How to Write a Research Paper

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Without publication, science is dead

Gerard Piel

Some Basics

- Scientific progress has been the basis of much of the improvement in our standard of living and quality of life. Science has also provided answers to a row of long-standing and deep questions.
- What makes science so strong?
  1. Independence and freedom of research (only within limits for PhD students...)
  2. Open communication of methods, results, data etc. ➔ conferences, seminars, publications
  3. Peer review (refereeing) and free discussion of results
  4. Repeatability of work and compatibility with other results

Some more Basics

- This combination makes science unique. However, possibly the most important difference between academic and, e.g., business and military research is point 2: communication, i.e. publication of results.
  - Publication means that results can be openly discussed, tested and compared (Pts. 3+4 follow from Pt. 2).
  - This implies: We need to really trust the results we publish
  - In the real world: Secrecy is often maintained (e.g. regarding design of instruments, or numerical codes, or new results) until published or ready for publication.
- We must publish our results, even if we don't like to write. Darwin: "A naturalists life would be a happy one if he had only to observe and never to write."

Yet more Basics

- The number and **quality** of the publications is an important, possibly the most important factor deciding the career of a scientist, practically a matter of life and death.

➔ **Publish or perish!**

- Specifically for our Research School, publication is a requirement for successful completion of thesis.

Before starting to write

- Think early about what you want to communicate.
- Identify main aim & message of your paper.
- Wait with writing until you get final or almost final results.
  - It is inefficient to write, to rewrite & re-rewrite as the results evolve.
  - Even if you have "final" results, you will often find that you need to redo some work once you start to write.
  - Start writing soon after getting your results. It is surprising how quickly one forgets the details
- Discuss with your supervisor. He/she can judge best whether it is a good time to start writing.

Before starting to write

- What kind of publication is it? E.g. Journal paper, review paper, conference proceedings paper, etc.?
- Contents, format (& partly style) differ. Possibilities:
  - **Journal paper: presents final original results, careful description of technique etc., refereed** ➔
  - Review paper: summarizes, evaluates and synthesizes results already published elsewhere.
  - Proceedings paper: Often preliminary results, usually short, sometimes speculative (not as important as a journal paper)
  - Conference abstract: Short summary of results
  - PhD thesis: Combination of above. 1st chapter like review paper, later chapters like journal papers (or parts of journal papers).

Before starting to write

- If it is a journal paper, choose the journal (may not be necessary at this stage). However:
  - Implications of possible page limits (e.g., letters)
  - Implications of format and style requirements (e.g. style of references, B&W or colour)
- Read the literature: Identify what is new in your work relative to what has been done before. Your work must be embedded in what has already been done and published: each paper is another chapter in the story of science (o.k., most are more like another footnote...).

Before starting to write

- Put together structure of the paper:
  - Title, authors, addresses, possibly key words, etc.
  - Abstract
  - 1. Introduction
  - 2. Methods & Materials
  - 3. Results and
  - 4. Discussion & Conclusions
  - Acknowledgements
  - References
- IMRaD is a typical structure (AIMRaDAR). In some cases other structures may be more appropriate.
- Divide long sections into subsections

Before starting to write

- Select which results to show
  - Often a good idea to choose the figures to be published
  - Criteria: Does the figure show something new? Is it important to understand technique or results?
  - Remember: your interest in the details of your work is larger than that of the reader ➔ choose!
- Find the order of writing the various parts of the paper that is most natural for you
  - E.g. I like to start at introduction and write through to the end, then add figure captions, references and abstract
  - Other people prefer to start with figure captions (may be the better technique for your first papers).

Before starting to write

- Practice and improve your english
  - Remember: A paper is more likely to be read if it can be understood, i.e. if the language is clear.
  - Don't even dream of publishing in another language if you want your work to be noticed.
- You will probably need to learn LaTeX

Time to start!

The Title

- The title often decides if the paper is looked at by colleagues: So many papers, so little time!
  - I first check the title (and/or authors). If interesting I look at the abstract. If I'm still interested I look at the figures and only then do I read through the text.
- The title should be attractive
- The title should not be too long
- It should reflect the general field of the paper (e.g. include "solar" or name of planet)
- It should be as precise as possible (without forgetting the points above).
- It should not be too grandiose or promise too much.

