

How to publish a scientific paper ?

First session

Introduction of the subject

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1. Introduction

1.1. Purpose of the course

The purpose of the course is to introduce young scientists (doctoral students) into the publishing procedure of new scientific results. We do it in English for two main reasons:

- i. Most of the papers are published in English.
- ii. The communication language at international conferences is mostly English.

Actually, the rules and techniques what we are going to see during this course are the same in any language. So I recall that our main objective is not to improve our English knowledge (this is not a language course) but rather to learn about the rules of procedures of publishing and other important aspects of scientific life, like participation at international conferences and corresponding with other colleagues in English.

The rules, which I try to make clear during the course, are not written rules, they are not formulated in the sense of strict laws; you cannot learn them easily (there are just a few books about this subject in libraries). Still, experienced scientists apply them all the time during their work, especially in the redaction phase of papers or any other kind of description of scientific activities.

1.2. Content of the course

1st session:

- Introduction of the subject
- How to publish a paper – Part I.
- Requirements concerning the scientific content
– originality and ownership
- Order of the co-authors

2nd session:

- Question period
- Selection of the journal – the Impact factor
- How to publish a paper – Part II.
- Reduction phase:
 - Assessment of new ideas, title, figures, equations
 - Verification of existing works, search for exact references
 - Redaction of main chapters

3rd session:

- Question period
- How to publish a paper – Part III.
- Abstract, introduction, conclusions, acknowledgements, appendix
- Format of references and figures
- Final verification of the manuscript

4th session:

- Question period
- How to publish a paper – Part IV.
- Covering letter to the Editor
- The Referee's opinion

Corrections, answers to referee's remarks
The proofs
The copyright

5th session:

Question period
Participation at conferences
Workshop, symposium, international conference
Sessions, role of the Chairman
Invited lecturer
Oral and poster contributions
Contact making during a conference

6th session:

Question period
Scientific collaboration
How to make a contact?
Invitations, visits, seminars, corresponding
Establishing a collaboration
Joint proposals for funding collaboration
Problems around the ownership of scientific contributions

7th session:

Question period
Construction of a publication list and description of
scientific activities
Examination of papers proposed by the participants of the course

8th session:

Question period
The Ph.D. system in the U.S.A.
Examination of papers proposed by the participants of the course

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So, the first question is: where to begin the subject? Well, I think, before publishing a paper, there are many things that may influence its content, so let us begin with the question:

2. When there is a need to communicate our results at an international level?

During the doctoral studies you are working on a subject that needs to be improved. At least, you are *supposed to* work on such a theme. Your adviser has selected an appropriate topic. This is his job (nevertheless, not the only one). When you begin to work on your theme, first you should read a lot of papers and study books that are in your topic or near to it. (Most of them are, of course, in English!) It is a very important stage of your work: learning. Learning in a very extensive way; the maximum possible.

After a couple of months, you begin to see what has already been done in the subject and what is not. Evidently, you become more motivated by problems that are not yet solved. You should also consult with your supervisor on the subject. Well, this would be the normal way to proceed. However, frequently, this is not the case. Especially, when there are experiments to set up and to carry out. In such a case, most probably, you do not wish to wait until you read all those papers that are proposed to you by your adviser. So, you proceed with the experiments and, at the same time, continue reading.

In the second phase of your work, you obtain new scientific results. You must be sure that they are new. To make sure, it is good to consult frequently the literature using Internet and libraries. There are several advanced possibilities, for example “science direct” on Internet that allows you to find information very rapidly in your subject. In the case you are not sure, you should ask your supervisor.

It is very important that the results obtained be new. If you try to publish something that has already been resolved and written down in another work, you take a big risk for your paper to be refused by the publisher (i.e. by the Referee).

You also have to be sure that what you did is correct. No error, absolutely not! Your mathematical calculations should be repeated by yourself many times to be sure that everything is correct. There are rarely people who do not make mistakes. For example, myself, I do mistakes sometimes during calculation. It does not exclude, however, to obtain a good result; you just have to verify your calculations many times.

For example, it happens frequently in papers that the authors do not precise some details of their calculations. This is the case when they are more or less evident. So anybody working in that field could repeat them. It happened, for example, in one of my paper that I stated something (“plastic spin is zero for linear viscous slip in crystal plasticity”) in one line only. The calculation behind this statement was about 30 handwritten pages! You can imagine how many mistakes I made during the calculations. Finally, to be absolutely sure, I wrote a computer program to check out some parts of the calculation numerically. Actually, I noticed the new result during my earlier *numerical* simulations and then tried to prove it exactly in an *analytical* way.

So, in conclusion, it is very important that the obtained results be correct and new (important!). The purpose of a doctoral work is to realize this goal. So there is a need to communicate your results at an international level when you (and your adviser) estimate that the obtained results are really worthy.

Deontology: Never publish results copied from other’s work. Avoid copying even some small parts of other papers identically. However, it is unavoidable to cite earlier results in your subject (it is even compulsory). In each case, make reference to the original paper. If you publish a paper which uses some parts of your own earlier paper, you are not permitted to copy them identically without the agreement of the co-authors of that work.

You obtained new results. They are sure. How to proceed then to “advertise” them?

3. Step no 1: identification of the co-authors

This is a delicate step. In any case, please ask your adviser's opinion about it. Your adviser should, of course, be a co-author of the paper. Perhaps even the first author. The general rule is that everybody who is directly related to the production of the new scientific results and contributed to them in an active way should be a co-author. Then the question is, in what order should they be put?

