is especially common in general-purpose journals, which often redirect your paper to a "niche" journal.

Some publishers are now pushing the idea of internally "cascading" peer-review of papers. This means that authors are encouraged to submit their rejected papers to another journal owned by the same publisher. For you, this has the advantage of speeding up acceptance of your paper; for the publisher, this has the advantage of capturing manuscripts within their portfolios. The disadvantage for you is that your paper may be redirected to an inappropriate journal. If you think this has happened to you, ask a colleague if they think it is an appropriate journal.

Don't use impact factors! Journals with high impact factors are not necessarily considered "top journals" for promotion purposes; like any metric, impact factors are often "gamed" by publishers.

Certain young researchers (not in the US!) are paid by the sum of their publications, weighted by impact factor. This is a horrible system as it results in papers being sequentially submitted to a chain of journals, spiraling down until they reach the appropriate level. If this applies to you, you have my sympathy. My advice to you is simple: get advice from a senior colleague!

Chuck Weibel

Credits

Author photo is courtesy of the author.

Journal Refereeing: Merge with the Collective Mind

Ken Ono and Robert Schneider

Imagine you are a medieval alchemist. You devote your life to uncovering hidden truths, expressed in a poetry of esoteric symbols and terminology. Today a manuscript of new discoveries has made its way into your hands from an unknown author. Will this delicate codex unlock the enigmas that drive your work, or spark an explosion of ideas in other seekers? Who is this anonymous soul-mate sharing your own rare passion? It now becomes your quest—and your honor—to decipher the mysterious treatise.

At this point you may think the authors have played one too many a *Dungeons & Dragons* campaign, or recently binge-watched fantasy B-movies online (call it research for this article). But if you replace "medieval alchemist" with the word "mathematician" in the opening sentence, the paragraph now describes you yourself receiving a paper to referee. We offer here our thoughts about navigating this singular scenario, in which your judgment may shape the future history of your field. Like the alchemist in the opening paragraph, and just as romantically, as a journal referee you are in the position of secretly knowing new theorems (even entire theories) years before they officially[1] enter the literature. Moreover, you are invited to help shape the literature of your era.

What is the job of the research journal referee? In a nutshell, you will:

- Check the work to verify the ideas and equations are correct.
- Offer advice and raise questions to help clarify or strengthen the arguments (if a result is promising, one should give authors the opportunity to revise).
- Offer suggestions for improving exposition and overall presentation of the piece.
- Finally, write a referee report including a summary of the paper, a list of corrections and suggestions for the author(s), and an evaluation of appropriateness for publication in the journal (we note that referees do not make final editorial decisions, merely recommendations).

The first three bullet points fall somewhere between editorial work and collaboration; we caution that the last can be misinterpreted as the charge to be a guard or gatekeeper. We urge you to lean in a different direction: we should encourage each other in our work.

As to how one should evaluate a new result, we offer solid advice from two of our heroes. G. H. Hardy is well known[2] to have instructed referees for the *Proceedings of the London Mathematical Society* to use the following guidelines.

Hardy's criteria for refereeing. One should ask three questions of the result:

- Is it new?
- Is it true?
- Is it interesting?

Ken Ono is vice president of the American Mathematical Society and the Thomas Jefferson Professor of Mathematics at the University of Virginia. His email address is ken.ono691@virginia.edu.

Robert Schneider is a lecturer of mathematics and mathematics undergraduate research program coordinator at the University of Georgia. His email address is robert.schneider@uga.edu.

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[1] *Preprint servers, such as the arXiv, serve an important "unofficial" role in mathematical publishing.*

[2] *See Boas, Ralph P., Gerald L. Alexanderson, and Dale H. Mugler.* Lion Hunting and Other Mathematical Pursuits: A Collection of Mathematics, Verse, and Stories by the Late Ralph P. Boas, Jr. *Vol. 15. Cambridge University Press, 1995.*

Certainly these seem self-evident as minimal standards for publishing any piece of nonfiction. Equally succinct and perhaps more inspiring are criteria that former AMS President G. E. Andrews has been known to mention privately (for instance, once to the second author) as his own rules-of-thumb.

