

Abstract Submitted
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Unravelling Origami Metamaterial Behavior MARYAM EIDINI, University of Illinois at Urbana-Champaign, GLAUCIO PAULINO, University of Illinois at Urbana Champaign — Origami has shown to be a substantial source of inspiration for innovative design of mechanical metamaterials for which the material properties arise from their geometry and structural layout. Most research on origami-inspired materials relies on known patterns, especially on classic Miura-ori pattern. In the present research, we have created origami-inspired metamaterials and we have shown that the folded materials possess properties as remarkable as those of Miura-ori on which there is a lot of recent research. We have also introduced and placed emphasis on several important concepts that are confused or overlooked in the literature, e.g. concept of planar Poisson's ratio for folded materials from different conceptual viewpoints, and we have clarified the importance of such concepts by applying them to the folded sheet metamaterials introduced in our research. The new patterns are appropriate for a broad range of applications, from mechanical metamaterials to deployable and kinetic structures, at both small and large scales.

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