Origami, Linkages, and Polyhedra: Folding with Algorithms

Erik D. Demaine

MIT Computer Science and Artificial Intelligence Laboratory,
32 Vassar St., Cambridge, MA 02139, USA, edemaine@mit.edu

Abstract. What forms of origami can be designed automatically by algorithms? What shapes can result by folding a piece of paper flat and making one complete straight cut? What polyhedra can be cut along their surface and unfolded into a flat piece of paper without overlap? When can a linkage of rigid bars be untangled or folded into a desired configuration? Folding and unfolding is a branch of discrete and computational geometry that addresses these and many other intriguing questions. I will give a taste of the many results that have been proved in the past few years, as well as the several exciting open problems that remain open. Many folding problems have applications in areas including manufacturing, robotics, graphics, and protein folding.