

## **Topic: How to review a paper**

### ***Introduction***

The peer review process is an essential part of the publishing process. It validates and confirms a researcher's work and establishes a method through which work can effectively be evaluated.

It is thought that review by peers has been a method of evaluation since ancient Greece, although it was not standard practice in science until the mid-20th century.

Today, the publication process and the speed at which articles are peer reviewed and published are key elements in the appropriate accreditation of scientific findings.

The purpose of peer review is to ensure

- 1) quality, checking that no mistakes in procedure or logic have been made;
- 2) that the results presented support the conclusion drawn;
- 3) that no errors in citations to previous work have been made;
- 4) that all human and animal protocols conducted follow proper review and approval by appropriate institutional review committees;
- 5) and, very importantly, that the work is original and significant.

Proper reviewer conduct is essential for making the peer review process valuable and the journal trustworthy. Unfortunately most scientists acquire their review skills not through instruction but by actually doing it.

Our purpose is to define how best to peer review a paper. We will stipulate several principles of peer review and discuss some of the main elements of a good manuscript review, the basic responsibilities of a reviewer, and the rewards and responsibilities that accompany this process.

### ***1. Elements of manuscript review***

Manuscript review can be divided into two main categories: the technical and the ethical. Both aspects are primarily concerned with making the manuscript

better and ensuring that it is reporting trustworthy data. Let's look on typically reviewer instructions (review criteria):

1. Scientific quality of the work

⇒ Are the methods appropriate and presented in sufficient detail to allow the results to be repeated?

⇒ Are the data adequate to support the conclusions?

2. Presentations

⇒ Writing: Is it clear, concise, and in good English?

⇒ Title: Is it specific and does it reflect the content of the manuscript?

⇒ Abstract: Is it brief and does it indicate the purpose of the work, what was done, what was found, and the significance?

⇒ Figures: Are they justified? Are they sharp, with lettering proportionate to the size of the figure? Are there legends to explain the figures?

⇒ Tables: Can they be simplified or condensed? Should any be omitted?

⇒ Trade names, abbreviations, symbols: Are these misused?

3. Research violations

⇒ Are there violations of the Guiding Principles in the Care and Use of Laboratory Animals?

⇒ If the research involved human subjects, were the studies performed in accordance with the Declaration of Helsinki?

⇒ If you have concerns about the welfare of animal or human subjects used by the authors, include written comments to the editor.

4. Rating

⇒ Assign a rating on the reviewer form; rank the manuscript relative to other work in the same field.

5. Confidential comments

⇒ Provide comments regarding the novelty and significance of the manuscript.

⇒ Provide a recommendation about the manuscript's suitability for publication in the journal; these comments will not be returned to the author(s).

#### 6. Comments for authors

⇒ On the reviewer form, provide specific comments, preferably numbered, on the design, presentation of data, results, and discussion. DO NOT include recommendations for publication on the second page.

⇒ Please be certain that your comments to the author(s) are consistent with your rating recommendation.

#### 7. Privileged document

⇒ This manuscript is a privileged communication; the data and findings are the exclusive property of the author(s) and should not be disclosed to others who might use this information in their research.

⇒ The manuscript, illustrations, and tables should be destroyed upon completing the review or, if anticipating a revision, kept confidential until the review process is complete.

⇒ If you have shared responsibility for the review of this manuscript with a colleague, please provide that person's name and institutional affiliation.

Note that points 1, 2, 4, 5, and 6 are concerned with more technical issues. Is the writing clear, concise, and intelligible? Is the manuscript logical? Does it make a significant and novel contribution to the field? Are there any fatal methodological flaws? Are all the figures clear and necessary? Point 3 deals primarily with ethical issues. Are there any concerns with regard to the proper use and care of animals? If human studies were done, were they conducted with the prior approval of the subjects and institutions? Did the human protocols conform to prevailing ethical and legal standards? Point 7 likewise falls under an ethical realm, only not for the authors but for the reviewer. The manuscript must be treated in a

confidential manner. Thus a reviewer must not only provide an unbiased evaluative analysis of the structural components of a manuscript but must do so in an acceptable, ethical context.

