The Future of Mathematics

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Carnegie Mellon University

November 13, 2026

“Mathematics underwent, in the nineteenth century, a transformation so profound that it is not too much to call it a second birth of the subject—its first birth having occurred among the ancient Greeks…”

Howard Stein, “Logos, Logic, and Logistiké: Some Philosophical Remarks on Nineteenth-Century Transformation of Mathematics”

“The report of my death was an exaggeration.”

Mark Twain

“May you live in interesting times.”

(traditional)

Overview

Advances in AI for mathematics over the last several months have been stunning.

I will discuss:

- AI for Mathematics
- Recent Events
- Mathematicians' Responses
- The Future of Mathematics
- Practical Recommendations

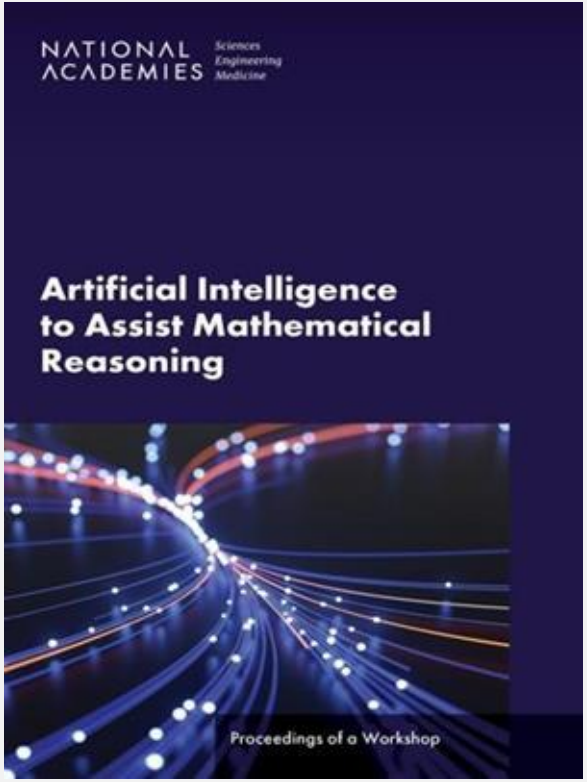
AI for Mathematics

AI for Mathematics

In 2023, a workshop by the National Academies for Science, Engineering, and Medicine explored the promise and challenges of AI for mathematics.

The NSF Institute for Computer-Aided Reasoning in Mathematics was launched in September 2025 to address the challenges.

Institute for Computer-Aided Reasoning in Mathematics

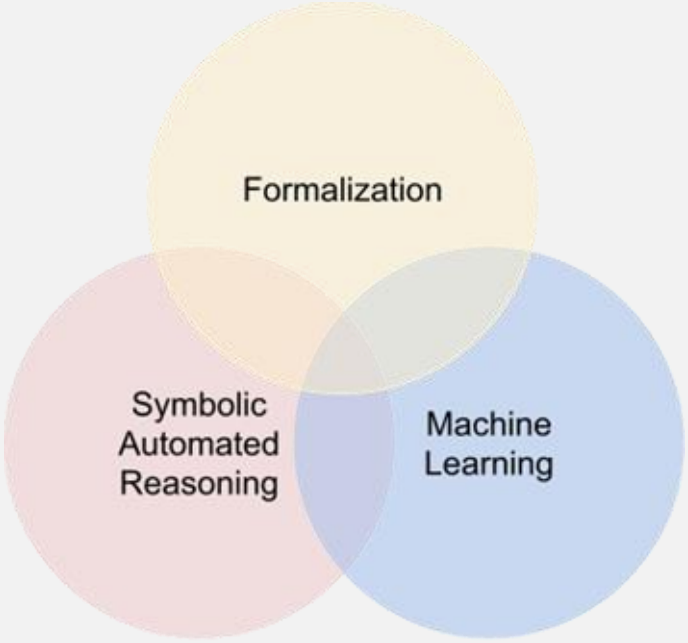


AI for Mathematics

We interpret the phrase broadly to include:

- interactive theorem proving and formalization
- automated reasoning and symbolic AI
- machine learning and neural AI

All three come together in neurosymbolic theorem proving.



AI for Mathematics

Formalization can be used to:

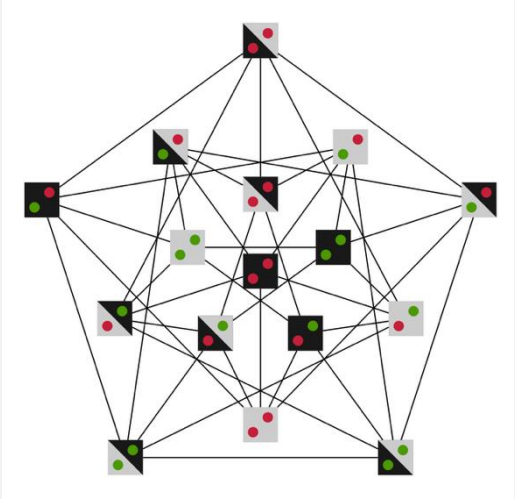
- verify correctness
- build reference libraries
- search for results
- support collaboration
- teach mathematics
- explore and discover new mathematics
- support uses of automated reasoning and AI

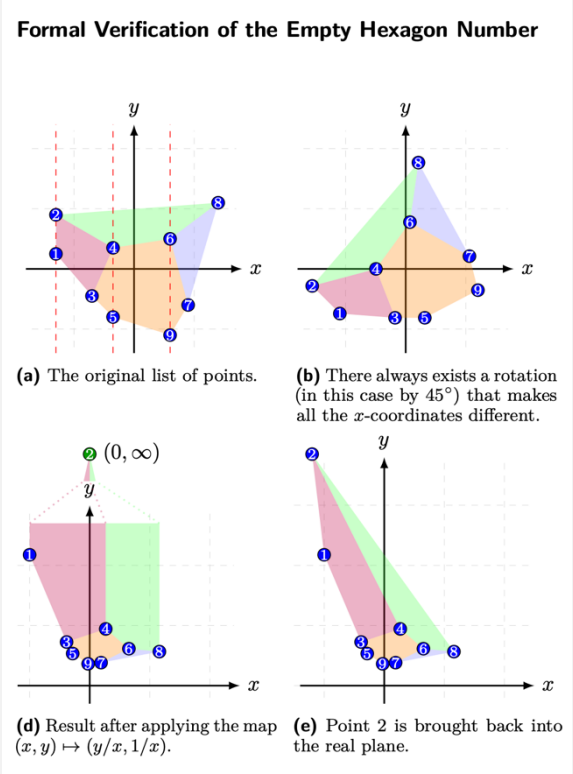
```
theorem riesz_lemma {F : Subspace 𝕜 E} (hFc : IsClo
    (hr : r < 1) : ∃ x₀ : E, x₀ ∉ F ∧ ∀ y ∈ F, r *
  classical
    obtain ⟨x, hx⟩ : ∃ x : E, x ∉ F := hF
    let d := Metric.infDist x F
    have hFn : (F : Set E).Nonempty := ⟨_, F.zero_m
    have hdp : 0 < d :=
      lt_of_le_of_ne Metric.infDist_nonneg fun heq
        hx ((hFc.mem_iff_infDist_zero hFn).2 heq.sy
    let r' := max r 2⁻¹
    have hr' : r' < 1 := by
      simp only [r', max_lt_iff, hr, true_and]
      norm_num
    have hlt : 0 < r' := lt_of_lt_of_le (by simp) (
    have hdlt : d < d / r' := (lt_div_iff₀ hlt).mpr
    obtain ⟨y₀, hy₀F, hxy₀⟩ : ∃ y ∈ F, dist x y < d
    have x_ne_y₀ : x - y₀ ∉ F := by
      by_contra h
      have : x - y₀ + y₀ ∈ F := F.add_mem h hy₀F
      simp only [neg_add_cancel_right, sub_eq_add_n
      exact hx this
    refine ⟨x - y₀, x_ne_y₀, fun y hy => le_of_lt ?
    have hy₀y : y₀ + y ∈ F := F.add_mem hy₀F hy
```

AI for Mathematics

Symbolic methods include:

- SAT solvers
- First-order theorem provers
- Constraint solvers
- SMT solvers
- Computer-algebra systems

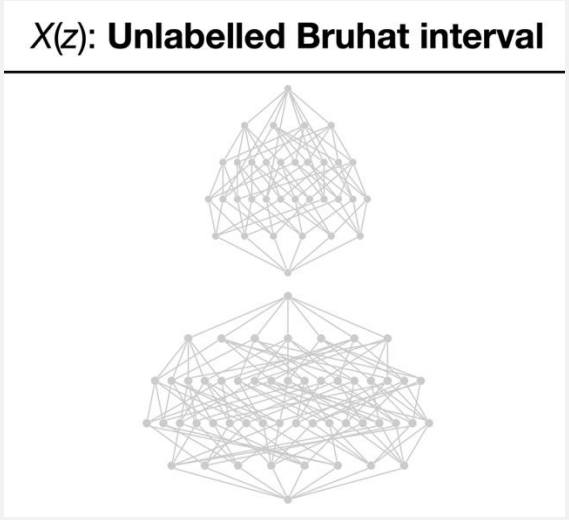


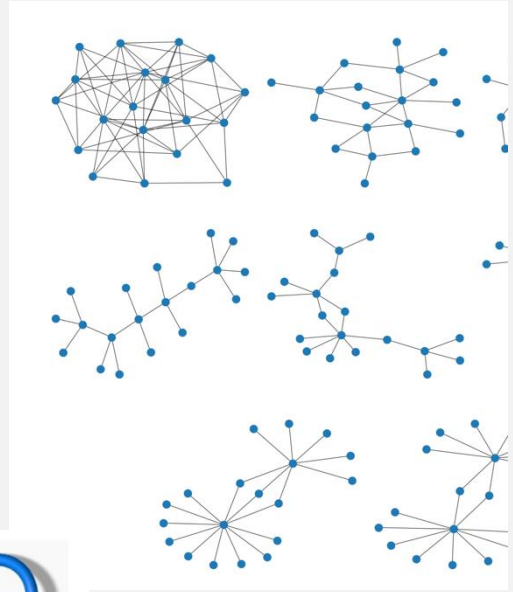


AI for Mathematics

Machine learning includes:

- Data mining and pattern detection
- Reinforcement learning
- Evolutionary search
- PINNs
- Use of coding agents
- Formal and informal proving agents





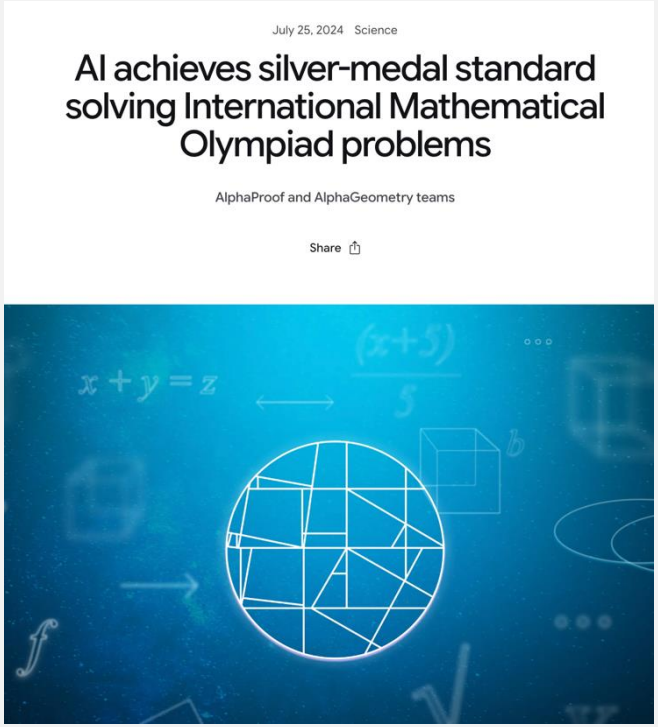


AI for Mathematics

Neurosymbolic theorem proving brings together LLMs, formalization, and symbolic automation.

