SURVIVAL GUIDE FOR SCIENTISTS

Survival Guide for Scientists

Writing – Presentation – Email

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To Truusje, Wouter, Guido and Kristel

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Email Guide for Scientists

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PRESENTATION GUIDE FOR SCIENTISTS

EMAIL GUIDE FOR SCIENTISTS

PREFACE

Communication is part of almost any professional activity. For researchers, writing scientific papers and giving scientific presentations is a daily ritual. Scientists that do not practice these communication activities will not make any contribution to science. Fortunately, communication skills can easily be learnt by any professional. Unfortunately, many scientists – due to a chronic lack of self-knowledge – do not feel any necessity for improving their own communication competences. As a result, scientists often (50% of the time) give bad talks and often (50% of the cases) write low-quality manuscripts. In addition, many courses are given by people whose profession it is to give those courses. Lessons given by non-active researchers are hardly ever useful, but invariably a waste of time.

In the present guide I give very practical how-to advice on essential topics such as the foundations for writing scientific texts (including dealing with referees and editors), presenting data and research information, and the writing of collegial, efficient emails. Each section is organized as a collection of short rules, outlined and numbered in a logical order as self-explanatory pieces of information – allowing the reader the freedom to study any number of them in any desired order.

A number of the hints are certainly politically incorrect, but they are all the more useful and can be found nowhere else.

Originally the guides were aimed primarily at undergraduate, graduate, and postdoctoral students in the natural sciences. But I have discovered that also more senior scientists will profit from it.

But it doesn't stop there: many of my hints, in particular those referring to presentations, are of invaluable use for a much broader audience of professionals, up to consultants and (public) managers.

Studying the full text will cost less than one and a half hour. Implementing the hints will immediately result in far better presentations, far better scientific papers and far better emails. In the beginning, adoption of the guidelines might cost somewhat more time. But in the end it will be amply rewarding: Your manuscripts will be more easily accepted by editors and referees, they will be better read, and better cited. Your talks will stand out. And all of this achieved by – in the long run – spending altogether less time on these activities.

This guide represents my views and my advice. But it is also meant to be your guide. Navigate to www.sciencesurvivalblog.com to contribute, discuss or criticize my hints. The whole community will profit. Next editions will have your hints in them as well.

This text has evolved as the result of collaborations with PhD students, postdocs and senior colleagues of the *University of Amsterdam*, *University of Twente* and the *FOM-Institute for Atomic and Molecular Physics.* I am grateful for their input.

I am thankful to Sanford Bingham, CEO of FileOpen Systems Inc., for his generous (software) support in the early stage of this project.

Ad Lagendijk

WRITING GUIDE FOR SCIENTISTS

1 INTRODUCTION

The text you are reading right now, the *Writing Guide for Scientists* (from now on: *Writing Guide*), lays out a set of fundamental rules regarding writing scientific texts.

This "writing" is interpreted in a broad way. The rules include advise on submission strategies, on how to deal with editors and referees, on web posting, and advise on many more aspects of producing scientific articles.

This tutorial in itself is not a scientific text, and therefore the principles presented here hardly apply to the text itself.

The *Writing Guide* is part of the *Survival Guide for Scientists* (from now on the *Survival Guide*). Occasionally there might be general referrals in the *Writing Guide* to other parts of the *Survival Guide.* However, the *Writing Guide* is supposed to be self-contained. For completeness we present here the names of all the guides that together constitute the *Survival Gui*de for Scientists:

- *Presentation Guide for Scientists,* or short: Presentation Guide; as an addendum to the *Presentation Guide* we have published the *Example Guide*
- Email Guide for Scientists, or short: Email Guide
- Writing Guide for Scientists, or short: Writing Guide
- Survival Guide for Junior Scientists, or short: Junior Guide
- Survival Guide for Senior Scientists, or short: Senior Guide

1.A Target group

The target group I had originally in mind was physics undergraduate and graduate students, and physics postdocs. From experience I have discovered that senior physicists could also profit from studying the set of instructions laid out in the *Writing Guide*. (Just check a recent article in an international physics journal to appreciate this argument: quite a number of my rules are violated in these papers.)

The text is very likely also beneficial for mathematicians and for workers in other natural science disciplines, like chemistry and astronomy. The content is highly modular. Researchers in other fields can easily skip parts they consider too closely related to physics, or which they deem irrelevant for other reasons.

The number of cross-links in the guide is kept to a minimum. Each item can be studied on its own.

