

Soft and architected structures: instabilities, wave phenomena and multiphysics couplings.

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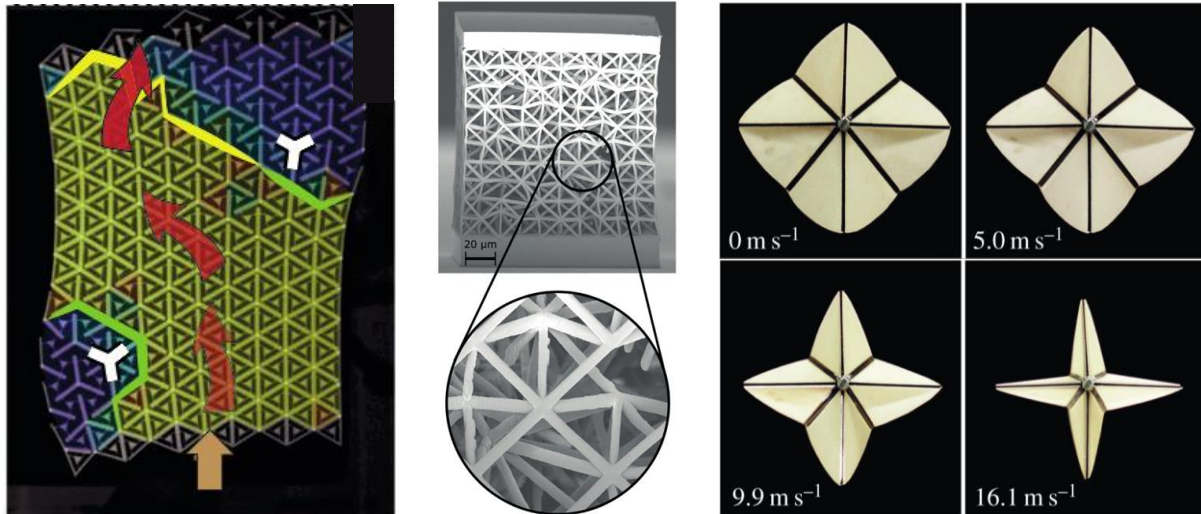


Fig. 1 : Nonlinear wave propagation in a multistable architected material (credit : L. Jin) ; Impact of geometric defects on the mechanical response of periodic structures (credit : R.N. Glaesener) ; Origami deformed by an air flow (credit : T. Marzin)

The goal of the colloquium is to present the latest advances in the field of soft and architected structures, including phenomena of wave propagation, instabilities and multiphysics couplings in these systems.

"Extreme mechanics" is a very active field that relies on the utilization of strong nonlinearities—be they geometrical or material—in slender or architected structures to engineer materials with remarkable properties. For example, buckling, traditionally viewed as a structural failure, has recently been extensively exploited to design shape-changing objects capable of maintaining structural integrity. The development of rapid prototyping techniques and active materials lies at the heart of these recent advances. Modelling such nonlinear structures also poses fundamental questions related to homogenization, understanding multiphysics couplings, and describing non-classical effective behavior laws, among others.

The goal of this mini-colloquium is to foster interactions between researchers in soft matter, slender structures, materials scientists, theoreticians and experimentalists, interested in developing and programming new functionalities in these structures.