

## How to Referee a Scientific Paper

All you ever wanted to know about writing or refereeing papers, and giving talks, but you never dared to ask

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## How to Referee a Scientific Paper

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### The Progress of Work in Computer Science Reprise

1. Work on a (relevant) CS question
2. Write a **scientific paper**
3. Submit the paper to an **appropriate** journal/conference
4. If **accepted** for publication then
  - Add one line to CV
  - Present work at scientific meetings
5. Else (**paper rejected or to be modified**)  
Go to Step 1

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## Roadmap of this Talk

1. The Role of the Referee in the Peer Review Process.
2. The Refereeing Process: What to Do, and How to Do it.
3. Ethical Issues and Dilemmas.
4. Receiving a Referee Report.
5. Something to Take Home.

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### Natural Selection in (Computer) Science Dramatis Personae

The actors in order of appearance:

1. the author(s),
2. the editor(s) / program committee members,
3. the referees,
4. the intended audience, and
5. Time.

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### Natural Selection in (Computer) Science Role of the Referee

The task of the referee is to **evaluate** in a **timely** manner a paper for publication in a specific journal or conference proceedings. (Alan Jay Smith. **The Task of the Referee.**)

Keywords:

- Evaluation / Critical Judgment, and
- Timeliness.

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### Evaluation / Critical Judgment

At least, this involves judging:

- if the paper is **correct**,
- if the problem studied and the results obtained are **new and significant**,
- if the quality of the presentation is **good**, and
- what changes might or should be made to the paper.

“This paper gives wrong solutions to trivial problems. The basic error, however, is not new.” (Clifford Truesdell, *Mathematical Reviews*, 12, p. 561)

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### What is a Publishable Paper?

A paper is publishable if it offers a **sufficient contribution** to the body of knowledge of the scientific community it addresses.

Examples:

- new and interesting results,
- new life from old results,
- survey of old results.

**Warning:** The referee's task is purely **advisory**.  
The referee provides an **opinion**.

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## Timeliness

Conference papers:

- hard deadlines / no chance of delaying a report,
- (very) short refereeing time (usually from one hour to a week).

Journal papers:

- soft deadlines / delays common,
- long refereeing time (usually four months to infinity).



### Timeliness (Halmos' Opinion)

Two tenets of **Halmos'** professional life that apply to refereeing:

- Be **boolean**, and
- Be **prompt**.

**Littlewood's zero-infinity law**: Is this or is this not the kind of thing that I'll eventually do? If it is, then do it **now**. If it isn't, than say so **now**!

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## The Refereeing Process Black Box Description

**Input:** A paper submitted to a specific journal/conference

**Output:** A referee report comprising, at least,

1. A recommendation for/against publication in the journal/conference. Sufficient justification for the recommendation is a **must**.
2. A list of necessary/recommended changes and revisions.

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## The Refereeing Process What Happens in the Black Box?

**Ideal:** Read the paper

- carefully,
- checking and evaluating the material, and
- without preconceived ideas.

**Price:** Use of considerable time and effort (especially for journal refereeing).

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## The Referee Report Conference Submission

PAPER: 35

TITLE: On the Reproduction Rate of Rabbits

AUTHORS: Leonardo Pisano

PC-MEMBER: Luca Aceto

REFEREE: Italum Acetum

EVALUATION: 5 (Typical Range: 0–10)

CONFIDENCE LEVEL: 3 (Typical Range: 1–3)

JUSTIFICATION AND GENERAL COMMENTS: This paper gives a recurrence equation that purports to describe the rate of growth of a population of rabbits. This is a mathematically unimportant issue. Moreover, the presentation is obscured by the author's use of Arabic numerals (including a number denoted 0) instead of the clearer Roman numbers. Although the author offers some evidence to support his claims, I found it inconclusive.

COMMENTS FOR AUTHORS: You should compare your work with that of the Venetian school.

CONFIDENTIAL COMMENTS FOR PC: It might be a waste of time to listen to this paper. The author is not a good speaker, and the contribution is dubious.

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## The Referee Report Journal Submission (but not only)

1. **Synopsis.** Summary of the main points of the paper (1–5 sentences are enough).
2. **Evaluation.** Answers at least the following questions:
  - Was the goal of the work worthwhile?
  - Were the developments correct?
  - Was the paper well-written?
3. **Recommendation.**
4. **Detailed comments for the authors.**

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### Issues in Evaluating a Research Paper I

What is the aim of the paper?  
Is it significant?

**Advice:** Exercise caution in rejecting a paper for its lack of significance. You must be able to defend terms such as **obvious** and **trivial** if you reject a paper simply on this ground.

“I have heard mathematicians sneer at the special theory of relativity, calling it nothing but a technically trivial quadratic equation and a few consequences. Yet it is one of the monuments of human thought. So what is “trivial”? Simple arithmetic? It may be trivial to us, but is it to the third-grade child?”  
[Stanislaw Ulam in “Adventures of a Mathematician”]

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### Issues in Evaluating a Research Paper II

Is the paper **appropriate** for the chosen forum?

**Advice:** Refer to a description of the topics covered by the journal/conference:

**Information and Computation** welcomes original papers in all areas of theoretical computer science and computational applications of information theory. Survey articles of exceptional quality will also be considered. Particularly welcome are papers contributing new results in active theoretical areas such as

- Biological computation and computational biology
- Computational complexity
- Computer theorem-proving
- Concurrency and distributed process theory etc.

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### Issues in Evaluating a Research Paper III

- Is the **approach** valid?
- Is the execution of the research **correct**?
- Are the correct **conclusions** being drawn from the results?
- Is the presentation **satisfactory**?
- Does the paper do justice to related work?
- What did you learn from the paper?



