Scholarly Publishing in the Generative AI age

- Preserving Trust to Accelerate Science

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Advancing human progress together

2024 Nobel Prize –

AI is no longer a tool at the margins — supporting Nobel science!

"for foundational discoveries and inventions that enable machine learning with artificial neural networks"

"for computational protein design"

"for protein structure prediction"

Princeton University | University of Toronto | **Univ. of Washington** | Google DeepMind

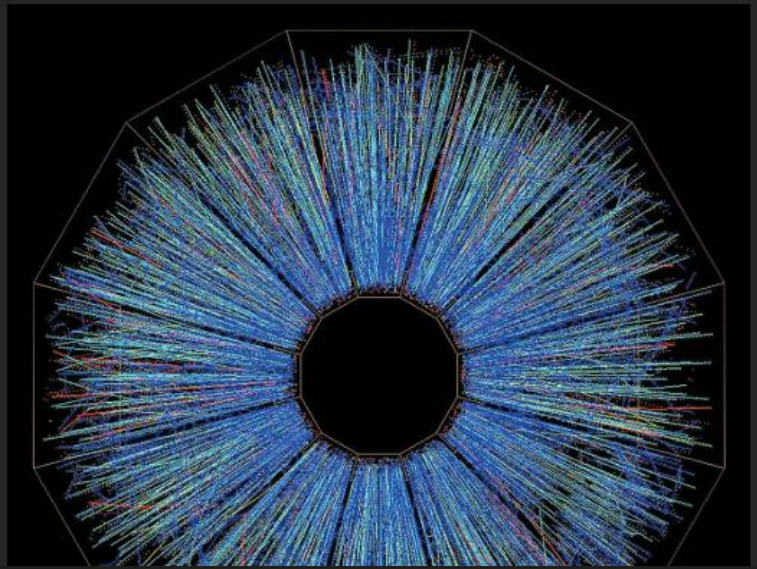
https://www.nobelprize.org/

NEWS | PHYSICS

ChatGPT spits out surprising insight in particle physics

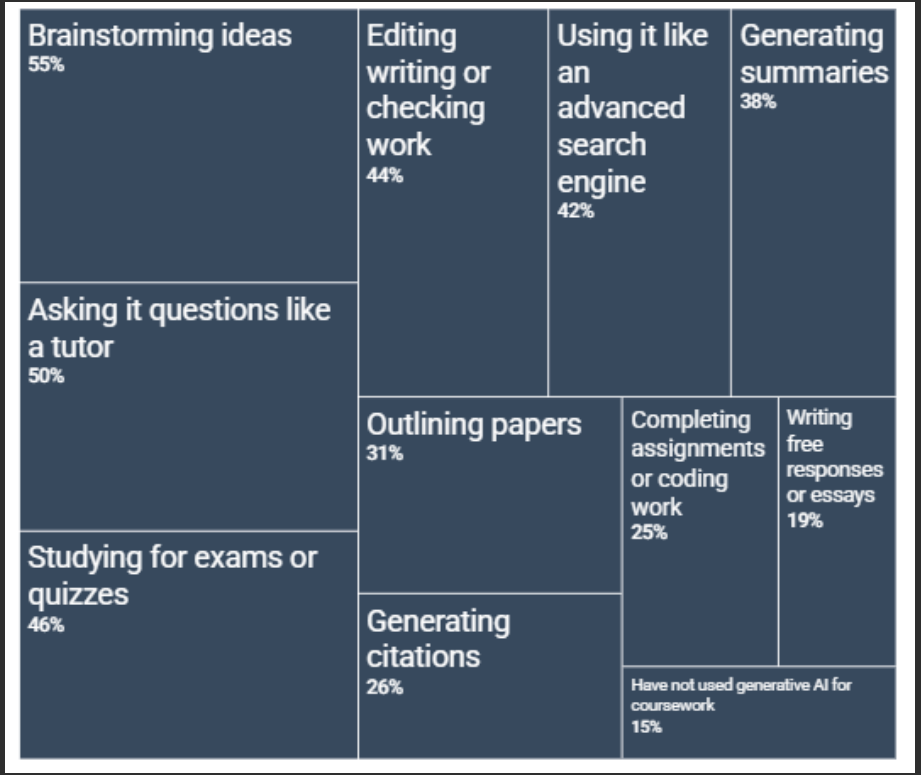
Physicists combined human acumen and AI-assisted math to show that a doubted particle interaction is possible after all

