NIH Center for Scientific Review

peer review notes

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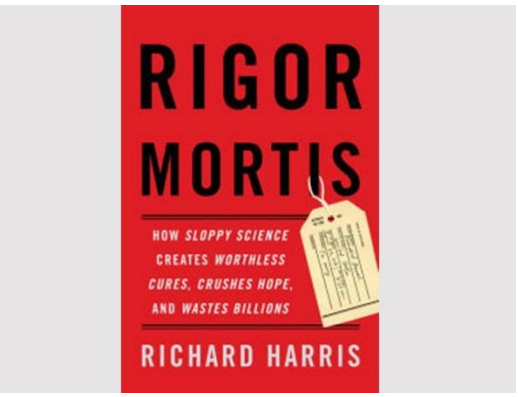
In this Issue

Rigor Mortis Author Richard Harris Gives Lively Talk at NIH



Rigor Mortis: How Sloppy Science Creates Worthless Cures, Crushes Hope and Wastes Billions.

Despite the disturbing title of his book and its focus on the serious problem of reproducibility of research results, NPR reporter Richard Harris recently gave a very thoughtful and well-received talk at the National Institute of Neurological Disorders and Stroke (NINDS).

Why the Dire Title?

Harris admitted that the title his publisher gave his book is "terrible." His working title was "Science Friction." Harris explained that rigor isn't dead. But problems with rigor are causing friction, which are slowing down science. "If you can reduce the friction," he said, "you can make science move forward faster."

Some of the Research that Moved Harris

When Harris was reassigned to the biomedicine beat in 2014, he took notice when he read about sobering problems in reproducing biomedical research.

- ***Amgen could only reproduce 6 or 11 percent of the 53 landmark cancer studies*** it looked at despite extensive efforts including asking the original researchers to blindly reproduce their research. (Published in Nature in March 2012.)
- ***German drug maker Bayer could only reproduce 25 percent of the 67 academic studies*** it tried to reproduce. (Published in Nature in September 2011.)

Harris Finds "Heroes" at NIH

When Harris raised these issues with leaders at NIH and in the scientific community, he was surprised by the welcome he received. "I thought people would say we don't want you to talk about our dirty laundry," he said. "But a lot of people said 'we need to get this out because we need to fix it.'"

Indeed, he praised NINDS' former Director, Dr. Story Landis and NINDS intramural researcher Dr. Shai Silberberg for catalyzing NIH efforts. Silberberg "is one of the heroes of my book," he explained. Silberberg started asking questions about the premise of his institute's clinical research after attending an NINDS peer review meeting. NINDS efforts led to a seminal workshop with journal editors and NIH and community leaders that produced transformative recommendations. The NIH Director, Dr. Francis Collins, and NIH Deputy Director, Dr. Lawrence Tabak, also drew praise for throwing their weight behind the rigor initiative.

Main Problems and Solutions

Harris summarized and illustrated the things that commonly lead to less rigorous research and how to address them:

Problems	**Solutions**
Questionable Ingredients	Validate ingredients
Dubious designs	Transparency and better training
Statistical errors	
Funding pressures	Ease the financial crunch

A Fundamental Problem: Not the Apples but the Barrel

Harris cited an interesting study published in the British Journal of Medicine that looked at scientific abstracts found in PubMed between 1974 and 2014. Researchers tracked 25 "positive" words used like "robust," "novel," "innovative," and "unprecedented." The relative frequency of researchers using these terms increased to up to 15,000% in the last 40 years.

"Scientists are under incredible pressure," he said, "to find exciting, spectacular results because they're fighting for a diminishing slice of research dollars. This pressure is distorting the culture of science and is a strong undercurrent to the problem of rigor."

In other words, we're not talking about a bunch of bad apples, he said, noting an analogy he picked up from Dr. C.K. Gunsalus, Director of the National Center for Professional and Research Ethics at the University of Illinois. Outright misconduct is still rare. A key problem is the barrel scientists find themselves in nowadays.

"Aren't You Worried You're Going to Destroy the NIH Budget?"

Harris' response to this question is that "if you cut the budget, you increase the pressures. You're not going to solve any problem." He then explains that he is working to tell the important story of how people are grappling with these problems. This process is one cause for hope, which may have been the main reason NINDS staff robustly applauded his presentation.

