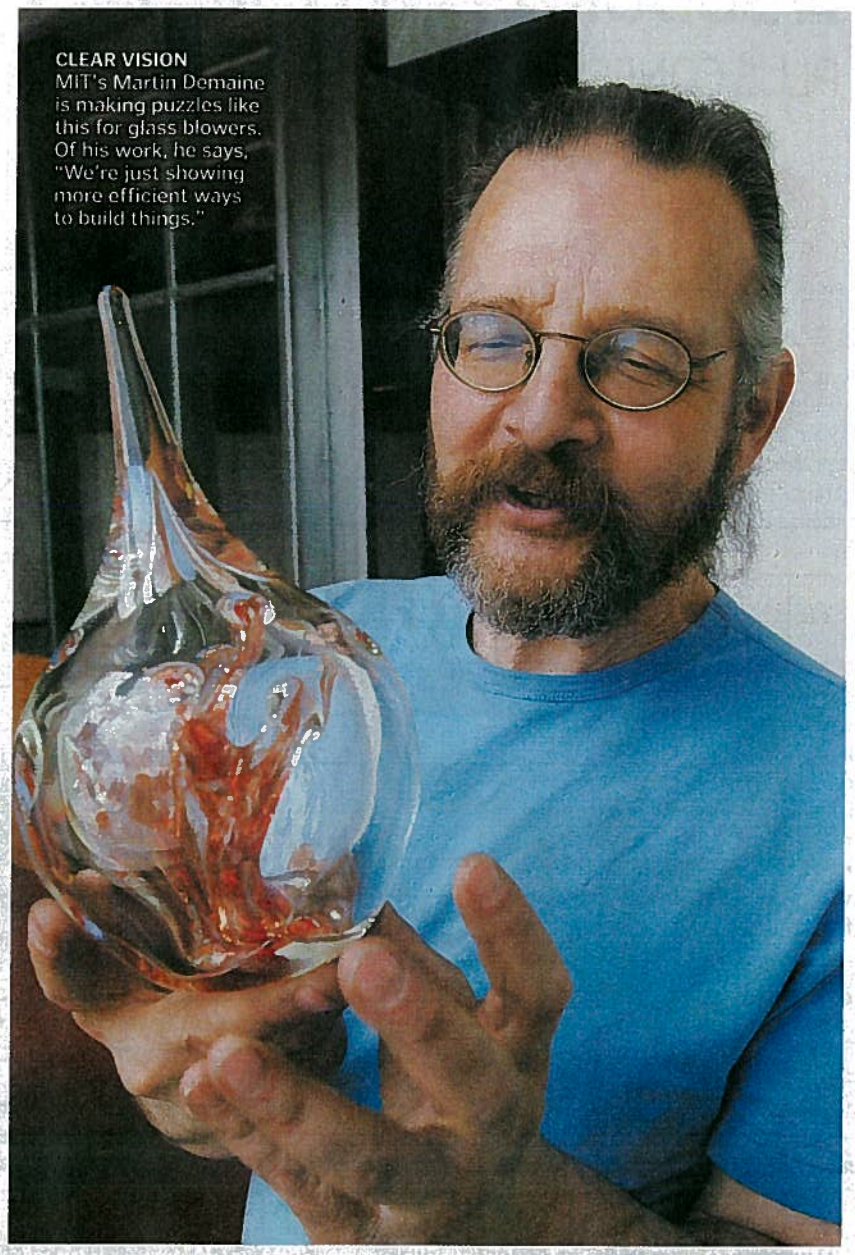
"PUZZLES WILL SAVE THE WORLD."

Martin Demaine is kidding, mostly, when he says this, but his puzzles have made cars safer, candies easier to unwrap, and maybe one day will help cure diseases. *By Amy Karafin*



CLEAR VISION
MIT's Martin Demaine is making puzzles like this for glass blowers. Of his work, he says, "We're just showing more efficient ways to build things."

Martin Demaine pulls out a paperweight from the hundreds of glass bottles, bowls, and curiosities that cover all the horizontal surfaces of his office. "This one had them going for a while," he says. Swirls of color, interspersed with thin layers of clear glass, seem to expand and contract inside the glass ball. In another work, a clear bottle contains a sort of blue-glass sea anemone. Another is lined with small cracks that resemble frost. "The first one I did, I didn't explain how I did it for about three months. Now, I wait like a week. I don't think it's good to be too secretive." Demaine, an artist-in-residence in the electrical engineering department at MIT and an instructor in the glass lab, is making puzzles for glass blowers.

The rest of his office, meanwhile, looks like an exploded toy store. There's an old box of Psyche-Paths, the vintage path-connecting puzzle, a 6-foot-tall papier-mache puppet of a jester, and a Rubik's Cube-era magic polyhedron that the 64-year-old Demaine has never even tried to solve. "I like to have these things to torture people."

His prime targets are colleagues and students at MIT's Computer Science and Artificial Intelligence Laboratory, where he's a visiting scientist. Here, Demaine theorizes problems in computer science using geometry, computational origami, game theory, and recreational mathematics.

Martin Demaine solves puzzles for a living. In his world, riddles become computer science, and computer science looks a lot like riddles. "For me, the excitement is to solve a puzzle that's never been solved before. As a researcher, you don't solve things that have been done; you ask questions, you create puzzles." The result is that he and his collaborators – including his son, Erik, who's on the faculty at the same MIT lab – have made important contributions to engineering, computer science, and mathematics, mostly by playing games.