20 FEB 2026 · 12:45 PM ET · BY PERRI THALER



GenAI in teaching and learning

- Near universal adoption rates
- 85% of US students
- Highest adoption in Asia (99%)



Inside Higher Education Student Voice Survey, August 2025: https://www.insidehighered.com/news/students/academics/2025/08/29/survey-college-students-views-ai

MIT Technology Review, July 2025: https://www.technologyreview.com/2025/07/28/1120747/chinese-universities-ai-use/

The Researcher of the Future 2025

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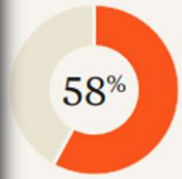
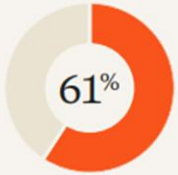
More than 3000 researcher globally surveyed



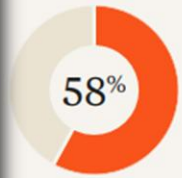
AI adoption in research has surged

58% have used AI tools for work, up from 37% in 2024.



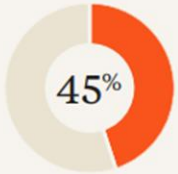
AI as a creative force

Notably, **61%** believe AI will be the creative force driving new knowledge in the next two to three years.



Researchers are largely positive about AI's potential to boost efficiency

58% say AI already saves them time today, and 69% expect it to save them time in the next two to three years.

