1062-35-206 **Marta Lewicka*** (lewicka@math.umn.edu), Hill Center for the Mathematical Sciences, 110 Frelinghuysen Rd., Piscataway, NJ 08854-8019. *Scaling laws of prestrained elastic films and non-smooth isometric embeddings of Riemannian metrics.*

This talk will concern the analysis and the rigorous derivation of shell models for thin films exhibiting residual stress at free equilibria. A mathematical analysis of these phenomena departs from the model of 3d "non-Euclidean" energy, which measures the pointwise deviation of the given deformation of a body from orientation preserving realizations of a Riemannian metric, given on this body. For metrics with non-zero Riemann curvature, the infimum of this energy is strictly positive.

We discuss the scaling of the energy minimizers in terms of the body's thickness and then rigorously derive the corresponding limiting theories, as the vanishing thickness Γ-limits. The theories are differentiated by the embeddability properties of the target metrics - in the same spirit as different scalings of external forces lead to a hierarchy of nonlinear elastic plate theories as recently displayed by Friesecke, James and Muller.

Relationships with existence of non-smooth (Sobolev type) isometric embeddings of 2d metrics into $\mathbb{R}^3$ will be exhibited, and recent parallel counterexamples and constructions (by Kohn and Venkataramani) will also be reported.

This is a joint work with Reza Pakzad. (Received August 09, 2010)