Learn More About What NIH Is Doing to Advance Rigor and Reproducibility

Using Bibliometrics to Assess the Productivity of NIH Grants and Peer Review

When we're asked to demonstrate the validity of NIH peer review, we often cite the broad scientific, economic and health impacts of NIH research. As NIH has faced increasing pressure to demonstrate that it is identifying and funding the best grant applications, it has shifted more and more attention to bibliometrics.

NIH is measuring the productivity of grant awards by using a new bibliometric index developed at the NIH, the Relative Citation Ratio (RCR). The RCR normalizes raw citations at the article level to reflect the ratio of citations relative to other papers published in the same year and in the same field. A paper that is cited as many times as expected for the year and field in which it was published will ideally have an RCR of 1.0. A paper that is cited twice as often as other papers published in the same field and in the same year should have an RCR of 2.0. It is important to note that the RCR is not perfect, and fields that produce fewer papers or do so later in the grant cycle have a disadvantage.

Giving Credit When Multiple Grants Support a Publication

The weighted RCR is the sum of the RCRs of all the publications produced from a grant award. Using the weighted RCR as a measure of productivity, estimates suggest that as the amount of funding per investigator increases, there are diminishing returns per unit of funding. However, publications usually acknowledge financial support from more than one grant award—sometimes more than 80 awards are acknowledged on a single publication. So far, productivity calculations have attributed the full value of the RCR to each of the awards listed on a paper.

Take Our Instant and Anonymous Poll Below and See Survey Results Right Away

We are interested in feedback from the scientific community on the most appropriate procedure to calculate the productivity of grant awards.

Should each grant award listed on a paper get full credit for the RCR for that paper, or should the RCRs be divided up between the different grant awards in some way?

Go to the Peer Review Notes Web Page to Vote

A. Give each grant listed equal, full credit.
B. Give each grant listed partial but equal credit.
C. Give each grant listed credit proportional to amount of the awards. For example, an award of $500,000 would get five times as much credit as an award of $100,000.
D. Give each grant credit based on the position of the related author on the author line. For example, awards from the first author should be more heavily weighted than awards from middle authors.
E. Do not use bibliometric indices to measure the productivity of grant awards.
F. None of the above.

A Bigger Question You May Want to Weigh in On

What role should bibliometrics (publications and citations) play in assessing NIH grant productivity and application potential?

Go to the Peer Review Notes Web Page to Vote

A. None.
B. Study their relevance.
C. Use with other tools to evaluate the NIH review process and the productivity of grant awards.
D. Employ them to help guide peer review and/or funding decisions.(A-F and A-E)
E. Give them a primary role in changing review procedures and making funding decisions.

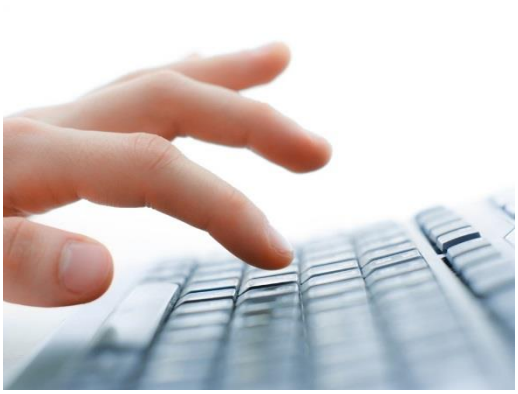
Let us know what you think in the comment section below.

Learn More

Dr. Michael Lauer, Director of the NIH Office of Extramural Research, has been blogging about the potential merits of bibliometrics such as the RCR:

- Applying the Relative Citation Ratio as a Measure of Grant Productivity
- Citations Per Dollar as a Measure of Productivity

