



Stony Brook University

Department of Civil Engineering  
College of Engineering and Applied Sciences

## SPRING 2021 ONLINE SEMINAR SERIES

**Dr. Francisco Lopez Jimenez, Ph.D.**

Assistant Professor, Aerospace Mechanics Research Center,  
University of Colorado, Boulder

**Monday, April 26<sup>th</sup>, 2:40 – 3:35 PM**

### **High strain composites: bending of thin composite laminates in deployable structures**

#### **Abstract**

Deployable space structures are compacted and stowed during launch, and unfurled to their full dimensions once in space, enabling the large systems necessary to advance space science and technology. They often rely on the bending deformation of thin elements, and benefit from materials that, while stiff in tension, can achieve to large curvatures before failure. In recent years, the industry has started relying on high strain composites: thin fiber composite laminates, whose failure curvature is underpredicted by traditional failure analysis of composites. This is due to several effects that can be neglected in thick laminates: fiber non-linearity, brittle failure size effects, and through-the-thickness strain gradients. While the enhanced bending properties of high strain composites are advantageous to build deployable systems, the lack of predictive tools makes the development of new designs expensive and time consuming. This talk will present results from recent experiments characterizing the failure properties of high strain composites, and discuss the specific micromechanics taking place. We will share preliminary efforts to develop predictive tools, and their application in new deployable systems.



**ZOOM LINK:** Meeting ID: 950 6760 3617; Passcode: 426506  
<https://stonybrook.zoom.us/j/95067603617?pwd=dXQybEprSkNITFY3WHIWyjViUG95UT09>