

Survival Guide for Scientist_s

Writing – Presentation – Email

Ad Lagendijk

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WRITING GUIDE FOR SCIENTISTS

4 TEXT STRUCTURE

4.A Organization of content

4.A.1 Margins

Regularly journals prescribe a margin size.

If you are free to choose your margins, choose them pretty large (left, right, top, and bottom).

This gives a relaxed impression and collaborators can easily insert comments in the printed version of the text.

4.A.2 Justification

Left and right margins determine where a line starts and where it ends. In texts four forms of justification can be applied:

Left justification. Lines have about equal length (if not overruled by hard returns or manual line breaks). New lines are aligned with the previous one on the left side. Hyphenation can reduce the raggedness on the right side. Also referred to as left alignment.

Right justification. Lines have about equal length (if not overruled by hard returns or manual line breaks). New lines are aligned with the previous one on the right side. Hyphenation can reduce the raggedness on the left side. Also referred to as right alignment.

Centered justification. Lines have about equal length (if not overruled by hard returns or manual line breaks). The center of new lines is aligned with the center of the text width (space between the margins). Hyphenation can reduce the length variations of the various sentences. Also referred to as centered alignment.

Full justification. There are no leading and no trailing spaces. Unprofessional word processors, like *MS Word*, implement this type of justification by adding extra space between the words in a sentence. Professional desktop software, like *Adobe's InDesign*, achieve this by adjusting the space between individual characters, by adding (micro)spaces between words, and by micro-changing of font sizes. Hyphenation can reduce the variation in character density of the various sentences.

The *La(Tex)* family uses a reasonably professional form of full justification.

You have no control over the justification used in a professional scientific journal. You do have control if you are writing an internal report or a thesis. If you do have control, never use full justification the *MS-Word* way. Either do it professionally or use left justification.

4.A.3 Subheadings

You write to be read. To be cited. To be followed. To be criticized. Help your readers. Break your results down into bite-size pieces. Keep it simple.

Use as many subheadings as possible.

The reader then knows much quicker whether or not he can skip the section. You can even explicitly help the reader to pass over some of your sections: "Readers not interested in the mathematical details can directly go to Section X".

Number all your subheadings if the journal allows it. This numbering will facilitate communication between multiple readers of your paper.

Try to minimize the coupling between different subsections. The lesser a subsection depends on the content of other subsections, the quicker your paper can be (partially) read.

If you find the number of subheadings too large, you can make them 'temporary' and remove them later, 'comment' them out.

4.A.3.A Hidden subheadings

A class of scientific papers do not allow to have subheadings in the paper. A number of short-letter type papers belong to this category.

Inexperienced authors should nevertheless use subheadings in these short notes. In the last stage of the preparation process these subheadings can be removed, or better: can be 'commented out'.

4.A.4 Paragraphs

A paragraph is a natural unit of information.

A paragraph containing more than ten sentences is often too long.

Look for a natural breaking point in a large paragraph. There you can start a new paragraph. Paragraphs are anchors for experienced readers. Help those readers to be able to quickly scan your paper.

4.A.5 Spaghetti text

Do not write spaghetti text by continuously referring to earlier pages or formulas. Readers get tired when they have to leaf through a text often. Your public is

not supposed to consist of pathfinders. You are neither writing for the referee, nor for somebody who is going to spell your text. Your average reader is mildly interested, and continuously looking for an excuse to put your paper aside. The use of headers and footers considerably increases the spaghetti-ness of your text. Avoid these notes as much as possible. Exceptions are of course footers and headers that contain page numbering or title/author information.

4.A.6 Parking places

Some subsections are parking places for information. For instance the subsection, or the part of the paper where the experimental details are presented, should be complete. Nowhere else in the paper should the reader be bothered with these experimental details. So a figure caption containing "The detector was calibrated using ..." is a crime. By putting all experimental details in the experimental section, the rest of the paper will be much easier to read and the interested reader does not have to use a radar device to find the spot where he can read about a particular experimental condition.

4.A.7 Standard partitioning

Many of your readers, including Nobel Prize winners, like and expect the standard pattern: introduction, experimental details, results, discussion, conclusion. Do not try to be original here.

