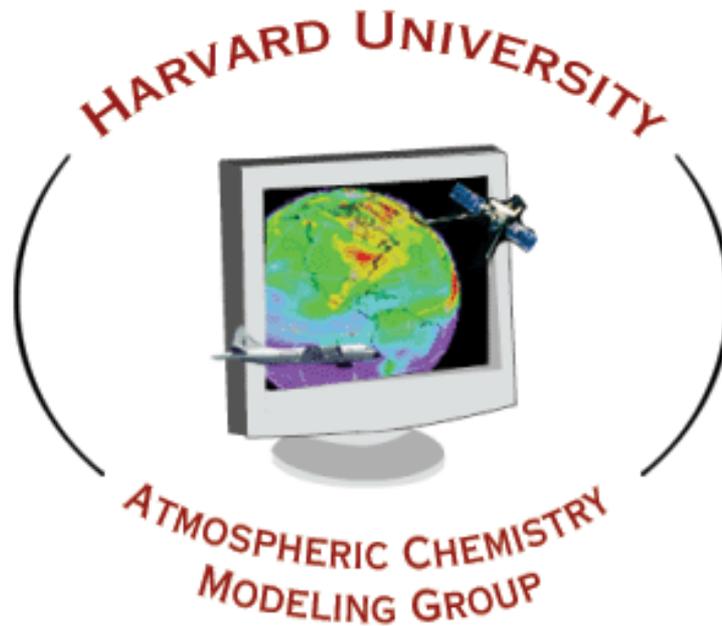


# The Scientific Literature And You

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# The function of the scientific literature

***“Scientists are motivated by two things: to understand the world and to get credit for it”***

- **By the rules of the scientific community, peer-reviewed literature from establishment journals represents the frontier of knowledge**
  - It is the foundation of knowledge on which your work should build
  - Other research literature (technical reports, conference proceedings, web sites, submitted papers) is called “gray”. You may find it useful and it may give you advance notice of new work, but it is not considered “knowledge”
- **Peer-reviewed journal publications are the main metric of productivity for PI scientists**
  - Publications are essential for delivering on research grants (and getting more grants), for professional promotions...
  - Quantity of papers doesn't matter beyond what is expected to demonstrate productivity – beware of LPUs (least-publishable units), they don't help your reputation

# The peer-review process

1. Author sends paper to journal, suggests reviewers
2. Editor does quick read to assess suitability for journal, finds reviewers (generally not from your list)
3. Reviewers are generally given 1 month to provide their review
  - ACP: reviewers are asked to give quick assessment of publishability in ACPD, followed by a more formal review later. Papers in ACPD are open for general review/comments though the authors are not held to respond to those
4. Paper comes back from review ~3 months after submission, with decision typically of (1) publish after minor revisions, (2) major revisions requiring re-review, (3) reject. For (1) and (2), you typically have ~1 month to revise paper and send it back – you can ask for more and that's always granted.
5. In case of (1), Editor decides if revisions are adequate and then accepts the paper. In case of (2), paper goes back to reviewer(s) for them to judge your major revisions (but no new comments! That would be double jeopardy). This is expected to be quicker than the initial review.
6. Paper comes back from this 2<sup>nd</sup> review ~6 months after initial submission. If at this point the reviewer is still asking for major revisions it's generally best to ask Editor to arbitrate/mediate

*All in all it typically takes 6-12 months for a submitted paper to get published, an appropriately deliberative time scale*

# Your responsibility towards the literature

- **You have a responsibility to be familiar with the peer-reviewed literature relevant to your research – otherwise how do you know that your work is new? (and if it's not new it's not worth doing)**
  - **You have no responsibility towards non peer-reviewed literature but that doesn't mean you should ignore it**
  - **Reading papers outside your research area is part of your general education – like talks at a conference or seminars. There is no particular responsibility but it's a good thing to do.**
- **You have a duty to cite peer-reviewed literature**
  - **It provides context for your paper – defines the foundation of knowledge on which you build**
  - **It increases the traceability of your paper through search engines**
  - **It is the ethical thing to do – it does nothing for your reputation to claim discovery of knowledge already present in the literature.**
  - **It is the collegial thing to do - getting cited is very important for scientists.**

