4. Scientific Writing and Refereeing

4.1 Publications

4.1.1 General Remarks

The Hierarchy of Writing

- You are going to write something as a professional Materials Science Engineer, no doubt about that. Of course, you have already written this and that during your years in School and University, so where is the problem?
  - Well, during your education you wrote something because somebody *made* you to do this. You did *not* write something because it was of any interest to others. Your teachers (and that includes me) would have no problems going on with their lives *without* having to read what you write. They only read it because they are paid for doing this. That is going to change soon. Your Bachelor's thesis, for example, will most likely not be read by a lot of people besides whoever gives you a grade - but it might be of large interest to the next student continuing your work. Your first published scientific paper is published because the journal you send it to, and the referees of that journal, believe that some people will want to read what you wrote.
  - What we are looking at here is the hierarchy of (scientific or technical) writing. To some extent, this hierarchy reflects the intended readership of your efforts at communicating by the written word.
- In a somewhat arbitrary way, we might distinguish the following hierarchical layers:
  - **Technical Protocols**
  - **Reports and Documentation**
  - **Theses**
  - **Proceedings**
  - **Letters**
  - **Papers**
  - **Reviews**
  - **Books**
  - Let's look at these topics in a quick and dirty way.
- **Technical Protocols** simply document what you have done; for example the set-up of an experiment, the actual experiment, the raw results obtained, a sensible condensed representation of the results and a discussion of the results.
  - It is the most detailed form of technical writing. Essentially, from your protocol, somebody else with about your educational background should be able to do exactly the same experiment without having to ask any questions, and the experiment should yield the same results (within the error bars, which you have discussed).
  - *You* have already learned how to write protocols in the Lab classes, so we won't dwell on this any more.
- **Reports and Documentations** are not primarily for other people to read, but - you guessed it - to report and document something in detail.
  - A technical report may follow some structure, even if no specifications have been made. When you start your own experiments (including e.g. simulations done with a computer), you are required to make continuous notes of what you are doing in a lab book or journal, and these notes should follow the general structure of a technical protocol.
  - The most common mistake in writing reports an documentation (and, to some extent, everything else) is to forget about writing down the **obvious**. For experiments with **Si**, to give an example, this could be:
    - The date.
    - Your name and affiliation.
    - The doping type and crystallographic orientation of the sample.
    - The temperature (at least write down "***RT***").
  - No newcomer would believe how often results reported in scientific papers become questionable or useless for further research simply because some detail is unclear. Was the **Si** specimen illuminated during the experiment? Not necessarily intentionally, but if it was exposed to the room light and not kept in a dark box, it was illuminated - and that may have made all the difference.
  - It is not meaningful to give rules here - the documentation of your **200.000** lines of code for the simulation program you wrote will look completely different from the description of experiments with an electron microscope - the only rule is that whoever looks at your documentation at some later time should be able to learn all about what you did and reproduce your results.
  - Again, *you* have *already learned* that in a rudimentary form (writing down the results of your Lab class experiments, on hopes), so we won't dwell on this any more either.

- **Theses** (plural of thesis) essentially come in three flavors - Bachelor, Master and **PhD** thesis - and, unfortunately, in many forms.
  - Requirement and formal requests differ from university to university but all theses have the general structure of a (review) research paper - they are just much longer.
  - *You* will soon write your first thesis and the best preparation you can have is in learning how to write a research paper.
- **Proceedings** are the written-up account of whatever you presented in a talk or poster at a scientific conference. They can easily take the joy out of traveling around to great places of the world on tax-payers money because the do not only require actual work (far more than preparing a talk) but must always be handed in as camera-ready manuscripts ("Camera-ready" nowadays can also mean Internet-ready).
  - Producing a camera-ready manuscript is the most difficult task of writing because it carries the by far longest list of requirements and restrictions.
  - Therefore, in this Seminar, we follow strictly regular conference procedures as outlined here.*you* will do just this: provide a camera-ready abstract and a camera-ready manuscript as "Proceedings" to your talk. We will get to this later in more detail. here is an *example* from last term; for the running term ook up the "Running Term".