Do not surprise the reader with an original structure.

4.A.8 Smooth text transitions

A scientific text should be a logical sequence of arguments. Nevertheless transitions will be present. Make them smooth. Announce next sections if they constitute a transition "In the next section we will present our new model".

4.B Length of sentences

Try to keep sentences short. A sentence longer than thirty words is difficult to read. You are probably a non-native English speaker and your reader certainly is. It requires quite some skill to produce easily readable sentences containing more than one comma. Always try to replace a comma by a period. Always try to replace a dependent clause that starts with "which" or "that" etc., by a new sentence.

5 TEXT CONTENT

The first author is in some sense the moral owner of the text. Coauthors should correct and come up with suggestions to improve the text. If in the end there is a discussion about language variants that differ only in taste, the opinion of the first author prevails. Senior authors should restrain themselves and not impose their own taste. First authors should be persistent in not giving in.

5.A Obligatory items

5.A.1 Title

Start with a working title.

Finalize the title only at the end.

Titles are short. No definite articles. Be precise. If your paper is 100% experimental, do not use a title that might give the impression that you have also done theory.

5.A.2 Authors

5.A.2.A First author

The first author writes the manuscript. Other authors comment and give suggestions. Never should a senior scientist write part of the paper himself. He should keep on discussing and suggesting modifications until he can live with the manuscript. A senior scientist, not being the first author, who writes part of the manuscript himself, will seriously depress and indeed insult the first author.

5.A.2.A.1 Many first authors

Group leaders with a big ego organize the writing of a paper differently. They split up the content of the paper in a number of parts. Each prospective coauthor gets to write such a part. They all have to turn in their sections and the group leader will glue it all together. Junior scientists in such a group will have a hard time growing up.

5.A.2.B Coauthors

Who will be coauthor? If your mother did not teach you any decency it is too late now anyway. The question of coauthorship only arises when the text is mature enough to be a concept for a paper. Or when there is agreement on what material should be in the paper. Discussing authorship earlier might give unnecessary friction, because the question who is going to be an author depends heavily on what is finally going to be in the manuscript.

Only put names of authors above the concept if you are sure that the list is complete.

Sending a concept with authors A, B, and C to colleague D with the question whether or not he wants to be a coauthor is an insult to colleague D.

5.A.2.B.1 Placeholder

If you want to postpone the discussion about the list of authors, circulate the concept with as authors the name of the first author and the placeholder "plus additional authors". Prospective authors that got a chance to glimpse at the concept do not feel excluded (yet).

5.A.2.B.2 Individual contributions

Some journals request a statement regarding the individual contributions of authors. The only acceptable solution is: all authors contribute equally. The reason being that it is very difficult to compare contributions. How would you weigh the 10% time input of a highly experienced, creative senior scientist against the 90% time input of an inexperienced junior.

5.A.2.B.3 Contribution of world specialist

Each and every author of a paper should understand the basics of that paper. Each and every author should be able to give a presentation on the content of that paper. With an increasing number of multidisciplinary papers this moral standard becomes more and more difficult to uphold.

A real moral problem is the specialist who has something that is indispensable for your research – a sample for instance. The specialist understands nothing of your work, but he requests to be coauthor on all the papers where you publish results obtained with his sample.

A good compromise is to put him on the first paper – sandwiched between a number of other coauthors – and leave him out on all future papers.

5.A.2.C Order of authors

The natural order of authors is: first author is the person who has spent most of his time on the subject, often a PhD student. The last author is the group leader. The remaining order is alphabetical between the first and last author. Exceptions

can be if there are more main contributors. Realize that readers will never understand subtle changes you make in the sequence of the list. In some journals you have to group the authors according to affiliation. In such a case the affiliation of the main contributor will be the first listed affiliation.

5.A.2.D Corresponding author

The role of the corresponding author is not clear. Many group leaders want to be the corresponding author. If they would leave this task to the (junior) first author the seniors feel they will 'lose control'. I think this is a bad habit of group leaders.

The first author should be the corresponding author, unless he has already left the group.

