AI and Scientific Integrity

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bioethics

SPECIAL ISSUE: PROMISES AND CHALLENGES OF MEDICAL AI | Open Access

Responsibility beyond design: Physicians' requirements for ethical medical AI

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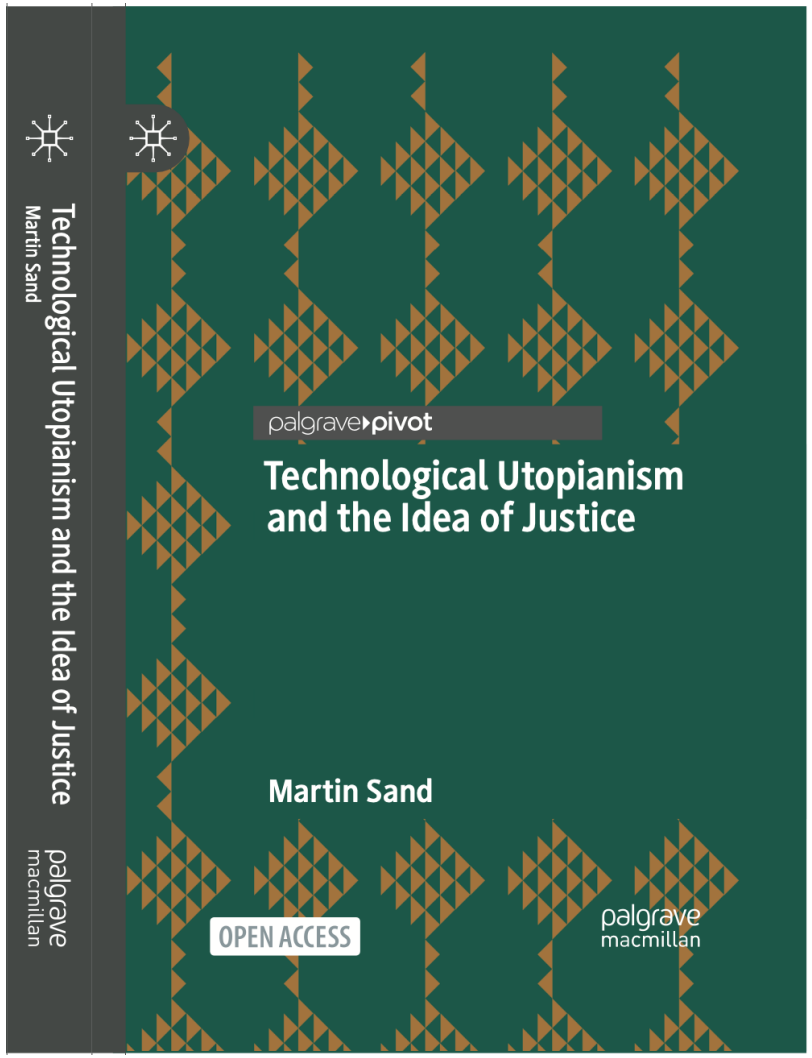
Abstract

Medical AI is increasingly being developed and tested to improve medical diagnosis, prediction and treatment of a wide array of medical conditions. Despite worries about the explainability and accuracy of such medical AI systems, it is reasonable to assume that they will be increasingly implemented in medical practice. Current ethical debates focus mainly on design requirements and suggest embedding certain values such as transparency, fairness, and explainability in the design of medical AI systems. Aside from concerns about their design, medical AI systems also raise questions with regard to physicians' responsibilities once these technologies are being implemented and used. How do physicians' responsibilities change with the implementation of medical AI? Which set of competencies do physicians have to learn to responsibly interact with medical AI? In the present article, we will introduce the notion of forward-looking responsibility and



Recent Developments

V+ ONDERZOEK

Hoe ik met ChatGPT een nepwetenschapsartikel schreef (en het nog gepubliceerd kreeg ook)

Eline van Strien

Een overduidelijk nepartikel publiceren in een chic klinkend wetenschappelijk tijdschrift is kinderlijk eenvoudig, ontdekte journalist Stan van Pelt. ‘Georganiseerde criminaliteit’, noemen fraudeonderzoekers het groeiende probleem van nepwetenschap.