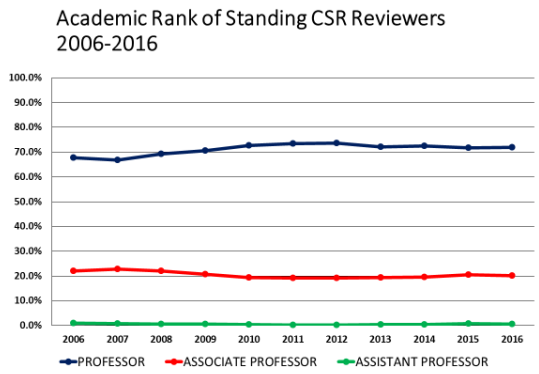
CSR Responds to Reader Feedback

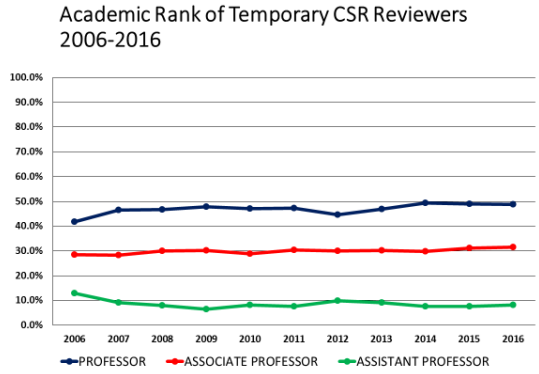


We asked readers in our last issue to tell us what they wished CSR would do to improve NIH peer review. About 25 readers raised concerns related to the recruitment and management of reviewers and chairs, review assignments, production of summary statements, and a few policies.

Recruitment and Management of Chairs and Reviewers

- ***Recruit more senior reviewers who will see the big picture:*** NIH tells its grantees that it expects them to serve when asked. We certainly aim high when we recruit reviewers, although it is important to make sure we are recruiting early career reviewers and midcareer researchers to develop tomorrow's reviewers. View the academic rank of our reviewers below:





- ***Train chairs to cut off "long-winded reviewers," openly discuss applications with discordant scores, and make sure reviewers know how to assess "Innovation."*** All of this is covered in our chair and SRO training, but if you see things going wrong, please say something to your SRO, Chair, or the Chief, Division Director, or CSR Director. We also welcome your suggestions on what more we could do.

- ***Encourage reviewers to demonstrate humility, neutrality, and openness in their reviews.*** We thank this reviewer for giving us and the community this important reminder of what we regard as a core value of NIH peer review.

Assignments

- ***Make assignments in our area of expertise!***

  When SROs assign 90 or more applications to a limited group of reviewers, they must make thousands of discrete assessments and decisions. Sometimes they want you on an application because you have spot on expertise and sometimes they need your broad perspective. Stretching a bit outside your field can mean the application gets a fresh viewpoint, but other times we know you're asked to stretch too far. When this happens, please let your SRO know as soon as possible so they can address the situation.

Critiques and Summary Statements—Wishes for SROs and Reviewers

- ***Make sure the summary statement reflects actual discussion rather than sugar coat the negatives. Or triple-check criticism so they are not simple proclamations of reviewer bias . . . papered over with generalities such as "consensus views" or "common knowledge."***

  With 60,000 applications, 17,000 reviewers and 247 SROs, it is hard to prevent all errors. But it saddens us to hear when a summary statement goes wrong, and we have ongoing efforts to maintain high quality. Two years ago, CSR developed R01 summary statement guidelines—with examples—for reviewers. It has been very popular, and we have since developed guidelines for writing fellowship reviews and we are developing guidelines for small business reviews. We will continue these efforts and incorporate them into our reviewer training.

Administrative Issue

- ***Stop putting travel payments on an IRS 1099 form so we have to save and file receipts to deduct these expenses from our taxes.***

  We protested the change and searched for a better way, but Federal tax law is not something we can change. And going back to the "good ole days" is not a viable option. Few would be happy if we required reviewers to file receipts to CSR three times a year.

Thank You and Final Word

Please let us know when you see something go wrong. If it happens at a review meeting, speak up quickly so the chair, SRO, Chief, Division Director or CSR Director may take action that could make a difference.

Keeping Applicants and Reviewers Out of Trouble

Yes, applicants and reviewers sometimes violate the confidentiality and integrity of peer review. It's rare but we still feel compelled to raise the issue to keep things fair and save researchers from making career-destroying mistakes.

We gave a few examples in our Reviewers Gone Wrong article last year, and this year CSR Director Dr. Richard Nakamura joined forces with Dr. Michael Lauer, Director of the NIH Office of Extramural Research, to give more examples to make sure everyone gets the message. View the latest alert on the Open Mike blog.

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