One can ask for ordinary (informal) proofs, formal proofs, or both.

Google DeepMind's AlphaProof and AlphaGeometry performed at the level of a silver medalist on problems from the 2024 International Mathematics Olympiad.



Ancient History

As recently as last January, I said the following in talks:

- AI has not had a substantial impact on mathematics.
- Nonetheless, there have been some striking results.
- These show that the technology is promising.
- AI will have an impact on mathematics in the long term.
- Mathematicians should learn about the technologies and play a role in their development.

Moral: Be careful what you ask for.

What Has Happened Since Then

In a nutshell:

- AI suddenly became very good at proving theorems, both formally and informally.
- Mathematicians' daily practice is being disrupted.
- ArXiv and journals are being overwhelmed by AI-generated content.
- Students and early-career researchers especially are uncertain what to do.
- Everyone is anxious.
- The popular media reinforces the view that AI is an existential threat to the profession.
- Even colleagues in the sciences seem to think so.
- Other important applications of AI to mathematics are being eclipsed.

My Views

- Mathematics is essential for using AI well and safely, for ensuring that results from AI are aligned with our goals, and for us to retain agency over our actions and decisions.
- It will require care and effort, but we will survive the disruptions.
- Mathematics will continue to thrive.

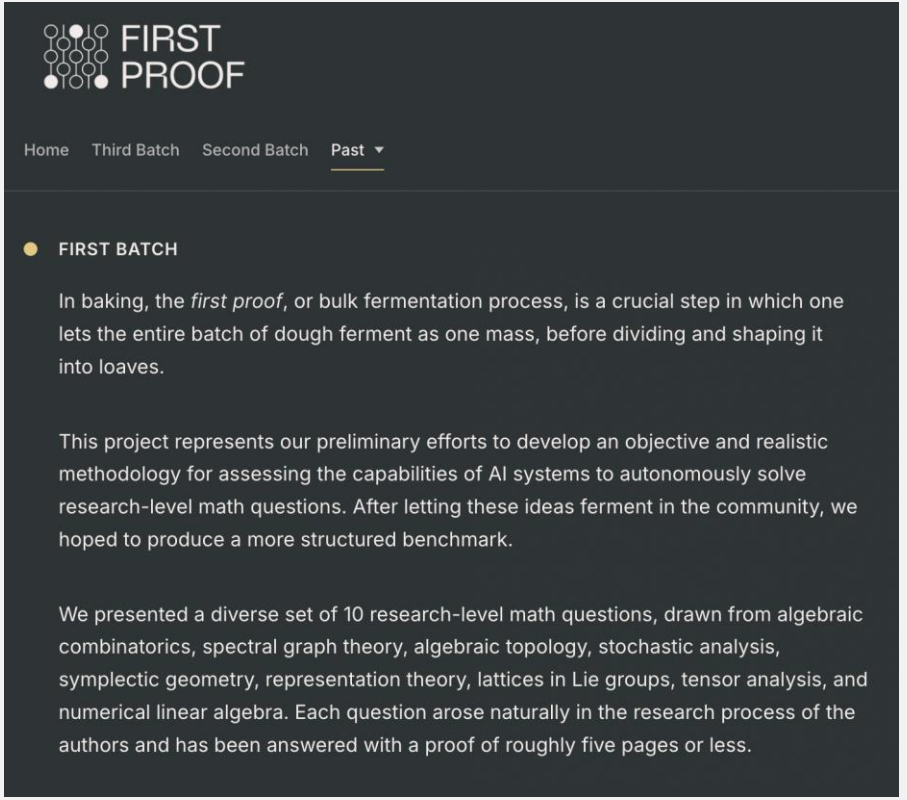
Goal of this talk: justify the optimism.

Recent Events

Recent Events

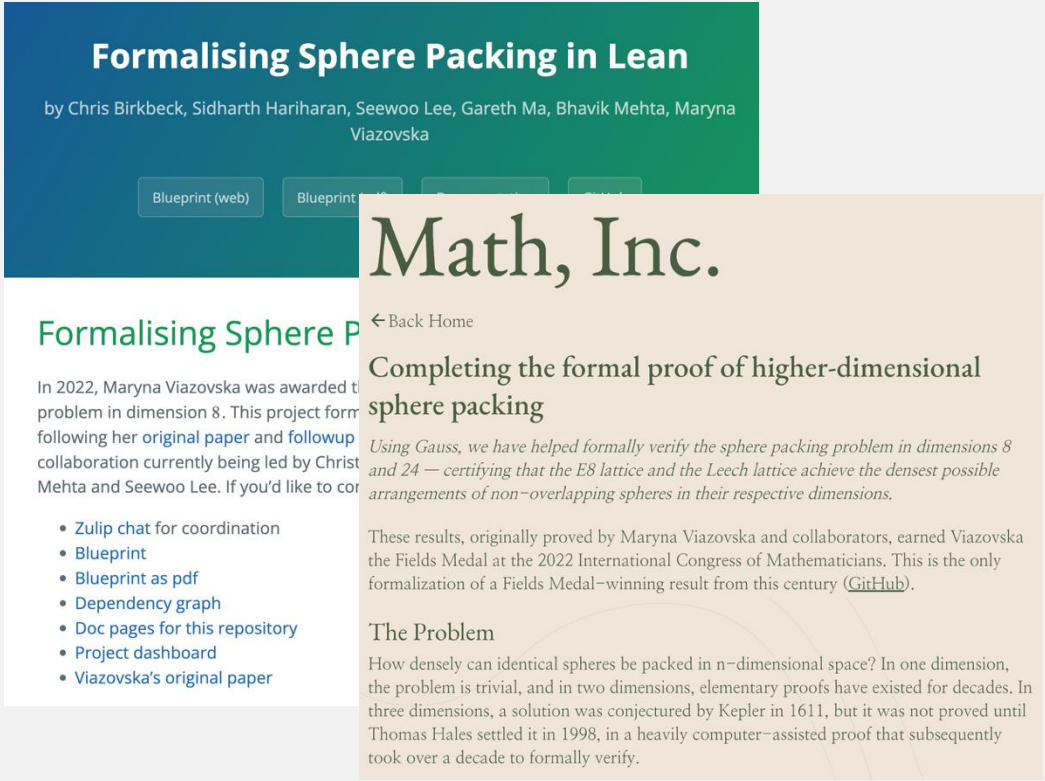
On February 5, 2026, eleven mathematicians posed benchmark research problems as part of the *First Proof* project.

By the time the solutions were posted on February 13, Google DeepMind and OpenAI had claimed surprisingly good performance using internal models.



Recent Events

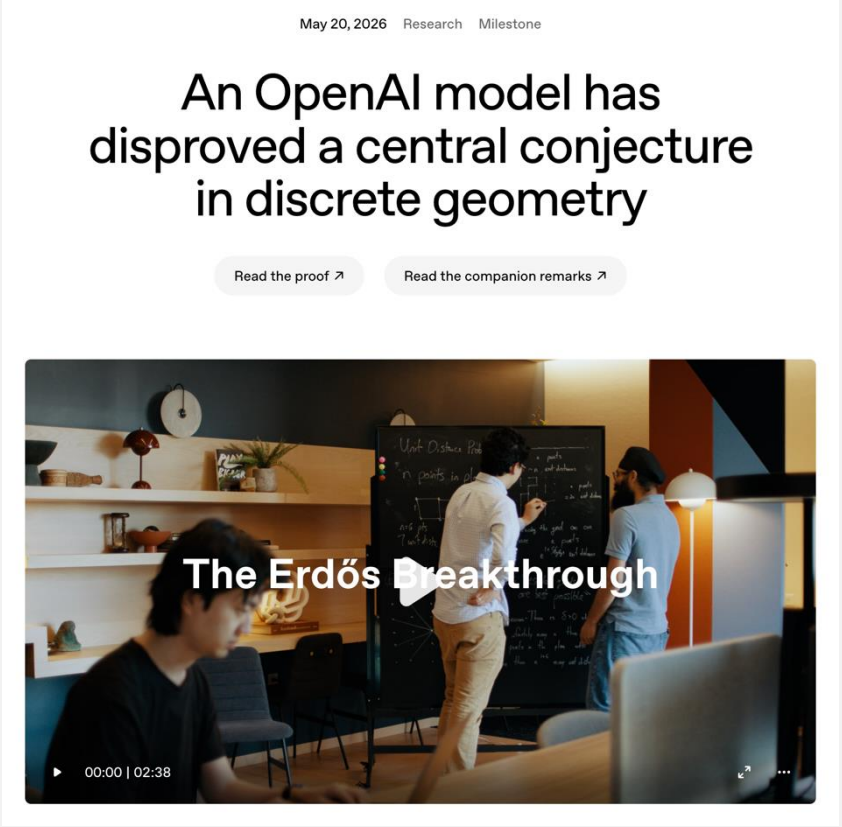
On February 23, an AI startup, Math Inc., announced that its proprietary proving agent had completed the formalization of a proof of the optimality of the E_8 sphere packing, building on a blueprint, library, and partial formalization by Hariharan et al.



Recent Events

On May 20, OpenAI announced that an internal model had disproved the Unit Distance Conjecture, settling a longstanding problem in combinatorics.

The proof was subsequently formalized in Lean, again using AI.