# How to stay on top of the literature

- **It's best to read the literature *while* you conduct your work**
  - **Don't spend a lot of time reading the literature before starting your work – you won't appreciate it properly until you get your hands dirty**
  - **Don't put off reading the literature until you write your paper – you'd be missing out on useful info and could get bad surprises**
- **Compile a library of literature relevant to your work by using the Science Citation Index or similar tool**
  - **Start from a seminal paper: use Intro to go back in time, SCI to go forward in time**
  - **When doing a SCI search, begin by scanning publication titles. If title looks relevant, read Abstract to confirm. If confirmed, download paper and do an Intro/SCI search on it. Eventually (and sooner than you think) you will have collected all the relevant recent literature.**
  - **I tend to err in neglecting the older literature and get criticized for it. Older papers are of historical interest for the development of ideas, and understanding that development is part of science. Older papers can also be pedagogical.**

# The literature as competition

- **Science is a competitive venture to contribute new knowledge – and this competition is expressed through publications**
  - This means that you should be aggressive about publishing your work, particularly in a crowded field
  - Your publications should clearly plant the flag of new knowledge and claim that new territory as your own. Don't water it down.
- **Science is also a collegial venture – appreciation of publications by your peers is essential for the good functioning of the community**
  - Think of *the community* as building the new knowledge, and you as part of the community
  - Give credit where it is due – it makes the community go round. “When my colleagues read my paper, will they be satisfied with how they have been cited?”
  - Don't let the literature hamper you, let it enable you – what do you contribute that's unique?

# How to read papers

- 1. Begin with the abstract (of course). Is it useful? If no, you don't need to read further. If yes, you do.**
- 2. Read the intro. A good intro is designed to motivate the paper in the context of previous literature. It often gives you a useful perspective on how others look at the research problem.**
- 3. Read the conclusions. They expand on the abstract and often present broader perspectives that may be useful to your work.**
- 4. Read the sections that are of specific interest to you or for which you have specific responsibility. You may be most interested in the model description, a data table, a piece of analysis...you shouldn't feel obligated to read the whole paper. If you've read the abstract and conclusions you have done your duty as far as staying on top of the literature. The rest is to serve your practical needs. I don't feel a responsibility to cite a throwaway statement buried in the text.**
- 5. If there are fundamental things that you don't understand in the paper, don't be complacent. Go to the textbooks and learn about them. There is no excuse for ignorance.**

## Being critical of the literature

- **Default attitude toward literature is that it is correct. For most of the literature that you read this assumption is good enough.**
- **Assumption becomes shaky when dealing with literature very close to your own research. In that case you may disagree with the conclusions, find that they're inconsistent with yours, consider the model or data to be inadequate, etc.**
- **This critical perspective is healthy; the authors are not any smarter than you are, and when they comment on something that you're an expert on you may rightfully judge them to be fools. This is part of the rough life at the frontier of knowledge. You certainly should not shy from criticizing the literature in your paper – dare to disagree!**

# Your duty as a reviewer

***“Your paper says a lot of things that are correct, and a lot of things that are new. Unfortunately, the two don’t intersect”***