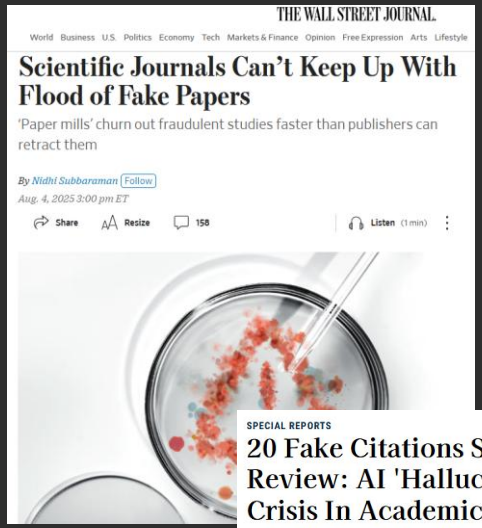


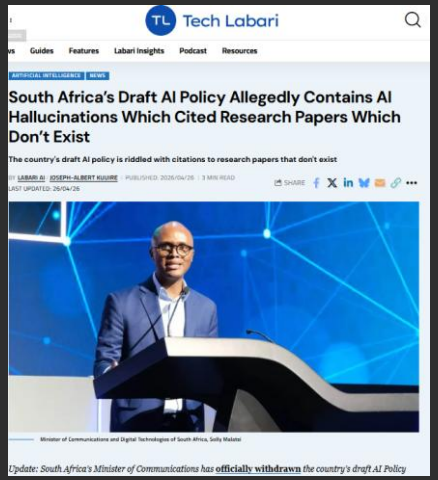
However, many feel underprepared

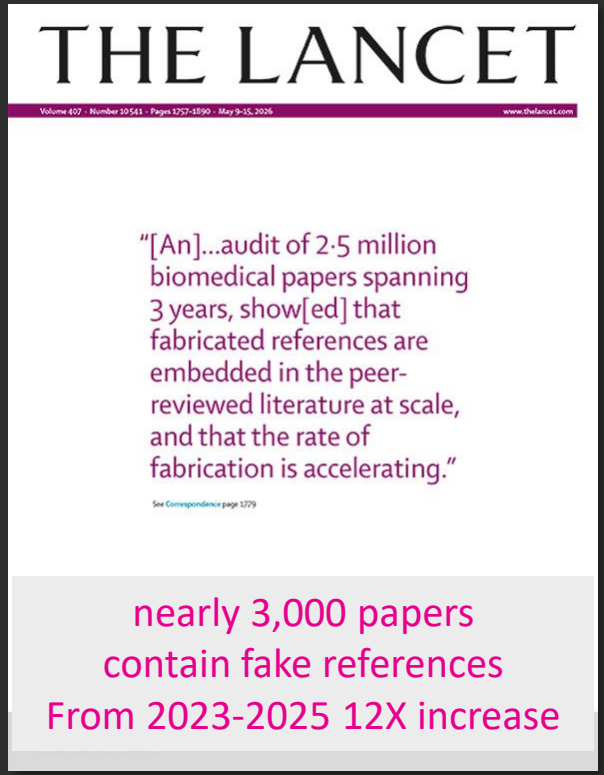
45% feel undertrained in AI, and only 32% agree their institutional AI governance is good.

https://www.elsevier.com/insights/confidence-in-research/researcher-of-the-future

The AI Productivity Paradox – Hallucinations & Fake Science







nearly 3,000 papers
contain fake references
From 2023-2025 12X increase

Agenda:
The AI Paradox in Publishing

- Acceleration
- Vulnerability
- Infrastructure Response

Researcher of the *Future* report

84% of researchers use AI (work/outside), but only 22% trust it

86% Believe it could cause **critical errors** or mishaps

81% Worry it may erode **critical thinking skills**

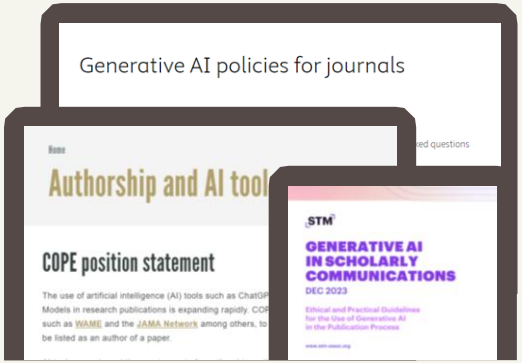
38% Are concerned about **ethical development**

26% Fear it will **devalue** them

https://www.elsevier.com/insights/confidence-in-research/researcher-of-the-future

Scholarly communication response to GenAI?

- Universities, COPE, learned societies and publishers have **created policies for researchers on responsible use of (Generative) AI**.
- **Most publishers allow** authors to use GenAI for a defined purpose (language and readability), if disclosed.
- **Policies are likely to be refined and adapted** as the technology develops, and in response to community feedback as well as in response to evolving legislation.



- Elsevier GenAI Ethics Policies
- COPE Position statement on Authorship and AI Tools
- COPE Discussion Document: AI in Decision Making
- STM Whitepaper on GenAI in scholarly communications

Elsevier's responsible AI principles

AS PART OF OUR RESPONSIBLE AI APPROACH...