Stan van Pelt

Recent Developments

CASE REPORT

Research Article

Unraveling the Neurological Mechanisms of Telepathic Communication: A Magnetoencephalography (MEG) Study

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ABSTRACT

Telepathy, the purported ability to transmit thoughts or mental states directly from one mind to another without the use of conventional communication channels, has long captivated human imagination and scientific inquiry. Despite its historical and cultural significance, the scientific investigation of telepathy has been met with skepticism due to its seemingly paranormal nature.

In this study, we employ Magnetoencephalography (MEG), a powerful neuroimaging technique, to explore the neural correlates underlying telepathic communication.

Utilizing MEG, we conducted experiments involving pairs of individuals tasked with engaging in telepathic interactions under controlled laboratory conditions. By recording the

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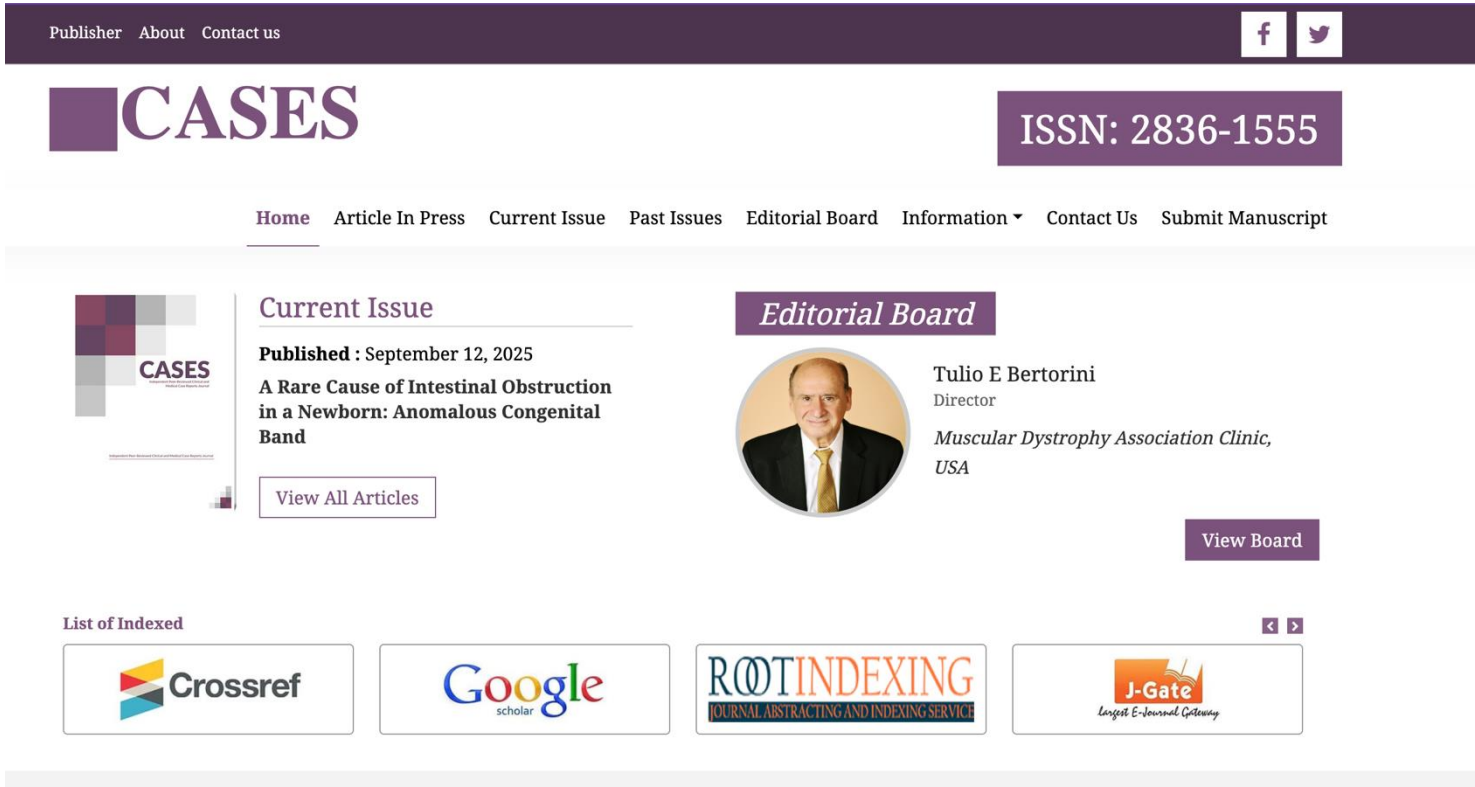