The Title

- Examples of titles. Which are good ones, which ones should you avoid using?
  - Planetary atmospheres
    (too general) ➔ (e.g.) Turbulence in the atmospheres of terrestrial planets
  - New light on the heart of darkness of the chromosphere
    ("solar" missing) ➔ New light on the heart of darkness of the solar chromosphere (eye-catching, but tricky)
  - Sizes of spots on sun-like stars
    (fine)
  - Velocity and temperature in solar magnetic elements from a statistical multi-line centre-to-limb analysis
    (too long, boring) ➔ Centre-to-limb analysis of solar magnetic elements

The Title

- Examples of titles (continued)
  - Magnetic fields in late-type dwarfs: Preliminary results of a multi-line approach neglecting line saturation
    (too long, too negative) ➔ Magnetic fields in late-type dwarfs measured with a multi-line approach
  - Some effects of finite spectral resolution on Stokes V profiles
    (does not reveal the main result: absence of downflows)
  - The solar iron abundance: the final word
    (promised too much)

Authors & Affiliations

- Choosing the authors and their order can sometimes be a delicate matter.
  - Scientists do science because they enjoy it. However, they usually don't mind some recognition for their work, or their ideas ➔ Co-authorship as a reward.
  - Authorship of good papers is also important for a scientist's career
  - Deciding who should be a co-author, who should be in the acknowledgements & the order in which authors stand on the paper can be tricky. Different fields & groups have different traditions (particle physics; space instruments; genome project) ➔ talk to your supervisor (the rubber stamps of John Smith, ...)

Authors & Affiliations

- Affiliation: Give the whole address when writing the affiliation of each author. E.g. Max-Planck-Institut für Sonnensystemforschung, Max-Planck-Str. 2, 37191 Katlenburg-Lindau, Germany
- A request: please use German original of our Institute's name on your papers, to ensure that the institute is recognized in publication statistics (increasingly important for funding etc.)
- E-mail address is also very useful (increasingly required by journals)

Authors & Affiliations

- Write out first names or only use initials?
  - Check the guidelines of the journal you propose to publish in.
  - Full name is of advantage if
    - There is another scientist with your Surname and first initial
    - You are a woman in a male-dominated field. Specially important if you are the only author, so that your work isn't cited as, "German idiosyncrasies have been charmingly discussed by M. Curie (2004). As he has shown...."

Abstract

- Structure of abstracts: condensate of paper in one paragraph
  - Start with typically 1-2 sentences on background & aims
  - Followed by a very short description of what has been done
  - Finally bring the main results & major consequences
- I suggest using the active voice (first person)
- No figures, no tables, no references (usually), no footnotes, avoid abbreviations, equations and symbols, make sentences short.

Abstract

- Exceptions to above guidelines:
  - Abstracts that will be published in abstract booklets (abstracts submitted to conferences). There it may be worthwhile to fill the space available (I'm usually too lazy, but you hopefully are not)
  - Abstracts of review papers. They often have a different structure than described above. However, if you are being invited to give reviews then you probably do not need to sit here and listen to this talk. Reviews as a whole are generally structured differently than normal papers & are not discussed further.

An example abstract

Introduction Method Results Discussion

The extension of the sunspot number series backward in time is of considerable importance for dynamo theory. We have applied a physical model to records of the ^{10}Be concentration in polar ice to reconstruct sunspot number between the year 850 and the present. The reconstruction shows that the period of high solar activity during the last 60 years is unique throughout the past 1150 years. This nearly triples the interval of time for which such a statement could be made.

The Introduction

- In the introduction you describe the background and context of your work, i.e. what has been done before. This involves a short overview of the relevant literature. Keep the overview short: the introduction of a research article is not a review article.
- Say why the present work needs to be done. Some criticism of earlier work may be necessary. Try to be mild. You don't want others to be harsh about your work either.
- Definitely needed: Goals of your paper. If similar papers exist: what is new in the method or results.

Introduction contd.