Here's what that looks like in practice:

1. We consider the real-world impact of our solutions on people → Developed and implemented Algorithmic Impact Assessment tool
2. We take action to prevent the creation or reinforcement of unfair bias → We train on bias protection in data algorithms and follow up on spotted biases
3. We can explain how our solutions work → Standards and practice on responsible AI rolled out across RELX
4. We create accountability through human oversight → Accountability throughout Data Science Lifecycle, set of principles around e.g. LLMs
5. We respect privacy and champion robust data governance → Signposting & integration of AI work with Data Protection & Privacy process

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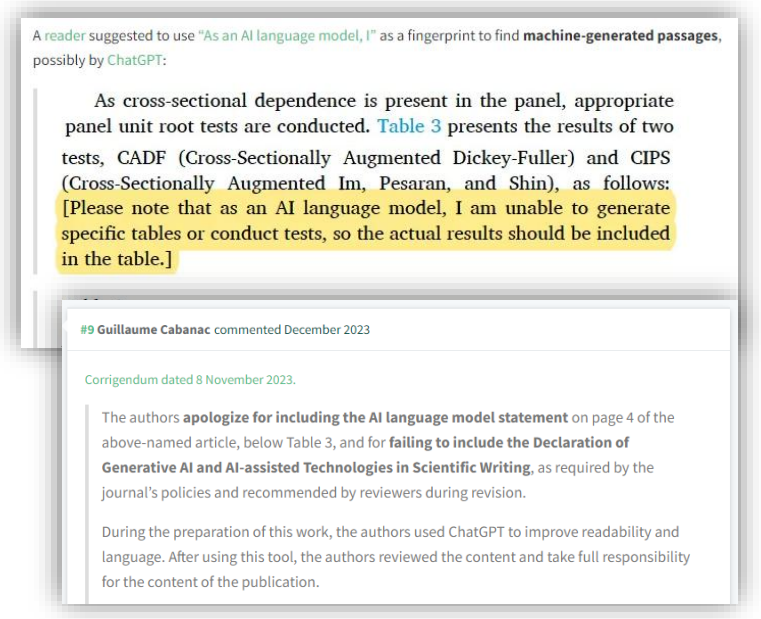
Elsevier Responsible AI Principles

Opportunities for researchers…and bad actors

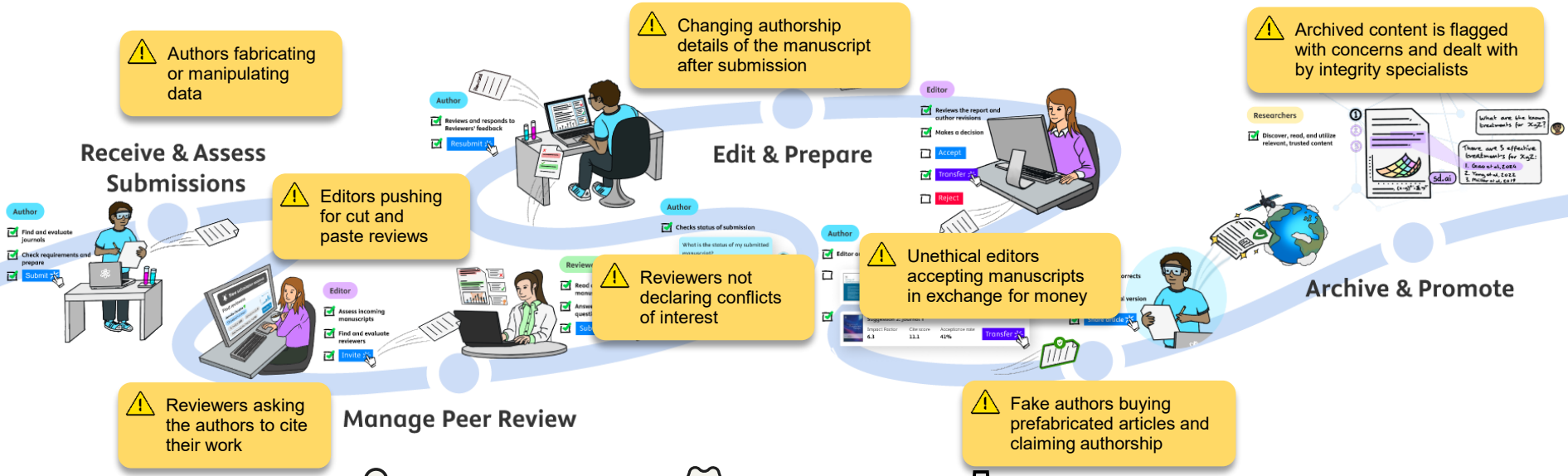
Generative AI can support to advance science, but also concerns about **inaccuracy** and **unreliable sources**, **copyright infringement, plagiarism** and **training bias**

