Integrated Environmental Assessment and Management, 2026, **22**, 633–636
https://doi.org/10.1093/inteam/vjag028
Editorial

Artificial intelligence in scientific review and writing: What should we be doing?

Richard J. Wenning[1,2,*]

[1]Wenning Environmental LLC, Yarmouth, ME, United States
[2]*IEAM* Senior Editor
*Corresponding author: Richard J. Wenning, Email: rjwenning@wenning.com

Generative artificial intelligence (GenAI) tools such as the GPT Series, Gemini, and similar large language models, as well as AI-powered research platforms such as SCITE and Semantic Scholar, are rapidly reshaping scientific research and science education. These AI tools are readily accessible and capable of producing sophisticated text that is difficult to distinguish from human-written content. This prompted Dwivedi et al. (2023) to ask in the title of their recent review of AI applications across academia and business, "so what if ChatGPT wrote it?" and Pearson (2024) to ask, "can AI review the scientific literature, and figure out what it all means?"

Both questions capture unease within the scientific community, where AI-assisted research, literature review, writing, and peer review challenge long-standing norms about authorship, originality, and scholarly responsibility. As GenAI tools capable of producing fluent scientific text become more integrated into research workflows, their use raises fundamental questions about transparency, intellectual contribution, bias, and the integrity of the scientific record. These questions require careful examination and rational answers to define the appropriate use of GenAI and AI-powered tools. This inspires a third question: Is there a middle ground between automatic acceptance and outright ban?

The experience with GenAI in science has been disappointing. Medical research publications have a long history of retraction (Okyay et al., 2025). Since the launch of OpenAI's ChatGPT in 2022, hundreds of medical research papers have been withdrawn or retracted over data concerns, false or irrelevant citations, peer review issues, and unethical use of AI (da Silva & Daly, 2025; Gelfand & Vallimont, 2025; Kocyigit et al., 2025). Commentaries and critical reviews have been particularly problematic because original data are not required, peer review is often conducted solely by publication editors, and GenAI tools can generate content quickly (Joelving, 2024).

While the medical sciences have attracted the most attention, concerns about AI use and the erosion of scientific integrity extend beyond the clinical and biomedical domains. Similar concerns have been raised in chemistry (Yuan et al., 2024), chemical engineering (Daniel & Xuan, 2024), ecology (Davinack, 2025; Rillig et al., 2024), the life sciences (Hoch & Clarke, 2025), omics biology (Burger, 2026), pollution control and environmental protection law and regulation (Bethlea & Esterman, 2024), and risk assessment (Alam et al., 2025; Hartung, 2023). In engineering, AI-generated designs, calculations, and technical narratives raise questions about accountability for safety-critical decisions and the potential introduction of latent errors into infrastructure and systems planning (Jooste et al., 2025). In legal scholarship, GenAI assistance with drafting and peer review raises concerns about the fabrication of legal precedent and the dilution or abdication of professional responsibilities (Du Toit, 2025). In environmental law and regulation, reliance on AI-assisted synthesis of complex environmental information risks undermining reproducibility, policy relevance, and public trust (Bethea & Esterman, 2024).

The collective experience in engineering, law, medicine, and the sciences is sufficient to discourage the use of GenAI in scientific writing and review (Table 1). The risks of accidental or intentional misuse of GenAI, however, are not borne by any single academic or professional discipline, sector, or career stage. Instead, the risks reflect systemic tensions embedded in academia's publish-or-perish culture, pressures to boost performance metrics in professional settings, and chronic constraints on time and resources.

Given these tensions, scholars and researchers have arguably become unwitting victims of GenAI. Users are easily duped by AI-generated hallucinations that provide false digital object identifiers (DOIs) for nonexistent references and generate inaccurate scientific statements (Emsley, 2023; Walters & Wilder, 2023). Experiences with distorted information and false citations described in commentaries by Emsley (2023) and Berk (2024) happen when research due diligence is absent. Egregious errors attributable to GenAI occur when authors fail to verify that citations in their research or peer-review comments are genuine and relevant. While the appeal of GenAI lies in its ability to accelerate drafting, synthesis, and routine analytical tasks, ostensibly amplifying productivity and visibility, the efficiency gains conflict with the foundational principles of scientific and professional integrity—namely, transparency in methods, verifiability of evidence, accountability for interpretations, and reliance on expert judgment.

