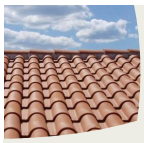

UCI Samueli School of Engineering | Department of Civil and Environmental Engineering

Presented By:
Andrej Kosmrlj, Ph.D.
Assistant Professor
Mechanical & Aerospace Engineering
Princeton University

Civil Engineering *Seminar Series*

Thursday, March 3rd, 2016
MDEA
2:00PM - 3:00PM

Elasticity, Geometry & 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 mechanics, 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. 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.

Andrej Kosmrlj is an assistant professor in Mechanical and Aerospace Engineering department at Princeton. Before joining Princeton, he was working as a postdoctoral fellow with David Nelson at Harvard and he obtained his PhD degree in Physics from MIT, where he was co-supervised by Arup Chakraborty and Mehran Kardar. Kosmrlj's research interests are at the interface between engineering, physics and biology, where he studies the mechanics of membranes, mechanical metamaterials, and the effects of protein aggregation.