

**Article:**

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*Scientific Fraud at Scale: Challenges for Trust in Published Data.*

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**Guests:** Dr. Adam McShane is a staff member in the Department of Pathology and Laboratory Medicine and Dr. Preejith Vachali is a clinical chemistry fellow, both at the Cleveland Clinic in Cleveland, Ohio.

Bob Barrett:

This is a podcast from *Clinical Chemistry*, a production of the Association for Diagnostics & Laboratory Medicine. I'm Bob Barrett. The peer-reviewed scientific literature is widely regarded as the foundation of medical practice. Basic science researchers make original observations, which are then identified by others as relevant to a particular disease state. Then others step in to translate those associations into treatments or diagnostics. Then later groups apply these new tools to make tangible improvements in quality of life.

For this process to reach the desirable end goal, each step in the chain needs to stand up to rigorous scrutiny. It needs to be proven to be correct. Otherwise, if the initial observations are found to be wrong, the whole house of cards comes crashing down. A recent article in the *Proceedings of the National Academy of Sciences [PNAS]* highlights a significant challenge to the time-tested practice of scientific inquiry: large-scale fraud.

Paper retractions were once rare events generally attributed to innocent, unintentional error in data collection or analysis. Now, we are confronted with networks of individuals at multiple stages of the publication process who collaborate to knowingly contaminate the scientific literature with fraudulent studies. A News & Views article in the April 2026 issue of *Clinical Chemistry* summarizes the *PNAS* article, explains why large-scale academic fraud occurs, and proposes strategies to push back against it.

Today, we're joined by the article's authors. Dr. Adam McShane is a staff member in the Department of Pathology and Laboratory Medicine at Cleveland Clinic where he serves as Medical Director of the special chemistry laboratory. Dr. Preejith Vachali is a Clinical Chemistry Fellow at the Cleveland Clinic. And Dr. McShane, let's just get basic here for listeners who might not be familiar. What's the typical process for scientific research publication?

Adam McShane:

Yeah, thanks for the question and ultimately thanks for having me and Preejith here today to talk about our News & Views article and the interesting work we got to write about by Richardson, et al. I'll be short for this audience, probably

pretty familiar with the peer review process, but you have some sort of novel work that's supported by robust data, so you prepare it and submit it to a scientific journal. The editor of that journal reviews it for it's appropriate for the scope of the journal, it's of maritable quality, and he finds it appropriate. He sends it out to peer reviewers, who are experts in that area.

The reviewers review it, they send back their comments and the recommendation to the editor. The editor decides whether he wants to reject or accept it, or the third option which is revision. And then if it's a revision, that goes back to the authors and that gets rinsed and repeated a couple times, and accept or reject are obvious. Just a comment here is that you know, we're dependent upon these expert peer reviewers for quality publications to move the whole field of science forward. It's quite an important task that we rely on.

Bob Barrett: So, Dr. Vachali, are you able to expound on the fraudulent scientific activity described in the *PNAS* article?

Preejith Vachali: Certainly, as per the authors, it's an organized industrial-scale fraud. And there are three types of bad actors working in concert as per the article. The first one is paper mills, where they produce fabricated articles for a fee for a client. And the second folks involved in are brokers, who are connected to these predatory journals and who help give the assurance that these articles will be accepted. And then the last one they mentioned were the editors, who facilitate the passage through the peer review process, and it's a coordinated network of fraud.

Bob Barrett: And can you help us understand the motives for engaging in this kind of activity?

Preejith Vachali: The main motivation is kind of it's multi-layered and it's a structural thing. So, there are many things they described in their article. For example, in many academic systems worldwide, for career advancement or funding, there's always this publication pressure where they need to get the X number of publication or something like that. And then because of those reasons, there's always a market demand for these paper mills. And of course, for them, the paper mills, it's a lucrative market, money-making market.