1.B Goal of your paper

If you do not agree with the goals I will present in the following list, there is no need for you to continue to study the *Wring Guide*.

The primary goals are:

I to maximize the number of readers;
II to minimize the time needed to 'read' your paper;
III to maximize the fraction of satisfied readers;
IV to maximize the number of citations the paper will get.

The world of scientific publications is well characterized by the one-liner: "Get cited, or get lost".

1.B.1 Help your readers

To achieve the above four objectives you must make life easy and pleasant for your readers. If your intention is to make life easy on yourself you should quit physics (or for that matter any other natural science; law school might be more appropriate).

By only diagonally browsing your article, or by just studying its conclusion, or by merely looking at one of your figures, the reader should get valuable information. Your paper should allow for smooth and quick navigation. Readers might already know half of the content of your writing. Assist them in spotting the new material fast and help them skipping the rest.

1.B.2 Profile of your readers

Your average reader is mildly interested. Never expect scientists to go through your article from beginning to end. They will never read your references (but they will certainly check whether or not you cite them).

Professional researchers have to browse many, many papers on a daily basis and are continuously looking for a pretext to put your paper aside. You can call yourself lucky if they grant you ten seconds to obtain a first impression.

1.B.3 Quality of your papers

If you agree with the four principal goals laid out above, you can profit a lot from following the hints of the *Writing Guide*. Only some of my hints (but in my opinion really only a few) are a matter of taste.

Studying the principles will help researchers to write better papers, to produce superior replies to referees, and to become better referees.

http://www.sciencesurvivalblog.com

1.C Discussion groups

The author of the *Writing Guide*, that is me, has over 30 years of experience of writing scientific papers. In my opinion many of my hints are crucial for writ-

ing good texts. But it is also your guide: if you do not agree with one, some, or many of my hints, post your own ideas at our weblog www.sciencesurvivalblog.com. If more people agree with you, the *Writing Guide* will be improved by implementing your advice.

http://www.sciencesurvivalblog.com

1.D General advice for authors

Do not reinvent the wheel. Scientific texts have evolved over hundreds of years. Copy, steal, plagiarize, reuse, or whatever your favorite expression is for the action of using text structures, texts, mathematical equations, and figures, generated by senior and junior colleagues and by competitors. In many cases no source has to be acknowledged.

1.D.1 Help your coauthors

An additional advantage of closely following the advice given in this guide, is that your coauthors, including your supervisor, will be very satisfied with the efficient way you handle the shared papers.

Some of my advice will mean some unexpected hard work on the side of the (first) author (that is you) of a scientific paper. On the long run this will pay off.

1.E Format of the Writing Guide

This tutorial is organized as a large collection of short rules, outlined and numbered in a hierarchical way. The directives often represent an independent piece of information, so that the reader can work through any number of items in any desired sequence.

1.E.1 Publication form

The *Writing Guide* is available in basically two forms: as a book and as an ebook.

1.E.1.A Printed version

In the printed version the first three guides (*Presentation Guide*, *Email Guide*, and *Writing Guide*) are collected in one volume.

1.E.1.B Digital version

The *Writing Guide* will also be available as ebook (protected pdf). The pdf file will be prepared in cooperation with *FileOpen Systems*.

http://fileopen.com

1.E.2 Navigation

Navigation through the digital version is easy: there are bookmarks in the pdf version.

The printed version will be bound in such a way that it can be read hands-free.

1.E.3 Size of the Writing Guide

Suggestions for additions, corrections, or other ideas for changes and improvements are welcome if they do not make the text much longer. It is my intention to keep the size of the *Writing Guide* to a maximum of about 600 paragraphs. This size constraint ensures that scientists can read the whole text in less than half an hour. Increasing the size beyond this limit would deter too many members of the target group.

1.E.4 Text formatter

In physics and mathematics the standard text formatters are members of the Tex family (LaTex and AmsTex, for instance). A number of my formatting hints will be given in 'LaTex language'. However, any reader will be able to translate these suggestions into commands for his own text formatter (such as *MS-Word*).

http://en.wikipedia.org/wiki/TeX
http://en.wikipedia.org/wiki/LaTeX
http://www.ams.org/tex/amstex.html

1.F How to use the *Writing Guide*?

The *Writing Guide* is meant to be self-contained. Its study should be enough to produce well-written, well-structured papers (that still could contain bogus science).

A good, additional training in writing first-rate scientific papers is to scrutinize, with a number of colleague junior scientists a recent, short paper in a high-impact journal. These papers are supposed to represent the state-of-the-art in writing of scientific papers. This exercise might not make you happy, but it will certainly boost your self-confidence.