- **By scientific community rules, peer-reviewed literature represents the body of scientific knowledge – and all scientists are expected to be familiar with it.**
- **...which makes reviewing papers an important responsibility! As a reviewer, you’re the gatekeeper to the trove of human knowledge. And yet you’re doing it on a volunteer anonymous basis! Isn’t it amazing that the system works?**
- **I always accept to review papers in journals in which I publish (not others), because of (1) feeling of responsibility, (2) scientific interest**
- **The trove of human knowledge will be polluted if papers are published that are (1) wrong, (2) don’t add significant knowledge. You must cull those papers, for the sake of the scientific community.**
- **At the same time, don’t set your standards too high. Consider that the authors generally need to publish to satisfy their sponsors. A paper doesn’t have to be *great* to be publishable.**
- **The review process must be anonymous. Else it cannot be candid – scientists are amazingly thin-skinned against criticism.**
- **Decision on publishing the paper is made by the Editor. Your role as reviewer is only to advise the Editor. Which means that (1) you don’t need to comment on stuff where you don’t have expertise; (2) you shouldn’t get furious if the Editor doesn’t follow your advice.**

# Some suggestions for the review process

- **Don't create more work for the authors.**
  - Surely the work could be improved – but you're not a co-author, so that's not your job. Surely additional work could be done – but that's generally not feasible, the student may have graduated or the funding run out. Does the work as it stand provide a useful contribution to human knowledge? That should be your yardstick.
  - Remember that the authors are not interested in you making their paper better. They're interested in publishing. You're just standing in their way.
- **The authors have thought about the content of their paper a lot more than you have. On the other hand, you're a more sophisticated reader than most. This calls for a combination of humility and assertiveness.**
  - If you don't understand some aspect of the paper it's the authors' problem, not yours.
  - Rather than assume that the authors are wrong, ask them to 'clarify'?
  - Authors will view any criticism of their work as an aggression. Express it in personal terms to make it less aggressive: 'In my opinion,...', 'I couldn't understand...', 'I wasn't convinced...', 'I don't see how...'
- **Sometimes the English is atrocious. You're not in the ESL business – it's not your problem to fix. Just tell the Editor that the English needs to be improved.**

# How I review a paper

1. Read the paper and jot down comments as I read it.
2. Spend some time to think about the paper as a whole.
3. Separate review into ‘Overall Assessment’ and ‘Specific Comments’:
  - ‘Overall Assessment’ is a paragraph judging the paper – originality, importance, clarity, style, length. It includes a recommendation regarding publication.
  - ‘Specific Comments’ are an itemized list of my jotted-down comments.
4. Some comments are simply “for the authors’ consideration”, others require (in my view) a satisfactory response for paper to be publishable. I explain this in my Overall Assessment and sometimes put an asterisk before the most important comments.

# How to respond to a review

- **Criticism from an anonymous reviewer is hard to take!**
  - **Give the criticism a chance – could the reviewer be right? Think about it for a while.**
  - **Generally the reviewer is wrong (see previous lesson about humility) but it's your problem that s/he was mistaken – so fix it!**
  - **Even when the inescapable conclusion is that the reviewer is just an idiot, keep in mind that s/he is a more sophisticated reader than most.**
  - **Sometimes you may suspect that the reviewer has an ax to grind or is trying to sabotage publication of your paper. That's generally just paranoia on your part encouraged by an undiplomatic reviewer.**
- **You need to give an itemized response to reviewers' comments. Whenever possible, respond by changing *something* in the paper (can be small) and just say that you did in response. Keep responses very short and refer to the modified text. Don't engage in a private explanation or argument with the reviewer.**
- **Don't try to guess who the reviewer is. It's pointless.**

# Dealing with negative reviews

- **Don't get discouraged**
  - Reviewers are generally very close to your research area, may have strongly held opinions not consistent with yours, and be intolerant of yours – the review process is partly a crapshoot
  - Reviewers will tend to be more critical toward papers that they perceive as important
  - I have found no correlation over my career between the impacts of my papers and how they initially reviewed
- **Assess whether it's possible to win over the reviewer through changes to the paper**
  - Most reviewers are not fundamentally hostile and will respond positively if substantial changes are made that go in their direction – can these be made without weakening the paper? Is the additional work requested by the reviewer worth it?
  - If a second review is still negative you can appeal to the Editor
- **If it looks like it will not be possible to win over the reviewer, and their comments are unreasonable, then it's best to just submit to another journal**