

Personal Reflections on Peer Review

Do you remember the experience of submitting your first publication as a lead author? I do. Professor Matt Neurock and I were working on some new theoretical approaches for modeling metal/electrolyte interfaces with a fully atomistic treatment, and, due to the inherent challenges to such an undertaking, the work was filled with assumptions, idealizations, potential flaws, and pitfalls, not to mention a rich history of prior efforts to understand the system from a first-principles basis. I recall working through pages and pages of algebra trying to derive this mixed classical/quantum picture, and how it would play out when simulated through the widely-used density functional theory code, VASP. Finally, we reached the point where we felt we had a good grasp on how the theory worked, and we developed some case studies and submitted the work for peer review. A nail-biting month or two later I received an email from the journal with the subject line “Manuscript Decision Letter.” I eagerly opened the email, and what began as a series of pleasantries devolved into downright mean-spirited criticism. I ex-ed the email window closed and, frustrated with the critique on a manuscript I had labored over for months, went out for a long walk.



For a good while after that first experience (which, after taking that long walk and discussing with my advisor, wasn't as bad as it first seemed), I would be hesitant to open those “decision letter” emails, nervous about what that infamous Reviewer #3 was going to say. In due course, I found out that the Reviewer #3 experience is not all that uncommon, and instead of taking it full on with the emotions, one has to remember that science, after all, is a profession for critics, for those who probe the weak points of an argument, who look for the exceptions, for therein are the points where new theory is made and the unknown becomes known. And all too often do students, postdocs, and professors become so deeply embedded into their carefully crafted theories and interpretations, that, despite the best of intentions, they end up overlooking either a hidden assumption, a previous result published in the literature, or an alternative explanation that may just as well or even better explain the phenomenon reported. Peer review helps with all these things. It makes for better scientists, and even better science.

Peer review also benefits the reviewer. The reviewer who volunteers their time is rewarded through access to what is literally the cutting edge of research in their field of expertise. Peer review can come with all the excitement of attending a high-quality conference, with the added benefit that you can take the time to check the facts and provide written feedback, compared to the verbal exchanges at conferences which may be forgotten soon after the event is over.

We should also remember that peer review is a human undertaking, and by that I mean it comes not just with the cold, objective lens which many associate with the sciences. But it is a process of critique and selection that can also include such positive human characteristics such as appreciation, commendation, and encouragement. When manuscripts demonstrate scholarly excellence, in whole or in part, the reviewer should enthusiastically acclaim it, but wherein there is obvious sign of haste, overly wistful interpretation of results, sloppiness, or even fraud, it should be called out meticulously and in a professional manner.

We all have constraints on our time. Peer review is just one more thing to add to the list. But, if you can carve out some time to review a manuscript for *CORROSION* or one of the many other technical journals in our field, it can be well worth it. And, authors, just remember that peer review is one example of how “iron sharpens iron.” It should be vigorous, it can be combative, and overall it is the route to successful publication and dissemination of quality results. It does not automatically mean that a paper can be trusted if it has gone through peer review—given the time and costs of doing research very few experiments could be duplicated by a reviewer—but does provide one more opportunity for quality checking and providing valuable reference points for those future researchers who seek to “stand on the shoulders of giants.”

Christopher D. Taylor, Fontana Corrosion Center, The Ohio State University