1.F.1 Requested prior knowledge

The student is expected to have a reasonable knowledge of English, either because he is a native speaker, or because during his university education he had to study science textbooks that were written in English.

1.F.2 Further study

Some scientific organizations (examples: AIP, APS, OSA, IEEE) and some journals offer long and useful style manuals. (I recommend in particular the *AIP Style Manual* and an appendix of the *Review of Modern Physics Style Guide.*) The de-

finitive information is in the Standard Handbook of the ISO, but unfortunately is far too expensive (you can consult an excerpt from the ISO guidelines). If your appetite has been wetted after reading my *Writing Guide*, you can consult any of the above-mentioned style manuals. But you should realize that you are expected to work on science and on actually writing scientific papers, and not to work too much on reading about how to write scientific papers.

http://www.aip.org/pubservs/style/4thed/AIP_Style_4thed.pdf
http://forms.aps.org/author/styleguide.pdf
http://ao.osa.org/submit/style/jrnls_style.cfm
http://standards.ieee.org/guides/style/
http://rmp.aps.org/files/rmpguapa.pdf
http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=3653
http://www.iso.org/iso/home.htm
http://www.tug.org/TUGboat/Articles/tb18-1/tb54becc.pdf

1.F.2.A Courses in writing scientific papers

In university environments courses are frequently presented on how to write scientific papers. Do not follow these courses, even if your employer considers them obligatory. These lessons are not a good way of spending your time. The lectures are not given by active, professional researchers. Your task is to write papers that are crystal clear to your scientific community. You should cater to no other audience. The opinion of humanists, university lecturers and professors in language are absolutely irrelevant, and invariably an obstacle.

1.G Improving your English

If you want to improve your English, listen to English radio programs (like the *BBC World Service*), read high-quality intellectual magazines as the *New York Review of Books*, watch *CNN*, or watch English-spoken TV programs (without subtitles in your own language). Make sure that presentations and scientific discussions in your group are in English.

A useful and amusing resource is Paul Brians' complete website on *Common Errors in English Usage*.

http://www.bbc.co.uk/worldservice/
http://www.nybooks.com/
http://edition.cnn.com/
http://www.wsu.edu/~brians/errors/

1.H Culture

Much of this instruction manual is based on the assumption that the writer of the scientific texts works in a small-scale scientific group. In some branches the mores are totally different. For instance in high-energy-physics communities a four-page paper can easily carry hundreds of authors. It is obvious that writing such a paper involves, besides science, a lot of politics. And politics is (almost) nowhere to be found in the *Writing Guide*. In such communities my tutorial might still be useful for internal reports, theses and the like.

1.I Limitations

The *Writing Guide* deals with a number of different types of manuscripts. There is quite some play between the prescribed writing styles of various international journals. Some of my hints might not be allowed by your favorite journals. But these particular hints might still be useful for your internal reports, theses, proposals, etc.

1.J Male chauvinism

In many western societies women are underrepresented in the natural sciences. This absence is an undesirable situation. In this tutorial I could have been politically correct by continuously using "he/she" and "his/her". As this would make the text look uglier I have not done so. The reader should realize that wherever I say "he", it could well have been "she".

1.K Ethics

Natural science is about objective stuff 'out there'. Its findings should not depend on the observer. Work is being published to allow other workers to criticize the outcome, to check it, or to expand it.

In principle you could be requested to justify your results twenty, or more, years after the publication date. Reporting your results in detail in (internal and external) scientific texts, and archiving them extensively, apart from keeping good laboratory journals, is part of good ethical behavior of each and every natural scientist.

1.L Conventions in the *Writing Guide*

Words that are in *italic* represent (deposited) names of organizations, brands, companies and/or computer program names (and actions within a computer program). Examples: *Acrobat*, *LaTex*. Proper credit will be listed regarding these (deposited) names at the end of this guide.

1.L.1 Double quotes

Double quotation marks indicate quotes, either from text or from speech. To have the quotes stand out, their font color is red (not visible in the printed version).

1.L.2 Single quotes

In this booklet I use single quotes to indicate a ‘strange’ word, or a regular word occurring in an unusual meaning. In stead of single quotes I could also have used the word “so-called”.

1.M Commercial products

Regularly I will mention commercial (software) products that can help you in writing your paper. If your institution is of academic nature (university, college, etc.), then for a number of these products your institute might have a (cheaper) site license.