Publishing research

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Introduction

The advances of scientific research must be published so as to accomplish with their mission. In the 17th century, some scientific societies began to publish periodically research results. Currently, there are thousands of scientific journals. Some of them have a great reputation, some others are addressed to a very specific target and some may only have relevance in a specific country or region. Just a few come up with breakthrough articles that are rapidly reported by the media.

However, publishing in an average journal does not guarantee that the articles are going to be read by a large number of colleagues. In that sense, some scientists prefer presenting and discussing their research results in front of other specialised scientists. The results are thus orally presented and published in the book of proceedings of a conference.

Last but not least, the publication of articles in relevant journals is usually a keystone for comparing the curricula of different researchers or research groups. Moreover, there are conferences with more reputation than journals, in which it is very hard to have works accepted.

In this module, we address the publishing of research. In the first section, the description of journals and conferences is addressed. The second section elaborates on the steps for publishing in a journal or presenting work in a conference. The module ends with some notes regarding how to measure the relevance of a publication.
Objectives

The goals to be achieved by studying this module are the following:

1. To know the means of publishing the research.
2. To understand the steps of publishing in a journal.
3. To understand the steps of presenting research results in a conference.
4. To assess the relevance of a journal or conference.
1. Journals and conferences

When authors consider their work is worthy of publication, they decide which option is more suitable: a periodic publication (e.g. journal) or presenting the results in front of a specialised audience (in a conference). There are several reasons that make authors decide for one option or another. However, presenting a paper in a journal or a conference is not straightforward: in order to meet a certain quality, contributions undergo a review process that leads to a rejection or acceptance of the contribution.

In the first part of this module, we describe journals and conferences, and elaborate on their differences.

1.1. Journals and magazines

In most scientific disciplines, researchers publish their papers in journals.

A scientific journal is a periodical publication whose goal is to report research advances.

Journals may be very specialised (e.g. Journal of Advanced RFID Applications), specialised in a discipline (e.g. computer engineering) or may have a broader range of topics covered (e.g. Spectrum or Nature). Some broad-audience journals are considered magazines.

In general, there are some differences between journals and magazines:

- Journal articles are usually longer, providing detailed analysis of topics. Magazine articles are shorter and provide broader overviews of topics.
- Journal articles are written in the jargon of the field for researchers. Magazine articles are usually addressed to a wider audience.
- Journal articles often include formulae, analytical proofs, detailed information on methods etc., but rarely include photographs or advertising.
- In general, journal page numbers are usually sequential through all issues that form a volume. Magazine pages numbers usually start over with each issue.
Publishing research

Journals and magazines are identified by their ISSN (International Standard Serial Number) and are generally published by an editing company (e.g. Elsevier, IEEE\(^1\) or Springer). Moreover, journals are informally identified by their abbreviation. For instance, the IEEE Transactions on Science and Data Engineering that is shown in Figure 1 is also known as IEEE TKDE.

1.1.1. Contents of journals and magazines

The contents of a journal or magazine are decided by a board of editors. They receive the material from authors and distribute the submissions to specialists, who will carefully read the papers and inform the editors about their quality and scientific validity.

In some cases, journals and magazines publish special issues, which are devoted to a single topic (e.g. Journal of Advanced RFID Applications: special issue in privacy). In these cases, editors invite other scientists (called guest editors) who are in charge of selecting the papers for the special issue.

The number of papers the editors of a journal or magazine select is somehow related to the quality of the publication. If a quarterly journal publishes 10 papers, they are likely to be quality papers (assuming that editors are overwhelmed with a large number of contributions).

Scientific journals and magazines publish a variety of scientific and technical articles, not only research papers, but they also publish book reviews, surveys etc. Moreover, some journals and magazines may publish special issues containing the most outstanding contributions presented in a conference.

\(^{1}\)IEEE (read i-triple-e) stands for the International Institute of Electrical and Electronics Engineers.

Impact factor

The importance of a journal or magazine is usually measured by its impact factor. We will elaborate on this subject later in this module.
1.2. Conferences

The main difference between a journal and a conference is that the latter involves the oral presentation of the paper.

An academic conference gathers researchers to present and discuss their work. They provide a channel for exchange of information between scientists from all over the world.

Conferences are generally organised periodically, for instance every year or every two years. There are three kinds of conferences, regarding their range of topics and amount of participants:

- **Large conferences** with a broad range of topics, e.g. International Conference on New Technologies. These conferences are usually attended by a large number of scientists and students and last several days.

- **Conferences** attended by a large number of scientists but addressing a more specific topic, e.g. International Conference on Internet Users Security. In general, they are shorter than more general and populated conferences.
Finally, there are very specific and short conferences that are usually called workshops, e.g. International Workshop on Privacy and Security by means of Artificial Intelligence.