Common observations:

- **Authors <u>not</u> declaring use of AI** to improve writing: raise suspicion about improper and/or undeclared use of AI elsewhere in their research.
- Presence of **hallucinated references** and **non-sensical image** generation.
- **Reviewers breaching confidentiality** of the peer-review process by uploading a manuscript or their report to a publicly available LLM.
- **Concerns from Editors** about apparently **AI-generated papers**



Unethical behavior throughout the publishing journey
- GenAI lower barriers..



Uninformed Researchers

Well-intentioned researchers who **accidentally** breach journal policies or engage in poor practices due to ignorance or lack of awareness

Bad Actor

Authors, Editors and Reviewers who **occasionally** and **deliberately** submit fraudulent content or manipulate the editorial process for their own benefit

Paper Mill

Criminal **organizations** that submit fraudulent content on a **large scale** as a **business model**

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Elsevier use of AI to assist editors
- technology to support trusted research

- Reviewer recommendations for editors based on keywords and other metadata
- Editors are offered AI-based information on scope match of a paper and on duplicate submissions
- Authors are supported with finding a suitable journal to submit to, both pre-submission (Journal Finder) and after desk reject (Transfer Your Manuscript)
- Automated technical checks on a paper (missing items, usability, etc.) give feedback to the author during the editorial process
- AI-based research integrity checks analyse the manuscript and present the results back to the editor for human evaluation

New Gen AI capabilities inspire and enable us to experiment with additional innovative functionalities

- ScienceDirect AI
- Scopus AI
- Clinical Key AI
- LeapSpace

Building Infrastructure for Research Integrity
- Elsevier case

Industry trends

Article **retractions** are **increasing** due to **research fraud**

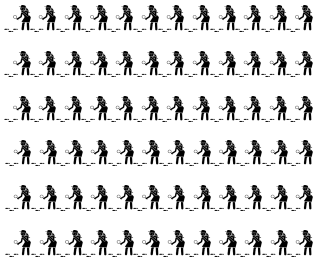
Publishing ethics cases are **more complex**

Complex networks are driving **systematic manipulation** of the editorial process