- Often done, but not necessary: give structure of remaining paper in last paragraph of introduction.
- Important: The sentences within a paragraph should follow a logical sequence (i.e. it should be possible to rearrange the sentences and someone else to be able to put them back into the correct order again). Example on next slide (as a little exercise)

➔Importance of connectors (see style)

Methods and Materials

- This section describes the techniques and data used. It can be called differently or can be broken into 2 or more sections.
- Examples of alternative titles:
  - Computational technique (appropriate for a numerical paper)
  - Instrument and measurements (e.g. if a new instrument is being described or used, or an instrument is used in a non-standard mode)
  - Data and analysis technique (e.g. if the special technique of analysing the data is essential for the results)
  - Instrument and observations + Method of analysis (Section broken into 2 sections)

Methods and Materials

- Scientific results must be reproducible. The Methods and Materials section is the key to guaranteeing reproducibility of your results, since it describes what you have done, how you have done it and with what.
- The "when" can also be important: give the time & date(s) of your observations, specially when studying variable phenomena.
- This section is often studied carefully by the referee. It can decide whether he/she feels that the results can be trusted or not. If he/she feels that the technique isn't strong enough, the paper will be rejected.

Methods and Materials

- Find the balance between:
  - Describing everything important
  - Leaving out everything not needed.
- Rule of thumb:
  - New method, new instrument, new type of data ➔ Describe in detail, since required for reproducibility.
  - Known method or instrument, previously used and described in other paper(s) ➔ Often a reference is sufficient.
- Do not repeat descriptions
- Often a figure can illustrate & clarify the method

Results

- The core of the paper, where the results obtained during the long labour of research are presented.
- Be concise. Pre-select the results (i.e. identify the important and new results) before writing about them in the results section.

➔Keep in mind:

The fool collects facts, the wise man selects them

(John W. Powell)

(don't be too wise: first collect the facts, then select them)

- Avoid repetition! (yes, I know that I'm repeating this statement, but this is a talk and not a paper).

More Results

- Decide on what to put into the Results section and what to move to the Discussions section.
- General rule (but not a very hard and fast one)
  - In the results section you only describe the results, but do not interpret them very much.
  - In the discussion section provide the interpretation and the comparison with the literature, without repeating all the results.

Results: Figures

- Use figures to show the main results if possible.
- Each figure must be referred to in the text.
- Each figure must have a caption.
  - Captions should be short, but self-explaining, since often figures are looked at before the text is read. I.e. if symbols or abbreviations are used, then they must have been defined in an earlier figure caption.
  - Captions should only clarify what is plotted and not try to interpret the figure. Interpret the figures in the main text.
- One way to structure this section is to write it around the figures. However, do not forget to make a logical order.

An exemplary figure

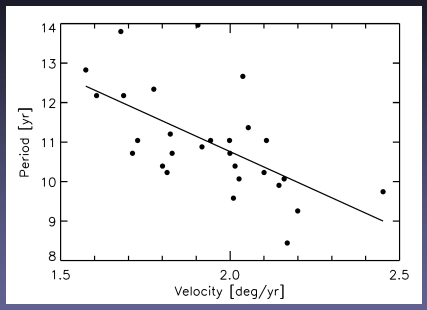


Figure 1. Solar cycle period vs. latitudinal drift velocity at cycle maximum, taken from an αΩ-dynamo model. The dots represent the data of 28 simulated cycles and the line denotes a linear least-square fit.

Anatomy of a Figure

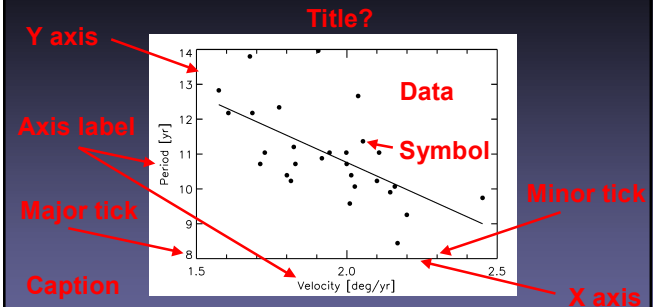
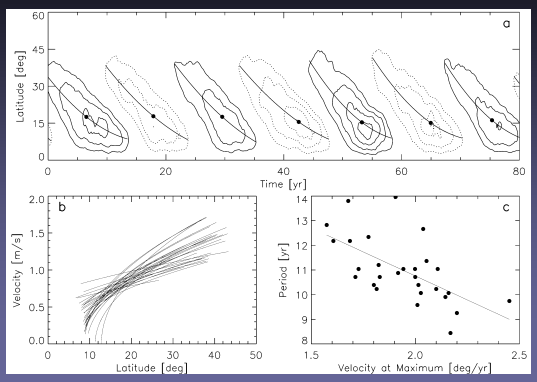


