Future of Math with AI, According to Mathematicians

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We know AI has recently made lots of progress in math...

- At least two models achieved gold on the 2025 IMO
- AI performance in FrontierMath and other benchmarks rapidly improving
- Mathematicians increasingly using AI for research

Goal of Talk: What then does the future hold for math?

- Hypothesize what the future of math might look like, both in the short-term and longer-term
- Explore predictions, essays, and speculations by mathematicians

Outline: Three mathematicians' predictions on future of math

1. Kyler Siegel: A framework of a future with math superintelligence

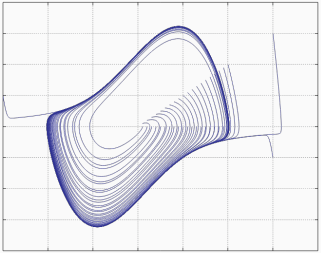
2. Daniel Litt: Mathematics in the Library of Babel

3. Terence Tao: Math at Scale

Kyler Siegel’s framework of the future with math superintelligence

Kyler Siegel

- Math professor at USC
- Previously professor and NSF postdoc research fellow at Columbia. Bachelors was also from Columbia.
- Specializes in geometry and topology, or symplectic geometry more specifically.

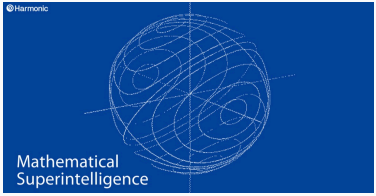


On math superintelligence

Kyler wrote the first part of an essay on what the future might look like with math superintelligence (MASI)

What is mathematical superintelligence?

Machine which can perform essentially any aspect of mathematics (including research) in a substantively and unambiguously better way than any human being



Two types of math superintelligence

There is a distinction between

1. humans < AI < humans + AI
2. humans < AI = humans + AI

We call these type 1 and type 2 mathematical superintelligence (MASI).

In type 1 MASI, AI is a critical tool for math but humans are still driving or meaningfully contributing to math research, while in type 2 MASI, human mathematicians have become more or less obsolete.

Three sequential epochs of the future

1. Epoch I: AI boosts productivity
2. Epoch II: type 1 superintelligence
3. Epoch III: type 2 superintelligence

Some questions to think about: *Pωā' ¯ḏ̊' ỳẘhg ̊ḥÔ ωỳ ⁴ g h¯ḏ ỳ˗¯˗ẘā g hɟā 'āḥ'ā' Šḏ̊!ḏ āɛω!ḏ hẘā ˝ ā ̊ḥ ḥω˝ ' Šḏāḥ ⁵̊ỳ ɛω''̊Ɛɣāƀ ˝ ̊ɣɣ ˝ ā ẘāh!ḏ āɛω!ḏ ²²²'*

Epoch I

AI is a powerful new productivity tool. In this epoch, there are many opportunities and risks:

- New tools and opportunities
  - Rapid education and literature search
  - New unexpected connections between subfields
  - New possibilities for coding experiments and computations
- Risks and pitfalls
  - Content overload
  - Overreliance and brain atrophy
  - Potempkin understanding
  - Plagiarism and missing attributions
  - Environmental destruction

... among many others

Epoch II

AI can do a large portion of the technical heavy lifting in math research. For example,

- AI converts a roughly stated lemma into a precise formulation and provides a rigorous proof
- AI produces a fully detailed paper based on only high level user guidance

In other words, mathematicians are more like project managers supervising the AI.

Epoch III

AI capable of fully autonomous long-term math research with little or no guidance from human mathematicians.

To think about:

- what does math look like in this world? perhaps more like humanities, or a recreation or personal enrichment activity?
- whether and how humanity may still benefit significantly from shared math insights?
- when does math superintelligence arrive?
- who gets to allocate the compute?