These issues are **exacerbated by AI**

Combining **human oversight and technology** to detect and prevent misconduct

✓ Our team of integrity specialists has grown from 2 in 2020 to 120+ today



✓ We screen submissions for over 100 integrity signals at multiple stages

✓ We use innovative technology

ProofigAI

imagetwin

iThenticate

Industry collaboration

✓ We provide expert insights, funding, technology

✓ We align on policy

STM Solutions

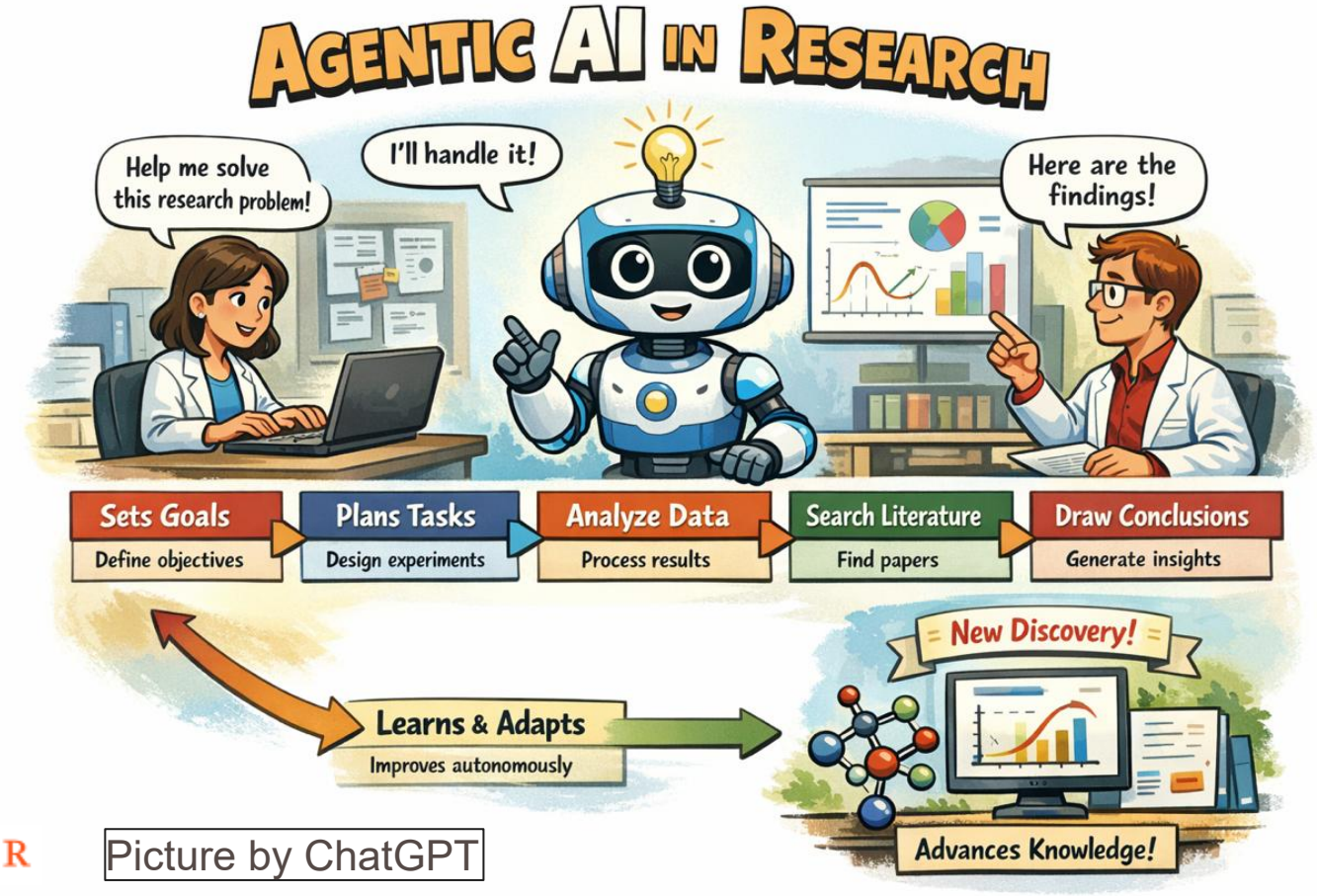
STM INTEGRITY HUB

COPE

UNITED2ACT AGAINST PAPER MILLS

Investing more than $20 million over three years

Agentic AI : Increased Autonomy –Increased Capabilities and Risks



Picture by ChatGPT

Already first steps of Research Automation

- The AI Scientist by Sakana.ai

Article

Towards end-to-end automation of AI research

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The automation of science is a long-standing ambition in artificial intelligence (AI) research[1,2]. Although the community has made substantial progress in automating individual components of the scientific process, a system that autonomously navigates the entire research life cycle—from conception to publication—has remained out of reach. Here we present a pipeline for automating the entire scientific process end to end. We present The AI Scientist, which creates research ideas, writes code, runs experiments, plots and analyses data, writes the entire scientific manuscript, and performs its own peer review. Its ideas, execution and presentation are of sufficient quality that the manuscript generated by this AI system passed the first round of peer review for a workshop of a top-tier machine learning conference. The workshop had an acceptance rate of 70%. Our system leverages modern foundation models[3–5] within a complex agentic system. We evaluate The AI Scientist in two settings: a focused mode using human-provided code templates as an initial scaffold for conducting research on a specific topic and a template-free, open-ended mode that leverages agentic search for wider scientific exploration[6,7]. Both settings produce diverse ideas and automatically test, report on and evaluate them. This achievement demonstrates the growing capacity of AI for making scientific contributions and signifies a potential paradigm shift in how research is conducted. As with any impactful new technology, there could be important risks, including taxing overwhelmed review systems and adding noise to the scientific literature. However, if developed responsibly, such autonomous systems could greatly accelerate scientific discovery.

