1116-35-70 **Marta Lewicka***, lewicka@pitt.edu. *Prestrained elasticity: curvature constraints and differential geometry with low regularity.*

This lecture is concerned with the analysis of thin elastic films exhibiting residual stress at free equilibria. Examples of such structures and their actuations include: plastically strained sheets; specifically engineered swelling or shrinking gels; growing tissues; atomically thin graphene layers, etc. These and other phenomena can be studied through a variational model, pertaining to the non-Euclidean version of nonlinear elasticity, which postulates formation of a target Riemannian metric, resulting in the morphogenesis of the tissue which attains an orientation-preserving configuration closest to being the metric's isometric immersion.

In this context, analysis of scaling of the energy minimizers in terms of the film's thickness leads to the rigorous derivation of a hierarchy of limiting theories, differentiated by the embeddability properties of the target metrics and, a-posteriori, by the emergence of isometry constraints with low regularity. This leads to questions of rigidity and flexibility of solutions to the weak formulations of the related PDEs, including the Monge-Ampere equation. In particular, we observe that the set of $C^{1,\alpha}$ solutions to the Monge-Ampere equation is dense in C^0 provided that $\alpha < 1/7$, whereas rigidity holds when $\alpha > 2/3$. (Received July 11, 2015)