1056-BF-1497   **Robert J. Lang*** (`robert@langorigami.com`), 899 Forest Lane, Alamo, CA 94507. *Mathematical Methods in Origami Design.*

The last decade of this past century has been witness to a revolution in the development and application of mathematical techniques to origami, the centuries-old Japanese art of paper-folding. The techniques used in mathematical origami design range from the abstruse to the highly approachable, and tap into diverse mathematics ranging from Euclid up to the latest developments in computational geometry.

In this talk, I will describe how geometric concepts have led to the solution of a broad class of origami folding problems, including the problem of efficiently folding a shape with an arbitrary number and arrangement of flaps, and new geometric forms known as "origami tessellations." Along the way, mathematical methods have enabled origami designs of mind-blowing complexity and realism, some of which you'll see, too.

As often happens in mathematics, theory originally developed for its own sake has led to some surprising practical applications. The algorithms and theorems of origami design have shed light on long-standing mathematical questions and have solved practical engineering problems. I will discuss examples of how origami has enabled safer airbags, Brobdingnagian space telescopes, lifesaving medical advances, and more. (Received September 22, 2009)