AI has long been used to aid scientific discovery, an ambition with deep roots in the history of the field[8–11]. Before the rise of large language models (LLMs), AI was limited to helping with specific, narrow tasks, such as discovering chemical structures[2], finding mathematical proofs[1], discovering new materials[12–14] and predicting the three-dimensional shape of proteins[15,16]. Other systems focused on analysing pre-collected datasets to find new insights[10,17,18]. However, with the recent advent of powerful and general foundation models, the role of AI has expanded to include assisting with a wider array of research activities. For example, LLMs now help with generating new hypotheses[19–21], writing literature reviews[19,22] and coding experiments[20,23]. Despite these advances in automating individual components, a system that autonomously navigates the entire research life cycle—from conception to publication—has remained out of reach until now.

This paper introduces The AI Scientist, a pipeline that achieves the vision of full end-to-end automation of the scientific process. The AI Scientist uses existing foundation models to perform ideation, literature search, experiment planning and implementation, result analysis, manuscript writing, and peer review to produce complete, new papers. We focus on machine learning science, as experiments typically occur entirely on the computer.

A central challenge in developing such a system is automatically evaluating the quality of its scientific output at scale. To address this, we created an automated reviewer and first evaluated its performance against real, human-generated papers. The Automated Reviewer can accurately predict conference acceptance decisions, performing on par with human reviewers (Supplementary Information section A.3). We then used The Automated Reviewer to compare various configurations of The AI Scientist by assessing how performance changes with the scale of the test-time compute and the quality of the underlying foundation model. We find that The AI Scientist performs better with more compute resources (Fig. 3c). Furthermore, The Automated Reviewer shows that improvements to the base models significantly improve the quality of the generated papers, a finding that strongly implies that future versions of our system will be substantially more capable, as models continue to improve (Fig. 3b).

To assess The AI Scientist in the same setting in which human-authored papers are evaluated, we conducted an experiment where we submitted generated papers to a workshop at the International Conference on Learning Representations (ICLR), with the organizers' consent. In computer science, such top-tier conferences are the primary and most prestigious venues for archival and rigorously peer-reviewed

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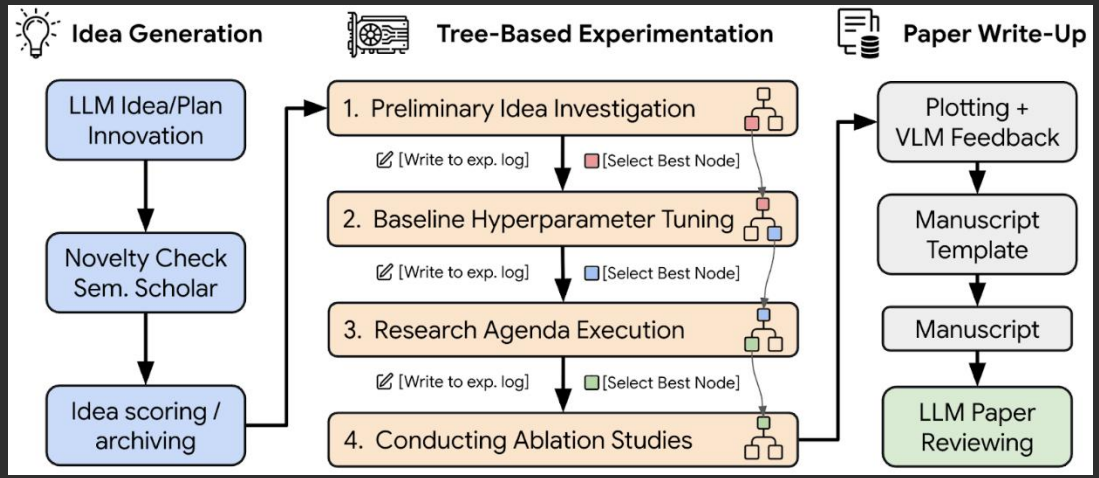
- **End-to-end research automation:** Generates hypotheses, runs experiments, analyzes results, and drafts papers autonomously.
- **Self-improving discovery loop:** Iteratively refines research directions to scale scientific exploration.