Recent Developments

“Dat een vakblad het zonder blikken of blozen wil plaatsen, laat zien hoe makkelijk het tegenwoordig is om een wetenschappelijk artikel te publiceren. Tenminste, in zogeheten **predatory journals** - in het Nederlands vaak roof- of neptijdschriften genoemd. **De uitgevers hiervan verdienen op oneigenlijke wijze miljoenen euro's aan de manier waarop wetenschappers hun resultaten normaal gesproken met elkaar en de buitenwereld delen**.”

Recent Developments

If address information is provided with the affiliation(s) it will also be published.

For authors that are (temporarily) unaffiliated we will only capture their city and country of residence, not their e-mail address unless specifically requested.

Large Language Models (LLMs), such as ChatGPT, do not currently satisfy our authorship criteria. Notably an attribution of authorship carries with it accountability for the work, which cannot be effectively applied to LLMs. Use of an LLM should be properly documented in the Methods section (and if a Methods section is not available, in a suitable alternative part) of the manuscript. The use of an LLM (or other AI-tool) for "AI assisted copy editing" purposes does not need to be declared. In this context, we define the term "AI assisted copy editing" as AI-assisted improvements to human-generated texts for readability and style, and to ensure that the texts are free of errors in grammar, spelling, punctuation and tone. These AI-assisted improvements may include wording and formatting changes to the texts, but do not include generative editorial work and autonomous content creation. In all cases, there must be human accountability for the final version of the text and agreement from the authors that the edits reflect their original work.

Abstract

Please provide an abstract of 150 to 250 words. The abstract should not contain any undefined abbreviations or unspecified references.

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NEWS EXPLAINER | 03 October 2025 | Correction 07 October 2025

How AI agents will change research: a scientist's guide

Researchers are increasingly turning to artificial-intelligence tools that can handle complex, multi-step processes.

By Elizabeth Gibney

AI agents can help with literature reviews, handling data sets and writing code. Credit: sanjeri/Getty

Millions of people consult chatbots every day. But artificial intelligence (AI) advocates are betting that 'AI agents' are the application of this technology that will affect society the most.

Agentic AI involves using a large language model (LLM) to carry out multi-step tasks, by connecting it to external tools such as Internet browsers or coding suites. The hope is that AI assistants can be created that simplify real-world tasks. In science, some think that AI agents – perhaps even several working together – will not just save time, but also eventually run their own experiments and generate knowledge.

RELATED

But this dream is not yet a reality. Although access to AI agents is

Streamlining everyday research tasks is one goal. "In my group, every PhD student now has their own AI agent that effectively serves as a research assistant," says Marinka Zitnik, a researcher in biomedical informatics at Harvard University in Boston, Massachusetts. These home-made agents help Zitnik's team to perform low-stakes tasks, such as curating data sets, turning text into tables and writing certain pieces of code, she says.

CAREER COLUMN | 13 October 2025

‘Am I redundant?’: how AI changed my career in bioinformatics

A run-in with some artefact-laden AI-generated analyses convinced Lei Zhu that machine learning wasn’t making his role irrelevant, but more important than ever.

By Lei Zhu

The rise of agentic AI tools caused Lei Zhu to rethink his role in bioinformatics. Credit: Lei Zhu

When I began my graduate studies, the first thing I needed to do was choose a research direction. The laboratory I joined focused on two main areas: functional assays and bioinformatics. This was more than a decade ago, and the typical workflow involved bioinformatics researchers analysing large data sets to identify genes associated with specific phenotypes or diseases, which would then be handed over to the functional-assay team for validation.

At the time, bioinformatics was a new, promising field, so I chose this path without hesitation. But, I did not have a programming background, so it was tough to get started. I began studying programming languages — first Perl, then R and Python.

“If anything, the rise of generative AI in bioinformatics has not diminished my role, **but redefined i**t. It has challenged me to become a better scientist. For good or ill, AI seems to be here to stay."

Use of AI in the scientific workflow is highly diverse

- There are benefits to using AI in science in some stages of the workflow

- **What are the illegitimate/problematic uses of AI and why?**

    - Is this already captured in existing regulation/codes of conduct?
    - If not - what can we do about those?