GenAI used without disclosure, critical evaluation, or relevant subject-matter expertise risks obscuring authorship,

Received: 9 February 2026. **Accepted:** 9 February 2026

Table 1 Why is artificial intelligence (AI) discouraged in scientific review and writing?

1. Accountability and Authorship
   - *In scientific writing, a core principle holds authors accountable for the accuracy of statements, data, and the interpretation of results.*
   - *AI takes no responsibility for conflicts of interest, errors, and misconduct.*
2. Risk of Hallucinations and Fabricated Content
   - *AI models can generate plausible but incorrect statements, fabricate citations, misattribute findings, and summarize nonexistent studies.*
   - *In scientific review, AI-generated endorsements can spread in law, policy, and regulation.*
   - *In scientific writing, AI-generated articles may be treated as authoritative sources.*
3. Loss of Critical Scientific Judgment
   - *AI does not independently assess methodological rigor.*
   - *AI does not understand regulatory, legal, and ethical nuance.*
   - *AI is problematic in environmental risk assessment, toxicology, and policy-relevant science, where interpretation matters as much as data.*
4. Transparency and Reproducibility Concerns
   - *AI obscures original text and scholarly synthesis.*
   - *AI blurs the line between scientific deduction and reasoned analysis.*
   - *Conclusions and results are difficult to verify or reproduce.*
5. Ethical and Equity Issues
   - *AI creates unfair advantages for those who lack subject-matter expertise.*
   - *AI undermines peer trust.*
   - *Manuscripts examined using AI tools may breach confidentiality.*

Table 2 What circumstances might artificial intelligence (AI) be helpful in scientific review and writing?

1. Language, Clarity, and Editing Support
   Enhance communication and reduce editorial and peer-review burden without altering scientific content.
   - *Grammar, spelling, and punctuation correction.*
   - *Improving clarity, coherence, and readability.*
   - *Reducing redundancy or awkward phrasing.*
   - *Assisting non-native English speakers.*
   - *Formatting text to journal style.*
2. Structural and Organizational Assistance
   Improve the organization of information without altering interpretations or conclusions drawn by authors from their research.
   - *Outlining review articles or reports.*
   - *Suggesting content reorganization for logic flow.*
   - *Creating tables, figure captions, or summaries from author-provided content.*
   - *Drafting document summaries (with verification).*
3. Literature Discovery and Screening (with Verification)
   Assist in the exploration of published and gray literature.
   - *Identifying potentially relevant papers.*
   - *Helping screen large bodies of literature.*
   - *Mapping themes and research gaps.*
4. Educational Training
   As a learning aid for skills development and to improve writing habits, but not as a substitute for original work.
   - *Explaining complex concepts.*
   - *Helping learn scientific writing conventions.*
   - *Demonstrating alternative ways to frame arguments.*
   - *Teaching proper citation and structure.*
5. Data Handling and Technical Support
   For technical efficiency, especially where it reduces errors and improves data transparency and reproducibility.
   - *Data cleaning or coding assistance.*
   - *Generating plots, tables, or dashboards from validated data.*
   - *Automating repetitive analytical steps.*

weakening reproducibility, and eroding trust in scholarly and institutional work products. These tensions extend beyond academia into policy, law, engineering, medicine, and environmental management, where decisions informed by unverified AI-assisted content may carry significant societal consequences. Debates surrounding GenAI are not simply about resisting innovation. Instead, they reflect a wider societal attempt to balance technological efficiency with ethical, epistemic, and governance standards that support transparent, evidence-based Baconian science.

The *Economist* magazine and Merriam-Webster dictionary capture this worrisome trend—the proliferation of unchecked AI-generated technobabble in the scientific literature and social media—in their 2025 word of the year. "Slop" describes the surge of low-quality, nonsensical AI-generated content flooding the internet, making it difficult, if not impossible, to distinguish between fake and fact. Slop casts doubt on the authenticity of scientific information and daily life.

