Four-colored Ravioli, Flying Kites, and Geometric Art Win Global Competition by National Museum of Mathematics and United Kingdom Mathematics Trust to Find the Most Creative Renditions of the Newly Discovered "Einstein Tile"

(New York, NY - December 14, 2023) – Four-colored Ravioli, Flying Kites and geometric art have won the worldwide competition by the National Museum of Mathematics (MoMath) and the United Kingdom Mathematics Trust (UKMT) to find the most creative uses for the newly discovered "Einstein Tile." Two leading global math organizations, MoMath in New York City, and the United Kingdom Mathematics Trust in London, announced the winners of the joint competition to celebrate the discovery of the Hat Tile, an "einstein" or aperiodic monotile, a shape which can tile the plane but can only do so non-periodically (not in a repeating pattern).

The worldwide competition to find the most creative rendition of the new tile was launched during the summer to celebrate the discovery of the Einstein tile in March 2023. This discovery, which was praised by math connoisseurs worldwide, solved a problem that had existed for decades.

More than 245 submissions from 32 countries, including China, Brazil, France, Spain, Norway, and more were reviewed by a panel of 11 judges.

The winners are: Shiying Dong, 41, from Greenwich, Connecticut in the United States; Evan Brock, 31, of Toronto, Canada; and Devi Kuscer, 17, from London, England, a student at UWC Atlantic College in Wales. Each will be awarded £5,000 for their innovative and fanciful designs which celebrate the beauty of mathematics. (NOTE: See attachment for images of the three winning designs.)

Shiying Dong created a three-dimensional, folded paper artwork. Dong's tile is made chiral by having a pyramid on top of it. The apex of the pyramid is uniquely chosen so that it is equally distanced to five of the base vertices, which form ⅚ of a hexagon, and all the angles around the apex add up to 360 degrees, which allows the pyramid to be

made without any gluing along the side edges. In this supertile layout, the Mystic tiles are highlighted with golden colors in the background of glimmering midnight blue.

Evan Brock designed homemade raviolis in the geometric pattern of Einstein tiles. These raviolis bring together tessellations and fresh, handmade pasta, for a more geometric dining experience. Two wooden molds were created to fill and shape the pasta, and four colors of dough were used to accentuate the tiling pattern. The mirrored tiles are made in green (spinach) dough; the other tiles use yellow (turmeric), orange (carrot), and red (beet) doughs.

Devi Kuscer, 17, designed a massive kite to mimic the shape of the singular Einstein tile. The kite is composed of eight kite shapes to make a single huge kite in the shape of the hat tile. The kite can be flown separately or be assembled and flown as a big 'hat tile kite.' Kuscer used the ratio of the lengths required of the vertical and horizontal lengths of each kite shape, and then scaled them to 57.7cm for the vertical and 50cm for the horizontal. The smaller scale hat tile was cut out of cardboard and used as a template to cover the surface of each large kite in the aperiodic pattern. Cardboard sticks were used to make the kite more stable and help the tiles to keep their shape.

"The discovery of the Einstein Tile created tremendous excitement in the math world that was even more delightful because it was compelling to everyone, not just mathematicians," commented Cindy Lawrence, Executive Director, and CEO of MoMath. "This contest provided a wonderful opportunity, especially in the non-traditional math world, to combine mathematics with creativity to amplify the excitement of this long-awaited discovery."

"I have run crochet workshops integrating art and math for the past year at MoMath in New York City," said Dong. "I have always loved various crafts as ways to express math in three-dimensional ways using everyday mediums. This was a wonderful, thought-provoking challenge in which I learned a lot about paper craft which I hope one day I can share with people who also enjoy creating with their hands."

"I heard about the contest through a *Stand Up Math's* YouTube video and thought it seemed like a fun way to take my love of geometry and combine it with my hobby of making pasta," explained Brock. "While making the Einstein ravioli, it was satisfying to see it tile my countertop, and I wanted to continue making more of them to keep adding to the pattern. I hope to see other people find creative uses for this shape in their own cooking and baking."

"As this was a math project outside of the classroom, I wanted to make sure it was fun," commented Kuscer. "I was inspired by the Einstein tile being made up of kites - so I thought why not make the whole thing fly. Since the Einstein tile creates an infinite pattern without ever repeating - my use of the shape mirrors the unconstrained nature of the original design by letting it fly freely in the air. I look forward to seeing what other inventive uses of the shape people come up with."

There were also 9 finalists who each will receive a monetary award and will have their creations displayed on the MoMath contest website.

The finalists are:

Pierre Broca, France
Sy Chen, Maryland
Mia Fan-Chiang, United Kingdom
Garnet Frost, United Kingdom
William Fry, New York
Verity Langley, United Kingdom
Emma Laughton, United Kingdom
Tadeas Martinat, United Kingdom
Julien Weiner, Louisiana

The contest is sponsored by XTX Markets, a leading algorithmic trading firm. Associate sponsors include: G-Research, Jane Street, Dexter and Deborah Senft, Philipp Legner, and the United Kingdom Mathematics Trust (UKMT).

About the National Museum of Mathematics
The National Museum of Mathematics (MoMath) is North America's premier cultural institution devoted to the wonders of mathematics and its many connections to the world around us. Located at 11 East 26th Street in Manhattan, MoMath is home to more than 40 interactive, engaging, and playful exhibits. The Museum is open seven days a week, from 10 am to 5 pm.

Since opening in December 2012, MoMath has welcomed more than 1.2 million visitors, including more than 300,000 students. When mandated by New York City to close in March 2020 because of the Covid-19 pandemic, MoMath transformed itself into a virtual Museum with an extensive global footprint. Since that time, MoMath has provided nearly 5,500 online programs reaching more than 150,000 participants from all 50 U.S. States and from 126 other countries.

For more information, visit momath.org.

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