Figure 1. Solar cycle period vs. latitudinal drift velocity at cycle maximum, taken from an αΩ-dynamo model. The dots represent the data of 28 simulated cycles and the line denotes a linear least-square fit

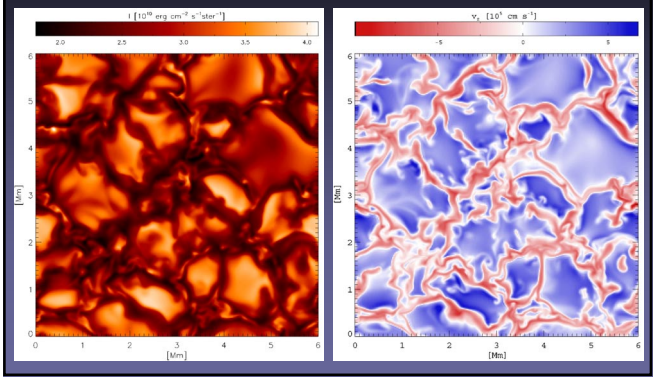
Types of Figures

- X-Y line graphs
  - If (more than two) data points are linked together by a line (shows dependence of one variable on another, with a particular order of the points)
- Scatter plots
  - Same as X-Y line graphs, but if the points are in no particular order
- Contour plots, surface plots, images
  - Ways of representing 3-D data sets.
- Histograms, bar charts, pie charts
  - Ways of representing distributions, fractions and their evolution

An Example



Images



What not to do

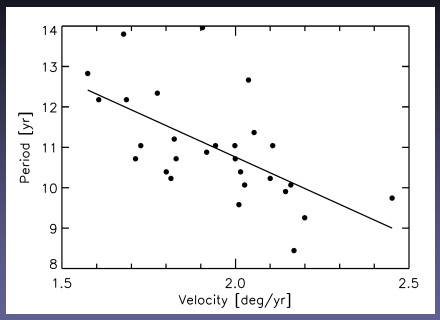


Figure 1. Solar cycle period vs. latitudinal drift velocity at cycle maximum, taken from an $\alpha\Omega$-dynamo model. The dots represent the data of 28 simulated cycles and the line denotes a linear least-square fit. Note the large scatter of the data points which contradicts earlier results by A. Einstein.

What to observe when plotting figures

- Line and character thickness
- Labels, character size, font
- Number and size of major and minor ticks
- Axes range, linear/log scale, x axis
- Line style, color, symbols
- Key to symbols
- Caption: Should give all the information needed to understand the figure, but is not a discussion (exceptions are possible; e.g. main results).

Tables

- Make a table if you have multiple numbers to show
  - and you cannot put them into a figure,
  - or if the exact numbers are important
- Remember, figures are generally easier to read than tables.
- A table may also be useful in the Methods section – e.g. a table of observations.
- Each table must have a title. Keep it short.
- Each table must be referred to in the text.
- Describe the different columns of the table, either following the title (some journals do not allow this) or in the main text.
- Some journals publish very long tables electronically only. Possibly put them in appendix.

An example of a short Table

Table1. Descriptive caption above table.

Model	l [m]	v [m s^{-1}]
A	1	10
B	3	−12
C*	5	15

*footnote

What to observe when making a Table

- Figure versus table
- Title or caption above table (depends on journal)
- Column headings (including units)
- Alignment of columns in table body
- Lines of demarcation
- Footnotes (e.g. sources of data)

Discussion

- In this section the already presented results are discussed and conclusions are drawn from them.
- Alternative title: Discussion and conclusions. Sometime broken up into two separate sections.
- It may be appropriate to repeat the MAIN results (but definitely not all of them), but this is not the aim of this section and is not necessary.
- This is often a difficult section to write, since drawing conclusions from the given data or theoretical results is not always straightforward. Drawing conclusions is an exercise in logic, requires some knowledge of the literature and some experience of the object being studied.

