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The Brilliant Math Coach Teaching America's Kids to Outsmart AI

This professor is traveling the country with simple advice for an uncertain future: Be more human.



By Ben Cohen [Follow](#) | Photographs by José A. Alvarado Jr. for *The Wall Street Journal*

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The country's most charismatic math teacher was standing in a middle school on a Friday night with a message for students and their anxious parents about the only subjects more stressful than algebra and calculus: AI and ChatGPT.

It had been a long day for Po-Shen Loh, a professor at Carnegie Mellon University and Team USA's coach for the International Mathematical Olympiad, who is traveling to 65 cities and giving 124 lectures before the next school year like he's on a personal mission to meet every single American math geek.

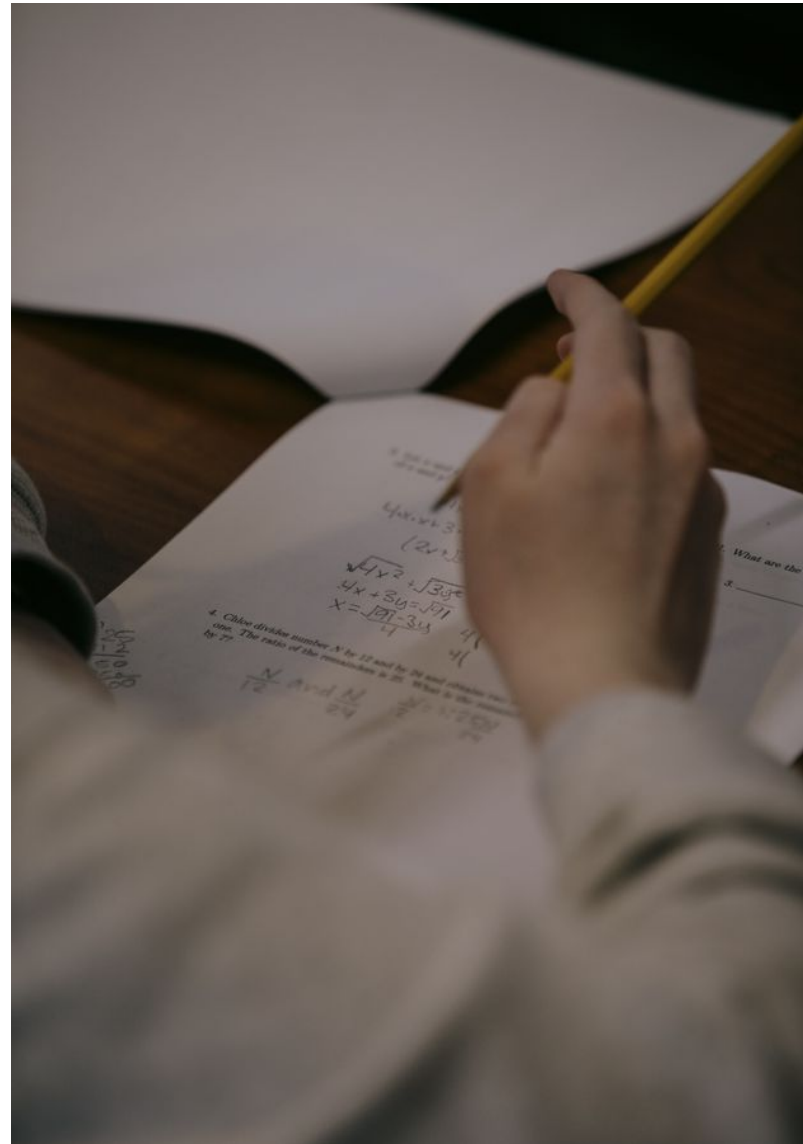
He started that morning at a Brooklyn middle school with a large percentage of low-income students before driving to a top-ranked high school on Long Island that afternoon and coming back to Queens in the evening. But the scholar had the energy of a fourth-grader on Skittles as he delivered a talk called "How to Survive the ChatGPT Invasion." And his simple, practical advice applied to everyone in the auditorium.

"Think about what makes humans human," Loh said, "and lean into that as hard as possible."

He says the key to survival is knowing how to solve problems—and knowing which problems to solve. He urges math nerds to focus on creativity, emotion and the stuff that distinguishes man from machine and won't go

obsolete. As artificial intelligence gets smarter, the premium on ingenuity will become greater. This is what he wants to drill into their impressionable young minds: Being human will only be more important as AI becomes more powerful.

It's not just students who should be paying attention to Po-Shen Loh. The lesson that he's evangelizing in schools is useful for any business that might be wondering how it's going to be warped by the existential threat of artificial intelligence. Which is every business.



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But the people who will inherit the economy reshaped by the AI boom are students today. The tech they're already using to cheat on their homework will look primitive by the time they're in college. Or high school. They belong to the first generation that will have grown up with AI, just as Gen Z came of age with the iPhone and millennials barely remember a time before they were online. These children and teens of the ChatGPT era will

have a better intuitive understanding of this disruptive force than adults because they will have never really experienced life without it.

