

# *Chez Pierre*

Presents ...

**Monday, February 2, 2015**

**12:00pm**

**MIT Room 4-331**



## **Special Biophysics Chez Pierre Seminar**

**Andrej Kosmrlj**

Harvard University

### ***“Elasticity, Geometry and Buckling”***

In this talk I present how geometrical shape affects the mechanical properties of thin solid membranes and how buckling instabilities change the geometry of periodic microstructures in materials. Using methods rooted in statistical physics, we find that random shape fluctuations and thermal excitations of thin solid membranes significantly modify their mechanical properties. Membranes subject to such fluctuations are much harder to bend, but easier to stretch, compress and shear. I will also comment on the relevance of these results for long ribbons, which behave like one-dimensional semiflexible polymers, but also show some features of two-dimensional membranes. Finally, I show how methods from solid state physics can help us deduce the geometry of buckled periodic microstructures. Buckling instabilities can change the microstructure symmetries, including a spontaneous chiral symmetry breaking, which drastically modifies the material properties.