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### Desirable Attributes of a Scientific Paper

When refereeing a paper, look for:

1. Correctness
2. Significance
3. Innovation
4. Interest
5. Timeliness
6. Succinctness
7. Accessibility
8. Elegance
9. Readability
10. Style
11. Polish

**Warning:** Most papers will be inadequate in at least one of these attributes. To err is human.

The authors have worked hard to make the paper seem as boring and unappealing as possible but did not entirely succeed in persuading me to recommend rejection, which is clearly what they had in mind when they wrote the paper. (From a real-life referee report)

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### Making Recommendations

**Key:** Set yourselves standards that are neither unrealistically high nor unrealistically low, and adopt them in all of your refereeing jobs.

This review seems to be typical of young reviewers who think that they show how great they are by trashing other people's work. (From a real-life PC discussion.)

**Idealist:** All journals/conferences must have the same high standards of publication.

**Realist:** The evaluation of a paper is often relative to the standards of the journal / conference it is submitted to. However, for reasons of courtesy, one should **never** suggest publication in a "lesser" outlet.

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## Categories of Papers I

Major results; very significant (fewer than 1 percent of all papers)

Example: S.A. Cook. The complexity of theorem proving procedures. This paper introduced the concept of NP-completeness.

Good, solid, interesting work; a definite contribution (fewer than 10 percent).

This paper is excellent in all respects. The contribution is important and non-trivial, the exposition is clear, and the accuracy is refreshingly high. . . .

I have very little feedback on this paper, reflecting its high quality, and strongly recommend acceptance. (From a real-life referee report.)

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### Categories of Papers II

Minor, but positive, contribution to knowledge (perhaps 10-30 percent).

Most of the papers that you'll ever see fall into this category. Do **not** underestimate the importance of their contributions to the development of scientific knowledge.

Elegant and technically correct but useless (Take 1).

Thus the exercise of this paper is like a cartographic expedition that explores in microscopic detail some utterly remote and obscure area at the end of the world. Mathematically nice but not relevant. (From a real-life referee report.)

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### Categories of Papers III

Elegant and technically correct but useless (Take 2).

It is strange and wonderful to observe the unbounded depths to which scientists will delve into a subject, once they have started investigating it. However, there is a limit to the depth to which others can be expected to follow them and remain fascinated by what they find there.

Since this result, though unflawed, does not shine by its own light and the authors make no attempt to polish it or show where it may be used, I recommend to reject it for publication. (From a real-life referee report.)

### Categories of Papers IV

Neither elegant nor useful, but not actually wrong.

Wrong and misleading.

So badly written that technical evaluation is impossible.

I read this section  $n$  times looking for proofs or references to proofs. Results are given without proof. This is not scientific paper level. It was acceptable when Fermat was working, but not in the last two centuries. (From a real-life referee report.)

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### The Bottom Line on Role of the Referee

**Remember:** Some wrong papers are accepted, but your role as a referee is to uphold the standards of the field, and to filter out as many of the “wrong or irrelevant” papers as possible.

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### Ethical Issues

Anonymity gives power. **Never** abuse it.

As a referee, try to be:

- Objective,
- Quick,
- Professional,
- Honest, and
- Courteous.

Treat the author with the courtesy due to a learned peer, and a fellow human being.



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### On Professionalism

As a referee you work for the **author** as much as for the scientific community at large.

Criticism should be **specific** rather than vague.

Avoid sentences like:

The main result of the paper is most likely wrong. [**Where? Why?**]

The author should cite related literature. [**What papers?**]

This is a nice exercise for a graduate student. [**Whom is this meant to offend?**]

The results are folklore. [**References?**]  
(From real-life referee reports.)

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## Some Dilemmas I

- How many papers should I referee?
- How much time should I put into a paper?
- What is the relationship between journal and conference versions of a paper?
- What if I have a conflict of interests?

**Warning:** All papers submitted to conferences and journals are submitted **in confidence**.

### Some Dilemmas II

- Is the referee responsible for (checking) the technical correctness of the paper?
- Should the referee improve the writing of the paper?
- Should the referee proofread the paper for the author?

**Advice:** Offer your services to the author, but remember that any responsibility for the paper's contents rests with the author.

### Some Dilemmas III

Should I ask the author to cite some work of mine?

- + Increases the number of citations to your work. (Cf. <http://scholar.google.com/>)
- Can jeopardize anonymity.

**Advice:** Do it only if your work is truly **relevant**.

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### Why Should I Referee?

**Idealist:** Every scientist should uphold the standards of his/her field.

**Realist:** There are rewards, e.g.,

- feeling of satisfaction for being asked to do the job by a famous scientist,
- increased reputation,
- goodwill from editors / program committee members, and
- appointment to editorial boards / program committees.

### Receiving a Referee Report I

“In this job one needs a very thick skin.” (Quoting Matthew Hennessy loosely)

“Every cockroach is beautiful for its mother.”  
(Neapolitan proverb)

One must learn to deal with referee reports properly.

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### Receiving a Referee Report II

Before reading a referee report on one of your papers:

1. Take a deep breath,
2. Remember that a **good** report is always valuable, and
3. that somebody spent time reading your paper and producing the report.

Use the reports to improve your paper.

If you **expect** bad reports in light of your paper's quality, do **not** even consider a submission.

### Something to Remember

Our currency is **reputation**. It takes a lot of hard work and (scientific) social skills to build one, but it takes very little to destroy it.

Try to evaluate your own work using the standards you apply to somebody else's, but do **not** be your own worst enemy.



### Conclusion

The job of refereeing papers is

- hard,
- necessary, and
- important.

Use the guidelines offered here, but remember that this is a job that is learned by doing it.

The advice we give others is the advice that we ourselves need.