Acknowledgements

- The acknowledgements are placed between the end of the regular text and the references.
- People who have contributed to the paper, but not by a sufficient amount to be included in the author list, should be thanked in the acknowledgements.
- Discuss with your supervisor, which people should be acknowledged.

References

- First and most important rule: Check the style manual of the journal to which you are submitting the paper. Different journals have different styles for the references.
- In solar physics: alphabetical and chronological, e.g.

  Aabacher A., 1999, J. Irreproducible Res. 15, 16
  Bardot B., 1988, B&B 1, 1111
  Cardinale C., 1977, in Old Movies, ed. C. Chaplin, p. 777
  Duck D., 1966, The adventures of Daisy D., Disney Press
  Duck D., and Mouse M., 1955, Goofy's Mag. 13, 13
  Duck D., McDuck S., and Mouse M., 1933a, ApJ 33, 333
  Duck D., McDuck S., and Mouse M., 1933b, ApJ 44, 444

References

- Other possibility: number the references in the order in which they are referenced in the text. Either use automated numbering scheme or wait with numbering until the paper is ready for submission.
- If you are using unpublished data or results of another researcher, then cite him/her in the text as, e.g., M. Monroe, 1999, private communication). Ask before you cite!
- No private communications or unsubmitted papers into the reference list.
- Papers that have been submitted, but not yet accepted for publication are cited as "submitted", those that have been accepted as "in press".

References

- References are a place where a lot of errors are propagated.
  - Make sure that the references are correct! Check with the paper directly or in ADS (which does have errors, though, and many BibTeX entries are incomplete. If you discover an error in a reference given in ADS, send them an e-mail and they will correct it).
  - Check if all papers cited in the text are also present in the references and vice versa
  - Check if dates, authors etc. agree between text & reference list; e.g. a paper that appeared in 1995a is also listed as such in the references.
- BibTeX is a great help in this respect.
- ADS provides references in BibTeX format as well.

Appendices

- Material that may be of interest for some readers, but not for most (e.g. lengthy tables, derivations of equations) can be put into an appendix or into multiple appendices.
- Most papers do not have an appendix.
- An appendix must be referred to in the main paper. E.g., "The derivation of Eq. (15) is given in Appendix B."

Style

- Scientific publications have their own style, different from the spoken work, different from the style of newspapers, or most literature.
- The aim of a scientific paper is to transmit what you have done and the results you have found. Remove everything not needed for this.

➔The style should be clear, simple, concise and readily understandable.

- Golden rule of paper writing style No. 1: KISS Keep It Short & Simple

Style: jargon

- Avoid jargon! I.e. do not use unnecessarily many, long and abstruse words to hide your meaning.

Style

- Scientific style as found in many publications is often impersonal (probably to make it appear more objective). Often the passive voice is employed. Also, in many of the papers written in the active voice, "we" is used, even if only a single author is present (some journals even require this).
- My suggestion:
  - Use the first person. Use "I" if you are the only author.
  - Sentences that become too long are hard to understand. However, if all sentences are very short, the text appears to be disconnected.
  - Reading papers written by leading scientists who are native english speakers can help, but be careful, some of them also use jargonese.... (I am no exception).

Don't forget the reader

- Remember the reader. Aim at a junior PhD student working in the same general field. E.g., if planetary atmospheres paper, then for atmospheric planetary scientist, but not specializing in the same planet.
- The 4 principles of writing for the reader:
  - The clarity principle: Make everything clear to the reader, but do not give more information than is necessary.
  - The reality principle: Assume that your readers know how the world works and do not need to be told everything, but be sure to tell them anything that you believe that they may not know & need to know.
  - The relevance principle: Stick to your topic and don't lose the aim of your paper from sight.
  - The honesty principle: State only what you can provide evidence for.

Style: The Dos

- Spell out your assumptions (Intro. or Methods Sect.)
- Be as precise as possible. If you have numbers, use them.
- Avoid using too many abbreviations. Define the abbreviations the first time they are used. E.g.: "Another name for Father Christmas (FC) is Santa Clause (SC). FC does most of his work in the run up to Christmas and so does SC, of course."
- Define all symbols the first time you use them
- Give the units! SI units are now generally agreed upon.
- Use italics sparingly, avoid bold face etc.
- Show the paper to your supervisor!!!!!!!!!!!!!!!!!!

