reread it yourself, and correct all misspellings and ambiguous expression. Analyze each sentence to clarify its meaning. Replace unsuitable words and expression by more suitable ones. If there are long phrases rewrite them by shorter sentences. Since some of our authors are at their first papers, maybe PhD students, and almost all are Romanians, ask some other person to help reading your manuscript before submitting it to the editor. He may be your supervisor, or a research team-mate, or just a friend. Many authors [Day98, Ern10] suggest this possibility and many errors will not arrive at the reviewers. Finally, just before sending the paper to the editor, read it again!

Another frequent error which can be easily eliminated with a little attention from the authors consists in respecting the Studia style, and giving all required information. We think to keywords, scientific classification [ACM, AMS], authors' addresses, incomplete references, or missing citations.

Some authors have algorithms in their papers. These must respect some important rules, they should be easily understood by the reader, and reflect a good programming style of the author. The Pseudocode language comes from Dijkstra's work [Dij75], and all of us must know and respect his ideas. A recommended style can be found in [Fre02].

6 Rules and Suggestions

We try to extract from what have been written above, and from many referenced papers, the important rules that should be obeyed by the authors of Studia UBB Informatica Journal. Some of them are considered rules (letter R), the other only suggestions (letter S).

First of all, all authors must have an ethical behavior, the must adhere to the ethical principles of scientific research [Ben05, Bri04, Gan93, IEEE]. We have in the past an unpleasant experience of plagiarism [Stu07]. In such cases the author will be banned from

publishing in our Journal. The editor can not afford to discover such behavior searching the Web. After all, there are many journals that are not seen in the Web. It is the author's responsibility for his acts! But there is some other unethical behavior. In this respect we consider that the first rule that must be obeyed by all authors in the world refers to the ethics of scientific research.

R1. Respect the required ethical conduct:

- Do not hide conflicting results; try to explain!
- Do not copy ideas, or paragraphs from other papers without citing them!
- Do not forget to cite all papers that inspired you!
- Do not fabricate or falsify data!

R2. Read and respect "the Instructions for Authors" from Studia homepage!

R3. Before sending your paper to the editor check if this is complete. Are there suitable keywords, ACM and AMS classifications? Did you forget to write your address and your mail?

S4. If you intend to write English paper in your career and you are not well acquainted with/ do not master well English, improve it. Learn by the writings of others, and from your experience!

R5. Respect the Mathematics and Computer Science terminology!

R6. When a paper has at least two authors they must sign a form to state they all approved the final draft sent to editors.

R7. The author/s must sign a form to state the paper was not published or sent to another journal.

R8. Define shortcuts first time they are used. A shortcut should be defined only if it is used at least three times.

R9. Write clearly, concisely, and correctly!

R10. Use simple words; pay attention to understandability of your text!

R11. Use a spellchecker to eliminate typing and lexical errors!

R12. Since all authors of a paper are responsible for its content, all of them must read and agree with the final draft.

R13. A figure or a table must be written on a single page, usually immediately after the paragraph where it was cited, or in the next page!

R14. Do not write "as can be seen in the following figure". Use "as can be seen in Figure 2", and label your figures.

- S15. Be careful to the clarity of your algorithms!
- R16. Abstract part should not refer to any part of the paper!
- R17. All the statements have to be proven!
- R18. The author's results are in past tense!
- R19. Numbers of value ten or less are spelled out. Write "five objects" not "5 objects".
- R20. When a reference is cited write first the author's name as in "Hoare [5] showed ...", not "[5] showed ...".
- R21. Use space after punctuation (not before), or around parentheses. Write "... done, and ...", not "... done ,and ...".
- R22. Parentheses should be attached to the word inside, and separated with one space from the word outside. Write (like this) and not(like this) , for example.
- R23. When you refer to one section of the paper start with capital letter, as in "Section 3".
- R24. Use past tense in your writing!
- R25. Use text instead of tables if this is possible!
- R26. Restate the others results with your own words and cite the source!
- R27. Each table, or figure, should be numbered, have a title and a legend describing it!
- R28. The references are written in alphabetical order. When the same author/name has two items use chronological order for these items.

References

- [ACM] Association of Computing Machinery, The ACM Computing Classification System, <http://www.acm.org/about/class/1998>
- [ACS] American Chemical Society, Ethical Guidelines to publication of Chemical Research
- [AMS] American Mathematical Society, The AMS Mathematics Subject Classification, <http://www.ams.org/msc>
- [Amo77] S. Amonson, Style in Scientific Writing, Essays of an Information scientist, vol.3 (1977-78), p.4-13.