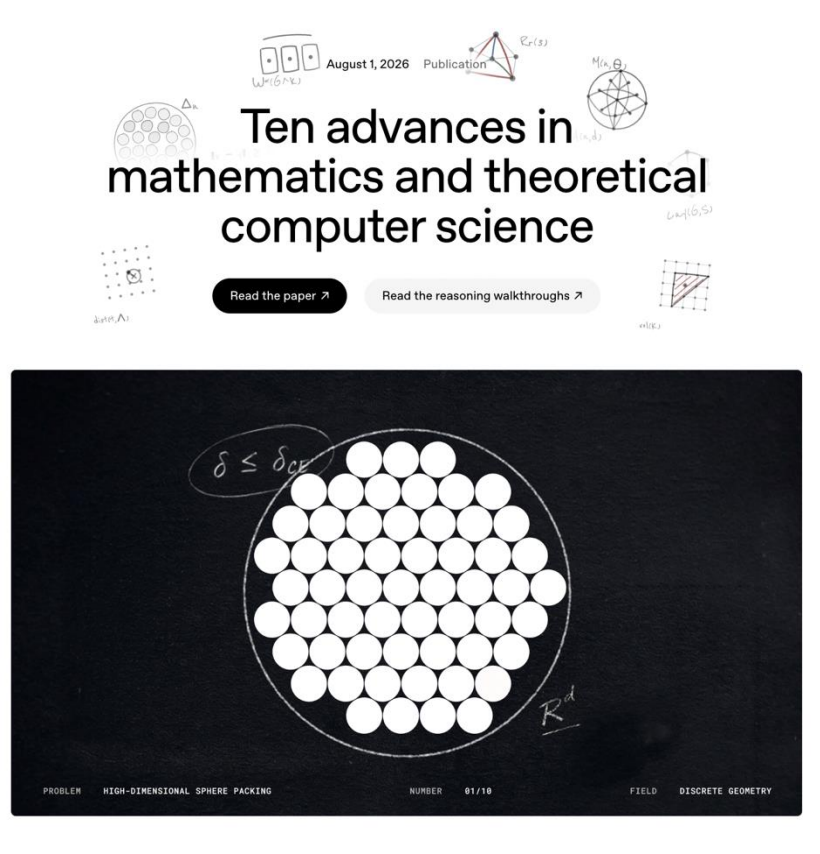


Recent Events

More AI-generated results appeared, including

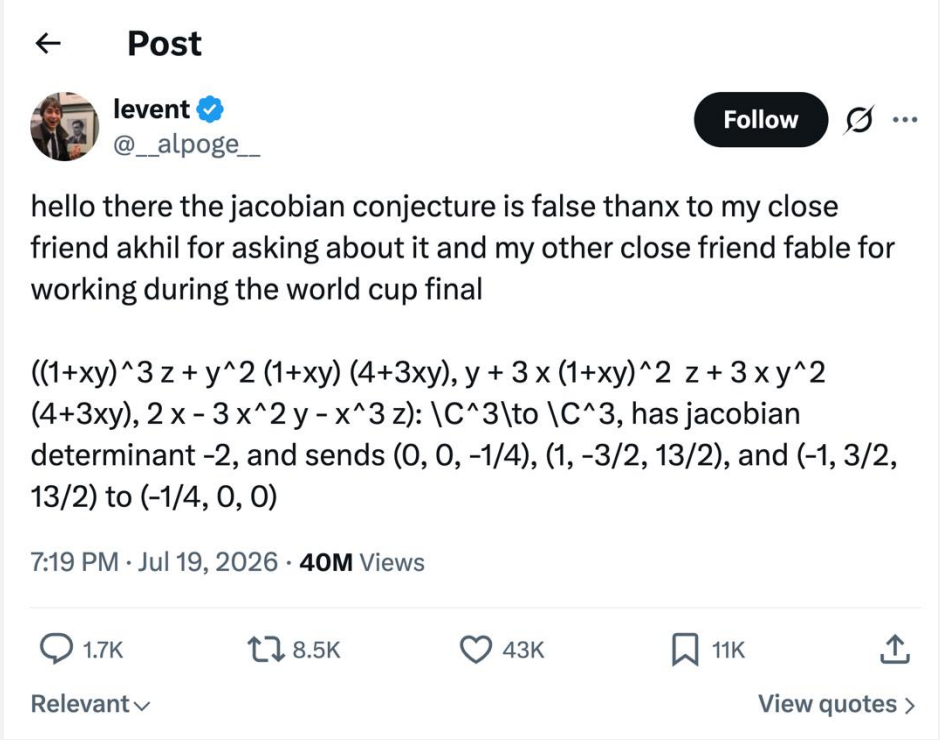
- resolutions of Gromov's conjecture on sofic groups,
- the Jacobian conjecture in three or more dimensions,
- and the Hopf conjecture on complex structures on S^6,

more often than not, accompanied by Lean formalizations.



Recent Events

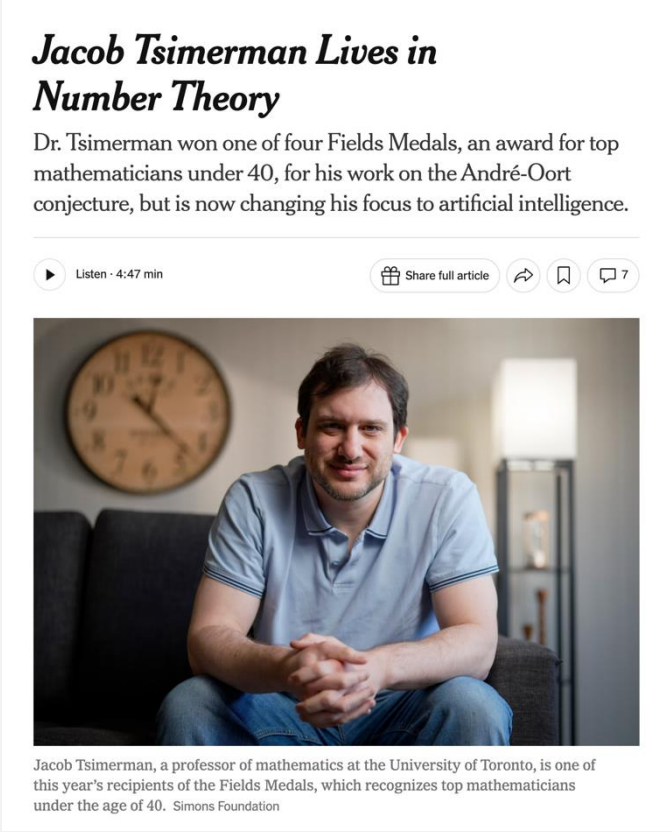
On July 19, Anthropic's Fable disproved the Jacobian Conjecture for three dimensions and higher, during the World Cup final.



Recent Events

On July 23, Jacob Tsimerman was one of four mathematicians to be awarded a Fields Medal at this year's International Congress of Mathematicians.

The same day, the New York Times announced that he was leaving mathematics to work on AI safety.



Jacob Tsimerman Lives in Number Theory

Dr. Tsimerman won one of four Fields Medals, an award for top mathematicians under 40, for his work on the André-Oort conjecture, but is now changing his focus to artificial intelligence.

Listen · 4:47 min

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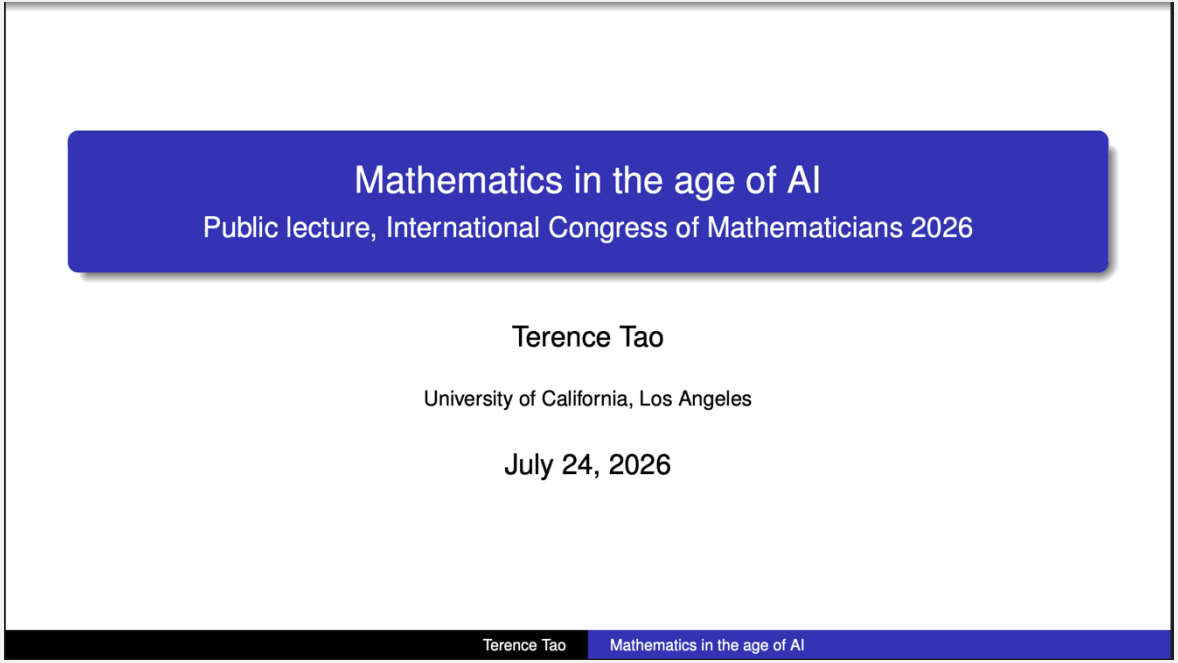
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Jacob Tsimerman, a professor of mathematics at the University of Toronto, is one of this year's recipients of the Fields Medals, which recognizes top mathematicians under the age of 40. Simons Foundation

Recent Events

The next day, Terence Tao gave a plenary lecture, “Mathematics in the Age of AI.”

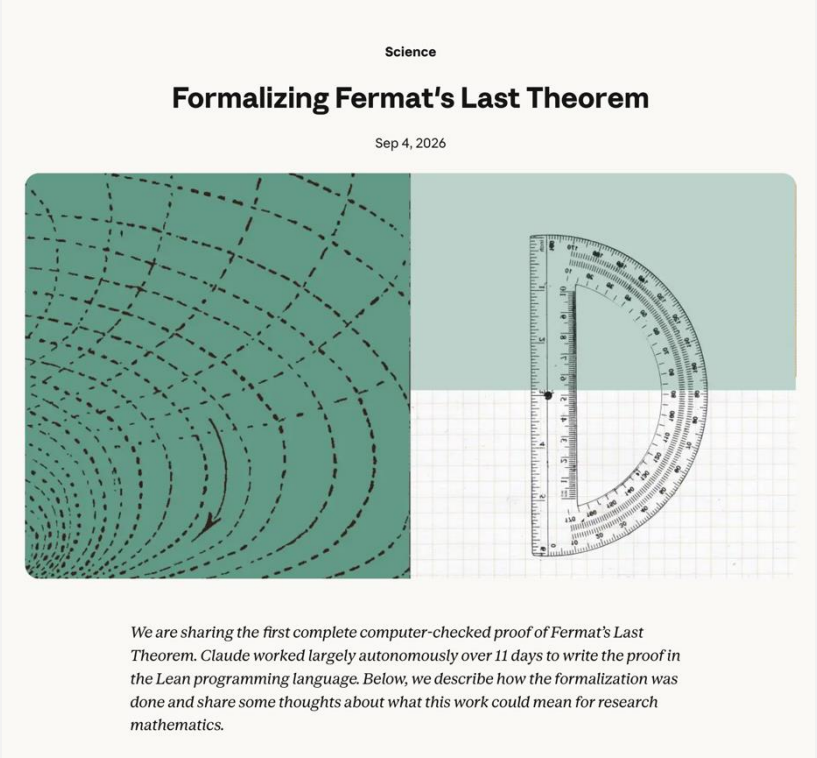
There was a panel on the topic one day later, moderated by Emily Riehl.