The solution to AI-generated "slop," however, is not another digital tool. Plagiarism checkers, now commonly used in scientific journal peer review, include tools that claim to identify or flag GenAI content. Commercial AI detectors such as Turnitin AI, GPTZero, Copyleaks, and ZeroGPT, however, are not foolproof. Researchers, editors, publishers, and teachers concerned about GenAI use risk being misled by the 10% or greater chance that AI detection tools will produce false positives or negatives. Dalalah and Dalalah (2023) have shown that when genuine and AI-generated texts are compared, there is a noticeable congruence in format and content, making type I and type II errors highly likely. Although some argue otherwise, it is unlikely to ever be possible to fully rely on AI detectors to accurately distinguish human-generated content from digital sources (Dugan et al., 2023; Sardinha, 2024).

If a digital solution to address GenAI misuse is impractical, abandoning AI technology altogether is not the right answer either. The most effective way to reduce the increase of AI-generated "slop" in scientific research and academic publishing, and to overcome the limitations of plagiarism detectors and AI content identification tools, is to refocus on teaching the value

of trustworthy, factual, data-driven, and human-edited information and analysis.

The misuse of AI is the fault of its human users, not the inanimate technology itself. AI is not sentient. AI does not replace human intellect. Scientific interpretation, judgment, and responsibility remain entirely with human scientists and professionals held accountable for the accuracy and originality of their work.

The use of AI is appropriate in scientific review and writing when used responsibly and transparently to improve language clarity, enhance literature exploration, and boost technical efficiency. Despite its misuse and limitations, GenAI, large language models, and AI-powered research platforms can contribute positively to scientific writing and review (Table 2). GenAI can support early draft technical writing by inspiring and organizing content, overcoming writer's block, and complementing literature searches conducted using well-established online platforms and commercial reference management tools such as EndNote and Zotero.

The numerous examples reported by Retraction Watch and others of inaccuracies in GenAI content, however, mandate human guidance and oversight (Doskaliuk et al., 2025; Kacena et al., 2024; Khalifa & Albadawy, 2024; Perlis et al., 2025). Academia, research institutions, and scientific publishers are obliged to adopt student- and profession-centered guidance that aligns with today's digital realities and maintains scientific integrity without compromising individual rights or equity (Deep et al., 2025).

Progress is being made. Guidelines for using GenAI and other AI tools have been proposed in chemical risk assessment (Wittwehr et al., 2020), water and environmental modeling (He et al., 2025), and other scientific fields (EC, 2025; Helmy et al., 2025). Major universities worldwide provide guidance on the use of GenAI (Ullah et al., 2024). The Society of Environmental Toxicology and Chemistry (SETAC) has established guidelines for the use of GenAI that members and contributors to its publications are expected to follow (Lynch et al., 2023). Leading academic publishers, including Elsevier, Nature, Oxford, Springer, and Wiley, have implemented explicit policies requiring or strongly encouraging authors to disclose the use of GenAI in manuscript preparation (see e.g., Oxford Academic, 2026).

When environmental models, statistical models, and various analytical tools materially contribute to research or scholarly outputs, their use is routinely disclosed to collaborators, reviewers, and other stakeholders. The same standard should apply to GenAI. If AI is intended to be a dialogue between humans and machines, let's aim to ensure that humans are in control of the conversation.

Author contributions

Richard J. Wenning (Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration)

Funding

None declared.

Conflicts of interest

None declared.

Acknowledgments

Thank you to Dr. Steve Bartell for his critical review.

Data availability

There are no new data associated with this article.

References

Alam, F., Alnazzawi, T. S. M., Mehmood, R., & Al-Maghthawi, A. (2025). A review of the applications, benefits, and challenges of Generative AI for sustainable toxicology. *Current Research in Toxicology*, *8*, 100232. https://doi.org/10.1016/j.crtox.2025.100232

Berk, H. (2024). Beware of Artificial Intelligence hallucinations or should we call confabulation? *Acta Orthopaedica et Traumatologica Turcica*, *58*, 1–3. https://doi.org/10.5152/j.aott.2024.130224

Bethlea, A., & Esterman, P. (2024). The ethics of using Generative AI in environmental law. Law360. August 28. https://sprlaw.com/wp-content/uploads/2024/08/Law360-The-Ethics-of-Using-Generative-AI-In-Environmental-Law.pdf

Burger, T. (2026). Keeping generative artificial intelligence reliable in omics biology. *Patterns (New York, N.Y.)*, *7*, 101417. https://doi.org/10.1016/j.patter.2025.101417

Dalalah, D., & Dalalah, O. M. (2023). The false positives and false negatives of generative AI detection tools in education and academic research: The case of ChatGPT. *The International Journal of Management Education*, *21*, 100822. https://doi.org/10.1016/j.ijme.2023.100822

