

Abstract Submitted  
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**Dynamics in thin folded polymer films**<sup>1</sup> ANDREW CROLL, DAMITH ROZAIRO, North Dakota State Univ — Origami and Kirigami inspired structures depend on a complex interplay between geometry and material properties. While clearly important to the overall function, very little attention has focused on how extreme curvatures and singularities in real materials influence the overall dynamic behaviour of folded structures. In this work we use a set of three polymer thin films in order to closely examine the interaction of material and geometry. Specifically, we use polydimethylsiloxane (PDMS), polystyrene (PS) and polycarbonate (PC) thin films which we subject to loading in several model geometries of varying complexity. Depending on the material, vastly different responses are noted in our experiments; D-cones can annihilate, cut or lead to a crumpling cascade when pushed through a film. Remarkably, order can be generated with additional perturbation. Finally, the role of adhesion in complex folded structures can be addressed.

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