Recent Events

On September 4, Anthropic announced that Claude had formalized a proof of Fermat's Last Theorem over a period of 11 days.

Kevin Buzzard's project to formalize it (taking some background theorems as axioms) is still ongoing.



Science

Formalizing Fermat's Last Theorem

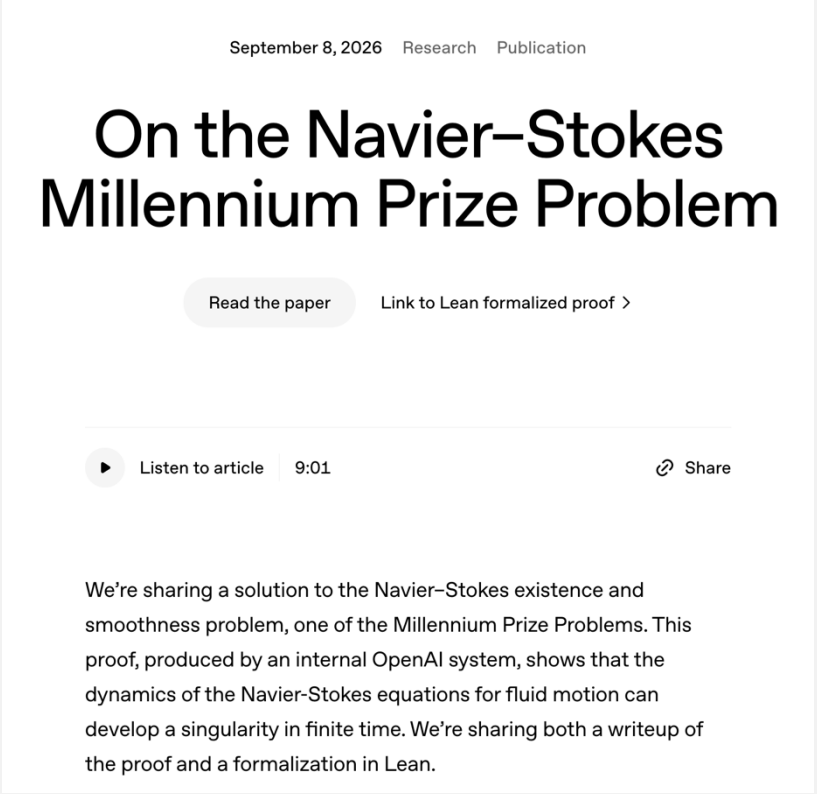
Sep 4, 2026

We are sharing the first complete computer-checked proof of Fermat's Last Theorem. Claude worked largely autonomously over 11 days to write the proof in the Lean programming language. Below, we describe how the formalization was done and share some thoughts about what this work could mean for research mathematics.

Recent Events

On September 8, OpenAI constructed a solution to the Navier-Stokes equations that exhibits finite-time blowup.

This (apparently) solves a Clay Millenium Prize problem.



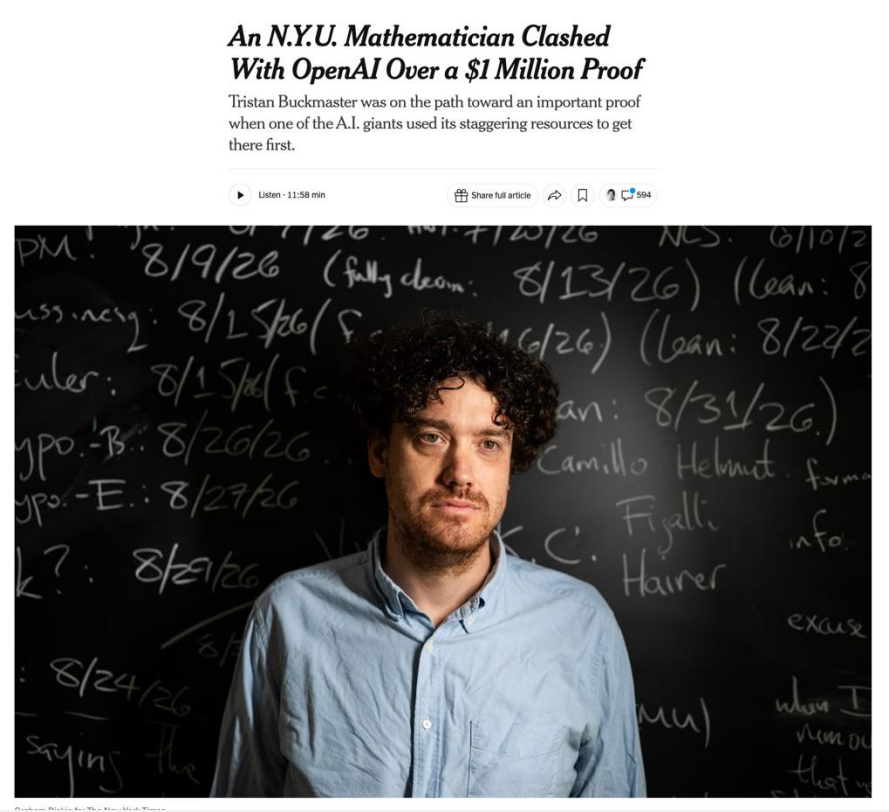
Recent Events

Tristan Buckmaster, an expert in PDEs, had been making steady progress using the same strategy.

He worked with Levent Alpöge (Anthropic) and various AI models.

The incident raised several concerns.

Buckmaster was careful to credit Diego Córdoba and Luis Martínez-Zoroa for the strategy.

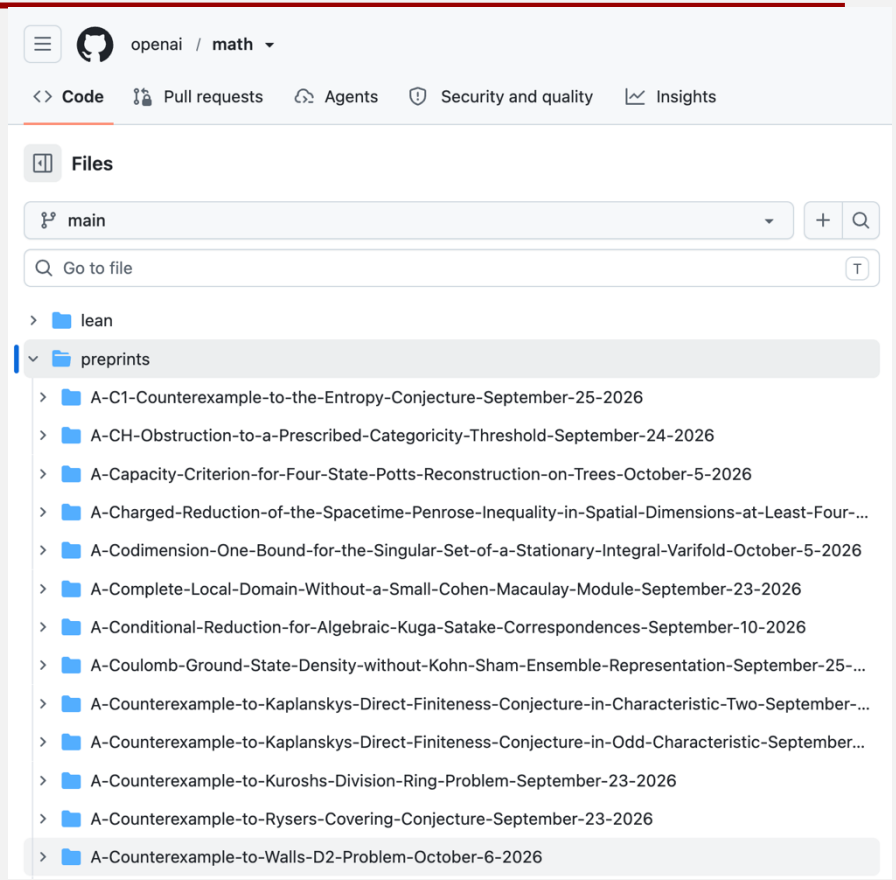


Recent Events

On October 6, Open AI released a repository with 722 manuscripts for 372 problems, 235 of which have a Lean formalization (possibly partial).

Claimed results include

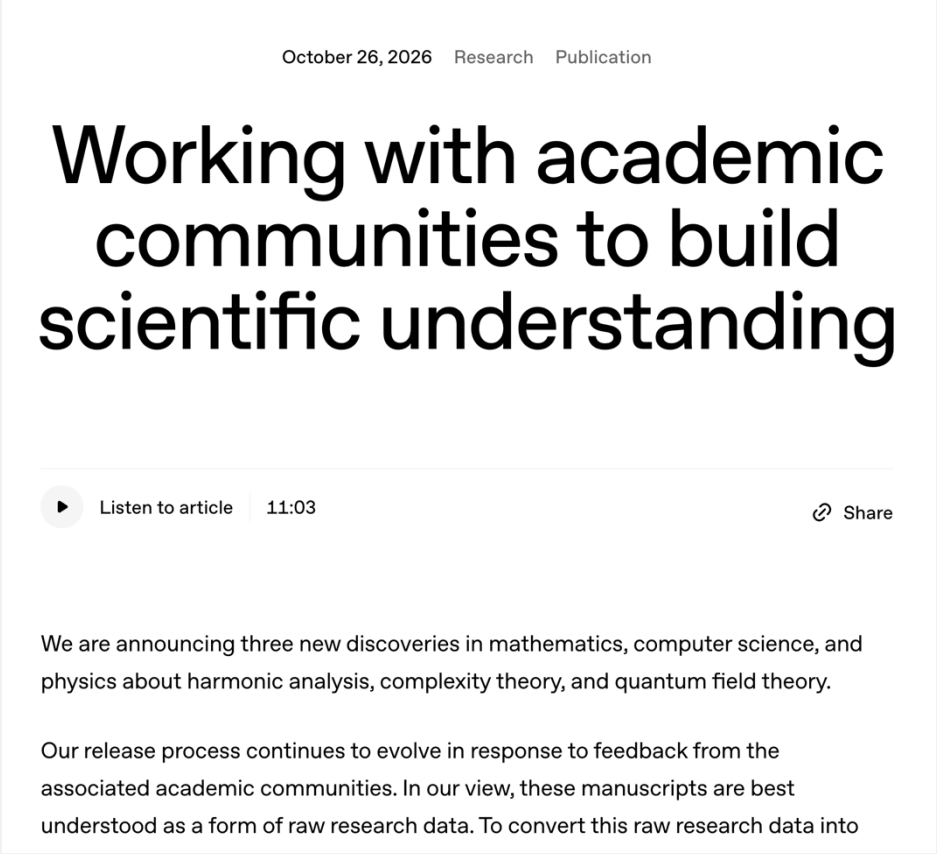
- the quasi-Riemann hypothesis,
- Hilbert's tenth problem over $\mathbb{Q}$, and
- Rokhlin's problem on multiple mixing.



