Guidelines for Peer Review of STEM Preprints

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This is a set of basic guidelines to follow when assessing a manuscript for peer review in STEM fields. Information was compiled from several sources including The American Chemical Society (ACS) Reviewer Lab, the Public Library of Science (PLoS) Reviewer center and PREreview guidelines and code of conduct. (*Peer Review Training: ACS Reviewer Lab*, n.d.; *PLOS Reviewer Center*, n.d.; *PREreview guidelines: How to write a preprint review*, n.d.)

Before you pick an article to review:

Is the research in your field of research or expertise?

It is important to have some experience or working knowledge of the field in order to write substantive feedback that authors can include in their manuscripts.

Do you have any conflicts of interest?

Conflicts of interest influence your ability to give impartial feedback. If you answer yes to any of these questions you should not review the manuscript.

1. Are you close friends with the authors?
2. Are you from the same institution?
3. Do you directly compete with the authors?
4. Do you have a contentious relationship with the authors.
5. Have you collaborated with the authors in the last 5 years?
6. Would you benefit financially from the publication of this work?

Understand your biases

Our biases emerge when our environment shapes the way we think about certain people, places or things. Everyone has some level of bias however, is important to not let our biases influence our ability to give reasonable and impartial feedback for scientific work. Here we list a few biases discussed in the ACS Reviewer Lab. (*Peer Review Training: ACS Reviewer Lab*, n.d.)

1. Ethnic and Gender Biases – the assumption that certain genders or ethnic backgrounds produce research that requires additional scrutiny.
2. Geographic bias – the assumption that research that comes from certain countries is of higher or lower quality.

3. Model Bias – The assumption that certain models are better than others for studying or understanding natural phenomena.
4. Positive Bias – The assumption that research with a positive result better in quality than negative results which are scrutinized more carefully.
5. Prestige bias – the assumption that research from known universities is better than research from institutions that are not well recognized.

Structure of a good Manuscript Review

Here I discuss one approach to reading manuscripts with the intention of peer-review. I include a set of key features and questions that should be considered when writing a manuscript review. This is not an exhaustive list so if you think there things that should be added to this list feel free to let me know and I can update the list!

Read the Abstract

1. What are the key claims?
2. Look for the key claims made by the authors.

Read the Introduction.

Think about the the context of the paper

1. What are they studying?
2. How does this work add to the field?
3. Is there a critical unanswered question?
4. Does the field have a lack of consensus?
5. Does the experimental approach have an advantage over previously published work?
6. What is the experimental approach?
7. Do the authors use a specific model system?

Write a ~4-6 sentence summary of what the authors are trying to study and how they intend to do it in their manuscript.

Read the Results and Methods

Does the data in each figure support the authors' claims?

1. Is the data presented logically?
2. Is the experimental system appropriate?
3. Are the methods well described?
4. Have the authors used all the appropriate controls?

If the figure does not seem to support the claim take note:

1. Is there a missing control?
2. What would be the appropriate control to include?
3. Could the authors reword their text to better reflect the data?
4. Is there an experiment that would better support that claim?
5. Is this a dealbreaker?

6. Is the data normalized appropriately?
7. Do the authors show a single "representative" experiment or an experiment with multiple replicates
8. Did the authors apply appropriate statistical tests?
9. Are the methods correctly applied and thoroughly described?

Are there other, minor issues with the figures?

1. Are axes labeled clearly? Do the authors use the appropriate units // consistent with the standards in the field?
2. Are the images clear – of sufficient resolution to clearly see the result?
3. Are all the figures mentioned in the text?
4. Is the data publicly accessible?

Review the Discussion

1. Do the conclusions make sense?
2. If the authors provide a model, does it seem accurate?
3. Do the authors provide clear context for the data they have shown in the paper?

When Writing Your Report:

Combine your 4-6 sentence summary of the manuscript with your bulleted or summarized list of major and minor points accumulated above. Be sure your feedback is constructive and concise. Include specific details about how the manuscript can be improved. If an experiment is necessary, clearly explain why completion of the experiment is required to support the authors claims or how the authors clams should be reframed without that supporting data. Include positive feedback to help authors understand what aspects of the paper are strong and should not change.

Hope these guidelines are helpful! Good luck!

References

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