Daniel, T., & Xuan, J. (2024). Responsible use of Generative AI in chemical engineering. *Digital Chemical Engineering*, *12*, 100168. https://doi.org/10.1016/j.dche.2024.100168

da Silva, J. A. T., & Daly, T. (2025). Letters to the editor generated by AI in neuroscience: The role of neuroethics. *Neuroscience*, *573*, 244–246. https://doi.org/10.1016/j.neuroscience.2025.03.040

Davinack, A. A. (2025). The double-edged sword of artificial intelligence in invasion biology. *Biological Invasions*, *27*, 1–11. https://doi.org/10.1007/s10530-025-03693-3

Deep, P. D., Edgington, W. D., Ghosh, N., & Rahaman, M. S. (2025). Evaluating the effectiveness and ethical implications of AI detection tools in higher education. *Information*, *16*, 905. https://doi.org/10.3390/info16100905

Doskaliuk, B., Zimba, O., Yessirkepov, M., Klishch, I., & Yatsyshyn, R. (2025). Artificial intelligence in peer review: Enhancing efficiency while preserving integrity. *Journal of Korean Medical Science*, *40*, e92. https://doi.org/10.3346/jkms.2025.40.e92

Dugan, L., Ippolito, D., Kirubarajan, A., Shi, S., & Callison-Burch, C. (2023). Real or fake text?: Investigating human ability to detect boundaries between human-written and machine-generated text. *Proceedings of the AAAI Conference on Artificial Intelligence*, *37*, 12763–12771. https://doi.org/10.1609/aaai.v37i11.26501

Du Toit, L. (2025). Artificial intelligence, the earth system, and the law. *Law, Innovation and Technology*, 1–23. https://doi.org/10.1080/17579961.2025.2593781

Dwivedi, Y. K., Kshetri, N., Hughes, L., Slade, E. L., Jeyaraj, A., Kar, A. K., Baabdullah, A. M., Koohang, A., Raghavan, A., Ahuja, M., Albanna, H., Albashrawi, M. A., Al-Busaidi, A. S., Balakrishnan, J., Barlette, Y., Basu, S., Bose, I., Brooks, L., Buhalis, D., … Wright, R. (2023). Opinion Paper: "So what if ChatGPT wrote it?" Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy. *International Journal of Information Management*, *71*, 102642. https://doi.org/10.1016/j.ijinfomgt.2023.102642

Emsley, R. (2023). ChatGPT: These are not hallucinations–they're fabrications and falsifications. *Schizophrenia (Heidelberg, Germany)*, *9*, 52. https://doi.org/10.1038/s41537-023-00379-4

European Commission (EC). (2025, April 15). *Living Guidelines on the Responsible Use of Generative AI in Research*. Second Version. https://research-and-innovation.ec.europa.eu/document/2b6cf7e5-36ac-41cb-aab5-0d32050143dc_en

Gelfand, A., & Vallimont, J. (2025). Letters from nobody: The problem of AI-written Letters to the Editor. *Headache: The Journal of Head and Face Pain*, *66*, 573–574. https://doi.org/10.1111/head.70006

He, M., Sandhu, P., Namadi, P., Reyes, E., Guivetchi, K., & Chung, F. (2025). Protocols for water and environmental modeling using machine learning in California. *Hydrology*, *12*, 59. https://doi.org/10.3390/hydrology12030059

Helmy, M., Jin, L., Alhossary, A., Mansour, T., Pellagrina, D., & Selvarajoo, K. (2025). Ten simple rules for optimal and careful use of generative AI in science. *PLoS Computational Biology*, *21*, e1013588. https://doi.org/10.1371/journal.pcbi.1013588

Hoch, R., & Clarke, J. (2025). A scientific future shared with AI. *PLoS Biology*, *23*, e3003274. https://doi.org/10.1371/journal.pbio.3003274

Hartung, T. (2023). Artificial intelligence as the new frontier in chemical risk assessment. *Frontiers in Artificial Intelligence*, *6*, 1269932. https://doi.org/10.3389/frai.2023.1269932

Joelving, F. (2024). AI-generated commentaries flood journals, distort metrics. *Science (New York, N.Y.)*, *386*, 1331–1332. https://www.science.org/doi/epdf/10.1126/science.adv4101