Style: The Don’ts

- Don’t copy whole sections or paragraphs from other papers, including your own, even if this seems inviting since they are already well formulated.
- There are also problems of ethics with this practice, specially if you are copying from papers that aren’t your own (PhD students have been known to be thrown out of PhD programs for plagiarism).
- If you do that, your scientific career is very likely to be dead.

Style & language

- Scientific english would be a whole lecture course in itself.
- Here I consider only a very few aspects.
- For example, it is important to have a handy list of verbs to use.

A collection of verbs used in describing cause-effect relationships and correlations:

actuate	compel	make
activate	control	originate (from)
affect	contribute (to)	produce
be associated (with)	correlate (with)	prompt
be conducive (to)	counteract	react (to)
be due to	depend (on)	relate (to)
be linked (to)	effect	respond (to)
be responsible (for)	induce	result (in/from)
blame (on/to)	influence	spark
bring about	initiate	stimulate
cause (to happen)	lead (to)	trigger

Killer cows and connectors

Connectors & Modifiers

lead from a (part of a) sentence (thought) to the next

A few examples (by far not exhaustive)

Indicating an addition:

additionally	as well (as)	furthermore
also	at the same time	in addition
as mentioned (above)	besides (infml)	moreover

Indicating a parallel:

by the same token	in the same way	that is
equally	likewise	
in other words	similarly	

Which journal?

- Criteria for choice of journal:
  - The journal should cover your field and should be read by colleagues
  - The journal should have a good reputation.
  - Monetary considerations: page charges (if any), cost of printing in colour, free reprints provided?
- Examples of appropriate journals:
  - General: Nature & Science
  - Physics: Phys. Rev. Lett., Phys. Rev. A-E
  - Astronomy (including solar system studies): Astronomy & Astrophys., Astrophys. J., Monthly Not. Royal Astron. Soc., Astron. J., Publ. Astron. Soc. Japan (or Pacific)

Which journal?

- Examples of appropriate journals (contd.)
  - Specializing in solar phys.: Solar Physics; JGR A, GRL
  - Specializing planetary science & geophysics: JGR, GRL, Annales Geophysicae, Icarus, Earth Moon & Planets ??
- What determines the reputation of a journal?
  - Impact factors: How often articles in the journal are cited on average.
    - Nature > Science > Phys. Rev, Lett.: highest impact factors.
    - Careful: Errors in recent years have given A&A and ApJ too low impact factors.
  - What scientists think of a journal ➔ talk to your supervisor and other scientists with experience in publishing in your field.

What about colour?

- Colour is easily produced on the screen and colour printers are also common. However, publishing a paper with colour figures is still very expensive.
- ➔ Try to avoid publishing colour figures. Use different line styles (solid, dotted, dashed, etc.) instead of coloured lines, use B&W greyscales instead of colour tables unless absolutely necessary.
- One possibility offered by Astron. & Astrophys.: No colour charges if the figures are in colour only in the electronic version, but B&W in the printed version.

The refereeing process

- Every suitable paper submitted to a respectable journal is sent to a referee (in some cases two) to judge its merit and to advise the editor on whether to accept or reject the paper. The editor decides!
- The referee will generally advise to either
  - publish without changes (rare)
  - publish with minor changes (the referee does not generally see the modified version again before printing)
  - publish with major changes (the referee is sent the revised version to comment on)
  - not publish in its present form, but resubmit after major modifications (to then be treated like a new submission)
  - not publish at all.

