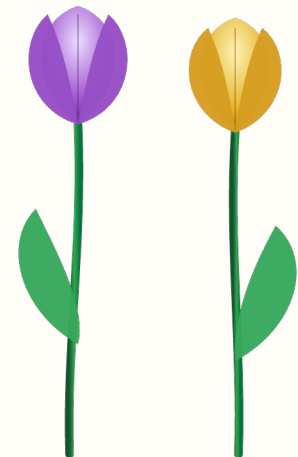


The Leiden Declaration on Artificial Intelligence and Mathematics

Jim Portegies

*Jarod Alper, Michael Barany, Alain Chavarri Villarelo,
Sander Dahmen, Walter Dean, Karthik Ganapathy, Michael Harris,
David Holmes, Mateja Jamnik, Steven Kelk, Bryna Kra, Ursula Martin,
Bartosz Naskręcki, Rodrigo Ochigame, Johannes Schmitt*



July 25, 2024 Science

AI achieves silver-medal standard solving International Mathematical Olympiad problems

AlphaProof and AlphaGeometry teams

Share 



July 25, 2024 Science

AI achieves silver-medal standard

July 21, 2025 Research

Advanced version of Gemini with Deep Think officially achieves gold-medal standard at the International Mathematical Olympiad

id AlphaGeometry teams

DeepSeek releases first open AI model with gold-level scores at maths olympiad

Research ♦ Jul 28, 2025

Aristotle Achieves Gold Medal-Level Performance at the International Mathematical Olympiad, iOS App Beta Launch



OpenAI 🏆

@OpenAI

We achieved gold medal-level performance 🏆 on the 2025 International Mathematical Olympiad with a general-purpose reasoning LLM!

ByteDance Seed Prover Achieves Silver Medal Score in IMO 2025

Research-level problems

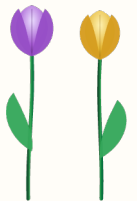


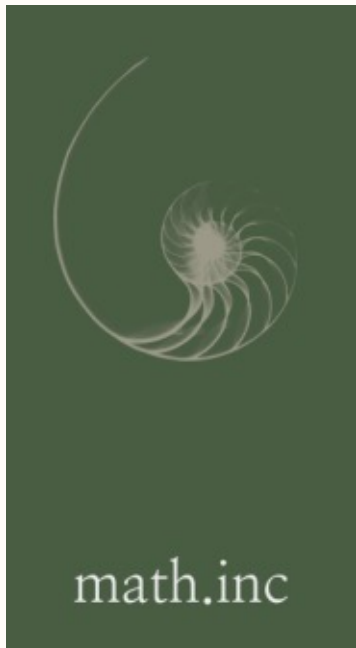
IMProofBench

Informal Mathematical Proof Benchmark

**FrontierMath: Benchmarking AI
against advanced
mathematical research**

**ArXivMath: Evaluating LLMs on Mathematical
Research Problems From Recent ArXiv Papers**





deepseek

 Symbolica



Axiom



OpenAI



Logical
Intelligence

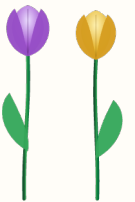
Google DeepMind



Harmonic



Meta



An amateur just solved a 60-year-old math problem—by asking AI

A ChatGPT AI has proved a conjecture with a method no human had thought of. Experts believe it may have further uses

BY JOSEPH HOWLETT EDITED BY LEE BILLINGS

SCI
AM

THE WALL STREET JOURNAL.

A Famous Math Problem Stumped Humans for 80 Years. AI Just Cracked It.

The math world is losing its mind over the new solution to an Erdős problem. This is what AI found, how we missed it—and why it matters.

The Washington Post

They just announced the highest honor for math prodigies. Here's why it may disappear.

NewScientist

AI's solution to 87-year-old riddle takes mathematicians by surprise

Mathematicians have been trying to prove the Jacobian conjecture for nearly a century, but now the Claude Fable 5 AI has apparently found a counterexample that disproves it

The New York Times

A.I. Is Coming for Mathematics, Too

For thousands of years, mathematicians have adapted to the latest advances in logic and reasoning. Are they ready for artificial intelligence?