If questions are posed about the content of the paper, the first author is most likely to be able to answer them best. The corresponding author should never answer the question without consulting the coauthors. Correspondence should always be cc'd (carbon copy) to all authors. This informing of coauthors even holds when the group leader is the corresponding author.

5.A.2.E Spelling of names

Beginning scientists should make up their mind about how they want their names be printed all through their career. I am referring to spelling, the number of initials, use of first name, leaving out or maintaining difficult characters (like "ü", and "ó") and more.

Whatever you choose, be consistent all your life. If you fail to be consistent, citation databases will classify your papers under different names. You will get a much reduced citation record. In addition people might get confused about whether or not "Bill Smith" is the same as "J.W. Smith".

Europeans should realize that there can be funny misconceptions, especially with the use of capitals in name additions. A name spelled as "Van Beethoven" is to an American a guy whose first name is "Van".

5.A.2.E.1 Use of first names in author list

Each author in a list of authors can decide individually whether or not he wants to include his first name. Some journals might refuse to print first names.

5.A.3 Affiliations

The first concept of the paper is always written by the first author. This writer will in many cases be a junior scientist without much experience. For him the correctness and completeness of author affiliations will not be important.

Since the 1980's names of institutes change regularly, often following fashion and hypes. For instance since the year 2000 more and more institutes have incorporated the prefix 'nano' in their new or renewed names. To keep the

peace with local managers and operators, it is important for seniors to check that the list of affiliations is correct, actual, and complete.

Seniors should be careful if they have dual appointments.

They should give full credit to all those employers who have supported the reported research.

5.A.3.A Change of affiliation

The affiliation reported in the paper should be the place where the work has been performed. Junior scientists change their affiliation after they have finished their PhD. They might write papers about their (old) PhD work while already employed at a new place. Such junior scientists like to please their new group leaders by trying to get their new affiliation on the paper. This is immoral. The old institute has invested a lot of money in the research without getting any credit, whereas the new institute would get a paper for free.

5.A.4 Abstract

First write the paper and then write the abstract.

Be very precise about the character (experimental, theoretical, numerical simulation, synthesis, etc.) of the work you have accomplished. Do not mislead the reader. Help him.

Indexing in a number of (internet) databases will be done on the basis of keywords found in your abstract.

No math, tables or references in the abstract.

The abstract will usually be followed by either a list of keywords or a few keys indicating subject classification.

5.A.4.A Keywords

Be as precise as possible. Do not try to attract readers on false pretexts. Copy the keywords out of a paper of your successful competitors, or copy them out of an older paper of your own group.

5.A.4.B Subject classification

Be as precise as possible. Do not try to attract readers on false pretexts. Well-organized societies, like the APS, maintain a comprehensive list of subject classification that has to be used on all papers submitted to these societies. In the case of the APS it is called the **PACS** (Physics and Astronomy Classification Scheme).

Copy the subject classifications out of a recent paper of your successful competitors.

<http://publish.aps.org/PACS/>

5.A.5 Date

Take care that the output, hard copy or digital, will contain the date (at least once on the first page 1).

Of course not with “\today” (because this *Latex* macro will be updated each time you recompile the *Latex* file). Very convenient for your coauthors is the use of “\pagestyle{myheadings}” left and right with the date. Every page will contain the date now. If one of your coauthors has two different hard-copy versions that got mixed up (occurs very regularly to me) they can immediately separate them again, and throw away the oldest. When you submit the file to a journal, this heading feature can always be commented out. The date should be the date of the last revision, or of the submission date. Following is an example (the use of \hspace is for aligning).

```
\pagestyle{myheadings}
\markboth {\underline{\hspace*{1cm}Megens et al.
{ 'Fluorescence lifetimes and linewidths ...'}
Submitted to Phys. Rev. A. on 11 Nov 2007}}
{\underline{\hspace*{1cm}Megens et al.
{ 'Fluorescence lifetimes and linewidths ...'}
Submitted to Phys. Rev. A. on 11 Nov 2007}}
```

5.A.6 Introduction

The first line of the introduction, which is the first sentence of your paper, is a very important part of your paper. The first paragraph will to great extent determine whether a potential reader will stay away from the rest of your paper.

Get inspiration by reading the introduction of some recent papers by a successful competitor. You could even copy it and change it by using some synonyms.