Recent Events

On October 26, they released results on

- the Kakeya Conjecture,
- the Exponential Time Hypothesis, and
- Yang-Mills Theory.



Recent Events

On October 26, Axiom announced a formalization of the classification of finite simple groups in Lean.

On November 6, they announced a formalization of the Stacks project.

October 26, 2026 by Axiom

Formalizing the Enormous Theorem

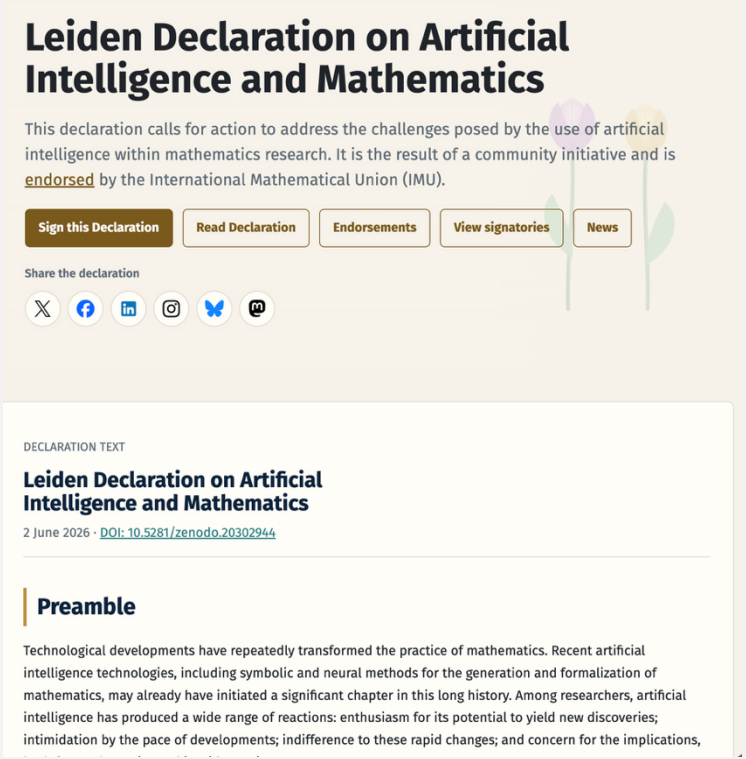
Axiom has formalized in Lean the classification of finite simple groups, the longest proof in the history of mathematics.



Mathematicians' Responses

Recent Events

On June 2, a group of authors released the Leiden Declaration, building on discussions from a meeting on the Mechanization and Mathematical Research at the Lorentz Center in September 2025.



Leiden Declaration on Artificial Intelligence and Mathematics

This declaration calls for action to address the challenges posed by the use of artificial intelligence within mathematics research. It is the result of a community initiative and is endorsed by the International Mathematical Union (IMU).

Sign this Declaration | Read Declaration | Endorsements | View signatories | News

Share the declaration

DECLARATION TEXT

Leiden Declaration on Artificial Intelligence and Mathematics

2 June 2026 · DOI: 10.5281/zenodo.20302944

Preamble

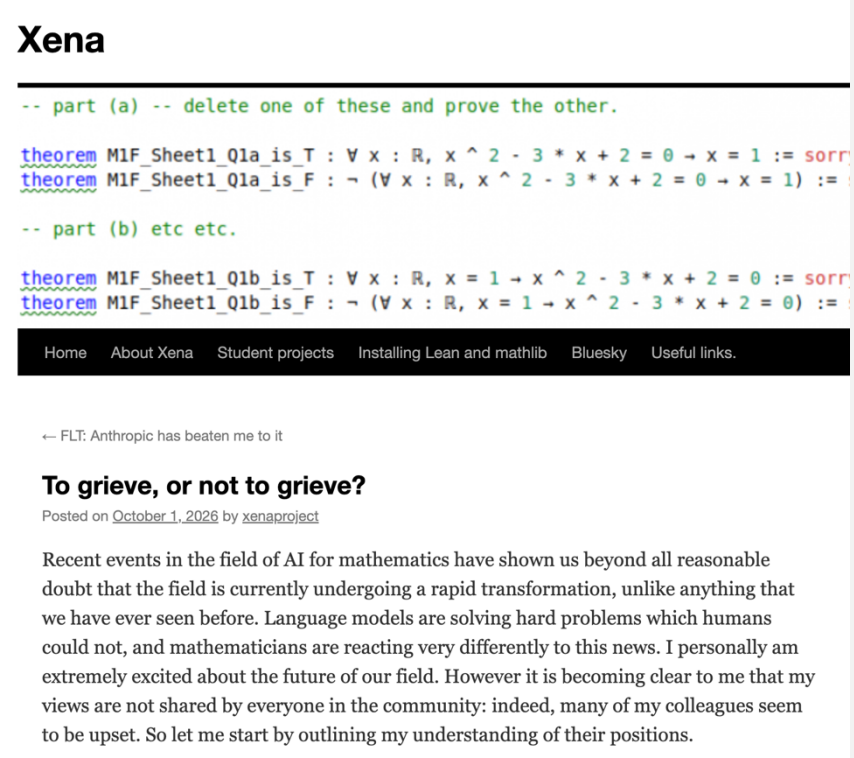
Technological developments have repeatedly transformed the practice of mathematics. Recent artificial intelligence technologies, including symbolic and neural methods for the generation and formalization of mathematics, may already have initiated a significant chapter in this long history. Among researchers, artificial intelligence has produced a wide range of reactions: enthusiasm for its potential to yield new discoveries; intimidation by the pace of developments; indifference to these rapid changes; and concern for the implications,

Recent Events

On October 1, Kevin Buzzard analyzed reactions to AI in terms of the five stages of grief.

Still, there are also glimmers of optimism and enthusiasm.

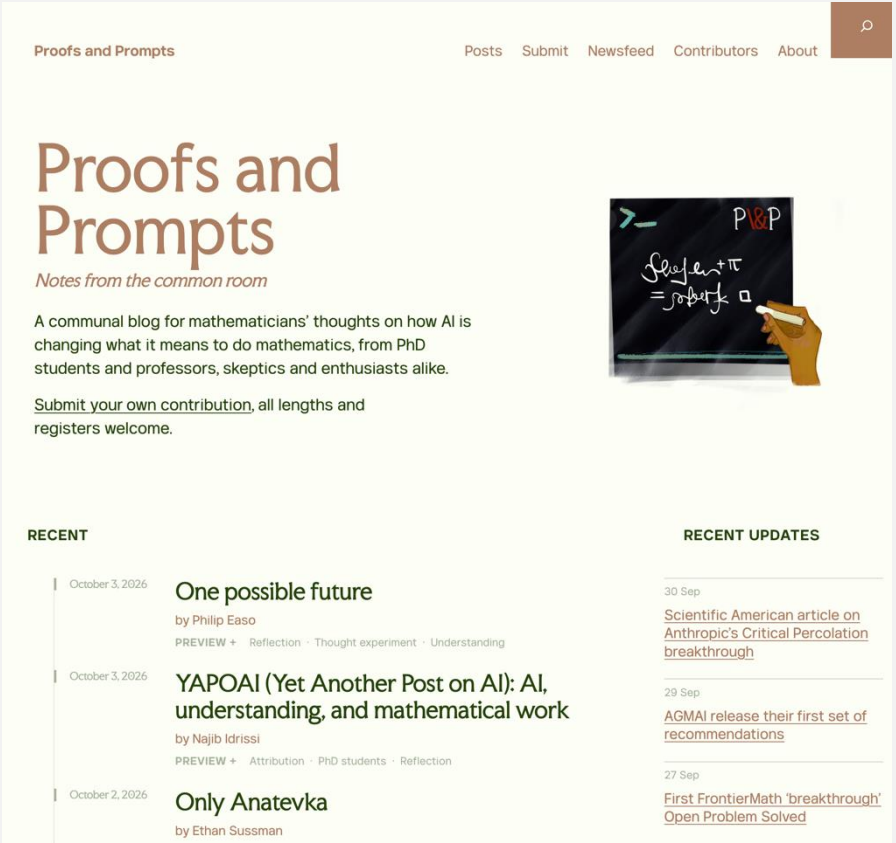
Nobody seems to doubt that this is a watershed moment for mathematics.



Mathematicians' Responses

Proofs and Prompts was launched in August as "communal blog for mathematicians' thoughts on how AI is changing what it means to do mathematics, from PhD students and professors, skeptics and enthusiasts alike."

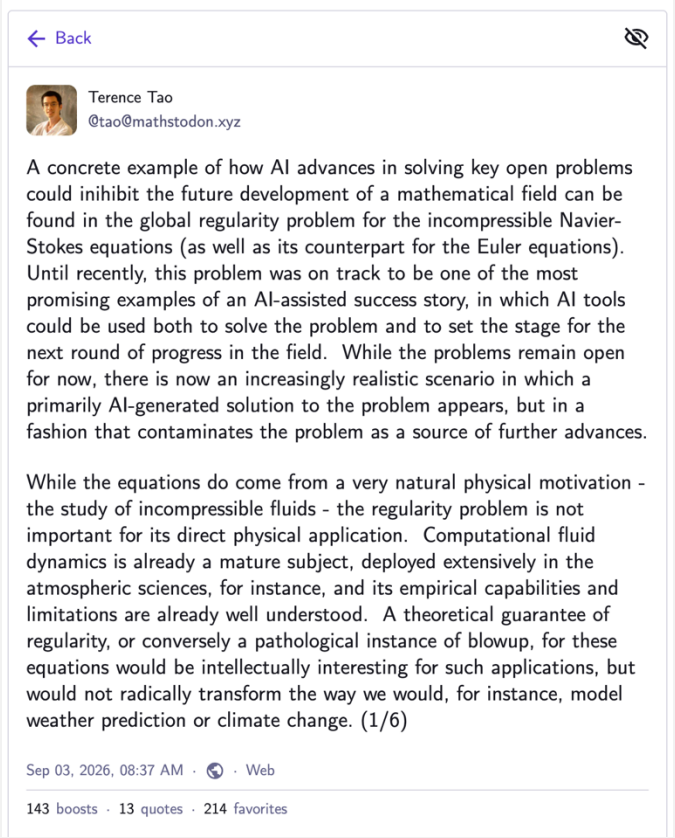
As of November 12, there have been 179 posts.