## ***2. Reviewer's etiquette and responsibilities***

It is important to remember that a reviewer is asked to provide an informed opinion about a manuscript. The decision whether the manuscript will be published is made solely by the editor. Thus the editor must be able to discern very precisely the reviewer's thoughts and weigh that opinion with or against those of the other reviewers and his/her own. An editor will appreciate a substantive evaluation of a manuscript. If a reviewer disagrees with the conclusion of an author, it is incumbent upon the reviewer to provide definitive reasons or appropriate citations, not simply make remarks such as, "I just don't believe your data," or "It can't possibly be so." If a reviewer has a bias against the author, he/she should recuse him/herself from reviewing the paper. A reviewer must be knowledgeable about the topic and have a clear understanding of the historical context in which the work was done. Because many manuscripts nowadays are collaborative efforts between different laboratories using a myriad of different techniques, it is unlikely that any single reviewer will be expert in all of the protocols encountered in a given paper. The reviewer should comment only on those aspects of the work with which he/she has familiarity; making the editor aware of this is helpful. Again, let us reiterate, the most important rule is to follow the golden rule: treat all manuscripts in the same manner that you would want your own treated.

The responsibilities of a reviewer can be summarized as follows:

1. The reviewer should provide an honest, critical assessment of the research. The reviewer's job is to analyze the strengths and weaknesses of the research, provide suggestions for improvement, and clearly state what must be done to raise the level of enthusiasm for the work. The reviewer should not manipulate the process to force the authors to address issues interesting or important to the reviewer but peripheral to the objective(s) of the study.

2. The reviewer should maintain confidentiality about the existence and substance of the manuscript. It is not appropriate to share the manuscript or to discuss it in detail with others or even to reveal the existence of the submission before publication. There are some exceptions, if approved by the editor. One exception is that the reviewer may want a junior colleague to have the experience of reviewing and therefore may ask him/her to collaborate on a review. However, if this is done, your collaborator on the review should also agree to maintain confidentiality, and the editor should be informed of the participation of this additional person. Some journals require editor approval before a colleague or student is asked to view a submitted paper; others do not.

3. The reviewer must not participate in plagiarism. It is obviously a very serious transgression to take data or novel concepts from a paper to advance your own work before the manuscript is published.

4. The reviewer should always avoid, or disclose, any conflicts of interest. For example, the reviewer should decline to review a manuscript on a subject in which he/she is involved in a contentious dispute and does not feel that a fair review can be provided. The reviewer should also avoid biases that influence the scientific basis for a review. One example of this is a bias that favors studies with positive rather than negative results. Another example is if the reviewer has a close personal or professional relationship with one or more of the authors such that his/her objectivity would be compromised. Scientific merit should be the basis for all reviews.

5. The reviewer should accept manuscripts for review only in his/her areas of expertise. Although editors try very hard to match manuscripts with the most expert reviewers, sometimes mistakes are made. It is unfair to the authors and to the overall review process if the referee does not have the expertise to review the manuscript adequately. The exception to this general rule is when an editor specifically asks for your view as a “nonexpert” or seeks your opinion on a special aspect of the manuscript (e.g., statistics).

6. The reviewer should agree to review only those manuscripts that can be completed on time. Sometimes, unforeseen circumstances arise that preclude a reviewer from meeting a deadline, but in these instances the reviewer should immediately contact the editor. It is unfair to the authors of the manuscript for reviews to be inordinately delayed by tardy referees. Delaying a review can sometimes lead to charges by the authors that the reviewers (who undoubtedly work in the same area) are “stonewalling” in order to publish their related work first, thus establishing priority.

7. The reviewer also has the unpleasant responsibility of reporting suspected duplicate publication, fraud, plagiarism, or ethical concerns about the use of animals or humans in the research being reported.

8. The reviewer should write reviews in a collegial, constructive manner. This is especially helpful to new investigators. There is nothing more discouraging to a new investigator (or even to a more seasoned one) than to receive a sarcastic, destructive review. Editors are not trying to determine the scientific prowess or wittiness of the reviewer. The reviewer should not shy away from discussing the weaknesses (or strengths) of a study, however. No one likes to have a paper rejected, but a carefully worded review with appropriate suggestions for revision can be very helpful. In fact, an author should prefer to have his/her paper rejected if the review process uncovered errors in the study

### ***3. Structure of a review***

Reviewing forms can have varying degrees of structure, according to the taste of the program chair (the journal editor etc.), or his or her motivation to wrestle with configuring the review system. However, it's a good idea to structure your review irrespective of whether the review form does this for you. The rest of this section makes no assumptions about the review form in front of you in the interests of generality.

**First of all**, summarize the paper. Give a neutral description of what you think the paper is about, where the authors are coming from, why they view the

problem as important, and what they've done. This is a great way to start writing a review, particularly when you're not sure how to get started.