Short conferences and workshops can be sometimes organised in conjunction with other large conferences. For instance, a workshop on RFID uses in public transportation can be organised along the aforementioned International Conference on New Technologies.

1.2.1. Organisation

The organisation of a conference involves several aspects. On the one hand, there is a scientific aspect: i.e. which papers are to be presented. On the other, there are economic and management issues. Most of the conferences related to Information and Communication Technologies are organised with the participation of institutions such the IEEE, the IFIP or the ACM. They offer support mainly for publishing the book of proceedings.

In order to organise a conference, both scientific and organisation committees are needed.

Regarding the scientific content of the conference, a programme committee (a group of researchers) is responsible for evaluating the proposals received. The programme committee chair finally makes a decision on the papers to be presented. Below in this module, we will discuss presenting proposals to a conference.

Concerning the management of the conference, the organisation committee is responsible for the reception of the attendants, supporting the sessions, printing the badges etc. The events a conference includes are not only related to presenting papers. In that sense, conferences offer some social events (such as a reception, a gala dinner or some visits to interesting places in or near the venue of the conference).

Authors with papers accepted in a conference, other students and scientists willing to attend the conference must register to it. This means that they pay a fee in order to have access to both the conference and the social events. They will also receive a printed or electronic copy of the book of proceedings. Figure 2 shows the cover of several conference books.
1.2.2. **Presentations in a conference**

The oral presentations that constitute the conference are organised in sessions. A session lasts around a few hours so up to four or five papers can be presented in each one. In general, the topics of the papers within a session are similar. Typically, work is presented in the form of short, concise presentations lasting between 10 to 30 minutes, usually including discussion. The authors presenting the papers are introduced by the session chair, usually a researcher that forms part of the programme committee.

In addition, conferences may include some poster sessions in which the works are not orally presented by authors. Instead, they are shown by means of a poster exhibition. In this case, authors just discuss with colleagues and students interested in the poster. Figure 3 shows an example of a poster presented in a conference. A poster can appear written in form of a very short paper in the book of proceedings.
If the number of sessions is large, sessions are organised in parallel (and hence the conference lasts a reasonable number of days). Moreover, conferences sometimes have a plenary session: in this session, a keynote speaker (an invited expert researcher) gives a conference. During plenary sessions, no parallel sessions are scheduled. Finally, large conferences may include some tracks. These are monothematic sessions that are usually organized by a subset of the researchers in the programme committee.
2. The process of publishing

In this section, the steps that take part in the process of publishing in a journal or in a conference are described. These steps are the following:

- Reading a call for papers.
- Writing the paper.
- Peer reviewing of the paper.
- Working in the final version of the paper.

2.1. The call for papers

The homepage of journals and magazines has a section with information for authors: there is an *aims and scope* section which details the topics the publication addresses, together with an *information for authors* section that gives details about the length of the publication, the format to use for writing the paper etc. They also give some information about the number of papers they usually publish, the members of the editorial board etc. Finally, they usually offer access to a free issue so authors can evaluate if their proposal is worth being sent to the publication (note that the online access to most journals and magazines is restricted to subscribers).

Conferences are announced together with their call for papers advertisement. In order to present a paper in a conference, authors must search and read the call for papers information.

A call for papers is a document addressed to prospective authors detailing the topics of a conference or journal, along with some other important information.

Moreover, if the editorial board is willing to gather proposals for a special issue, its call for papers is then announced.

Figure 4 shows the call for papers section of a conference. The call for papers includes important information such as:

- The aims and scope, that is the list of topics the papers sent may address.
- The important dates, that is the submission deadline, the date of acceptance of communications and, of course, the dates of the conference.
• The format authors must use to send proposals, the publisher of the book of proceedings, etc. Also, the instructions for submitting the paper are specified. Note that, in some cases, authors are requested to send a blind copy of the paper; i.e. no name or institutions can appear in it.

• The members of the committees, the venue of the conference etc.

In some disciplines, authors only need to send an abstract instead of the full paper to the organisation. Moreover, the book of proceedings may gather the full papers or just those abstracts (in this case, the book is a book of abstracts).

In conferences related to information and communication technologies, authors are usually requested to send the full paper.

Figure 4. An example call for papers for a conference
2.2. Peer reviewing

Authors send the manuscript according to the procedure specified in the call for papers. Once the organisers of the conference or the editorial board retrieve the manuscript, they assign it to several reviewers (usually two or three):

- In a conference, the reviewer is someone from the programme committee. However, the latter can send the manuscript to suggest to the editor some experts to act as reviewers.

- In a journal, the editor sends the manuscript to an expert from a group of reviewers that collaborate with the journal. In some cases, the author of the manuscript can suggest some experts to act as reviewers to the editor.