Mathematicians' Responses

A few days before the OpenAI announcement, Terence Tao provided context on Mathstadon.

He also noted that the lessons learned along the way are more important that the solution itself, and that AI-generated solutions disincentivizes exploration.



Back

Terence Tao
@tao@mathstodon.xyz

A concrete example of how AI advances in solving key open problems could inihibit the future development of a mathematical field can be found in the global regularity problem for the incompressible Navier-Stokes equations (as well as its counterpart for the Euler equations). Until recently, this problem was on track to be one of the most promising examples of an AI-assisted success story, in which AI tools could be used both to solve the problem and to set the stage for the next round of progress in the field. While the problems remain open for now, there is now an increasingly realistic scenario in which a primarily AI-generated solution to the problem appears, but in a fashion that contaminates the problem as a source of further advances.

While the equations do come from a very natural physical motivation - the study of incompressible fluids - the regularity problem is not important for its direct physical application. Computational fluid dynamics is already a mature subject, deployed extensively in the atmospheric sciences, for instance, and its empirical capabilities and limitations are already well understood. A theoretical guarantee of regularity, or conversely a pathological instance of blowup, for these equations would be intellectually interesting for such applications, but would not radically transform the way we would, for instance, model weather prediction or climate change. (1/6)

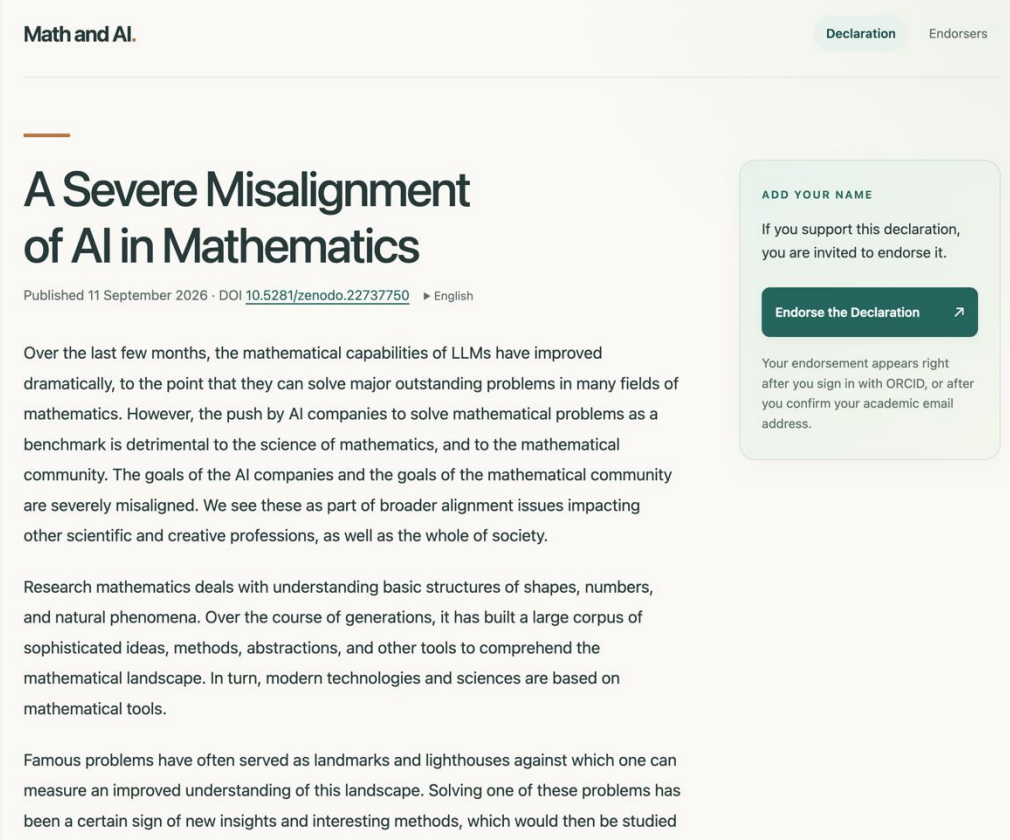
Sep 03, 2026, 08:37 AM · · Web

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Mathematicians' Responses

On September 11, 25 Fields Medalists issued a statement warning of a "severe misalignment of AI in mathematics."

More than 8,000 people have endorsed it to date.



Math and AI.

Declaration Endorsers

A Severe Misalignment of AI in Mathematics

Published 11 September 2026 · DOI 10.5281/zenodo.22737750 ▸ English

Over the last few months, the mathematical capabilities of LLMs have improved dramatically, to the point that they can solve major outstanding problems in many fields of mathematics. However, the push by AI companies to solve mathematical problems as a benchmark is detrimental to the science of mathematics, and to the mathematical community. The goals of the AI companies and the goals of the mathematical community are severely misaligned. We see these as part of broader alignment issues impacting other scientific and creative professions, as well as the whole of society.

Research mathematics deals with understanding basic structures of shapes, numbers, and natural phenomena. Over the course of generations, it has built a large corpus of sophisticated ideas, methods, abstractions, and other tools to comprehend the mathematical landscape. In turn, modern technologies and sciences are based on mathematical tools.

Famous problems have often served as landmarks and lighthouses against which one can measure an improved understanding of this landscape. Solving one of these problems has been a certain sign of new insights and interesting methods, which would then be studied

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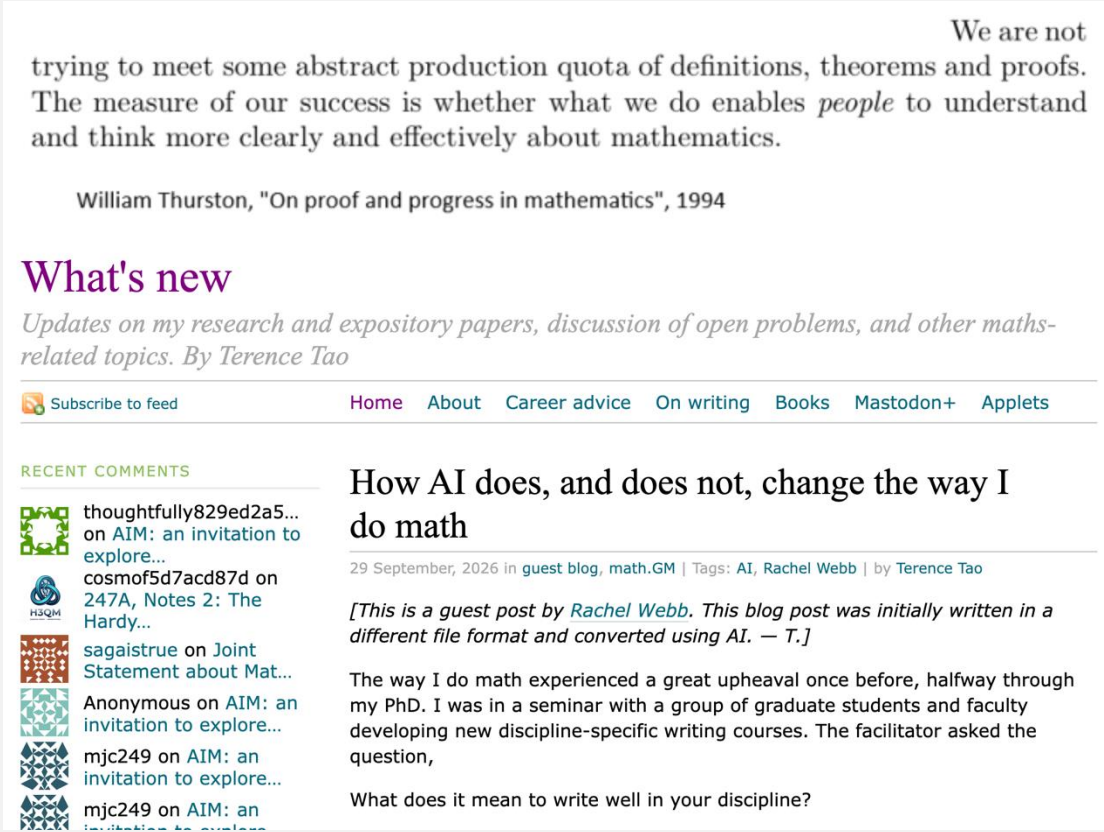
If you support this declaration, you are invited to endorse it.

Endorse the Declaration ↗

Your endorsement appears right after you sign in with ORCID, or after you confirm your academic email address.

Mathematicians' Responses

Tao has shared several guest posts on his blog.



We are not trying to meet some abstract production quota of definitions, theorems and proofs. The measure of our success is whether what we do enables *people* to understand and think more clearly and effectively about mathematics.

William Thurston, "On proof and progress in mathematics", 1994

What's new

Updates on my research and expository papers, discussion of open problems, and other maths-related topics. By Terence Tao

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How AI does, and does not, change the way I do math

29 September, 2026 in guest blog, math.GM | Tags: AI, Rachel Webb | by Terence Tao

[This is a guest post by Rachel Webb. This blog post was initially written in a different file format and converted using AI. — T.]

The way I do math experienced a great upheaval once before, halfway through my PhD. I was in a seminar with a group of graduate students and faculty developing new discipline-specific writing courses. The facilitator asked the question,

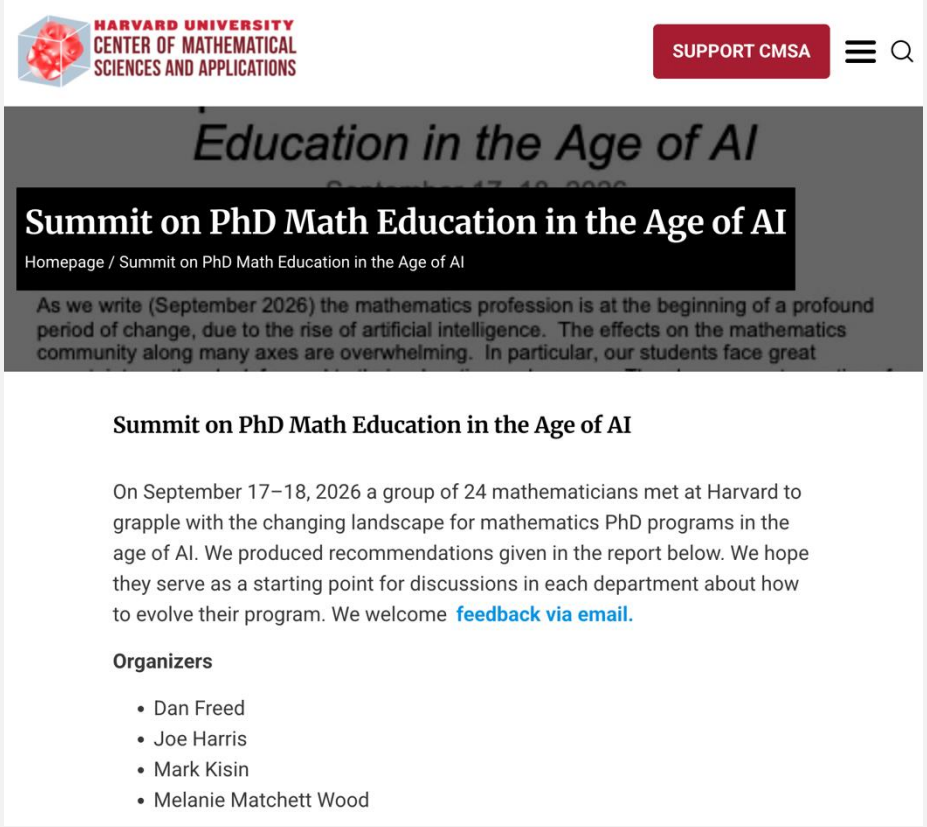
What does it mean to write well in your discipline?