NewScientist

A golden age of maths is dawning and mathematicians are freaking out

Mathematicians are stunned at the progress AI is making in solving advanced problems, leaving some questioning whether there will still be room for humans

Glitchwire

A Mathematician Used Claude Fable to Disprove the 87-Year-Old Jacobian Conjecture in a Few Hours

SCIENCE & TECH

The
Harvard
Gazette

AI leaps from math dunce to whiz

Sabine Hossenfelder – <https://youtu.be/k5dZmMa00IA>

The End of Human Mathematics? AI's Recent Breakthrough -- And What's Next



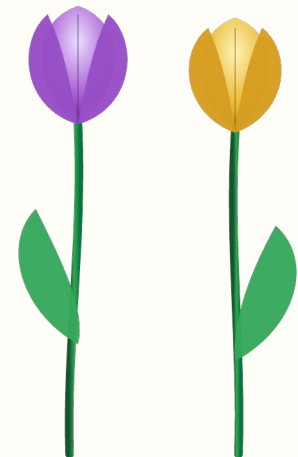
SCIENCE NEWS Maths is cooked, I heard this recently on a podcast. I agree.

Hossenfelder



The Leiden Declaration on Artificial Intelligence and Mathematics

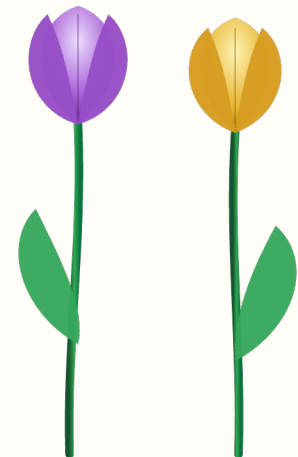
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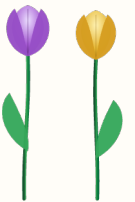
*Call for action to address the challenges
posed by the use of artificial intelligence
within mathematics research*

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What also needs urgent attention

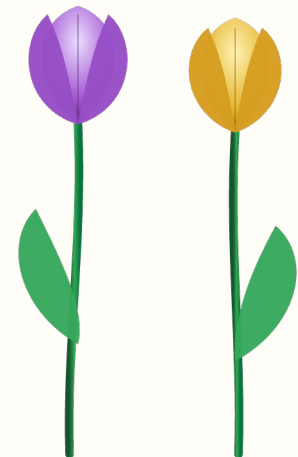
- Education
- Mentoring
- Training the next generation
- Science policy
- Use of mathematics in the wider world
- ...



The Leiden Declaration on Artificial Intelligence and Mathematics

*Call for action to address the challenges
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Community initiative

Editorial: the IMU endorses the Leiden Declaration on Artificial Intelligence and Mathematics

Artificial intelligence (AI) is increasingly affecting our day-to-day mathematical research, whether it be the use of large language models, systems for symbolic computation and formalization, or the growing industrial interest in mathematics as a testing ground for automated reasoning. While many of these developments are exciting, they raise questions that the mathematical community cannot afford to leave unexamined.

The “[Leiden Declaration on Artificial Intelligence and Mathematics](#)”—published on June 2, 2026—addresses many key questions currently being raised.

The declaration grew out of the conference “Mechanization and Mathematical Research”, held in September 2025 at the Lorentz Center at Leiden University in the Netherlands. Around 60 participants from 10 countries, including mathematicians, computer scientists, philosophers, and social scientists, took part. In the six months after the conference, a smaller working group developed the declaration with extensive feedback from the mathematical community. The text reflects AI technologies and mathematical practice as of May 2026.



Photo Christoph Sorger

nature

Mathematicians are developing rules for AI use – other fields should follow

The mathematics community is right to call for transparency, integrity and fairness to be protected when AI tools are used. Researchers in other areas could learn from this approach.

A little more than a decade ago, after a 2014 conference at Leiden University in the Netherlands, researchers published the Leiden Manifesto in *Nature*. It called for the responsible use of metrics in research and included a set of ten principles to help to ensure rigour and fairness in the evaluation of research¹. Along with the San Francisco Declaration on Research Assessment (DORA), the Leiden principles have been adopted around the world.