Reviewers usually have some weeks to read their assigned papers and to evaluate them. Reviewers have to check that the proposal in the manuscript has not been published elsewhere and that the methods are described in a sound manner.

2.2.1. Review forms

Once the reviewers have read the manuscript, they send their comments to the editor or to the programme committee chair (in case of conferences). In general, the reviewers use a form that is electronically sent via email or web. In these forms, the following information is usually requested:

- A summary of the aim of the paper

- The novelty and soundness of the proposal

- The quality of the writing and additional elements (pictures, bibliography etc.)

- The suitability to the conference/journal, given its list of topics

- Some comments that the reviewer wants to make to the authors (hints for improving the text, for elaborating on the proofs, for providing additional information etc.)

- Some comments that will only be accessible to the programme chair

- The proposal on rejecting or accepting the paper (namely reject, weak reject, neutral, weak accept, accept).

Conflicts of interest

A reviewer can state if there is a conflict of interest in reviewing the paper: for example, the author may be a close colleague of the reviewer and these situations should clearly be avoided.
Last but not least, reviewers are also requested to evaluate their confidence according to the degree of knowledge or expertise in the topic. In that sense, the comments from a reviewer having high confidence in a topic should be considered differently than those from a reviewer who is not an expert in the topic.

### 2.2.2. Acceptance or rejection

Once the reviewing process has ended, the programme committee chair gathers all the reviews. Some conference and journal paper management systems are able to supply summaries, average punctuations and other items in order to provide organisers or editors with a set of tools to make the final decision on the manuscript.

If the decision is a rejection, the paper has no room in the conference or in the journal. If the decision is to accept the paper, authors should implement the changes suggested by the reviewers in order to make the final version of the paper.

### 2.2.3. Revisions

Due to the short time during the organisation of a conference and since editing and printing the book of proceedings takes several weeks, there is no chance to improve rejected papers and to resubmit them to the programme committee. However, regarding the publication in journals, several rounds of revisions are possible.

The acceptance decision of a non-rejected manuscript can be accepted with minor revisions or accepted with major revisions.

- If accepted with minor revisions, authors will have to do a brief effort to take into account the comments of the reviewers to make the final version of the paper. In that case, just a final checking of the paper is done by the reviewers of the paper.

- If accepted with major revisions, the paper may be far from being finally accepted. Authors should work hard in order to rewrite parts of the paper, improve some parts, do more tests etc. to fulfill the requests of the reviewers. After the major revisions are implemented, reviewers check again the paper and usually a few reviews are additionally done in order to assess the validity of the final version.
2.3. Final version

The final version of the paper is usually called the camera ready version of the paper. In conferences, authors make use of templates of the typesetting system and generate the files that will be used for compiling the book of abstracts. In general, authors are responsible for the final content that will be published: e.g. no grammar or spelling check will be done, figures will not be redrawn.

The typesetting of a journal or a magazine is quite different. Professional editors work in the final version of the paper, so typos and visual aspects are going to be perfectly addressed. However, editors are not usually scientists, so there may be room for some flaws of the content (imagine the development of a complex formula or the transcription of a table). In that sense, authors are sent the typeset version of the paper so they have to check that there is no error.
3. The relevance of a publication

During the development of the professional career of scientists, there are several occasions in which their productivity must be assessed. For instance, when applying for a position in a college or research institution, their curriculum is going to be taken into account, specially their scientific and academic activities. Moreover, when competing for research funding, the research curricula of the entire research group is to be evaluated. In that sense, evaluators use the number and relevance of publications in order to compare scientific curricula.

The importance of the conference where you have presented a paper or the impact of the journal where your article has been published are key items considered when evaluating the researcher curricula.

In this section we address how to measure the relevance of a publication.

3.1. Conferences

There is no standard regarding the quality of a conference. On the one hand, there are small workshops that are very interesting that may have no proceedings book published. On the other hand, there are some very large conferences with hundreds of papers printed on a book published by a well-known publisher (for instance, IEEE). The question is: how to know if a conference is better than another one? This is now addressed.

The relevance of a conference depends on the paper acceptance ratio, the reviewing process and the publisher of the book of proceedings.

A first idea is to measure the acceptance ratio of the conference. For instance, a conference with 500 submitted papers and 450 accepted papers may not have accepted only high-quality papers. Generally, the acceptance ratio information can be found in the preface of the conference proceedings book. A conference with 500 submissions and only 40 papers accepted is likely to have accepted good works.

Additionally, the reviewing process is also important to figure out the relevance of a conference: using blind reviews and four revisions per paper may be better than only evaluating abstracts.
The publisher of the book of proceedings may also be taken into account. For instance, Springer-Verlag or IEEE Publishing are well-known editors. They also provide an ISBN\(^2\) for the book and hence it can be bought worldwide. On the contrary, if the book has no ISBN and merely consists of the papers burnt on a CDROM it may not have any relevance in the curriculum.

