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Andres Arrieta

*Purdue University*, aarrieta@purdue.edu

Jakob Faber

Katherine Riley

André Studart

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# Extending Origami: Crease Pre-stressing for Functional Adaptation

Andres F. Arrieta<sup>1</sup>, Jakob Faber<sup>2</sup>, Katherine S. Riley and André R. Studart<sup>2</sup>

<sup>(1)</sup> Programmable Structures Lab, School of Mechanical Engineering, Purdue University, West Lafayette, IN 47907, aarrieta@purdue.edu

<sup>(2)</sup>Complex Materials, Department of Materials, ETH Zürich, 8093 Zürich, Switzerland

## KEYWORDS:

Origami, Programmable Matter, Multistability

Shape programmability has been proposed as a mechanism to provide in material systems and structures with dynamically adaptable properties and multifunctionality [1, 2, 3, 4]. In this work we explore the capabilities to program fast and efficient shape adaptation from introducing pre-stress in the folds of origami-like structures following bioinspiration from the insect order Dermaptera [1, 2]. In a recent paper, we showed how membrane pre-strain in the creases of Dermaptera wings introduces a bistable behaviour responsible of the remarkable fast self-folding and locking mechanisms exhibited by these insects. In this paper we explore the design space for functional applications translating bioinspired design principles into engineering structures.

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