EML WEBINAR

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MULTISTABLE STRUCTURES - FROM ENERGY TRAPPING TO MORPHING

In the search for materials with new properties, there have been great advances in recent years aimed at the construction of mechanical systems whose behaviour is governed by structure, rather than composition. Through careful design of architecture, new mechanical properties have been demonstrated, including negative Poisson's ratio, high stiffness-to-weight ratio and mechanical cloaking. While originally the field focused on achieving unusual (zero or negative) values for familiar mechanical parameters, more recently it has been shown that non-linearities can be exploited to further extend the design space. In this talk I will focus on multistable building blocks (i.e. building blocks with multiple stable configurations) and show that they provide an ideal platform for the design of structures and materials with new modes of functionality, including shape-reconfigurable architectures, fully elastic and reusable energy-trapping metamaterials, systems to manipulate the propagation of elastic pulses and soft robots capable of jumping.

Professor Bertoldi is the William and Ami Kuan Danoff Professor of Applied Mechanics at Harvard University. Dr Bertoldi's research contributes to the design of materials with a carefully designed meso-structure that leads to novel effective behavior at the macroscale. She investigates both mechanical and acoustic properties of such structured materials, with a particular focus on harnessing instabilities and strong geometric non-linearities to generate new modes of functionality. Since the properties of the designed architected materials are primarily governed by the geometry of the structure (as opposed to constitutive ingredients at the material level), the principles she discovers are universal and can be applied to systems over a wide range of length scales.

Host: Professor **Davide Bigoni**, University of Trento

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