**Second**, state what you think the contributions are. It's rare to find a paper that completely fails to make any contributions, but it's much more common to find one that makes no useful contributions, or contributions that turn out to be flawed. In any case, state what the authors think the contributions are, or, if you think there's a contribution you think they've missed, what it is. A surprisingly common mistake among paper authors is to fail to state the contribution - if that's the case, gently point this out, but try to fill it in.

**Next**, give your specific comments on the paper by working through the scribbles you made on first (or second) reading. Often you may find your opinion has changed in the meantime, which is fine (you may even have learned something!). Some reviewers like to separate their comments into technical discussion, and then small points like typos and other mistakes, often referred to as "nits".

Specific comments which aren't nits fall into several categories, e.g.:

- Novelty: what's new about the work? Is there some related work that the authors have missed? Does the related work invalidate the contribution, or (more likely) simply change it's context or emphasis?
- How well written is the paper? Could it be made clearer? Suggestions here range from running a spell checker or improving the language, to rearranging entire sections of the paper to make it flow better.
- Are there any apparent technical flaws? If you think there are, it's better to express these concerns as questions than flat assertions.
- Are there gaps or unaddressed issues? These need not render the paper worthless, but they may be suggestions for points the authors should address next time or in the camera-ready submission.
- Was there anything you thought was really cool about the paper? It's always good to mention any moments of delight you had reading it.

If you are conference's or workshop's reviewer, you have more categories, e.g.:

- Is the paper likely to prompt interesting discussion at the conference or workshop? Are the audience likely to take away some interesting ideas they can work with, beyond simply a feeling of good, solid, but otherwise uninspiring work?
- Is the paper appropriate for the venue, given the Call for Papers? For example, papers suitable for IEEE Infocom are rarely appropriate for SOSP (and vice versa). Also, in theory at least conference papers report on complete, mature work whereas workshop papers present early work or argue a position.

**Finally**, provide some kind of conclusion at the end. If you like, summarize the good points and bad points separately, but the important thing is to give a brief recommendation for the paper and your reasons for it.

This may sound complex, but the point is not to write a lengthy essay on the paper. The review can be quite brief, but if it contains most of the above then both the Program Committee (the journal editor) and the authors are much more likely to find it useful.

#### **4. Overall Recommendation**

Most review forms will have some tick list or Lickert Scale for you to use, e.g.:

- Accept in its present form with no revisions
- Accept after minor revisions (re-review unnecessary)
- Accept after major revisions (after re-review)
- Reject but encourage re-submission in another form (e.g short paper, poster)
- Reject

**OR**

- Excellent - This paper is amongst the best papers I have ever read (short-list for best paper award)
- Very good paper (Consider short listing for best paper award)



- Sound paper - I recommend acceptance
- Borderline - This paper could be accepted if there is room
- Poor - This paper has limited contribution, or the work is not yet ready for publication. I do not believe it should be accepted, but if other reviewers differ, I would not oppose strongly
- Unacceptable - The work makes no contribution or, worse, it is flawed or scurrilous. I believe that publication of this paper would reflect badly on our community. I would strongly oppose any other outcome.

These are both good sets of words to consider if there is no particular response mode prescribed.

## ***Conclusion***

There are many aspects of providing good constructive reviews. However, the most important traits are courtesy, fairness, and punctuality. Thus, when peer are reviewing, follow the golden rule: treat other manuscripts as you would want your own to be treated. The entire peer review process, which in essence determines the public record of science, is based on trust—trust between authors and editors and trust between editors and reviewers. The quality and integrity of the entire scientific publishing enterprise depends in large measure on the quality and integrity of the reviewers.

## ***Self-study materials***

- 1) Boi Faltings. How to write a review, 2004. URL:

<http://www.manfredhauswirth.org/misc/Reviewing/STAIRS-2004-talk.pdf>.

Abstract: Short guide to writing the reviews about the research papers and proposals.

- 2) Richard Henderson. The Peer Review Process. URL:

[http://www.elsevier.com/\\_data/assets/powerpoint\\_doc/0005/110993/process.ppt](http://www.elsevier.com/_data/assets/powerpoint_doc/0005/110993/process.ppt).

Abstract: Detailed description of The Peer Review Process from Elsevier, the one of world leading provider of professional information solutions in the Science.

- 3) Sample paper review. URL: <http://www.sis.pitt.edu/jjoshi/IS2935/>

[Sample\\_review.pdf](#).