Adam McShane: And just to add one thing, Preejith, is if your junk folder is anything like mine, you're filled with hundreds of emails from predatory journals or submit the abstracts for a certain fee. And the authors, although mine's an antidote, the authors--the one year of study--they found that there were hundreds of conferences that had frequently retracted articles or problematic publications. So, you know, I think -- I'm afraid

my junk folder probably is similar to a lot of others in the field who are publishing.

Bob Barrett: Well, the scientific community and the public trust the peer review process to rigorously vet scientific literature. Dr. Vachali, should we be worried about our scientific foundation?

Preejith Vachali: Well, it's concerning, but we should not be panicking at the moment. As Dr. McShane mentioned early on, most of the reputed journals go through a thorough review process, but we have to be careful about these kinds of fraudulent papers. And the hard part is never detected in many cases, so we have to do our due diligence.

Adam McShane: Yeah. And one comment, Dr. Vachali, is the old adage is 'we're standing on the shoulders of giants,' right? So, the foundation of science is kind of built upon this process to go further. And when we have this potential corruption at the foundational level, we're not going to be able to grow from it. And the authors, Richardson, et al., found that the growth rates of fraudulent publications are actually outpacing legitimate ones. So yeah, concerning is definitely true.

Bob Barrett: So what tools are currently available to prevent this type of scientific fraud, Dr. Vachali? And why are they lacking?

Preejith Vachali: So, the article describes few measures or guardrails, for example, retractions and de-indexing journals, and public exposure. A few they described. And also, if you're a peer reviewer, look for AI-derived phrases. And unfortunately, current tools are largely reactive, meaning like, respond after publications. So, they kind of talk about screening these kinds of tools to get integrated into the editorial process and also, they call for international coordination. So basically, fundamental reform of matrixes that generate these kind of fraud articles to come into the market and their demand.

Adam McShane: To add on there, it's just difficult to maintain this. Our tools of retractions and de-indexing journals. According to the authors, it can't keep up with the paper mill publications. So once again, you have a problem with legitimacy. The organizers, the actors are organized. So, it's definitely a challenge to the field.

Bob Barrett: Dr. Vachali, for someone listening today, whether they're a laboratorian, a researcher, or a journal reviewer, what is one step they can take to combat this fraud?

Preejith Vachali: So, there are a few things we can put in place. For example, look for the source legitimacy and always cite the articles that come from reputed journals, either for your research or lab-derived test development, or always try to avoid predatory journals. So, there are a few things that we can look into.

For example, PubPeer, Retraction Watch, which authors described in their article. And also, if you're a peer reviewer, look for certain red flags. Unusually short review turnaround time, or AI derived phrases, or suspicious images, and data integrity, those kinds of things we have to -- you know, those are red flags, and then alert editors and ask them for an investigation. If you are in hiring or promotion panel or committees, weigh quality over quantity. So those kinds of measures could alleviate the problem to some extent.

Bob Barrett: Well, Dr. McShane, we'll close out with you, give you the last word here. If paper mills start pairing with AI-generated data and change the scale of this problem entirely, are we even remotely prepared for that?

Adam McShane: Yeah, yeah, difficult question. You know, Dr. Vachali just mentioned about AI-generated items and, you know, the so-called 'AI slop,' right? The poor-quality AI-generated content that could include fabricated data, fabricated images, fictional references, for example. It could be difficult. I think as this field more moves forward, it's going to be even more difficult to distinguish potentially something that's not factually based and just being purely fabricated as these tools get more sophisticated. And I really think that we're going to need to fight fire with fire, so to speak, where hopefully the journals can have AI tools themselves to try to prescreen these things, be able to quickly look through data, and make sure that this is something that is of legitimate nature and quality before we spend a lot of human effort to go through and get these, and hopefully prevent them from falling through the cracks.

Bob Barrett: That was Dr. Adam McShane and Dr. Preejith Vachali from the Cleveland Clinic in Cleveland, Ohio. They wrote a News & Views article in the April 2026 issue of *Clinical Chemistry*, bringing attention to the problem of large-scale scientific fraud. They've been our guests in this podcast on that topic. I'm Bob Barrett, thanks for listening.