Mathematicians' Responses

On September 17-18, Harvard's CMSA hosted a Summit on PhD Math Education in the Age of AI.

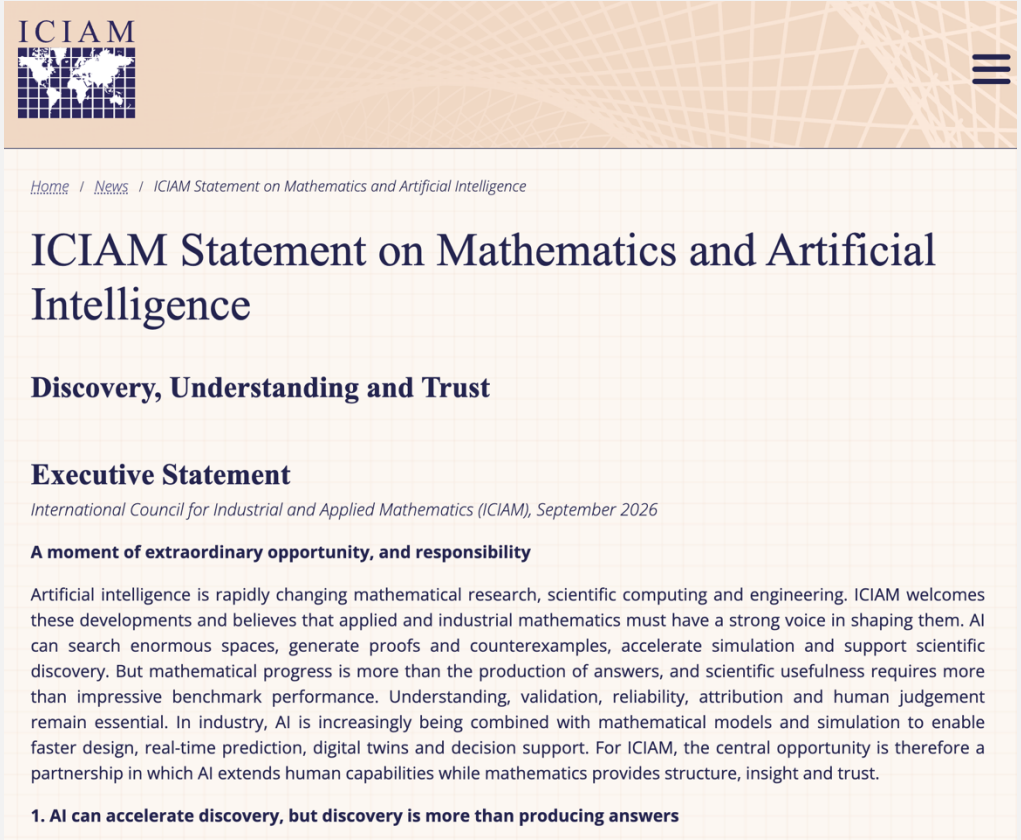
A week later, the group of 24 mathematicians produced an 8-page report with recommendations.

A month later, the CMSA hosted a Summit on the Math Research in the Age of AI.



Mathematicians' Responses

Mathematics Departments, Journal Editorial Boards, and Professional Societies have held emergency meetings, instituted policies, and issued statements.



ICIAM

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ICIAM Statement on Mathematics and Artificial Intelligence

Discovery, Understanding and Trust

Executive Statement

International Council for Industrial and Applied Mathematics (ICIAM), September 2026

A moment of extraordinary opportunity, and responsibility

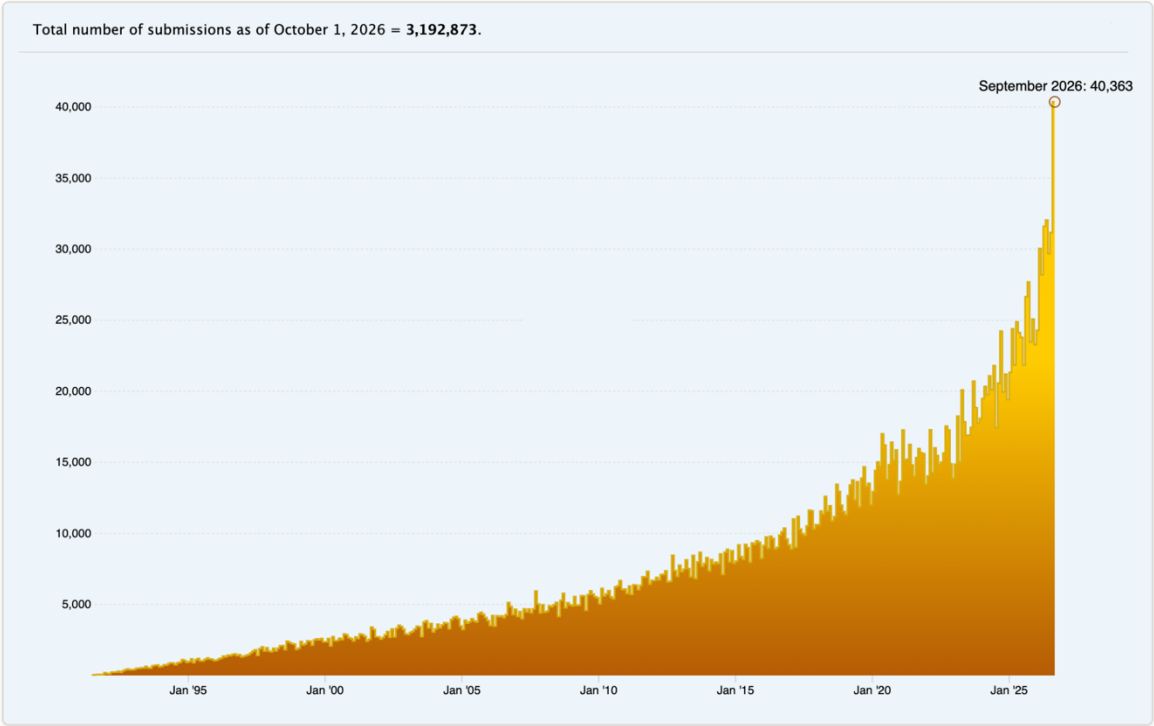
Artificial intelligence is rapidly changing mathematical research, scientific computing and engineering. ICIAM welcomes these developments and believes that applied and industrial mathematics must have a strong voice in shaping them. AI can search enormous spaces, generate proofs and counterexamples, accelerate simulation and support scientific discovery. But mathematical progress is more than the production of answers, and scientific usefulness requires more than impressive benchmark performance. Understanding, validation, reliability, attribution and human judgement remain essential. In industry, AI is increasingly being combined with mathematical models and simulation to enable faster design, real-time prediction, digital twins and decision support. For ICIAM, the central opportunity is therefore a partnership in which AI extends human capabilities while mathematics provides structure, insight and trust.

1. AI can accelerate discovery, but discovery is more than producing answers

Mathematicians' Responses

An increasing percentage of arXiv submissions in mathematics report substantial use of AI.

arXiv imposed a two-paper per month rate limit.



arXiv submission rates have steadily increased since our founding in 1991. In September, arXiv received 40,363 submissions in a single month – a new record.

Mathematicians' Responses

Some essays I have written:

- "Varieties of Mathematical Understanding," Bulletin of the AMS, 2022
- "Is Mathematics Obsolete?" arXiv, 2025
- "Mathematicians in the Age of AI," arxiv, 2026
- "What is Mathematics Now, and What Should it Be," blog post, 2026, to appear in the *Notices of the AMS*
- "The Future of Mathematics," blog post, 2026

I have also given talks, served on panels, and appeared (and will appear) in podcasts.

Mathematicians' Responses

In 2024, in the Bulletin of the AMS, Akshay Venkatesh published "Some Thoughts on Automation and Mathematical Research," stemming from talks in 2021.

"Our starting point is to imagine that $\aleph(0)$ teaches itself high school and college mathematics and works its way through all of the exercises in the Springer-Verlag Graduate Texts in Mathematics series. The next morning, it is let loose upon the world—mathematicians download its children and run them with our own computing resources. What happens next—say, in the subsequent decade?"

Mathematicians' Responses

"We may comfort ourselves with the thought that, in reality, the premise is so far in the future that we need not think about it. But if we allow even a remote possibility that this might happen in twenty years—the timescale between commencing an undergraduate degree and obtaining tenure—it certainly merits us grappling with the possibilities. I suggest that:

- Human mathematics may go on as before in many respects, just as many other professions have adapted to automation. Indeed, the resulting mathematics will be inestimably more powerful than ours, in the sense that its ability to solve any specific question will be vastly greater.
- However, the resulting field will be greatly altered; its central questions and values will be very different from those to which we are accustomed, rendering it all but unrecognizable to us."

The Future of Mathematics

The Future

Immediate disruption:

- What should mathematics look like going forward?
- What does a working mathematician do on a day-to-day basis (especially students and early-career researchers)?
- How do we assess work (especially for students and early-career researchers)?
- How should we train our students?
- What should we tell our students?
- How much should we spend on AI subscriptions?
- How do we deal with the flood of journal submissions?

The Future

I will say something about those questions later.

The more general message is that mathematics will continue to thrive and will emerge even stronger than before.

I will try to justify my optimism.

The Future of Mathematics

5 October, 2026 in guest blog, math.HO, opinion | by Terence Tao

[This is a guest post by Jeremy Avigad. This blog post was initially written in a different file format and converted using AI. — T.]

"Mathematics underwent, in the nineteenth century, a transformation so profound that it is not too much to call it a second birth of the subject—its first birth having occurred among the ancient Greeks…"

Howard Stein, in "Logos, Logic, and Logistiké: Some Philosophical Remarks on Nineteenth-Century Transformation of Mathematics"

"The report of my death was an exaggeration."

Mark Twain

"May you live in interesting times."

