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The Finnish Society of Sciences and Letters

AI in Research: Possibilities and Challenges

THINGS TO TAKE INTO CONSIDERATION WHEN USING GEN·AI IN RESEARCH

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THIS PRESENTATION

Some points of view and observations regarding the **use and misuse** of generative AI in research AND how I think we should **tackle the problems and push forward good practices**



Dalle 4
Claude
OpenAI

THIS PRESENTATION: TOPICS

Reviewing and GenAI
Manuscript factories – ”paper mills”
Popularization of research
Guidelines for the use of GenAI
Research of GenAI use
Take home message

REVIEWING AND GEN·AI

REVIEWING: GENERAL OBSERVATIONS

· Due to the **dramatically rising number of manuscripts** submitted to journals it has become increasingly **difficult to find competent reviewers** for manuscripts. This seems to be an issue for almost all journals and conferences.

· There is a **pressure to get reviews done fast**. Some journals try to “force” reviews in a week or even shorter.

· My personal observation is that the work-load of a researcher is not on a downward trend, quite the opposite

There is a “conflict” between the demand and the supply of good reviews

REVIEWING MANUSCRIPTS WITH GEN·AI

The use of generative AI and AI-assisted technologies in the journal peer review process

ELSEVIER

"When a researcher is invited to review another researcher's paper, the manuscript must be treated as a confidential document. Reviewers should **not upload a submitted manuscript or any part of it into a generative AI tool as this may violate the authors' confidentiality and proprietary rights and, where the paper contains personally identifiable information, may breach data privacy rights**."

"This confidentiality **requirement extends to the peer review report**, as it may contain confidential information about the manuscript and/or the authors. For this reason, **reviewers should not upload their peer review report into an AI tool, even if it is just for the purpose of improving language and readability."**

The American Journal of PATHOLOGY
Discoveries in Basic and Translational Pathobiology

GUEST EDITORIAL · Volume 194, Issue 10, P1802-1806, October 2024

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The Impact of Generative Artificial Intelligence on the External Review of Scientific Manuscripts and Editorial Peer Review Processes

