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Capillary Origami with a Twist TIMOTHY FARMER, JAMES BIRD, Boston University — Often, when a liquid drop contacts a solid, the droplet deforms to minimize surface energy. For sufficiently thin solids, the solid can instead minimize the combined surface and elastic energy by wrapping around the drop. This mechanism has been used to direct the 3-dimensional self-assembly of 2-dimensional sheets, in a process often referred to as capillary origami. Past experiments have shown that a variety of bending modes can exist for a droplet wetting a thin elastic sheet. However, these studies have only considered interactions between materials with uniform properties and are thus limited to symmetric deformations. In this talk, we present results for asymmetric deformations obtained by controlling these elastocapillary interactions with a pattern of surface chemistries. Our results demonstrate that spontaneous twist can be initiated in a body through a combination of surface chemistry and capillarity.

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