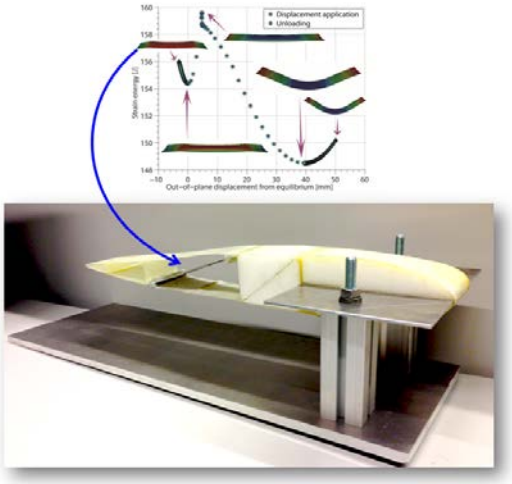
University of Colorado at Boulder

AEROSPACE ENGINEERING SCIENCES

Seminar



Andres Arrieta

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Structural Nonlinearity: Performance Augmentation & Novel Functionalities

Nonlinearity arises naturally in physical processes encompassing most engineering fields and applications. In spite of this prevalent nature, nonlinearity in structural engineering design is commonly associated with problems and loss of functionality. Owing to the ever growing need for better performance and new modelling techniques that provide better understanding of nonlinear behaviour, new attitudes towards the use of nonlinearity have started to emerge. The rich behaviour available when purposely designing structural nonlinearity in mechanical systems can lead to exciting novel functionalities beyond the load-carrying capability. This concept is illustrated through the design of multi-stability in structural elements, designed to be both embedded within larger systems and to serve as building blocks of architectured periodic structures featuring effective extreme mechanical properties. Ultimately, the designed properties arising from structural nonlinearity are shown to provide augmented performance and new capabilities. Particular applications are presented in the fields of morphing structures and nonlinear energy harvesting for autonomous powering of microelectronic devices.

Thursday, April 16, 2015
11:30 AM
DLC Collaboratory

Biography:

Dr. Andres Arrieta is currently Group Leader of the Compliant Systems Group at the Laboratory of Composite Materials and Adaptive Structures in ETH Zurich, where he currently co-supervises 4 doctoral students and 3 master's student. He received his Ph.D. in Mechanical Engineering from the University of Bristol in 2010, where he studied the nonlinear dynamics of multi-stable structures. Before, he obtained his bachelor in Mechanical Engineering from the Universidad de los Andes, in Bogota, Colombia. His research interests focus in designing structural nonlinear for creating novel functionalities in distributed compliance structures and smart material systems.