“
The ability
of machine-
learning
tools to
perform

University of California, Los Angeles, AI is rapidly changing mathematicians' job descriptions. But it is arguably doing more than that. As AI and commercial AI software become integrated into maths research, they “will change the kinds of problems that are pursued and the forms of proof that are valued”, according to a report from the workshop⁴. The Leiden declaration warns of the risks this poses to the autonomy of the field. Indeed, evidence is starting to emerge that, across science, the use of AI correlates with a narrower breadth of research topics⁵. As the declaration states, this will disadvantage both researchers who lack access to the technology and those who do not wish to use proprietary AI tools.

The Leiden declaration holds that mathematical results should continue to be published in peer-reviewed venues subject to the principles of open science, and that “no proprietary knowledge or equipment should be required to understand them”. Moreover, any material used as training data should have the required attributions and should not be used without consent.

Those recommendations reflect real concerns raised by the breakneck pace of developments, as highlighted in the workshop. To take the example of the unit-distance problem, OpenAI researchers have posted the proof on the publicly accessible company website (see go.nature.com/4epjtkd) and the findings have been verified by a group of mathematicians who are independent of the firm.





[VIEWPOINTS](#)

[REPUBLISH](#)

[PRINT](#)

Opinion: Biologists Should Articulate Their Position on AI

In the Leiden Declaration, mathematicians issued a treatise on how AI challenges their field. Others must do the same.

Visual: J Studios / DigitalVision via Getty Images

Featured Endorsements

Peter Scholze verified

Director, Max Planck Institute for Mathematics

This is a wonderful declaration, coming at the right time. The goal of mathematical research is human understanding of mathematics, and so mathematics can only thrive in a community of human mathematicians. It is crucial to preserve this communal spirit. In my experience, mathematical ideas, like children, must be nurtured and grow over the years. Just like I do not want my children to be educated by AI, I am pondering my mathematical ideas without use of AI, and generally avoid reading AI-generated text as best as I can.

Terence Tao verified

Professor, University of California, Los Angeles

This has been the result of months of community input about the fundamental values and goals of the mathematical community. In retrospect, these were questions we should have been systematically discussing years ago, but in any event the exercise was extremely valuable, and the end result is excellent. I wholeheartedly endorse the statements and recommendations in this declaration.

Robbert Dijkgraaf verified

Distinguished University Professor, University of Amsterdam; President-Elect, International Science Council; Former Minister of Education, Culture and Science, The Netherlands

Scientific research is in the midst of a major transformation through the impact of AI, and mathematics is one of the disciplines most fundamentally affected through automated proof generation and machine-generated reasoning. It is therefore more important than ever that the mathematical community comes together to establish clear guidelines and shared standards, to safeguard not only the practice of mathematics but its deeper purpose: the cultivation of understanding, judgment, and human insight.



Signatories

[Sign Declaration](#)

3135 Signatories

Ronald Ortner

[ORCID](#)

2026-07-24

Lehrstuhl für Informationstechnologie, Montanuniversität Leoben

John McGreevy

[ORCID](#)

2026-07-24

Professor, University of California San Diego

Livia Grammatica

[verified email](#)

2026-07-23

Université de Strasbourg

Amos Turchet

[ORCID](#)

2026-07-23

Faculty, Università degli studi Roma Tre

Harsha Honnappa

[ORCID](#)

2026-07-23

Purdue University, Associate Professor of Industrial Engineering

The New York Times

nrc

'Laat big tech niet bepalen welke
wiskunde ertoe doet'

As A.I. Makes Strides in Mathematics, Mathematicians Urge Caution

**SCI
AM**

**Mathematicians sign declaration to rein in AI
use**

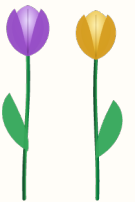
SCIENCEINSIDER | MATH

Mathematicians issue warning as AI rapidly gains ground

New declaration argues the technology jeopardizes the field's values and culture

Le Monde

Des mathématiciens lancent un appel pour reprendre la main sur l'IA

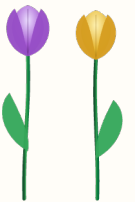



Terence Taoverified

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Lorentz workshop:
Mechanization and Mathematical research





Lorentz
center

Mechanization and Mathematical Research

15 – 19 September 2025, Leiden, the Netherlands @omega

Topics

- What can formal and automated proof offer mathematics in the future?
- How will AI affect mathematical proof, understanding, and creativity?
- What can history, philosophy, and social science teach us about these questions?

