

## **NCSA Materials and Manufacturing Theme Seminar**

Thursday, November 12<sup>th</sup>, 12 -1pm  
NCSA 1040

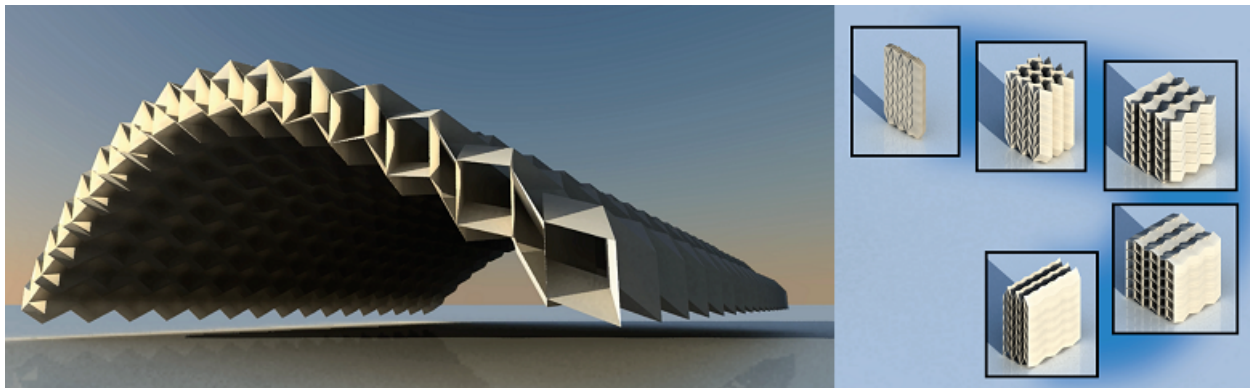
### **Reconfigurable Origami Tubes with Tunable Stiffness**

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Thin sheets assembled into origami tubes can create a rich variety of deployable, reconfigurable, and mechanically tunable three dimensional structures. This talk will introduce a unique origami tube structure that can deploy through a flexible deployment mode, yet it is substantially stiffer for any other bending or twisting deformations. Eigenvalue and structural analyses are used to quantify the global stiffness and highlight interesting mechanical characteristics of the origami systems. A variety of new structures and cellular assemblages are explored by changing the cross-sections, three dimensional layouts and coupling orientations of the tubes. These deployable structures are suitable for various applications in robotics, aerospace, and architecture. On a smaller scale, assembling thin sheets into tubular assemblages can create metamaterials that can be deployed, stiffened, and tuned.



**Deployable architectural canopies (left) and reconfiguring metamaterials (right) are some potential applications of the coupled origami tubes**