Use the introduction to describe the status of the field.

A little ‘hying-up’ is desirable (“great interest”, or “dramatic developments”, “has become a very active field of research”). Do not present your results in the introduction. Some history might be appropriate.

“This paper is organized as follows” is a cliché.

5.A.7 Conclusion

A conclusion is not a summary. In a conclusion you sum up your findings. Not what you have done.

For a short paper this might not be necessary. Avoid repetition of text already present in the rest of your paper (like the introduction).

A common mistake is to present new information in the conclusion.

5.A.8 Acknowledgement

You can be sure that your local colleagues will spell your acknowledgement section. Never forget the acknowledgement section. Do not circulate concepts of your paper without a full acknowledgement section, or put a place holder there "we thank (to be completed) ..."

5.A.8.A People in acknowledgement

Forget nobody. You can be sure that all your group member will scrutinize this section. Just be gentle to people that helped you. Next time they will help you again.

Present names in alphabetical order, unless some people made special contributions. Be consistent with first names: all names with first names or all names with initials. Do not use titles. If your boss is a German professor convince him that in American English he does not lose his authority if you use his first name. Under all circumstances you should avoid German, Dutch, and Belgian titles like Prof. dr., Prof. dr. habil., and Prof. Dr.-Ing.

In American English usage of a first name does not necessarily imply informal relations.

5.A.8.B Refused coauthors

Some people might feel very uneasy about the fact that they are not a coauthor. You can de-escalate this situation by spending a warm paragraph on their role in the acknowledgement.

5.A.8.C Institutions in acknowledgement

The first concept of the paper is always written by the first author. This writer will in many cases be a junior scientist without much experience. For him the acknowledgement section will not be important.

A scientific group gets (some) support from its host institution. This support is acknowledged through the mentioning of the affiliation in the title. No extra acknowledgement, please.

Much research is in addition supported by science supporting agencies. These life-saving organizations would like to be recognized, often in a prescribed way. To keep the peace with those organizations, the acknowledgement should contain this information exactly according to their request. For juniors: just look at some previous papers of your group to see how the acknowledgement section should be written.

5.A.9 List of references

Together with the acknowledgement section, the list of references will be the best studied part of your paper. It is there where you make friends and enemies.

The enumeration of papers will to a large amount determine how referees and colleagues receive your paper.

5.A.9.A Choice of references

Be honest with your choice of references. Papers or books that were essential for your own research should be cited. Give them ample credit and refer to them more than once. Even if you hate the authors.

If your field has a number of leaders, try to include in the list of references at least one paper of each leader.

If a reader will start to browse through your paper, the first section he will probably consult is the list of references. Very likely, to check whether or not you referred to his work.

This rushing to the list of references is also an act that the referee will perform. If the referee feels you have neglected his work, both you and the referee are in an awkward position. You, because you will be confronted with a hostile referee, and the referee because he cannot bring up this point in detail as he will risk blowing his anonymity.

Size limits on the paper might seriously constrain the number of references you can include. In case you have to make a choice between skipping a real reference or a reference to ease a potential referee, omit the real reference.

5.A.9.B Blockbuster

If your field has some extremely well-cited papers, cite them as well. It will make your field more influential.

5.A.9.C Reviewers

When the editor receives your paper, he has to choose referees. He will very likely pick at least one, if not all, of the referees out of your list of references. Be aware of this important aspect of the list of references.

5.A.9.D Own work

Citing your own work is only allowed if you do it in a modest way.

Not more than 15% can be self-citations.

A higher percentage will be interpreted as a real sign of dealing with an author that considers himself a misunderstood genius.

5.A.9.E Unpublished

Referencing unpublished (like “unpublished” or “private communication”) material is a bad habit. It shows something that a real scientist is not supposed to do: he is bragging about information he has and nobody else has. Moreover this secret information is apparently important for understanding the paper.

If the reference to unpublished work is to your own work or one of your coauthors, you open a dangerous can of worms. It may give the referee the idea that you are still working on the subject and that it is not finished yet. Especially when you are trying to get your paper published in a high-impact letter journal, you make life unnecessary hard on yourself. The referee will say “Why don’t the authors write an expanded paper on the subject where all the unpublished material can be included”. This type of argument by the referee is a real killer.