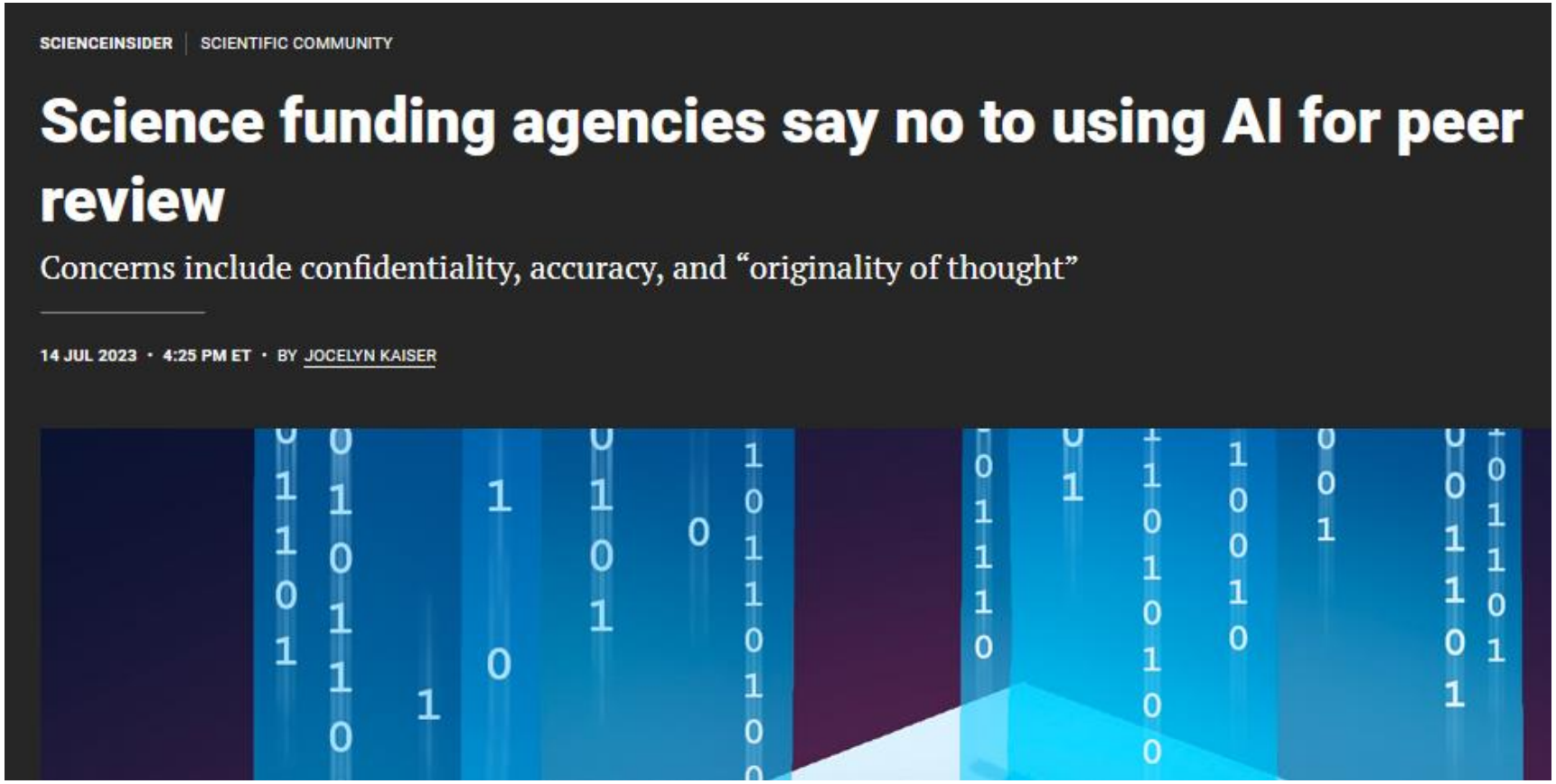
Chhavi Chauhan * · George Currie †

"It is a question of when, rather than if, we will see a journal embrace Gen AI as a "peer" reviewer, either in addition to human reviews or as a replacement."

"As the use of Gen AI picks up momentum, it would be paramount to educate all stakeholders, especially human peer reviewers, and to institute clear policies to enable responsible and impactful integration of Gen AI in the peer review process for greater societal good."

Gen AI tool/Gen AI detection tool name	Website*	Brief description
Turnitin	https://www.turnitin.com	Performs check for Gen AI generated text and plagiarism
iThenticate	https://www.ithenticate.com	Performs plagiarism check
Paperpal Preflight for Editorial Desk	https://paperpal.com/preflight-for-editorial-desk	Assists with research integrity checks
Papermill Alarm	https://clear-skies.co.uk	Detects organized research fraud across all areas of science
Signals	https://research-signals.com	Gauges the legitimacy of a research article by surfacing robust insights about the authors from article metadata
Imagetwin	https://imagetwin.ai	Detects integrity issues in figures

REVIEWING FUNDING APPLICATIONS WITH GEN·AI



SCIENCEINSIDER | SCIENTIFIC COMMUNITY

Science funding agencies say no to using AI for peer review

Concerns include confidentiality, accuracy, and "originality of thought"

14 JUL 2023 · 4:25 PM ET · BY JOCELYN KAISER

REVIEWING FUNDING APPLICATIONS WITH GEN·AI

"Critics also worry that AI-written reviews will be error-prone (the bots are known to fabricate), **biased against nonmainstream views** because they draw from existing information, and lack the creativity that powers scientific innovation. "The **originality of thought that NIH values is lost and homogenized** with this process and may even constitute plagiarism," NIH officials wrote on a blog."

REVIEWING FUNDING APPLICATIONS WITH GEN·AI

"Some researchers, however, say **AI offers a chance to improve the peer-review process**. The NIH ban is a "technophobic retreat from the opportunity for positive change," says psychiatric geneticist Jake Michaelson…"

"Eventually **I see AI becoming the first line of the peer-review** process, with human experts supplementing first-line AI reviews. … **I would rather have my own proposals reviewed by ChatGPT-4 than a lazy human reviewer**," he adds."

REVIEWING FUNDING APPLICATIONS WITH GEN·AI

Research Council of Finland

As a reviewer, you are not allowed to disclose any information concerning application documents or reviews to outsiders. This also applies to entering the information in AI tools such as ChatGPT (see also the European research integrity guidelines (PDF) on the use of AI tools in research or review). In addition, you are not allowed to use secret information to your own benefit or anyone else's benefit or disadvantage.

The referred to guidelines have 3 instances of AI use that refer to disclosing the use of AI

”PAPER MILLS” AND GEN·AI

”PAPER MILLS”

” Paper mills are fraudulent organizations that make money by writing fake manuscripts and offering authorship slots for sale to academic customers.” [1]

*“Paper mill outputs are large scale, and many **thousands** of fake manuscripts have been successfully published in peer-reviewed journals.”*

*“Clear Skies, a company with a commercial paper mill detection tool, estimates that **paper mill activity now accounts for >1.5% of the research literature**”*

*“Mills are offering large **cash bribes** to editors for publication of their products.”*

[1] https://doi.org/10.1016/j.jclinepi.2024.111549

”PAPER MILLS”

“The increased availability of artificial intelligence tools may mean fraudulent paper mill outputs are easier to produce and harder to detect.”