Group Discussion of Vignettes (20 Min)

- **All vignettes are numbered: Form a group with the people that have the same vignette/number!**
  - Does the vignette describe illegitimate/problematic scientific conduct? Why – or why not?
  - Is there existing regulation / codes of conduct (e.g. Netherlands Code of Conduct for Research Integrity) that would classify the use as misconduct?
  - If there is misconduct – what can we do against it?

Panel Discussion (~ 15-20 Min)

- What is the domain you discussed? How was AI used?
- Was it illegitimate use and if so, why?
- Did something surprising come up in the discussion?

Vignette 1: Peer Review

Dr. Samuel Greene, a mid-career physicist, had been asked to review several manuscripts for a leading journal. Under time pressure, he experimented with an AI summarization tool: he uploaded the manuscripts and asked the AI to generate key points, strengths, weaknesses, and even suggested reviewer comments.

The AI's output was coherent and saved Samuel hours. He lightly edited the text and submitted the reviews. Editors praised him for the speed and clarity of his feedback.

Vignette 2: AI-Enhanced Imaging

Dr. Amira Khan, a cell biologist, was working on a project to visualize protein interactions in cancer cells using microscopy. Her images, however, were noisy and low-resolution. A colleague suggested she try a new AI-based image enhancement tool, marketed as a way to “clarify” biological images.

Amira was amazed: the software transformed her fuzzy micrographs into crisp, detailed pictures. Structures that were previously ambiguous now appeared strikingly clear. Eager to showcase these results, she included the enhanced images in her manuscript—without disclosing that they had been processed by AI.

Her paper was accepted in a prestigious journal, and the images were highlighted as a breakthrough. Later, another lab attempting to replicate her findings could not observe the same structures.

The AI’s output was coherent and saved Samuel hours. He lightly edited the text and submitted the reviews. Editors praised him for the speed and clarity of his feedback.

Vignette 3: Manuscript Drafting

Dr. Wei Zhang, an early-career neuroscientist, was under pressure to publish to secure tenure. He had collected a large dataset of functional MRI scans but struggled to write quickly enough. To save time, Wei began using an AI language model to draft sections of his manuscripts.

The tool was efficient: within hours, it generated polished introductions, complete with references. Wei skimmed the text but rarely double-checked the citations. When reviewers returned his first paper with only minor revisions, he became more confident. Soon, he was submitting multiple AI-assisted manuscripts.

Vignette 4: AI in Statistical Analysis

Dr. Ingrid Morales, an epidemiologist, was leading a large-scale study on environmental exposures and childhood asthma. Her dataset was massive—thousands of variables across multiple regions—and traditional statistical methods were slow to yield clear patterns.

She turned to an AI platform capable of automatically identifying associations and generating statistical summaries. Within hours, the system produced detailed reports suggesting several “significant” correlations between certain air pollutants and asthma rates. Excited by the apparent clarity, Ingrid included these findings in a manuscript.

However, during peer review, a statistician raised concerns: the AI’s algorithm performed its own internal feature selection and modeling choices, which were not described in the paper. When asked, Ingrid realized she could not fully explain how the system determined which associations were meaningful.

Vignette 5: Automated Grant Proposal Writing

Dr. Raj Patel, a biochemist, had spent months preparing for a competitive federal grant deadline. To save time, he used an AI grant-writing assistant that promised to "enhance clarity and persuasiveness." The system reorganized his ideas, improved phrasing, and even suggested references to strengthen the rationale section.

When Raj submitted his application, reviewers praised its polish and logical flow. Encouraged, he used the same tool for other proposals. Later, a colleague mentioned that several sentences in Raj's submission matched text generated by the AI for another user—raising concerns about potential self-plagiarism and originality.

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Vignette 6: AI and Human Subjects Data

A clinical psychology lab at a university had collected hundreds of interviews from participants discussing trauma and resilience. To accelerate transcription and coding, the team used an AI service that automatically transcribed and categorized emotional content.

Weeks later, the principal investigator learned that the AI service stored user data on external servers and used uploaded recordings to improve its algorithms. Although participants had consented to recording and research use, they had not been informed their voices might be processed or retained by a commercial third party.

Thank you!

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