Scientific Organizers

- Johan Commelin, Universiteit Utrecht & Lean FRO
- Mateja Jamnik, Cambridge University
- Rodrigo Ochigame, Universiteit Leiden
- Lenny Taelman, Universiteit van Amsterdam
- Akshay Venkatesh, Institute for Advanced Study

This workshop is part of our collaboration with NIAS and aims to stimulate research in the humanities & social sciences.



LORENTZCENTER.NL



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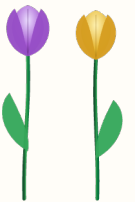
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Jarod Alper	University of Washington
Michael Barany	University of Edinburgh
Alain Chavarri Villarelo	Vrije Universiteit Amsterdam
Sander Dahmen	Vrije Universiteit Amsterdam
Walter Dean	University of Warwick
Karthik Ganapathy	University of California, San Diego
Michael Harris	Columbia University
David Holmes	Leiden University
Mateja Jamnik	University of Cambridge
Steven Kelk	Maastricht University
Bryna Kra	Northwestern University
Ursula Martin	University of Oxford
Bartosz Naskręcki	Adam Mickiewicz University Warsaw University of Technology
Rodrigo Ochigame	Leiden University
Jim Portegies	Eindhoven University of Technology
Johannes Schmitt	ETH Zurich

Inspiration

- Uppsala Code of Ethics for Scientists
- San Francisco Declaration of Research Assessment
- UNESCO Recommendation on Open Science
- UK Universal Ethical Code for Scientists
- IMU Committee on Publishing
- SIAM AI task force
- AMS

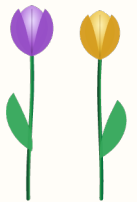


Values

1. High degree of certainty in results:
Supports scientific integrity.
2. Giving credit where credit is due, taking responsibility for correctness, merit-based standards
3. Transparency and accessibility of methods and results
4. Proper evaluation of work
5. Autonomy as key strength of mathematics

On top of these:

Duty of care for other people and our environment

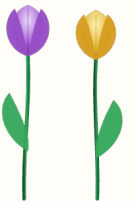


Threats

1. Flooding of publication system with unreliable results
2. Problems with credit, attribution and responsibility
3. Dependency on proprietary AI systems – increase in inequality
4. Overhyping of results, no insight in methods, misplaced trust
5. Further loss of autonomy: Big Tech determining research agenda

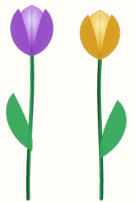
On top of these:

Entanglement of mathematicians' work for use in technology that can be applied for warfare, mass surveillance, political disruption, and for which the environmental impact can be enormous.



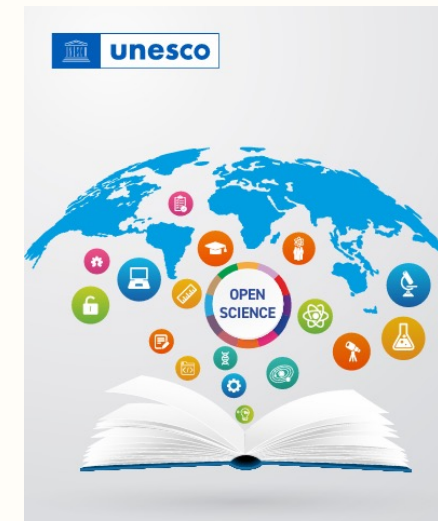
Recommendations for individual mathematicians

1. Disclose tool use
2. Support the needs of reviewing
3. Adhere to principles of open science
4. Retain the responsibility for correctness
5. Affirm the humanity of authorship
6. Put effort into proper attribution
7. Participate in public discourse
8. Stay informed about the emerging technologies
9. Welcome new contributors
10. Consider carefully which tools to use
11. Evaluate the ethical consequences of your work and take action accordingly



Recommendations for individuals: Open Science

1. Disclose tool use
2. Support the needs of reviewing
3. Adhere to principles of open science



UNESCO Recommendation
on Open Science

www.nature.com/scientificdata

SCIENTIFIC DATA

Amended: Addendum

OPEN

SUBJECT CATEGORIES
» Research data
» Publication
characteristics

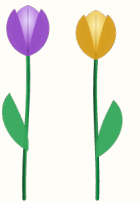
**Comment: The FAIR Guiding
Principles for scientific data
management and stewardship**