Most common reasons for rejection of a manuscript

MOST COMMON REASONS FOR REJECTING ARTICLE MANUSCRIPTS
(Cited by 85 Editors of Scientific and Technical Journals)

Reason	Number of Respondents
Subject	
Not suitable for journal	63
Not timely	4
Coverage	
Questionable significance	55
Questionable validity	39
Too shallow	39
Too exhaustive	8
Length	
Too long	26
Too short	4
Presentation	
Bad organization	35
Ineffective expression	33
Ineffective or unusable illustrations	11
Failure to follow style guide	4

Contributors' most common mistakes

- Organization and Presentation (50): Rambling – do not show problem or significance of results; no summary; failure to make a case; failure to cite previous work; too long – overly detailed information; poor graphics; no mention of uncertainties.
- Manuscript (21): Failure to follow instructions for authors.
- General (15): Unaware of the scope of the journal – look at a few issues and see what we publish; too PR oriented – tooting their own horns; insignificant papers – not up to professional standards.
- Expression (8): Lack of clarity, conciseness (try to write clearly, not profoundly); failure to write for the audience – use of highly specialized terms.

Dealing with referees' reports

- At first sight referees' reports often look more negative than they really are.
- ➔ Read the report & show it to your supervisor. Then put it away for a week before looking at it again (to calm down). Discuss it with your supervisor after this time. Now make the changes to the paper asked by the referee.
- When sending back the revised paper, also send back a reply to the referee, pointing out how you have taken his/her comments into account in the revised manuscript. If you disagree with the referee and haven't taken one of his/her suggestions into account, this is where you explain why.
- Referees are not always stupid. If the referee does not understand something, then it is likely that the paper is not clear on this point. Make it clearer.

Dealing with referees' reports

- Remain polite. Usually the referee is trying to help. It is better that the referee catches any errors before the paper is published. Even if the referee is nasty, there is usually nothing to be gained by showing your anger.
- If you feel that you are being unfairly treated by the referee you can ask for a second opinion. This step is only worth it if your paper gets rejected and you have good reason to believe that another referee will be more positive. You should also be able to argue why you feel that this referee isn't being fair. The editor will then generally send your paper and the report of the first referee to another referee. If this referee also turns down your paper, then that is where it usually ends.

Ph.D. Theses

- Basic structure of a Ph.D. thesis can follow two paths (Some Universities leave you no choice):
  - Path 1: Like a long research paper: IMRaD (or similar)
  - Path 2: A succession of almost independent research papers bounded by an introduction and final conclusions.
- In both cases the following parts are obligatory:
  - Summary [language(s), form and length often prescribed by the university]
  - Introductory chapter: Review of the field, to show that the student has mastered the literature and background.
  - Conclusions chapter, including an outlook for future work. This is to show that the student has got his/her own ideas for future work, which is a part of reaching independence in scientific work.

Ph.D. Theses

- A Ph.D. thesis is longer than a typical research paper, i.e. there is more space for writing about details, specially about the methods.
- Chapter(s) on methods and materials are obligatory only if Path 1 is followed, but are often also introduced for Path 2, since more space is available (see point above).
- For path 1 the references are best listed at the end of the thesis, for path 2 after each chapter.
- I tend to allow my students more freedom with individual style in the thesis than in papers. However, supervisors differ in this respect.

Ph.D. Theses

- In the IMPRS we expect each Ph.D. thesis to contain the material of multiple research papers.
- Remember that your thesis will be carefully read by multiple people and you will be questioned about it. ➔ Don't take writing your thesis too lightly.
- However, very few theses are read as often as research papers once the student has got his/her doctorate (although they are often given to new students starting on a subject as an introduction) ➔ do not spend a year writing your thesis (avoid unnecessary perfectionism).

Posters

- A poster must be attractive and should bring its main message across in 5 minutes (divide the number of posters at a meeting by the lengths of the poster breaks...)
- Basically a poster is an extended abstract with pictures (and short captions)
  - Rules Nos. 1+2+3: **Less text!**
  - Rule No. 4: Show only the absolutely main result(s)
  - Rule No. 5: Use big fonts, to be readable from 2m away!
  - Rule No. 6: A picture tells more than a 1000 words
  - Rule No. 7: Do not clutter. Space looks attractive.
  - Rule No. 8: Use colour!
  - Rule No. 9: Avoid tables. If at all, only very short tables.

Posters

- Possible structure of a poster:
  - Title (BIG) + authors + affiliations
  - Abstract
  - A very short Methods and Materials section (can in some cases even be left out)
  - Main Result, or Results (the bulk of the poster)
  - Conclusions (short)
  - Few references (even no references is o.k.)
- In contrast to a paper in a refereed journal, the results presented in a poster and published in proceedings can be preliminary.

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