“As large language models continue to rapidly evolve, paper mills could potentially leverage this capacity to supply high-profile manuscripts, including clinical trials, if there is sufficient commercial demand.”

[1] https://doi.org/10.1016/j.jclinepi.2024.111549

”PAPER MILLS”

Paper mills often **suggest reviewers that are “bought and paid for”** = the paper is “bogus” and the reviewers are bogus. RESULT: Bogus paper is “peer reviewed” by bogus reviewers and accepted. **GARBAGE enters the system**.

“Hindawi reveals process for retracting more than 8,000 paper mill articles”[1]

“Reckoning with Hindawi’s paper mill problem has cost Wiley, which bought the open-access publisher in 2021, an estimated **$35-40 million** in lost revenue in the current fiscal year”

WILEY

[1] https://retractionwatch.com/2023/12/19/hindawi-reveals-process-for-retracting-more-than-8000-paper-mill-articles/

https://www.wiley.com/en-us/network/publishing/research-publishing/open-access/hindawi-publication-manipulation-whitepaper

POPULARIZATION OF RESEARCH

POPULARIZATION OF RESEARCH

Popularization of research is **making research results understandable** to the ”man on the street” or the ”non scientific granmother”**.**

- Very important from the point of view of dissemination of results
- Very important from the point of view of getting ”attention” to science

Popularization **often considered a necessary evil**, almost a superfluous that ”is not something that a research scientist should engage in” – yet it belongs under the umbrella of ”publish or perish” and ”if a tree falls in the forest and no-one is there to hear it did it make a sound?”

POPULARIZATION OF RESEARCH

SHORT
DEMO

GEN·AI GUIDELINES

GEN·AI GUIDELINES

”It all comes down to guidelines”

Something has to be written down in terms of ”rules and regulations”!
otherwise it is near impossible to manage and enforce the use of GenAI

This needs to be done **sooner rather than later**!

Correct practice must become a part of ”academic culture” and **supervisors must understand** what is at stake and ”relay info to young researchers”

LUT University

Erasmus University Rotterdam

GEN·AI GUIDELINES

The golden rules for using GenAI

GenAI is a tool

- Use GenAI as a sparring partner, for example to brainstorm about topics. Please note that the information may be incorrect.
- Use GenAI as a supplement and not as a replacement. Stay critical.
- Use GenAI to boost your creativity. It can be a good way to discover new perspectives.
- Use GenAI to create summaries.
- Use GenAI to create a basic text based on your own input.
- Use GenAI to make your own text accessible to a specific target group.

Always check and edit the text before sharing it with others. Ultimately, you remain responsible for the work you deliver and share.

GEN·AI GUIDELINES

2. GUIDELINES ON THE RESPONSIBLE USE OF GENERATIVE AI IN RESEARCH

2.1. RECOMMENDATIONS FOR RESEARCHERS

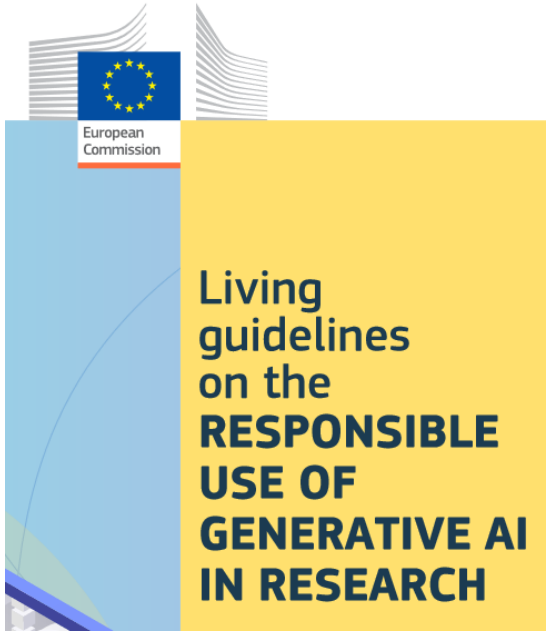
For generative AI to be used in a responsible manner, researchers should:

1. **Remain ultimately responsible for scientific output**.
   - Researchers are accountable for the integrity of the content[13] generated by or with the support of AI tools.
   - Researchers maintain a critical approach to using the output produced by generative AI and are aware of the tools' limitations, such as bias, hallucinations[14] and inaccuracies.
   - AI systems are neither authors nor co-authors. Authorship implies agency and responsibility, so it lies with human researchers.
   - Researchers do not use fabricated material created by generative AI in the scientific process, for example falsifying, altering or manipulating original research data.
2. **Use generative AI transparently.**
   - Researchers, to be transparent, detail which generative AI tools have been used substantially[15] in their research processes. Reference to the tool could include the name, version, date, etc. and how it was used and affected the research process. If relevant, researchers make the input (prompts) and output available, in line with open science principles.
   - Researchers take into account the stochastic (random) nature of generative AI tools, which is the tendency to produce different output from the same input. Researchers aim for reproducibility and robustness in their results and conclusions. They disclose or discuss the limitations of generative AI tools used, including possible biases in the generated content, as well as possible mitigation measures.
3. **Pay particular attention to issues related to privacy, confidentiality and intellectual property rights when sharing sensitive or protected information with AI tools.**
   - Researchers remain mindful that generated or uploaded input (text, data, prompts, images, etc.) could be used for other purposes, such as the training of AI models. Therefore, they protect unpublished or sensitive work (such as their own or others' unpublished work) by taking care not to upload it into an online AI system unless there are assurances that the data will not be re-used, e.g., to train future language models or to the untraceable and unverifiable reuse of data.
   - Researchers take care not to provide third parties' personal data to online generative AI systems unless the data subject (individual) has given them their consent and researchers have a clear goal for which the personal data are to be used so compliance with EU data protection rules[16] is ensured[17].
   - Researchers understand the technical and ethical implications regarding privacy, confidentiality and intellectual property rights. They check, for example, the privacy options of the tools, who is managing the tool (public or private institutions, companies, etc.), where the tool is running and implications for any information uploaded. This could range from closed environments, hosting on a third-party infrastructure with guaranteed privacy, to open internet-accessible platforms.
4. **When using generative AI, respect applicable national, EU and international legislation, as in their regular research activities**. In particular, the output produced by generative AI can be especially sensitive in relation to the protection of intellectual property rights and personal data.
   - Researchers pay attention to the potential for plagiarism (text, code, images, etc.) when using outputs from generative AI. Researchers respect others' authorship and cite their work where appropriate. The output of a generative AI (such a large language model) may be based on someone else's results and require proper recognition and citation[18].
   - The output produced by generative AI can contain personal data. If this becomes apparent, researchers are responsible for handling any personal data output responsibly and appropriately, and EU data protection rules are to be followed.
5. **Continuously learn how to use generative AI tools properly to maximise their benefits, including by undertaking training.**
   - Generative AI tools are evolving quickly, and new ways to use them are regularly discovered. Researchers stay up to date on the best practices and share them with colleagues and other stakeholders.
6. **Refrain from using generative AI tools substantially[19] in sensitive activities that could impact other researchers or organisations (for example peer review, evaluation of research proposals, etc).**
   - Avoiding the use of generative AI tools eliminates the potential risks of unfair treatment or assessment that may arise from these tools' limitations (such as hallucinations and bias).
   - Moreover, this will safeguard the original unpublished work of fellow researchers from potential exposure or inclusion in an AI model (under the conditions detailed above in the recommendation for researchers #3).

Recommendations for:

- Researchers
- Research organizations
- Research funding organizations

20 universities´ guidelines analyzed, including AALTO



European Commission
Directorate-General for Research and Innovation
Directorate E-Prosperity
Unit E4 - Industry 5.0 & AI in Science

RESEARCH OF GEN·AI USE AS A PHENOMENON

RESEARCH OF GEN·AI USE AS A PHENOMENON

Personal observation that it seems also others have made:

There is a lot to understand and to study here!

How AI changes working life? Research? How is human behavior affected by AI?

Does AI increase productivity? Are investments into AI profitable?

Also financing available for research!

NordForsk
News

Pre-announcement: Call for proposals on responsible use of Artificial Intelligence

TAKE HOME MESSAGE

KEY POINTS TO TAKE HOME

Transparency: Be open about HOW and WHERE you have used GenAI in your research, demand same from others

Privacy: Do not expose your own or others´ private work to GenAI, because it will become ”public” NB! Closed GenAI systems are an exception! Know your GenAI.

Test, learn & find: Do not be afraid, test and learn – find where GenAI can make your life easier. Popularization of research and translation are clear cases already.

Leadership must know: Senior researchers MUST know this stuff! Otherwise problems will follow.

Generate an image typical of ying and yang that fits a black background

Copilot AI-generated content may be incorrect

Sure, here are some images, choose one to insert into the presentation

Designer

LUT University

THANK YOU FOR YOUR PATIENCE