Mark D. Wilkinson *et al.*^a

There is an urgent need to improve the infrastructure supporting the reuse of scholarly data. A diverse set of stakeholders—representing academia, industry, funding agencies, and scholarly publishers—have

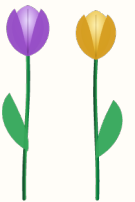
Recommendations for individuals: Humanity of mathematics

4. Retain the responsibility for correctness
5. Affirm the humanity of authorship
6. Put effort into proper attribution



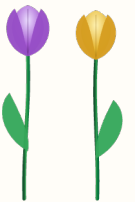
Recommendations for individuals: Interactions with others

7. Participate in public discourse
8. Stay informed about the emerging technologies
9. Welcome new contributors



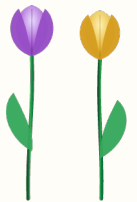
Recommendations for individuals: Ethical considerations

10. Consider carefully which tools to use
11. Evaluate the ethical consequences of your work and take action accordingly



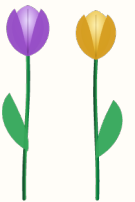
Recommendations for mathematical organizations and funders

1. Build expertise and plan strategically
2. Take the lead on policies for publishing and reviewing
3. Maintain standards of rigor
4. Protect the rights of authors
5. Insist on appropriate publication outlets
6. Support public research laboratories
7. Provide frameworks for collaboration
8. Align funding with values



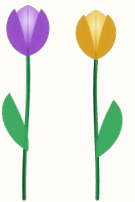
Recommendations for organizations: Planning and policy

1. Build expertise and plan strategically
2. Take the lead on policies for publishing and reviewing
3. Maintain standards of rigor
5. Insist on appropriate publication outlets



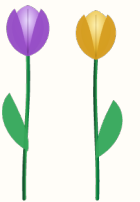
Recommendations for organizations: Support rights and autonomy

- 4. Protect the rights of authors
- 6. Support public research laboratories
- 7. Provide frameworks for collaboration



Recommendations for funders

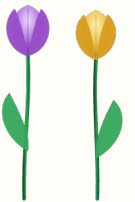
8. Align funding with values





We thus feel that there is an urgent need for a considered response from the mathematical community. The following constitute brief descriptions of actionable recommendations. We encourage professional organizations to endorse this Declaration, and to add provisions according to their own values, priorities, and governance.

“We encourage professional organizations to endorse this Declaration, and to add provisions according to their own values, priorities and governance.”



— NEWS · JULY 24, 2026

ICARM endorses the Leiden Declaration

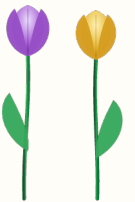
We endorse the Leiden Declaration as an important first step in helping the mathematics community grapple with the use of AI.

The [Institute for Computer-Aided Reasoning in Mathematics](#), one of seven [NSF Mathematical Sciences Research Institutes](#) in the United States, endorses the [Leiden Declaration on Artificial Intelligence and Mathematics](#).

The advent of AI raises serious concerns for mathematics and for society as a whole. In addition to the economic, environmental, social, cultural, and political effects, we should

Recommendations for policymakers in government and elsewhere

1. Protect the rights of authors
2. Don't believe the hype
3. Regulate the artificial intelligence industry
4. Invest in public computational infrastructure

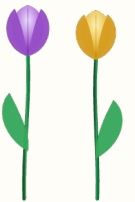


Request to commercial AI:

Adhere to values outlined in declaration

Endorsement by IMU

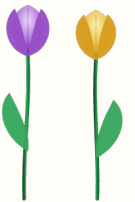
By endorsing the declaration, the IMU affirms that the future of mathematical research must be guided by human judgment, fair and transparent practices, and the shared values of the global mathematical community. Mathematics is, and should always remain, a profoundly human endeavour.



You can still sign the declaration



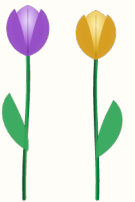
<https://leidendeclaration.ai>



conclusion



<https://leidendeclaration.ai>



This is not a conclusion

- Become involved!
- We need to act now,
individually, as a community,
together with others outside mathematics
- Bring discussion to your institute or department
- Help convert this to policy



<https://leidendeclaration.ai>

