

Chapter 10

The Editorial Review Process

Peer review is a critical part of the publishing process at most science journals. Yet for many authors, the editorial review process might seem intimidating, maybe even a bit mysterious. Because there are many variations on the basic peer-review paradigm, in this chapter I will explain in some detail how the process works at the *Journal of Micro/Nanolithography, MEMS, and MOEMS* (JM³). It is typical of other peer-review processes as well.

Peer review is defined as “the critical assessment of manuscripts submitted to journals by experts who are usually not part of the editorial staff.”¹ It supports the scientific process by providing authors with constructive criticism of their work and by filtering out less valuable work, thus providing a “stamp of approval” from editors and peers for published scientific work. The mere prospect of peer review prompts authors to improve both the science and its presentation in a submitted manuscript.

10.1 The Goals of Peer Review

The peer-review process serves two immediate goals: to help editors decide which manuscripts to publish and which to reject (filtering), and to give authors advice on how to improve their papers (criticism). Additionally, the “stamp of approval” of being published in a peer-reviewed journal can aid authors in their careers, as well as having many other benefits. But it is my philosophy that everything about the science publishing enterprise should be focused on the reader, and so it is with the peer-review process. The filtering and criticism that accompanies an editorial peer-review process helps to get the best papers into the hands of the most interested readers efficiently.

But for the peer-review process to fulfill its goals, the reviews must be of good quality. What constitutes a quality review? Alas, almost none of us have ever been trained in proper paper reviewing—we generally figure it out through experience. Anyone who has published a fair number of papers knows that some reviews are of much higher quality than others (independent of the ultimate fate of any given manuscript). A good review teaches the author about writing and about science, resulting not only in one better paper but in making every subsequent paper the

author writes better. It also makes the job of the editor significantly easier. A poor-quality review does none of this.

10.2 Characteristics of a Well-Done Review

The topics of this book constitute a reasonable list of things a reviewer should be looking for in any paper that might hope to be published. The appendix is a summary of the advice from this book, organized in the form of a checklist.

To be clear, neither editors nor reviewers need to use a formal checklist when writing a review. The appendix is a guideline to help both editors and reviewers make sure that the most important aspects of a scientific paper are considered. As one might expect, the checklist also happens to be a great list of things an author should consider before submitting a manuscript. It is always good advice for an author to think like a reader, and the first readers will be the editors and reviewers.

After reading and critically evaluating a manuscript, the reviewer must now convey that evaluation to the journal editors. In all cases, a respectful and constructive tone should be used. The format of the review is not important, but each review should contain certain vital information. The first paragraph should contain these three key points:

- Provide a brief (1–2 sentence) synopsis of the paper;
- Explain what is novel in this paper (1–2 sentences), both what the authors claim and your assessment; and
- Explain why the work is significant or not (1–2 sentences).

If the reviewer finds it difficult to put any or all of these points into one or two sentences, chances are the manuscript has not done a good job conveying its key messages—a potential red flag.

The second paragraph should give an overview of the quality of the research being reported. If there are any significant flaws in the logical progression from method to data to analysis to conclusions, bring them up here and what could be done to fix the flaws. In this paragraph, focus on the big issues (if there are any). If all is good, say so.

The third and final section of the review should be a list of specific points that the author should address. These points can be small or large, from graphics formatting to paper organization. Remember, though, that copyediting will be done by the journal staff after acceptance, so do not worry about language or format issues unless they interfere with your ability to properly understand and review the manuscript, or if improper language causes what is said to deviate from what is meant.

What does a poor-quality review look like? A list of generic complaints or conclusions without specific references to the details of the manuscript is not very helpful (for example, saying that the work is not novel without providing any example prior publications that cover the same topic). The worst kind of review is

one that simply states the reviewer's accept/reject opinion. This is essentially of no value to an editor.

Reviewers are absolutely essential to the success of a peer-reviewed scientific journal. Reviewers volunteer their valuable time (typically 3–8 hours per manuscript) for no obvious benefit other than the altruistic goal of giving back to their community.

