

Encore

Origamist blends mathematics, intricate forms

By David A. Sargent Special to the Sun Journal

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The original piece of art that Eva Szillery made for the production of *Animals Out of Paper* play at The Public Theatre in Lewiston.

- Russ Dillingham/Sun Journal

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LEWISTON — A fiery red hawk with a 4-foot wingspan hangs in midair, poised for an earthward swoop, with talons exposed. The bird is a magnificent work of origami used as a central prop in The Public Theatre's production of "Animals Out of Paper."

Eva Szillery created the intricately folded paper bird specifically for the show, which opens Friday, Jan. 28, and continues through Feb. 6. She is a master of origami constructions and is recognized nationally for her use of modular origami techniques in teaching mathematics.

The technique utilizes multiple sheets of paper to create a larger and more complex structure. Szillery explained its importance in mathematics education in an interview Wednesday morning at The Public Theatre, where several pieces of her work and some step-by-step examples will be displayed in the lobby during the show's run.

In a soft voice that resonates with excitement about her subject, Szillery talked about students in fifth grade through graduate school grasping many difficult principles of engineering mathematics that can, otherwise, be significant challenges at all grade levels.

Working with origami enhances spatial vision, which is lacking in traditional math, she said, and young people quickly see the relationships of shapes as they fold and connect paper objects. No glues or other fasteners are used.

Szillery, who earned a doctorate in mathematics from Eotvos Lorand University in Hungary, is self-taught in her origami skills. She applies her teaching skills in middle school to college level all over Maine.

"The students love it very much," she said.

Modular origami is the basis for a new branch of geometry named computational geometry. It helps, Szillery said, in understanding structures all around us; has applications in robotics, hydraulic tube bending and satellite research; and has connections to protein folding, which is a major problem of interest in biology.

Szillery said the use of origami in teaching mathematics, especially geometry, has come to be known as "origametria."

"There are many things you can tell in advance if it can be folded," she said, emphasizing that there are limits and not all envisioned shapes can be folded.

Szillery was asked to create the origami hawk for "Animals Out of Paper" about eight months ago. She researched the subject thoroughly. She watched video of hawks in flight and made careful calculations of the bird's proportions in preparation for turning pieces of paper into the large construction.

The bright red hawk is important to the play's plot, which involves three origami experts who discover their lives are as complicated as the paper they fold. One of the elements of the play's story line relates to a character's attempt to design the crease pattern in a mesh heart sleeve for the treatment of congestive heart failure. That was a true medical project actually designed by origamist Robert Lang.



Eva Szillery photographs the piece of origami she made for The Public Theatre's production of Animals Out of Paper.

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One of the original pieces of origami that was used in the highly acclaimed Off-Broadway production that is part of the set at the Public Theatre in Lewiston for the upcoming play: Animals Out of Paper.

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Among the amazing pieces of Szillery's work that The Public Theatre playgoers can see are an Epcot ball, which is the shape of the Epcot Center building at Walt Disney World in Florida, constructed on 270 pieces of square paper.

Talking about the many complex aspects of origami's relationship to mathematics, Szillery pointed out inter-relationships of geometric solids that were discovered by Plato and Archimedes. She showed examples of "Buckyballs," shapes named for Buckminster Fuller, the creator of geodesic domes. The well-known shape of a soccer ball is a Buckyball.

She explained about the symmetry of 108-degree shapes and the creation of dodecahedrons, stellated icosahedrons and other shapes. Six pieces of the basic Sonobe unit become a cube. Then 12, 30 and as many as 270 can be combined into marvelous forms -- a process that involves many rules of mathematics.

Demonstrating more playful uses of origami, Szillery made a 1-foot tall T-Rex dinosaur from a 30- by 30-inch sheet of wrapping paper.

Szillery is founder of the Maine Origami Society, director of the Maine Junior Engineering Technical Society and state director of the Mathematical Association of America's American Mathematics Competitions. In 2005, she received the University of Maine Pulp and Paper Foundation Educator Recognition Award for Programming Excellence.



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