

Biochem 200A (Macromolecules) Peer review project:

Why are we doing this?

The main goal of this project is to help students develop and harness their critical faculties in a way that helps them become productive members of the scientific community. Specifically we will introduce students to the real world of scientific communication by having them read and review pre-publication papers posted on preprint server such as *BioRxiv*. In formal scientific communication, peer review provides an important element of quality control by evaluating the evidence and arguments of a paper prior to its final publication. Unfortunately, the principles of peer review are often taught in a haphazard manner by laboratory mentors, and students end up with highly variable levels of experience and expertise in reviewing papers. This haphazard training results in uneven standards of peer review. In this class several students will work together with a faculty mentor to learn how to perform peer review in a critical and constructive way. To achieve this we will adhere to the FAST principles as articulated by ASAPbio (<https://asapbio.org/fast-principles>), which require that reviews be: Focused, Appropriate, Specific, and Transparent.

How will this project work?

For this project the class will break into groups of three students. Each group will be assigned an original research paper, chosen from the preprint server *bioRxiv*. We will choose and assign these papers based on their relevance to material covered in the course. Once papers are assigned each group will have two weeks to carefully read and evaluate the work. During this time group members may discuss the paper but each student should compile their own list of its strengths and weaknesses. At the end of the two week reading period each group will meet, together with a faculty member and/or TA, to discuss the paper and to write a collective review. At the end of the course we will post these reviews as comments on *bioRxiv*. Grading of this exercise will be based on oral participation in the review meeting and on the final written review.

How do we write a review?

We will discuss this in more detail in the class, but basically you will write a brief summary of the findings of the paper (one paragraph) and a brief evaluation of its significance (one paragraph). You will then provide a list of specific comments, concerns, or questions you have about the work. Ideally these specific points should aim to improve the clarity, rigor, and/or correctness of the data and conclusions of the paper. During your discussion meeting you should compare your individual lists of comments/concerns and agree on a reasonable final list.

What are the FAST principles?

In recent years the scientific community has begun to move away from a system in which peer-review was conducted in secret, often by for-profit publishing groups, and with little accountability toward a system in which reviews and reviewers are more transparent; more collaborative; and more public. Many journals (e.g. *eLife*) publish papers with their reviews, and preprint servers (e.g. *BioRxiv*) encourage public comments and reviews of their content. To promote broad and inclusive participation in the process of peer review requires a positive culture around the entire process. The non-profit advocacy group, ASAPbio, has developed a set of norms to help promote that positive culture, summarized by the acronym **FAST (Focused, Appropriate, Specific, and Transparent)**. Here are some notes on each element (taken from <https://asapbio.org/fast-principles>).

FOCUSED: Respect the focus of the paper – additional work may be suggested where it is relevant to the study or if it provides an opportunity for collaborations, but requests that go beyond the initial scope or that relate to perceived impact should be avoided or clearly designated as optional suggestions for a future study, it is not a reviewer’s responsibility or remit to impose research priorities on the authors.

When evaluating a paper for a journal **focus on the science and not the journal**. When evaluating preprint, the feedback should be “journal agnostic” and focused on the importance of the scientific work without specific journal criteria in mind.

Focus on the science and not the people – Feedback must be objective and focused on the paper or any commentary about the work, not on the authors; there should not be statements that imply specific practice or behaviors by the authors (e.g. misconduct, deliberate omission of a citation to another work).

APPROPRIATE: The tone of the feedback should always be appropriate: polite, respectful and constructive, toward the authors and to anyone engaging in the public discourse about that work. Commenters should be mindful of the impact language choices might have on the authors or readers. If you would not do or say something in person, reconsider whether it should be included in your comments, or reflect on whether the comments should be revised to ensure feedback remains constructive and polite.

Reviewers should consider their motivation for providing feedback. Commenters should reflect on whether their perception about the work’s interest may influence their comments, and remind themselves that there should be a focus on constructive objective feedback; if that is not possible, reconsider whether you should provide a review.

Reviewer should reflect on any biases before, during, and after writing their reviews, including aspects related to their own background, professional position, or perception about the work’s interest; the evaluation of the work should be the same irrespective of who the authors are, their background, seniority etc. Reflect on any potential competing interests or other factors that may influence your feedback (e.g. earlier reactions or critiques on the study on social media). If you think any biases or competing interests will influence the evaluation, reconsider whether you should provide the review.

Peer review and public commentary on papers is a form of scientific discourse and should be approached as such by all parties who engage in it; authors and commenters should be willing to discuss their work/assessment with others (readers, authors, other reviewers, editors), provided the exchange follows expected norms and behaviors.

There is a collective responsibility to call out inappropriate behaviors or critiques. We should favor criticism and disfavor bad reactions to it, as a community we have a collective responsibility to protect those subject to unreasonable criticism.

Reviewers should behave with integrity, following ethical conduct expected in all research activities. Provide feedback without seeking to gain benefit from it, critiques aimed at gaining citations for the commenter's own work, or seeking to damage a competitor are not appropriate.

SPECIFIC: Feedback should be specific, clear, actionable, and useful for the authors to improve the work. Comments should be outlined in a logical manner and substantiated with evidence. The clearer the feedback, the easier it will be for authors and readers to understand it.

Reviews should include a summary of major strengths and weaknesses of the study; to ensure it is as useful as possible for authors and readers, it is important for the feedback to designate which critiques are major and affect the rigor of the study (flaws/controls) and which are optional or minor issues.

Are claims supported by the data? One important element of reviews is to evaluate whether the study claims are supported by the data, and it is relevant for public reviews to contain comments about this; if the claims are not supported, the review can include requests for the claims to be revised, or for new data to support the conclusions.

Be honest and candid, if you feel the paper needs improvement, it is appropriate to indicate so, supported by the reasons for this and possibly examples/suggestions on how to improve the issue.

TRANSPARENT: Those providing feedback should do so transparently; where applicable, comments on the paper should be accompanied by information on any potential competing interests and on the limits to the reviewer's expertise.

Signing (or not) of reviews. Public feedback is valuable to both authors and the community – it increases awareness and transparency about the scientific process; post your feedback publicly; if you are comfortable doing so, you may sign your comments.

Acknowledge errors. Embrace feedback, it is good practice to acknowledge any errors in your work, either in the paper or in a review/comment.

Credit contributors. Disclose and credit colleagues who contributed to the review.