10.3 The Peer-Review Process at JM³

JM³ practices an editor-driven external peer review of author-submitted manuscripts. Reviewers (also called referees or assessors) are anonymous, meaning that authors never know the identity of the reviewers. This single-blind approach is not the only style in use at scientific journals. Some journals practice double-blind reviewing, where the reviewers are not told the names or institutions of the authors (in an attempt to avoid bias). Other journals practice open review, where the names of the reviewers are published along with their reviews when the paper is published. Other journals take a middle road, where reviewers are given the option of signing their reviews before they are sent to the authors. The single-blind process used by JM³ (and described in some detail in this section) is by far the most common style of peer review in scientific publishing.²

Journals should have a well-documented process for peer review. Here is a step-by-step description of the manuscript review process used by JM³:

1. Authors submit their manuscript online, along with a cover letter and various other information. During this step, the author selects either a currently open special section or a regular paper or letter category for their manuscript.
2. The manuscript goes through a quality-control check by journal staff. If there were problems with the submission, then the journal staff works with the corresponding author to address them.
3. The manuscript is processed through the Similarity Check plagiarism screening service (based on software from iThenticate), comparing the submission to a large database of previously published papers. If there is sufficient content in the submission that is identical to that found in a previously published paper, the authors will be contacted for an explanation, and the manuscript may be rejected and sanctions imposed if egregious problems are confirmed.
4. Based on the category selection made during submission, the manuscript goes to either the special-section Guest Editors or the Senior Editor (SE) associated with the regular paper category. The editor performs a first editorial review by reading the cover letter, title, and abstract, and skimming through the paper. This editor checks to see if the scope of the paper properly matches the scope of the journal and if the writing is

sufficiently good to allow for an effective review. If not, the editor may decide to decline the manuscript without review.

5. For a regular submission, the SE decides on an Associate Editor (AE) with suitable expertise to handle the submission. The AE is not necessarily an expert on the topic but will have enough familiarity to be able to find reviewers and interpret their reviews. For a special section submission, the Guest Editors will decide which Guest Editor will serve the role of the AE for this submission.
6. The AE does the bulk of the editorial work for *JM*³. They begin by performing a second editorial review of the paper, checking for scope, novelty, significance, and quality. They may skim the paper quickly or read it in great detail. The AE must decide if the paper has a chance of being accepted for publication and thus is worth sending out for review.
7. If the AE does not decide to decline the manuscript without review, they will search for and assign qualified reviewers. At least two reviews are required to accept a manuscript for publication, but some AEs may choose to seek three reviews. Often, the reviewers are chosen to have complementary skills (experimental, theoretical, mathematical, etc.) so that the full range of topics in the manuscript can have expert analysis. Authors have the opportunity to supply a list of suggested reviewers at the time of submission, but it is the AE's decision whether to use anyone from that list. Finding qualified reviewers is the often most difficult and problematic step in the process, and sometimes 10–20 candidates must be asked before two reviewers accept the task.
8. When the reviews have been returned, the AE evaluates the reviews and makes a decision (usually to request author revisions or reject). Although the reviewers may provide accept/reject advice, the AE makes the final decision based on their reading of the manuscript and the substance of the reviews.
9. If the author revises the manuscript, it is sent back to the same AE. The AE looks over the revised manuscript and the author's point-by-point response to the reviewers' comments, and either decides to send the manuscript out for re-review or makes an accept/reject decision at this point. Multiple rounds of re-review are possible, depending on the extent of the revisions. Generally, the manuscript would be sent back to the same reviewers, but it is possible that new reviewers would be chosen if an original reviewer was unavailable or if significant added material required a reviewer with an additional area of expertise.

10. Finally, after a manuscript decision has been made, the proposed decision is sent to the Editor-in-Chief for approval. The Editor-in-Chief performs a final quality check on the overall editorial process, possibly making suggestions for changes or improvement. At JM³, it is rare that I change in any way the decision made by the AE.
11. If the manuscript is accepted, the authors receive instructions about how to make a final submittal of the manuscript and its figures. No changes to the manuscript content should be made following acceptance.
12. The final submitted manuscript goes through copyediting and professional composition steps. These important and often unheralded steps can have a major impact on the level of professionalism of the paper, fixing typos and grammatical errors, improving the exposition and presentation of the paper, and ensuring that the graphics are of sufficient quality.
13. Page proofs are sent to the corresponding author for approval, and possibly to supply missing information. Authors should return these proofs promptly.
14. The finalized paper is published online immediately and in the print version of the journal at the end of the quarter.

JM³ has a specific process for handling submissions by members of the editorial board (myself included) to ensure an impartial review, treating the editorial board member as any other author, with no access to the internal editorial process for that submission. Additionally, JM³ accepts appeals from authors who disagree with an editorial decision. The Editor-in-Chief is available to hear from authors or reviewers who wish to lodge complaints or make suggestions for improving the publication process.