Take the "fold and cut" problem, which the Cambridge resident worked on with his son: Is there a way to fold a piece of paper so that, by making one cut, you can create a hole of any given shape? The question, rooted in fold-and-cut tricks that magicians had been evolving for years, was posed in a magazine puzzle column. The Demaines' solution has since been used in the manufacturing of car air bags. And they're currently working on folding nanostructures, which is a sort of DNA origami. "Protein-folding is like a puzzle. . . . If we understood how the folding occurs, we could design proteins that make some diseases go away," Martin Demaine says. Ultimately, though, the research is not focused on applications. "We're just showing more efficient ways to build things."

Publishing papers that don't have direct applications has been getting easier, too. "Hopefully," Demaine says, "we're part of the reason – showing that these things are good exercises for students and researchers, and that it's OK to do research for fun. And I think, overall, it's going to improve ways of thinking and working. Listen to me," he says, smiling. "Puzzles will save the world."

Demaine is doing his part. "I have no life, because I'm always at the lab. I'm just having so much fun." When you solve a puzzle, he says, "you get this glow, this flash, you get this strength. It's a high." He just wants others to have as much fun as he's having.

When a paper he coauthored on wrapping a sweet Austrian candy called Mozartkugel – which he describes as part origami, part computational confectionary – was invited to be in a journal, he was thrilled, and surprised. Mozartkugel (named after the composer, who was born in the town where it was invented in 1890) is a perfect sphere, and each one is individually wrapped in a square piece of aluminum foil. Demaine and his son saw it as a challenge to compute the smallest piece of foil that could be used for each one, to minimize waste. "It's serious research. But there was a lot of humor in it."

It was, after all, a puzzle about marzipan, wrapped in nougat or praline cream, and coated in dark chocolate. And who wouldn't want to solve that?

Amy Karafin is a freelance writer and closet math nerd who divides her time between New York and Mumbai, India. Send comments to magazine@globe.com.

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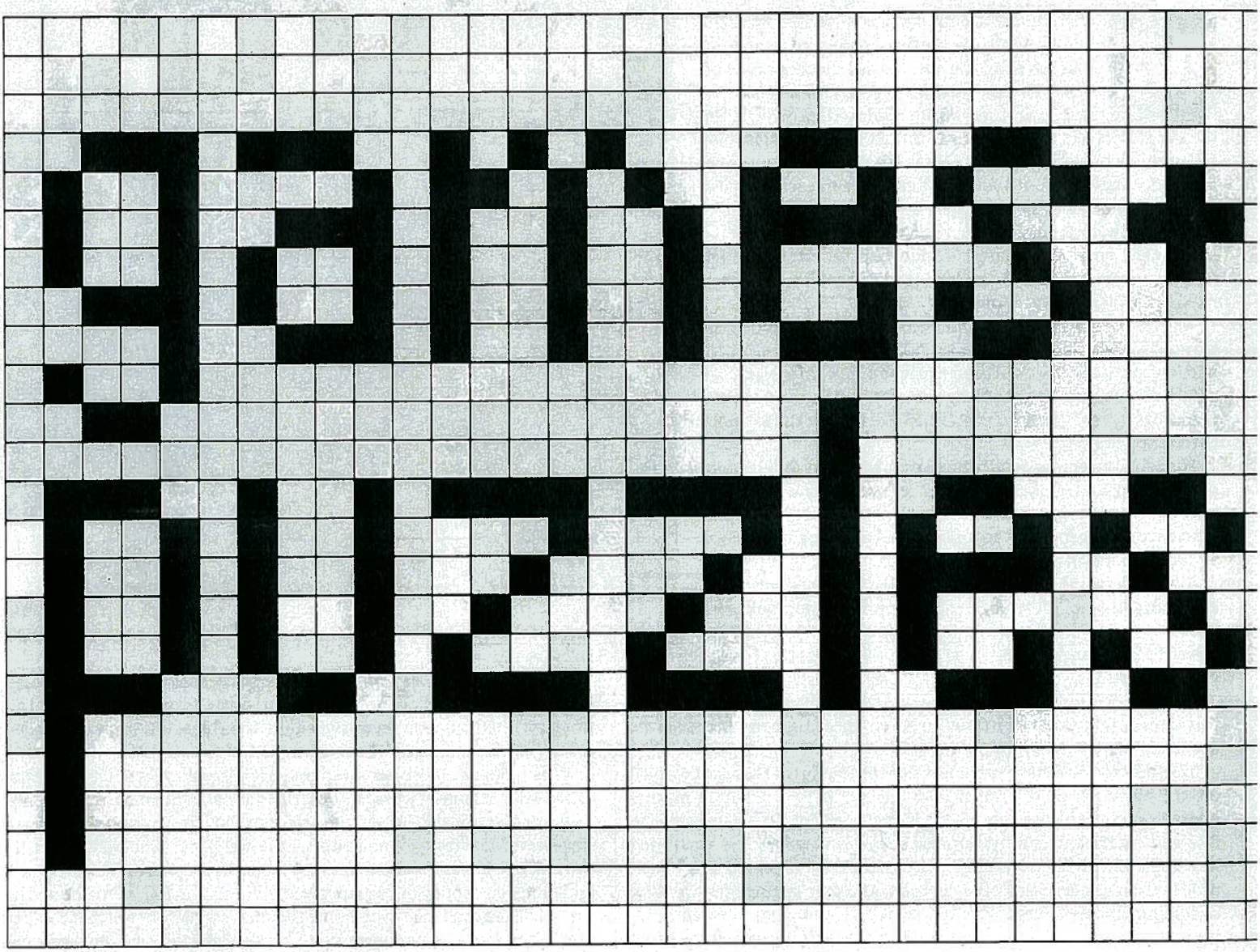

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