Andrews's criteria for refereeing. Does the result satisfy at least two of the three questions:

- Is it surprising?
- Is it elegant?
- Is it useful?

These idealistic rules preserve the practical simplicity of Hardy's criteria, yet place aesthetics in the foreground. We would like to posit that if a paper satisfies even one of Andrews's criteria, it soars above almost all other instances of human activity, and is worthy of praise.

There is further advice for referees in the great article[3] by Arend Bayer in the March 2019 issue of these *Notices*. As supplementary rules-of-thumb, we suggest that referees:

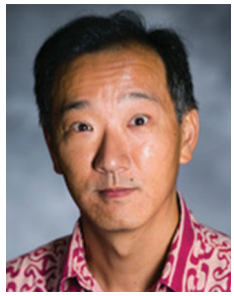
- Always first seek the beauty and importance in a paper.
- Try to really understand the author's goals—one cannot review a paper without first seeing these.
- Give every paper a fair chance.
- Remember that authors work hard to conceive and write a paper, so never write a report after a single glance.

Refereeing is usually discussed in the context of service to the mathematics community (which is very thankful to you, on that note). But in addition to giving up one's own time, we gain a lot from our refereeing work, too. Refereeing a paper shouldn't be taken on like a homework assignment. This is an *opportunity*, not just to serve your community, but to merge with the collective mind of mathematics and participate in its creative process.

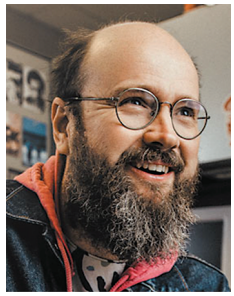
Speaking personally, the authors experience anticipation with every new paper we agree to review: we have felt the excitement of recognizing a groundbreaking result (surprisingly, not always right away), the sense of revelation, and the eventual pride of having played a nurturing role when it debuts. And along with the whole mathematics community, we are swept up in the wave of new research and enthusiasm triggered by new advances. So of course, we are on the lookout for the next potential mind-blower to show up by email!

Then like our imagined alchemist, be curious of the contents. Approach each submission in the sincere hope that it may eventually appear in print. For the sake of others in your field, you have the responsibility to see what is valuable in it, and to help revise it so its value will be readily recognized. Read carefully and comment respectfully. And if you should not recommend to accept a paper, be clear that the piece is just not appropriate for the present journal—not that it is being rejected from the literature.

It may be **through you alone** that important work will find its audience.



Ken Ono



Robert Schneider

Credits

Ono author photo is courtesy of Ken Ono.
Schneider author photo is by Mike Colletta.

[3] *Bayer, Arend. Writing, and Reading, Referee Reports.* Notices of the American Mathematical Society *66.3 (2019): 363–367.*

Design and Construction of Mathematical Posters

Anya Michaelsen

When making a poster, or any kind of presentation for that matter, it's important to keep in mind that **your primary goal is to *communicate***. This one guiding principle can help inform decisions from "How do I structure it?" to "Should I include this equation?" and "What should my title be?" So with this in mind, there are three key components to creating an effective poster:

- **Structure**–appearances and organization.
- **Content**–details to include and wording.
- **Logistics**–the nitty-gritty, putting it together.

Structure

Despite the saying, people do tend to judge books by their covers, which is why the structure of your poster, its "first impression," is one of the most important aspects of your poster. The first aspect that anyone will notice about your poster is its structure and overall appearance. If they see a wall of text or poorly formatted equations, that's an immediate turnoff. You want the first glance at your poster to invite someone to come up and read it or talk to you, not scare them off. After all, you can't communicate if no one comes to talk to you. How do you do this?

Anya Michaelsen graduated from Williams College with a BA in mathematics and is currently a graduate student at UC Berkeley. Her email address is anya_michaelsen@berkeley.edu.

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