According to the above ideas, the CORE Conference Ratings elaborates a ranked list of conferences. This rating measures the conferences and assigns them to categories such A+, A, B or C.

Last but not least, the fact that a certain conference has its proceedings indexed in a well-known database (such DBLP\(^3\), for computer science disciplines or the ISI Web of Science) may be considered another sign of the quality of the conference.

### 3.2. Journals and magazines

Regarding journals and magazines, there is a well-established way of measuring its relevance: the impact factor. Although this measure has generated some criticisms, the fact is that the impact factor of a periodical publication is widely used as a measure of its relevance. The measure uses the number of citations as basis. It has become a universally accepted way of measuring the relevance of a publication in a journal.

**Number of citations**

Despite being published in a journal or in a conference, another item that must be taken into account when measuring the relevance of a publication is the number of citations a paper has received.

Naturally, the more citations the more relevant the paper may be, regardless of whether it has been published in a journal or in a highly-rated conference. However, self-citations (that is citations in papers by the same authors of the cited paper) should not be considered.

Thomson Scientific indexes hundreds of journals of scientific disciplines in their databases. In that sense, they store the articles of these magazines and journals together with the bibliography and author information. Hence, the information systems easily compute the impact factor of each indexed journal. This procedure is done yearly and its results are published in the *Journal Citation Reports* (ISI JCR). This index can be accessed from the ISI Web of Science.

The impact factor of a journal is computed using a three-year period. It can be viewed as an approximation of the average number of citations in a year, given to those papers in a journal that were published during the two preceding years.
For example, the 2003 impact factor of a journal would be calculated as follows:

\[
A = \text{the number of times articles published in 2001–2 were cited in indexed journals in 2003}
\]

\[
B = \text{the number of citable items (usually articles, reviews, proceedings or notes; not editorials and letters to the editor) published in 2001–2}
\]

\[
\text{2003 impact factor} = \frac{A}{B}
\]

Note that the 2003 impact factor was actually published in 2004, because it could not be calculated until all of the 2003 publications had been received and archived.

*Journal Citation Reports* includes a table of the relative rank of journals by impact factor in each specific science discipline. It is important to remember that different scientific disciplines can have very different publication and citation practices. As a result, the journals of different disciplines (e.g. medicine) may reach higher impact factors than others (e.g. telecommunications).

Figure 5 shows different information from the ISI JRC for the journal *IEEE Wireless Communications*. Figure 6 shows the ranking of journals in the area of computer science, information systems.

**Alternatives to the ISI JCR**

In recent years, some alternatives to ISI JCR have been proposed. For instance, the *Sci-mago Journal Rank* provides an alternative way of computing the impact factor of a journal. This system uses the data from the Scopus database. Additionally, they analyse the scientific production for each country. It can be accessed from [http://www.scimagojr.com/](http://www.scimagojr.com/)
Figure 6. Ranking of journals in the area of computer science, information systems
Summary

This module addresses the publishing of research papers. In the first part of the module we elaborate on describing conferences and journals. A conference differs from the journals basically in that the first involves the oral presentation of the work. We also specify the differences between conferences and workshops and between journals and magazines.

The second part of the module addresses the process of sending a proposal (manuscript) to a publication or to a conference. We focus on the call for papers, but also comment on the review process.

To conclude the module, we discuss how the relevance of publications is typically evaluated. We have pointed out how to measure the importance of a conference and have addressed the impact factor in journals.
Activities

1. Given the example call for papers of this module, identify the information it contains according to what has been explained: organisation, venue, which dates are important, topic etc.

2. Search for information about the h-index and the g-index.

3. Access the Web of Science and look for the publication with the highest impact factor.

4. Using the Web of Science, list the ten most important publications of the computing related disciplines.

5. Look for the website and schedule of some large conferences about your discipline and identify the concepts explained in this module.
Glossary

**conference** Event that gathers scientists to present and discuss their work.

**impact factor** Index that ranks journals according to their relevance.

**journal** Periodical publications that offer the research results in a specific science or technology field.

**magazine** Journal oriented to a broader audience and usually covering general topics.

**major revision** Process of rewriting and improving parts of a paper in order to have a second chance for being published in a journal.

**poster** Short form of displaying a research result, at a glance, that does not involve the oral presentation of the proposal in the conference or even appearing in the book of proceedings.

**rejection** Decision on a manuscript that has not been considered for publication or presentation in a conference.

**reviewer** Scientist that reads the manuscript thoroughly and makes comments to make organisers and editors decide on its acceptance.

**workshop** Small conference that usually lasts one or two days with very specific topics.
Bibliography