In the meantime, they have Loh. On the night I listened to him in New York, where a janitor shooed the crowd outside and Loh held court in the darkness, he slept in his rental car at a rest stop in New Jersey before his 6 a.m. flight to his next destination. He was off to a math contest in Chicago, followed by a math competition in Orlando. He made a quick stop at home in Pittsburgh and then headed to Detroit, Chicago again, Toronto and back to New York, where I met the ebullient professor again in a Manhattan school for gifted and talented students.

What he sees when he looks at AI is the kind of challenge that made him curious about math when he was in middle school and began to view the world as a collection of problems waiting to be solved. He realized he liked solving them and doing things his own way.

“The most interesting problems to do in the world are the ones where nobody has told you how to do them,” he told students. “And the problem I’ve been thinking about recently is how to help people flourish in a world with ChatGPT. Do you guys know what that is?”

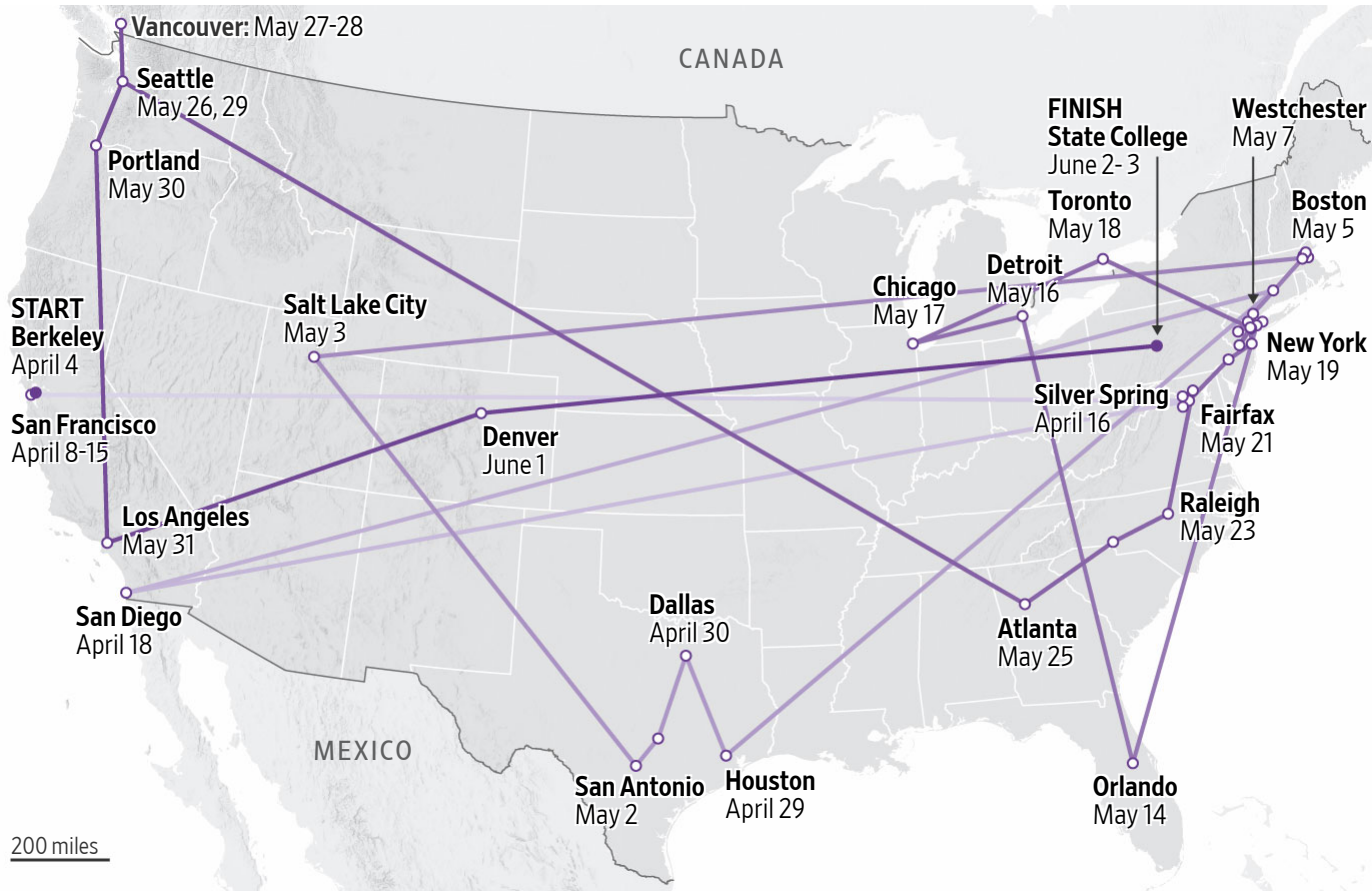
Every hand in the auditorium shot up.

