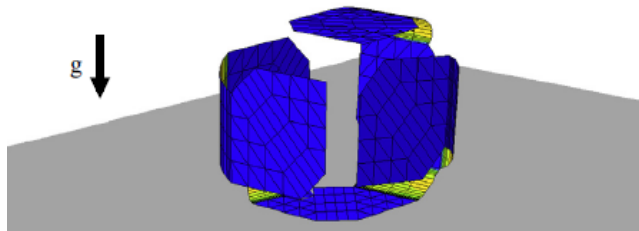
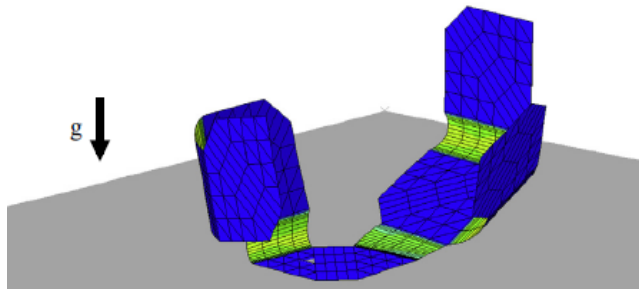
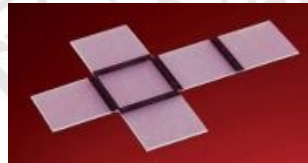
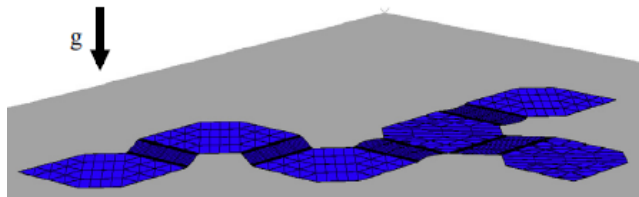


# Self-folding structures

**Problem:** A structure or a material is called *self-folding* if it can be “programmed” to perform folding operations without manipulations from external forces. Self-folding systems are of interest when it is impractical to apply such manipulations (e.g., at very small or very large scales, or in remote applications as space systems). Creating useful 3D structures through folding operations applied to initially 2D entities has the potential to impact several areas of design and manufacturing, such as biomedical engineering, architecture, aerospace field. One approach to the design of self-folding systems is to leverage the multi-functionality of *active materials* (e.g. shape memory alloys) to create forces and displacements via non-mechanical stimuli.

**Objective:** Review of self-folding technologies and state-of-the-art. Numerical simulations of simplified self-folding systems.



**Type:** Literature review / Numerical

**Prerequisites for numerical part:**

- Basic knowledge of Matlab
- Basic knowledge of Abaqus

**References:**

- Edwin A Peraza-Hernandez, Darren J Hartl and Richard J Malak Jr *Design and numerical analysis of an SMA mesh-based self-folding sheet* Smart Mater. Struct. 22 (2013) 094008 (17pp)
- Edwin Alexander Peraza Hernandez , Shiyu Hu, Han Wei Kung, Darren Hartl, Ergun Akleman *Towards building smart self-folding structures* Computers & Graphics 37(2013)730–742

Thesis proposal