Example!!!!	
Go to "Running Term" term for information	
Miniconference: Semiconductor Nano Technology and Energy	
Call for Papers, Conference Schedule, and Deadlines	
Suggested Sessions and topics for contribution: Consult the **Link**	
Deadline for Abstracts:	**Friday, Nov. 16th 2010**
Template for Abstracts Example for Abstract	Send to: ra@tf.uni-kiel.de and hf@tf.uni-kiel.de The line is open!
Extended Deadline for Abstracts: (only if rejected at first attempt)	**Friday, Dec. 10th 2010**
Presentations at Conference:	**Wednesday, 8:15 - 13:15**; **Jan / Feb 2011; to be determined**
Deadline for Papers:	**Friday, Feb. 11th 2011**
Template for Papers Example for Paper	Send to: ra@tf.uni-kiel.de and hf@tf.uni-kiel.de The line will open in Jan. 2011

  - Chances are that *your* first publication will be in the form of a paper in a Proceedings volume, Otherwise, it probably will be it he form of a letter - see below
- **Letters** originally were exactly that - letters to the editor, published in the back of the thick Journal volume, describing short and to the point some major new discovery or insight. The idea was to get it published as quickly as possible, and as a matter of course, to follow up somewhat later with a full account in the form of a regular paper.
  - In our modern time, we now have dedicated letter Journals, many of them more prestigious than the regular Journal. Examples are the "Phys. Rev. Letters", the No. 1 Journal in the physics oriented sciences, the Appl. Phys. Lett., and so on.

- It is difficult to get into those Letter journals (see "**Peer review**"), and it may take longer to have your stuff published than in a regular Journal. As far as rules and regulations are concerned, they are more or less the same as for the "mother" journal with an additional strict page limit
- *You* may or may not write a letter in your future career, we will, however, not dwell on it because as far as writing techniques are concerned, it it is just a subset of the topic "paper".

Papers. The main mode of scientific publication.

- If your Bachelor thesis work produces something good, *you* may find yourself to be one of the authors of a paper. However, you will probably not be the one who wrote it.
- Nevertheless, that's what we will practice here. How to write a (camera ready) paper.

Reviews. A long and thorough paper discussing other papers, i.e. the state of the art in a certain field. A review might be published in special review Journal, in regular journals as something special, as a book or as a chapter in book.

- Statistically it's unlikely that *you* will ever write a review; certainly not any time soon, because that is always done by acknowledged experts in the field.

Books. Yes. You know scientific text books or a facts books (I hope).

- You're not going to write one any time soon, so we will not discuss that any further.

Formal Requirements

Whenever you write anything that will either get printed or on-line published by recognized organization, publishing company or whatever, you must meet some formal requirements.

- Even worse; if you are a German engineer, you may even have to obey some ***DIN*** norms. In other countries, more likely then not, some bureaucracy will also cramp your style. We will come back to that in the appropriate contexts.

What kind of requirements you face depends to some extent on how your work will be brought to the attention of the scientific community:

- If you write for a good old Journal, the requirements may be relaxed. You may be required, for example, to write equations a certain way, indicate references, e.g., by numbers in square brackets [1-5], or like this[1-5]. You do not have to use particular fonts or write everything in two columns as it will appear later in print.
- If your write "**camera ready**" for typically conference proceedings, you will have to meet an unbelievable number of requirements. In order to get an idea of what that means, activate this link. Everything else - Books, on-line journals, rapid letter journals, or whatever - are between the two extremes.

If you activated the link, you saw almost three pages of rules, instructions, requirement, and what not. Isn't that rather annoying and bureaucratic overkill?

- Well - yes! It can be annoying. But see the bright side. If you write a paper "just so" - like the good old essays in High School - but no longer by hand but with a computer, you also have a lot of decisions to make. What kind of font are you going to use? Are headlines bold or what? And so on and so forth.
- Even if you do not make those decision but just take what you get upon hitting the keypad, you have still made a decision: You are going with the default options of the computer or with a format somebody else installed.

So be happy that your publisher has made all those decision for you, it saves you stress and time. You also have no choice, so getting all worked up may burn some excess calories but otherwise doesn't get you anywhere.