Summary

1. Short-term new math 'golden era': rapidly accelerated productivity and abundant mathematical discoveries
2. Mathematicians work at increasingly higher levels of abstraction and play more managerial or supervisorial roles
3. Ultimately, human mathematicians add diminishing practical value to the research process, and they need to negotiate entirely new relationships with math

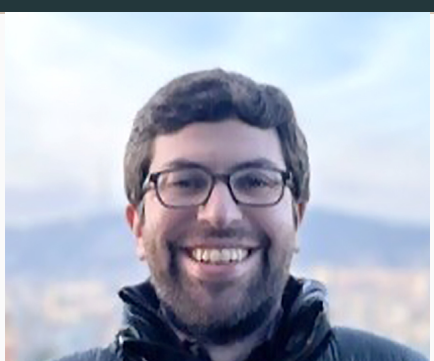
Daniel Litt: Mathematics in the Library of Babel

Daniel Litt on AI and Mathematics

Key claims from “Mathematics in the Library of Babel” (Betalog, Feb 21, 2026)

Outline

1. Progress of Math and AI
2. What can existing models achieve
3. Obstacles + Future



Daniel Litt — University of Toronto

> You type 8+11 into your calculator.
> You press 8 and 11, and the calculator beeps. You try to divide, but the screen remains blank. After a moment, it beeps again. You press the = button. Nothing happens.
> "It appears that you calculator is broken," the professor says.
> You nod. "I have a feeling that's true."

What can existing models achieve

- AI can already prove non-trivial research lemmas
- Much of math research is adapting known techniques
- Inference scaling + scaffolding can unlock surprising capability

Limitations of current models

- Formal verification
- Models performs best when similar results already exist
- Many correct solutions are very poorly written.

Near-Term Obstacles to Automation

- Truth-seeking crisis
- Creativity and theory-building
- Long-horizon tasks
- Cost

The Library: Litt's Thought Experiment

- Imagine a world with automated research
- What would mathematicians do?

AI + human exploring a "library of proofs"

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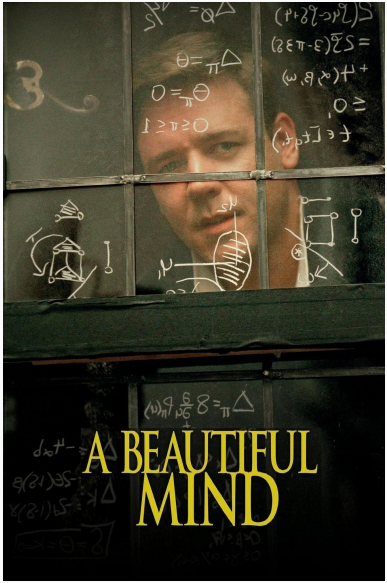
Terence Tao: Math at Scale

The End of the Lone Genius



$$\frac{1}{\pi} = \frac{2\sqrt{2}}{9801} \sum_{k=0}^{\infty} \frac{(4k)!(1103 + 26390k)}{(k!)^4 396^{4k}}$$

Source?

It was revealed to me in a dream

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Collaboration is Hard in Mathematics!

- High barrier to entry
- Proofs need to be 100% correct
- Workflows do not scale

New Workflow is Emerging thanks to AI

- Solving projects instead of single problems
- AI's capability is increasing astonishingly — "Citizen Math" for general public
- Formal verification (Lean) enables automatic proof checking

Case Study I: A Pilot Project in Universal Algebra

Identify all pairwise implications

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Case Study I: A Pilot Project in Universal Algebra

Identify all pairwise implications

- 110 possible implications

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Case Study I: A Pilot Project in Universal Algebra

Identify all pairwise implications

- 110 possible implications
- Each implication is independent and **modularized**.

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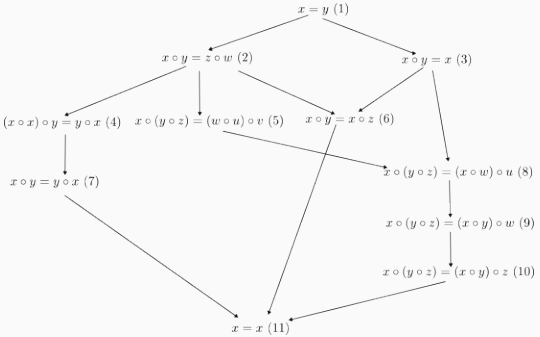
Case Study I: A Pilot Project in Universal Algebra

Terence built a github repository to collect **Lean** solutions from the community



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Case Study II: Erdős Problems

Erdős #367

Case Study II: Erdős Problems

The author Wott (Wouter van Doorn) is an independent researcher from the Netherlands.

Case Study II: Erdős Problems

Terence & Gemini finished the last piece

Case Study II: Erdős Problems

Boris Alexeev & Aristotle formalized the proof in Lean

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