After his talk, I asked how his message to a room full of fifth-graders applies to someone in an office, and he replied faster than ChatGPT. “The future of jobs is figuring out how to find pain points,” he said. “And a pain point is a *human* pain.” Loh would tell anyone what he told the students and what he tells his own three children. It’s his theorem of success. “You need to be able to create value,” he said. “People who make value will always have opportunities.”

He is living proof. Born in California and raised in Wisconsin, the 40-year-old Loh was a child prodigy who attended the California Institute of Technology, where he met his wife on the first day of freshman orientation and got married on the day before graduation. After earning his graduate math degrees from Cambridge University and Princeton University, he joined the faculty of Carnegie Mellon in 2010. He was named coach of the U.S. team in 2013. American teenagers hadn't won the International Mathematical Olympiad in nearly two decades. They have since won four times.

He's soon returning home and moving into dorms to start training for this summer's world championship in Japan with his team of the nation's top six high-school students. But first he's barnstorming across the country on a tour so exhausting that I got tired just typing out his itinerary.

Po-Shen Loh's tour schedule



Source: Po-Shen Loh

He visits schools of all kinds. He transforms outdoor pavilions in public parks into makeshift classrooms. He gets a workout by schlepping four heavy bags with 170 pounds of speakers, cords and equipment wherever he goes, which is basically everywhere. He's currently traveling to 32 cities in 35 days for 50 lectures, and the second leg of his tour will take him to 46 cities for 62 more talks. U.S. math scores have plummeted since the pandemic, but he's working as hard as humanly possible to turn those numbers around.

The professor's national adventure began two years ago, when Loh was eager to hit the road after being stuck at home, and he liked spreading his excitement about math so much that he decided to do it again last year. This year, he's talking about ChatGPT, since that's what everyone seems to be talking about.

"When I was young, if you had asked me why I like math, the answer I would have given is that the questions and answers are precise and the logic is clear," Loh says. "Now we have AI. We have robots. And what kinds of problems are the easiest for AI and robots to target? The logically precise ones."

Loh was aware of the hype around AI, but the first time he was floored by its potential was March 14, also known as Pi Day, when he started experimenting with the most viral product in Silicon Valley's history. When OpenAI released its most recent large language model, GPT-4, he paid a \$20 monthly fee and gave ChatGPT Plus a tricky math-contest question: find the prime factorization of 899. He didn't instruct the chatbot to use the difference of two squares. He didn't have to. ChatGPT calculated the answer and showed its work. It was not only accurate but elegant.

"This machine is the world's most powerful tool at repeating things that have been done many times before," he tells students. "But now I want to show you something it cannot do."

Loh asked ChatGPT to find the largest fraction less than $\frac{1}{2}$ with a numerator and denominator that are positive integers less than or equal to 10,000. It was a question that it almost certainly hadn't seen before—and it flubbed the answer. (It's $\frac{4,999}{9,999}$.) This might sound familiar to anyone who has spent enough time with a chatbot that has a nasty habit of being confidently wrong: It made up a bunch of nonsense and apologized for its errors.



High-school juniors and seniors taking Math Olympiad tests in Hoboken, N.J.

“This is a preview of your life in the future when you ask ChatGPT for something and it starts blabbing about stuff it doesn’t know,” Loh says.

“Let’s dig a little more into this. The role of the GPT is to always say the most obvious next word. But what is invention? What is creativity and innovation? Is it to say the most obvious thing? No. It might be to say a non-obvious thing.”

Loh is a big fan of non-obvious things. At a university known for computer science, he teaches with a piece of chalk. To improve his public speaking, he spent a year taking improv-comedy classes. He’s even paying for the tour’s roughly \$50,000 cost with the profits from his latest non-obvious idea: an online math school that he founded.

Parents who suffered through remote learning might want to smash a computer when they hear the words “online math school.” Loh feels the same way.

“Math on Zoom was terrible,” he tells students. “Math on Zoom taught kids how to press alt-tab really fast when they heard footsteps.”

He didn’t need to explain that alt-tab is a keyboard shortcut to switch between computer windows. The kids roared their approval.

He wants to spread his enthusiasm to the masses, which he feels is one of his responsibilities as the U.S. national coach, but that’s not his only reason for traveling around the country and talking about math. He’s also marketing his company.

Teaching math the Po-Shen Loh way meant rethinking the way math is taught. The precocious middle-schoolers in his program take live extracurricular classes from exceptional high-schoolers, but there’s another person lurking in the virtual classrooms: a drama coach. Loh pays comedians, actors and theater majors to provide real-time feedback on the teachers’ performance, with the aim of making combinatorics as entertaining as YouTube, Twitch and whatever the students were escaping Zoom to watch.

He found a pain point, followed his own advice and leveraged his innate advantage over AI: He’s a human.

“Is there going to be a great human-versus-robots war? The answer is, unfortunately, yes,” Loh said. “My goal is to make sure the humans win.”



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