Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Rubber and gel origami: visco- and poro-elastic behavior of folded structures ARTHUR EVANS, NAKUL BENDE, JUNHEE NA, RYAN HAYWARD, CHRISTIAN SANTANGELO, University of Massachusetts, Amherst — The Japanese art of origami is rapidly becoming a platform for material design, as researchers develop systematic methods to exploit the purely geometric rules that allow paper to folded without stretching. Since any thin sheet couples mechanics strongly to geometry, origami provides a natural template for generating length-scale independent structures from a variety of different materials. In this talk I discuss some of the implications of using polymeric sheets and shells over many length scales to create folded materials with tunable shapes and properties. These implications include visco-elastic snap-through transitions and poro-elastically driven micro origami. In each case, mechanical response, dynamics, and reversible folding is tuned through a combination of geometry and constitutive properties, demonstrating the efficacy of using origami principles for designing functional materials.

Arthur Evans
University of Massachusetts, Amherst

Date submitted: 01 Aug 2014 Electronic form version 1.4