Here are some of the major statistics for JM³ in 2016:

- 134 manuscripts were received (114 regular papers, 13 special section papers, and 7 letters)
- For regular submissions (papers and letters),
 - 18% were declined without review.
 - 21% of manuscripts were rejected after being reviewed.
 - The overall acceptance rate was 61%.
 - The average time to first decision was 5.5 weeks (median time was 5.1 weeks).
 - No papers were accepted without revision, 65% of accepted papers were revised by the authors once, 30% were revised twice, and 5% were revised three times.

For papers that were accepted, the average time to acceptance was 15.6 weeks, and the median was 13.6 weeks (which includes the time for author revisions). Each additional revision cycle added about 2 weeks on average to the final acceptance time. The average (median) time from acceptance to publication was 3.6 (3.4) weeks.

10.4 Responsibilities

All parties in the peer-review process (authors, editors, and reviewers) must work in an environment of mutual trust and cooperation. Honesty and integrity are of course required in all aspects of the process. Additionally, each participant in the peer-review process has specific responsibilities that must be fulfilled.

Authors

- Ensure that the work is original and has not been previously published or submitted for publication elsewhere (see Chapter 15). Cite your own prior and overlapping work properly (see Chapter 5).
- Select the list of authors appropriately (see Chapter 13), with full approval of the submission by all authors.
- Choose the most appropriate journal (see Chapter 8) and submit the best manuscript possible. Never knowingly submit a poor manuscript hoping that the editors and reviewers will help you fix it.
- Spend the time to understand the submission requirements of the chosen journal and comply with those requirements.
- Identify all funding sources and make the editors aware of any potential conflicts of interest.

Editors

- Provide a transparent process for editorial review, and deviate from that process only under exceptional circumstances.
- Deal fairly and respectfully with all parties in the publishing process.
- Recuse yourself when dealing with a manuscript for which you have a conflict of interest—let a non-conflicted editor handle the submission and make the decisions.
- Ensure that all details of a submission are kept confidential.
- Work assiduously for timely decisions.
- Choose reviewers who are likely to provide fair, unbiased, high-quality, and timely reviews.
- Hold all parties in the publishing process to the highest ethical standards.^{1,3}

Peer Reviewers

- Disclose any conflicts of interest (arising from competitive, collaborative, financial, or other relationships) that might bias your opinions of the manuscript. If you are chosen to review despite a conflict of interest, do your best to provide an unbiased review.
- Return the review quickly. If you are unable to return a quality review in a timely manner for any reason, let the editors know as soon as possible.
- Provide a constructive, professional review—it should never get personal.
- Provide a detailed review, supporting all opinions with evidence; your goal should be to help the authors improve their paper even if you recommend rejection.
- Hold information gained from your review confidential. Never disclose or use knowledge gained from reviewing a manuscript until that manuscript has been published.

10.5 Criticisms of the Peer-Review Process

The peer-review process has its critics, some of them quite vocal. Here are some of the major criticisms often leveled against the peer-review process:^{4,5}

- It stifles innovation by rejecting non-conforming or controversial views,^{6,7} and distorts the record by rejecting null results (see Chapter 7).
- It is unreliable, frequently failing to find major flaws in the work, including fraud and plagiarism.
- It is neither consistent nor objective, and it is often biased in several ways.⁸
- It is expensive and delays publication.
- There is little evidence that it is effective, let alone the best method available.
- Most rejected articles are eventually published in another peer-reviewed journal.

I have to admit that each one of these points has some validity. The peer-review process is not, and never will be, perfect. However, there is a growing body of evidence that peer review works in its intended goals of filtering and improving papers.⁹⁻¹¹ A recent survey found that 91% of authors thought the peer-review process had improved their last published paper.¹² There are many flaws in the process, but as former *BMJ* editor Stephen Lock wrote, “we have no better way of distinguishing between the promising and the meretricious or for improving the scientific and linguistic qualities of an article.”⁵

10.6 Conclusions

Peer review has evolved significantly since it was first introduced in the mid-eighteenth century,^{13,14} and it continues to evolve today. Technology has drastically sped the process, with email, web-based submissions, and online publishing. Search-engine-style document comparisons do a reasonable job of detecting plagiarism. But in the end, it is the careful reading of a manuscript by editors and expert reviewers that makes the whole process work. Science is a human endeavor, with the scientific quality dependent on the attitude, training, and work ethic of the scientists involved. Likewise, scientific journal publishing depends on the efforts of well-trained and hardworking scientists and engineers who choose to give back to their scientific community by volunteering for their journal.

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