General rule: the amount of contribution is a good measure for the order of the co-authors. However, we do not know beforehand what would be the exact content of the paper, thus we cannot yet establish the contribution of the co-authors. The final decision has to be postponed to the end of the redaction phase of the paper. For the moment, it is sufficient to establish a simple list of the expected co-authors, without any priority. The exact order should be done at the end, when it will be clear what the extent of contribution of each partner is. Do not forget; until the paper is finished, still there is a lot of work to do! Much more than what you imagine, especially, when one is a beginner. Keep in mind: in many cases, up to the appearance of the paper in print, you have to work on the paper-writing about as much as you worked to obtain the results themselves!

In any case, it is important that the co-authors be aware about your plan of paper writing before even you begin the redaction phase. It would not be a good idea to complete the paper and then show it to them only near to the finishing stage. Actually, it is possible that some of them would like to be involved more in the writing stage so that they can increase their contribution. That may change the order of the authors at the end.

3.1. How to estimate the extent of contribution of a co-author?

Order of the co-authors.

Let us examine this question through some examples.

- a. You have received the basic ideas of the new results from your supervisor. You worked on them, made your calculations basically alone (analytically, or by writing a new computer program), created the figures, and then discussed the results with your adviser. Finally, you even write the paper in English. The order is evident: you are first, the adviser is second.
- b. It is your adviser who writes up essentially the whole paper in English, otherwise everything else is the same as in (a). Normal order: you are still first and your adviser is second. Why? It needs some explanation. Well, your adviser is a professor (or equivalent), so he has already published many papers where he is the first author. He made his career already – which was initiated by his adviser - now it is his turn to promote his young co-worker in his career.
- c. You have received the basic ideas of the new results from your adviser. You worked on them; however, you were not able to do your calculations alone. Your adviser had to do this work in your place. Perhaps even he passed to you a computer code what he made and you only had to run the code and to plot the results. Finally, he even had to write the paper in English (with your full assistance with typing and figures). The order is evident: you are second, the adviser is first.
- d. During the work, you had to consult several times with a third person because of his specialty in a field, which is not the field of expertise of your adviser. This other colleague makes a significant contribution by providing good advises and perhaps even by furnishing some computer code what he developed and you used it with good results. This third person should then become a co-author of the paper, normally at the third place in the final order.
- e. A further partner is involved in the work, usually from industry. Perhaps the work was financed by an industrial partner who also furnished experimental data and all precision what you needed to know in order to carry out your research. This third or fourth

partner should then become a co-author of the work. He also has to ask his company for clearance of the obtained results, that is, the permission to publish the data. The company may wish to exclude from publishing some of the data (exact composition of the material or its processing). It may even happen that the industrial company does not give its permission for publishing the results. Then you cannot write a paper in an international journal.

- f. A fourth person furnished a computer code for you, without any special discussions about the results what you obtained with the code. Then, normally he is not a co-author of the paper. You have to; however, thank his help in the acknowledgement part of the paper by specifying the nature of his help.
- g. If there are equivalent contributions of some of the co-authors, they should be put into alphabetical order.

In any case, it is very important that each co-author reads the paper before sending it to a journal. (Except in very special cases, for example, when the co-author made his contribution already but he left to another country and did not let you know his address.) This case, unfortunately, is quite frequent in some countries. It happens easily when the doctoral student is not able to publish his work in time so there is only Ph.D. defense but no paper writing (or not all the new important results were published during the doctoral work). Then the adviser is forced to write the paper without further help of the student. It may happen then that he puts his name first, especially if he had to construct a significant part of the figures and run the code to obtain further results (which helped in the understanding of the subject). Such a case happened to me once.

Examples for the order of the co-authors:

1. L.S. Toth, A. Molinari, N. Zouhal, "Cyclic plasticity phenomena as predicted by polycrystal plasticity", *Mechanics of Materials*, 32, 99-113, 2000.

2. Molinari, F. El Houdaigui, L.S. Toth, "Comparison of the tangent model predictions to finite element results for the solution of the inclusion problem in viscoplasticity", *Applied Mathematics and Mechanics*, in press. 2000.
3. I. Kopacz, L.S. Toth, M. Zehetbauer, H.P. Stüwe, "Large strain hardening curves corrected for texture development ", *Modelling and Simulation in Materials Science and Engineering*, 7, 875-891, 1999.
4. A. Hildenbrand, L.S. Toth, A. Molinari, J. Baczynski, J.J. Jonas, "Self consistent polycrystal modelling of dynamic recrystallisation in shear deformation of a Ti-IF steel", *Acta Materialia*, 47, 447-460, 1999.
5. Y. Estrin, L.S. Toth, A. Molinari, Y. Bréchet, "A dislocation-based model for all hardening stages in large strain deformation", *Acta mater.*, 46, 5509-5522, 1998.
6. A. Borbély, L.S. Toth, B. Bolle, " Texture and hardness in wire drawn [001] single crystals ", *Textures and Microstructures*, 31, 1-9, 1998.
7. J.J. Jonas, S. Shrivastava, L.S. Toth, "The inverse Swift effect : experiments and theory", *Acta Materialia*, 46, 51-60, 1998.
8. L.S. Toth, A. Molinari, D. Raabe, 'Modelling of rolling texture development in a ferritic chromium steel', *Metallurgical and Materials Transactions* 28A, 2343-2351, 1997.