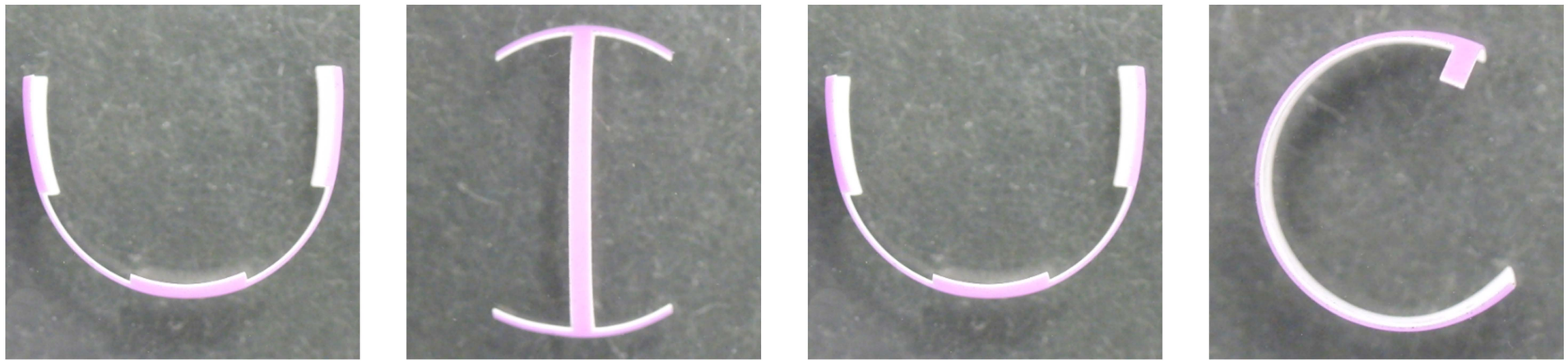

Self-folding from 2D to 3D

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Self-folding refers to the mechanisms through which a structure can sense the variations in its surroundings and demonstrate bending behavior to undergo autonomous shape transformation. The potential to reconfigure engineered systems (across length scales) in a tether-less and on-demand manner has made self-folding a topic of substantial technological importance. For my research, I fabricate planar bilayer sheets of varying geometric parameters and then investigate their shape transformation behavior in organic solvents. The self-folding process from planar to curved configurations is driven by the differential behavior of the bilayers where one constituent layer swells more than the other as the solvent concentration increases. In this picture, bilayer polymeric samples (individual layers were pigmented white and purple for visualization) were swelled and then imaged separately from the top to make up the words "UIUC" and "MECHSE" ("MECHSE" is the abbreviated form of my department - Mechanical Science and Engineering). These images demonstrate the possibilities for programmable and on-demand realization of complex three-dimensional architectures from rationally designed two-dimensional bilayer systems. Thus, my research findings could be used to design shape reconfigurable functional devices for sensing, actuation, drug delivery, and energy harvesting.