- [And09] R. Andone, I. Dzitac, How to write a good paper in Computer Science and how will it be Measured by ISI web of Knowledge, Int. J. of Computers, Communication, and Control, 5 (4), 2010, pp.432-446
- [Ben05] D.J. Benos, et all, Ethics in scientific publications, Advan.Physiol. Edu., 29 (2005), p. 59-74, doi:10.1152/advan.00056.2004.
- [Bla99] Blaga, P. A., Pop, H. F. L^AT_EX 2 ϵ , Editura Tehnică, București, 1999.
- [Boc07] G. Bochmann, How to do Research Paper in Computer Science, (contains Writing Technical Articles by H. Schulzrinne), <http://www.elg.uottawa.ca/~bnochmann/dsrg/how-to-do-good-research/how-to-write-papers>
- [Bri04] J. Brice, J. Bligh, Author misconduct: not just the editors responsibility, Medical Education, 39 (2004), p.83-89.
- [Buc10] B. Buchberger, Thinking, Speaking, Writing, Springer Verlag, 2010, <http://www.risc.jku.at/education/courses/ws2010/tsw>
- [Day75] R. Day, How to write a scientific paper, IEEE Trans. On Professional Communication, ASM News, 41 (7) 1975, 486-494.
- [Day98] R. Day, How to Write and Publish a Scientific Paper, Oryx Press, 1998.
- [Dij75] E. W. Dijkstra, Guarded commands, nondeterminism and formal derivation of programs, Comm. A.C.M., vol.18 (8), 1975, pp. 453-457.
- [Ern10] M. Ernst, Writing a technical paper, <http://www.cs.washington.edu/homes/mernst/advice/write-technical-paper-html>
- [Fre02] M. Frențiu, Programming style, <http://www.cs.ubbcluj.ro/~mfrentiu/style>
- [Gan93] R. D. Ganatra, Ethics of authorship of scientific papers, Journal of the Forum for Medical Ethics Society, vol. 7 (3), 2010, p.1-5.
- [IEEE] IEEE, Software Engineering Code of Ethics and Professional Practice, IEEE-CS/ACM Joint Task Force on Software Engineering Ethics and Professional Practices, 1998.
- [Lan07] P. Lange, How to write a scientific paper for a peer-reviewed journal, chapter 5 in “How to write and illustrate a Scientific Paper, Cambridge Press, UK.
- [Ler96] K. Lertzman, Twenty one suggestions for Writing Good Science Paper, Bulletin of the Ecological Society of America, 1996, <http://bio.wiona.edu/delong/EcolLab/21%20Sugestions.html>
- [Mal01] S. Maloy, Guidelines for Writing a Scientific Paper, <http://www.sci.sdsu.edu/~smaloy/MicrobialGenetics/topics/scientific-writing.pdf>

- [Mal10] S. Maloy, How to write a scientific paper and Word Usage in Scientific Writing, <http://www.sciencediversity.com/2010/how-to-write-a-scientific-paper-and-word-usage-in-scientific-writing>
- [Nad05] A. Nadim, How to write a Scientific Paper, ASJOG, Vol.2 (2005), 255-258, <http://www.asjog.org>
- [Pop09] H.F. Pop, M. Frențiu, Effort Estimation by Analogy based on Soft Computing Methods, KEPT2009: Knowledge Engineering: Principles and Techniques, Selected Papers, Cluj University Press, Cluj-Napoca, 239-246, 2009.
- [Sch09] Henning Schulzrinne, Common Bugs in Writing, 2009 <http://www.columbia.edu/~hgs/etc/writing-bugs.html>
- [Stu05] Editors, Final Note on Dănuț Marcu, Studia Univ. Babeș-Bolyai, Seria Informatica, 52 (1), 2007, p. 112.
- [Tis*1] M. E. Tischler, Scientific Writing Booklet, <http://www.biochem.arizona.edu/mark/sci-writing.pdf>
- [Vla10] M. Vlada, Metodologia conceperii, elaborării și redactării lucrărilor științifice, Conferința Națională de Învățământ Virtual, ediția a VII-a, 2009, p. 47-53.
- [Zob97] Zobel, Writing for Computer Science. The Art of Effective Communication, Springer Verlag, 1997.
- [***1] ***, Principles of Science Writing, Scitext Cambridge, UK, <http://www.scitext.com/writing.php>