https://www.nature.com/articles/s41586-026-10265-5

A guide to AI agents

"...the true power of Agentic AI lies in its ability to augment human expertise rather than replace it. These systems are increasingly being designed to collaborate with researchers, providing insights, generating novel ideas, and handling repetitive tasks, thereby freeing up scientists to focus on creative and high-level problem-solving." [12]

Gridach, et al.
(Preprint 2025)

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https://www.elsevier.com/academic-and-government/how-to-harness-agentic-ai-in-academia

Researcher of the *Future* report

What would give researchers confidence in using AI tools?

59% Transparency and clear citations

55% Access to current literature and data

55% Training on high-quality, peer-reviewed content

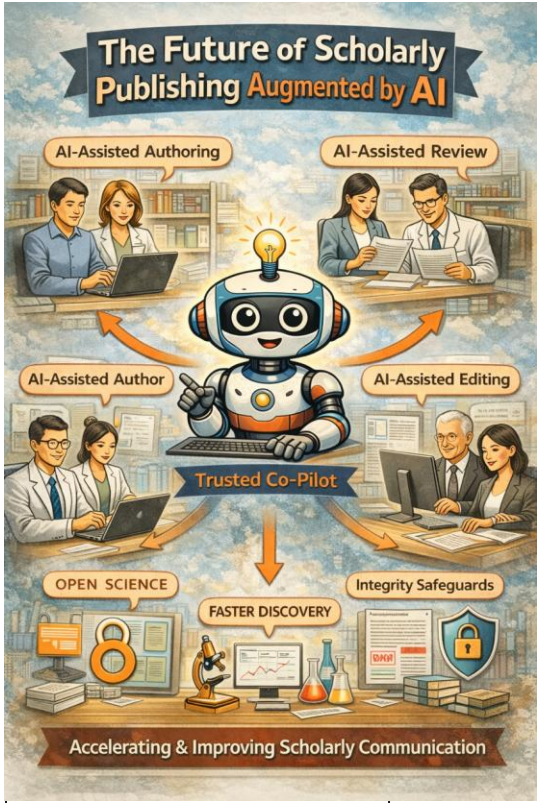
49% Regular human validation of AI outputs

https://www.elsevier.com/insights/confidence-in-research/researcher-of-the-future

Industry example – Elsevier LeapSpace

- Seamless AI assistant
- Agentic AI Deep Research
- Multi-publisher content
- Trust cards & claim radar
- Independent advisory board

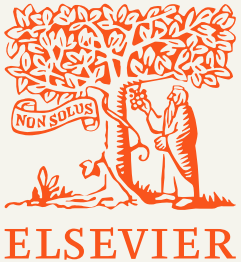
Role of AI in publishing – Editors are Guardians of Trust



Picture by ChatGPT

- AI Accelerating Research & Publishing
- AI Enhancing Quality & Collaboration
- Ethical & Responsible AI Use Is Essential

Thank you very much!



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