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Reconfiguration of broad leaves into cones LAURA MILLER, University of North Carolina at Chapel Hill — Flexible plants, fungi, and sessile animals are thought to reconfigure in the wind and water to reduce the drag forces that act upon them. Simple mathematical models of a flexible beam immersed in a two-dimensional flow will also exhibit this behavior. What is less understood is how the mechanical properties of a leaf in a three-dimensional flow will passively allow roll up and reduce drag. This presentation will begin by examining how leaves roll up into drag reducing shapes in strong flow. The dynamics of the flow around the leaf of the wild ginger *Hexastylis arifolia* are described using particle image velocimetry. The flows around the leaves are compared with those of simplified sheets using 3D numerical simulations and physical models. For some reconfiguration shapes, large forces and oscillations due to strong vortex shedding are produced. In the actual leaf, a stable recirculation zone is formed within the wake of the reconfigured cone. In physical and numerical models that reconfigure into cones, a similar recirculation zone is observed with both rigid and flexible tethers. These results suggest that the three-dimensional cone structure in addition to flexibility is significant to both the reduction of vortex-induced vibrations and the forces experienced by the leaf.

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