(traditional)

I recently attended a meeting of innovative science and technology startups supported by Convergent Research, the organization that oversees the Lean FRO, a nonprofit that develops the Lean theorem prover. The meeting was designed to stimulate discussion, and when I introduced myself as a mathematician, many participants were eager to talk about the impact of recent events in AI on mathematics and reactions in the mathematics community. They were surprised to hear that I find the tone of the community responses on blogs like this one and Proofs and Prompts generally positive and encouraging, even though we all recognize that fundamental aspects of our day-to-day professional lives are bound to change. These discussions have helped me shape some of the thoughts I would like to share here.

The Future

A narrow view of what mathematicians do:

- we try to solve problems;
- when the hard problems are too hard to solve,
- we make up easier approximations,
- solve them,
- and then vary the parameters.

This is the practice that has been disrupted by the events of the last few months.

The Future

History offers a broader view: mathematics is a culture of rigorous reasoning and communication, providing us with language and abstractions that let us think and communicate more reliably and efficiently.

It is the exercise of capacities that are so fundamental to our survival as a species that they are wired into our DNA.

Mathematical thought isn’t going away any time soon.

The Future

The challenge: solving the kinds of problems we have been solving is decoupled from the goal of enhancing our mathematical understanding, given AI.

The question, therefore, isn't whether we still need mathematics, but rather how to pursue mathematical understanding in the age of AI.

I will provide three general answers.

Solve Harder Problems

There are two salient features of today's foundation models:

- they have seen the entire mathematical literature,
- they are tireless; a swarm of agents can make its way to a solution by trying countless variations.

The AI-generated solutions to open problems all have a similar character: they are problems that AI could solve by cobbling together available techniques.

(I am grateful to Matthew Ballard for this characterization, and the subsequent analysis.)

Solve Harder Problems

Can every interesting mathematical question be answered that way?

Probably not, and even questions that can may have more interesting and satisfying solutions that invoke novel ideas and insights.

Reinforcement-learning training regimes have systems chain conventional moves and learn, from a history of failures and successes, which ones are most promising in a given state.

Solve Harder Problems

The fact that the value of an action is graded solely in terms of the success of a final trajectory breeds superhuman cleverness but may miss creativity and higher-level strategizing.

In any case, there are still hard questions to be solved and ambitious research programs to pursue, and the possibility of making progress on them with the help of AI is exciting.

Think Bigger Thoughts

In 1853, the young Bernhard Riemann submitted three potential topics to his advisor, Carl Friedrich Gauss, to choose from for his Habilitationsvortrag, a lecture he was required to give to secure a teaching position at the University of Göttingen.

Gauss reportedly chose the topic for which Riemann was least prepared, to see what he would make of it.

Think Bigger Thoughts

The resulting lecture, “On the Hypotheses Which Lie at the Foundations of Geometry,” was published posthumously in 1868, and it revolutionized the field.

The lecture distinguished a space’s metric properties from its topological properties and introduced the general notion of a manifold, though the latter did not receive a fully rigorous treatment until the twentieth century.

Think Bigger Thoughts

The focus on intrinsic properties of a space—in Riemannian geometry, those determined by the metric and independent of embedding in a larger space—was key to Einstein's theory of general relativity decades later.

Riemannian geometry has had applications that Riemann himself could never have imagined, from robotics and medical imaging to statistical analysis.

From the point of reinforcement learning:

- The benefits of Riemann's decisions are diffuse and hard to isolate.
- The time horizon is huge.

Think Bigger Thoughts

Will AI eventually be able to make advances like these?

That’s not even the right question to ask.

We should care about AI only insofar as the results are interesting and important to us, and, at the end of the day, it’s up to us to decide what that means.

The values we assign to mathematical developments are embedded in our history and culture.

Think Bigger Thoughts

Imagine planning a trip to go backpacking in the Alaskan wilderness for exercise and recreation.

You might be happy to let AI help book your flight, but not to let AI take the hike for you and send you pictures.

In mathematics, what is at stake isn’t our recreation but agency over our reasoning and deliberation.

Think Bigger Thoughts

Whether or not AI can think, it can’t think for us.

We have our own lives to live; mathematics is our story to tell, and it’s up to us to decide how to tell it.

With AI, there’s even more to explore, and no shortage of avenues for discovery.

Try New Things

The technologies themselves raise new questions, and that we have a lot to learn about how to use them effectively.

Formal methods and machine learning techniques provide new opportunities, and people who use them to solve mathematical problems and discover new results should be seen as doing mathematics.

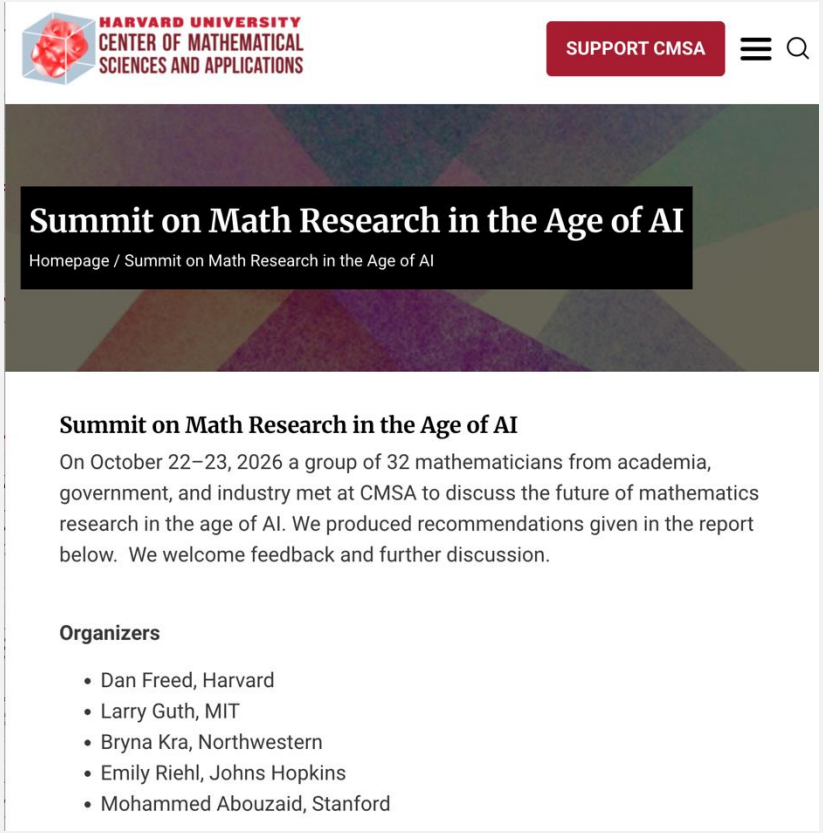
This requires mathematicians to give up fixed notions of what it means to do mathematics.

Practical Advice

Practical Advice

Three sources for recommendations:

- 3Blue1Brown: There's never been a better time to go into math
- Harvard CMSA Summit on PhD Math Education in the Age of AI
- Harvared CMSA Summit on Math Research in the Age of AI



Summit on PhD Math Education in the Age of AI

1. Programs should add new training opportunities to teach skills that are becoming increasingly relevant. These may include: collaboration, formulating questions, interdisciplinary work, use of AI tools, and formalization.
2. Skill in communication to both expert and broad audiences should be part of the training in a PhD program and an explicit degree expectation.
3. While homework can provide a useful way for students to learn course material, assessment should be based on in-person written or oral assessments.
4. Programs should provide access to AI tools for all graduate students, with use never mandatory and methods subject to the standards of the advisor and department.
5. Advisors should hold regular detailed discussions with their students about expectations for AI use.

Summit on PhD Math Education in the Age of AI

6. Three ethical rules: (i) maintain responsibility for the correctness and understanding of the mathematics that appears under your name, (ii) always disclose AI use, and (iii) obtain explicit agreement from all involved parties before entering material into an AI system.
7. A mathematics PhD program should require rigorous in-person assessment of research plans and progress by multiple faculty at least annually, including meaningful feedback for the student.
8. A thesis should be an original scholarly contribution. This should be understood broadly; for instance, the thesis need not record the first proof of a statement.
9. A PhD should not be awarded primarily on the basis of the text of the dissertation. The text should serve as the foundation for a rigorous thesis defense that requires complete mastery of the thesis content.

Summit on Math Research in the Age of AI

1. Mathematicians should reshape the profession as it adapts to the rise of new technologies. This will be achieved by sustained community collaborations supported by resources and coordination, and by recognition of the work involved.
2. Different types of scholarly work are valuable in mathematics. Their relative merits are evolving rapidly; incentive structures in academia must change accordingly.
3. Academia and funding agencies must prioritize training, funding, and empowerment of students and early-career mathematicians.
4. The community should build connected, curated mathematical repositories and expand publication formats to accommodate databases, interactive work, and exposition.
5. Formal proof should supplement existing mathematical practice, with subject experts guiding the construction and maintenance of reusable formal libraries.

Summit on Math Research in the Age of AI

6. Academia, industry, and government agencies should build sustained partnerships, guided by the mathematics community, to advance discovery, human understanding, and AI safety. Collaborations must center people, particularly trainees, and ensure that humans shape the future direction of mathematics and technology.
7. Mathematicians should foster large-scale collaborations by providing shared resources, by developing new ways to organize knowledge and track progress, and by crediting participation in such projects.
8. The mathematical community should reaffirm and update professional norms for the age of AI, emphasizing fairness, collegiality, attribution, and collaboration.
9. The mathematical community should maintain opportunities for contributions to the subject that do not depend on the use of AI tools.
10. Mathematicians should communicate the importance of mathematics to the general public, including offering opportunities for deeper engagement. This work should be recognized as contributing to the advancement of mathematics.

Advice to Students

- Do what you have been doing all along: learn the mathematics.
- Get an AI subscription but use it wisely.
- Focus on quality, not quantity. 100 papers on arXiv won't get you anywhere. It's better to have three really good ones.
- Choose projects wisely and learn how to convince others that they are interesting.
- Invest time in understanding the new technologies:
  - You may find them useful for what you want to do.
  - You may decide to go all in and make the methods themselves a focus of your research.
  - If not, there is no harm done.
  - It's a great fallback if academia doesn't work out for you.

Advice to Senior Faculty

- Do what you have been doing all along: explore mathematics.
- Get an AI subscription and figure out what it can do for you.
- Focus on quality, not quantity. Set a high standard for publication.
- Focusing on communicating ideas, motivations, and intuitions.
- Collaborate with your students to learn about the new technology:
  - They are more comfortable with technology than you are and have a lot of energy.
  - You know more mathematics than they do and have wisdom to impart.
  - We are all in this together.

Advice to Everyone

Keep applications in mind:

- Formal verification
- AI safety
- AI for science
- Optimization
- Algorithms

Ideas and methods from pure research often lead to practical advances.

Novel uses of AI in pure research push the boundaries of what the technology can do.

Advice to Everyone

Do everything you can to dispel the notion that mathematics is facing an existential crisis.

We need disciplined mathematical thinking now more than ever.

There is no technological advance that will make mathematical thought or the mathematical profession any less important.

There has never been a more exciting time to do mathematics.