Jooste, J. L., Wolff, K. E., & Joubert, J. G. (2025). Engineering students' perceptions and use of generative artificial intelligence. *Computer Applications in Engineering Education*, *33*, e70064. https://doi.org/10.1002/cae.70064

Kacena, M. A., Plotkin, L. I., & Fehrenbacher, J. C. (2024). The use of artificial intelligence in writing scientific review articles. *Current Osteoporosis Reports*, *22*, 115–121. https://doi.org/10.1007/s11914-023-00852-0

Khalifa, M., & Albadawy, M. (2024). Using artificial intelligence in academic writing and research: An essential productivity tool. *Computer Methods and Programs in Biomedicine Update*, *5*, 100145. https://doi.org/10.1016/j.cmpbup.2024.100145

Kocyigit, B. F., Okyay, R. A., Seiil, B., Qumar, A. B., & Sumbul, H. E. (2025). Analysis of retracted publications on artificial intelligence: Trends, ethical concerns, and scientific integrity. *Journal of Korean Medical Science*, *40*, e280. https://doi.org/10.3346/jkms.2025.40.e280

Lynch, J., Shaw, J., Nelson, E., & Apitz, S. (2023). Artificial intelligence and the SETAC journals. *SETAC Globe*. Society of Environmental Toxicology and Chemistry (SETAC). https://www.setac.org/resource/artificial-intelligence-and-the-setac-journals.html. Date accessed April 6, 2026.

Okyay, R. A., Kocyigit, B. F., Qumar, A. B., Yessirkepov, M., & Sumbul, H. E. (2025). Fifty years of retracted medical publications from 1975 to 2024: A comprehensive analysis of trends, reasons, and countries using the retraction watch database. *Journal of Korean Medical Science*, *40*, e300. https://doi.org/10.3346/jkms.2025.40.e300

Oxford Academic. (2026). https://academic.oup.com/pages/for-authors/books/author-use-of-artificial-intelligence. Date accessed April 6, 2026.

Pearson, H. (2024). Can AI review the scientific literature—and figure out what it all means? *Nature*, *635*, 276–278. https://doi.org/10.1038/d41586-024-03676-9

Perlis, R. H., Christakis, D. A., Bressler, N. M., Öngür, D., Kendall-Taylor, J., Flanagin, A., & Bibbins-Domingo, K. (2025). Artificial intelligence in peer review. *JAMA*, *334*. https://doi.org/10.1001/jama.2025.15827

Rillig, M. C., Mansour, I., Hempel, S., Bi, M., König-Ries, B., & Kasirzadeh, A. (2024). How widespread use of generative AI for images and video can affect the environment and the science of ecology. *Ecology Letters*, *27*, e14397. https://doi.org/10.1111/ele.14397

Sardinha, T. B. (2024). AI-generated vs human-authored texts: A multidimensional comparison. *Applied Corpus Linguistics*, *4*, 100083. https://doi.org/10.1016/j.acorp.2023.100083

Ullah, M., Bin Naeem, S., & Kamel Boulos, M. N. (2024). Assessing the guidelines on the use of generative artificial intelligence tools in universities: A survey of the world's top 50 universities. *Big Data and Cognitive Computing*, *8*, 194. https://doi.org/10.3390/bdcc8120194

Walters, W. H., & Wilder, E. I. (2023). Fabrication and errors in the bibliographic citations generated by ChatGPT. *Scientific Reports*, *13*, 14045. https://doi.org/10.1038/s41598-023-41032-5

Wittwehr, C., Blomstedt, P., Gosling, J. P., Peltola, T., Raffael, B., Richarz, A. N., Sienkiewicz, M., Whaley, P., Worth, A., & Whelan, M. (2020). Artificial Intelligence for chemical risk assessment. *Computational Toxicology (Amsterdam, Netherlands)*, *13*, 100114. https://doi.org/10.1016/j.comtox.2019.100114

Yuan, M., Guo, Q., & Wang, Y. (2024). The current research status and prospects of AI in chemical science. *Progress in Natural Science: Materials International*, *34*, 859–872. https://doi.org/10.1016/j.pnsc.2024.08.003

Integrated Environmental Assessment and Management, 2026, 22, 633–636
https://doi.org/10.1093/inteam/vjag028
Editorial