5.A.9.E.1 Internet

Often the unpublished material is not really unpublished. For instance regularly theses are cited as unpublished. But nowadays there is no excuse whatsoever for not having these theses online on the internet. In such a case the uri of the thesis can be used as a real reference. This is beneficial in many ways. The thesis might be read much more than when not online and you give every reader (and referee) in principle the possibility to check and browse, or maybe even read the thesis.

5.A.9.F Preprint server

If you want to refer to work that has not been published yet, there is a solution: submit your paper to an established scientific archive.

For instance the Cornell University archive, [arXiv](http://arxiv.org/), which is an e-print service in the fields of physics, mathematics, non-linear science, computer science, and quantitative biology. These archive papers are not refereed, but as they are available to everyone, they can be cited.

<http://arxiv.org/>

5.A.9.G Accepted for publication

It is legal to cite your own work that is in the process of being published. Mention the journal where it is going to appear (“Accepted for publication in Chem. Phys. Lett.”). Be careful that the referee can use this as an excuse not to accept your present paper. The referee does not know the content of your paper and he can guess that it has a lot to do with the present paper.

Apparently you are, according to him, in the game of ‘serial publications’. Or as the APS puts it: After a paper on whifnium we do not need a paper on whafnium and later one on whoofnium. See the very interesting [APS-text](#) on referee criteria.

http://prola.aps.org/pdf/PRL/v28/i6/p331_1

5.A.9.H Private communication

Private communication as a reference is only acceptable if you use the results of a colleague that he is going to publish later.

In this sense it is equivalent to “to be published”. It must be information that an interested reader should be able to get hold of eventually.

If the private communication is essential for your paper and will not be published, your style of writing is immoral.

5.A.9.I Non-journal references

A short comment that would, if put inline, hamper the flow of reading can be put in a reference. Like: Reference 10: “Our convention for the Hilbert transform differs by a factor of 2π from the convention in Reference 6.”

5.A.9.J Foreign language

Citing papers that are not in English is futile.

The majority of readers can not study these papers. These foreign-language citations often serve as a claim of priority. As a referee I never accept these foreign-language references in a paper that I review. If there is an English translation of the journal, it is OK, but then the English translation should also be given in the list of references.

5.A.9.K Spelling of names

Check, and check again, that all the names are spelled correctly. Referee A. Kühn will be utterly displeased if you spell his name as “A. Kuhn”. Never, ever use first names in the list of references.

Check the citation database [ISI Web of Knowledge](http://www.isiwebofknowledge.com/), or *Elsevier’s ScienceDirect*, or just Google the name with some extra keywords, if you are not sure about the spelling of the names. Do not be sloppy. Authors will feel insulted if you misspell their names. Referees will feel insulted. Why make all these enemies, when by paying attention and being accurate you can make friends?

<http://www.isiwebofknowledge.com/>
<http://www.sciencedirect.com/>

5.A.9.L Use of “et al.”

To shorten the list of references, a long list of authors can be shortened by et al., like “First Author et al. have discovered ...” The abbreviation “et al.” is short for “et alii”, a Latin expression for “and others”.

Only use et al. if otherwise the author list will be much too large. Do it consistently: if the number of authors is larger than a certain number (for instance three) use "et al." A real bad example is to use "et al." for your competitors and use the full list for self citations.

Journals might have a policy about the maximum number of authors above which "et al." has to be used.

5.A.9.M Ibid.

If your reference entry has more than one paper by the same authors and if the journal name is long, then you could, instead of repeating the journal name, use the abbreviation "ibid."

This is Latin for "ibidem", which means "in the same place". It certainly will impress referees (if they are well educated).

If the same author has published more than one paper and you refer to them, do not repeat his name, just use a semi-colon to separate the papers.

5.A.10 List of figure captions

Some journals request that the submitting author supplies a list of all figure captions separated from the figures. Later I will describe in detail how to [write a figure caption](#). Separate very clearly the various captions (by several line spacings).

Do not let the caption text wrap around the figure number. The text lines should be left aligned at a position right of the figure number.