Title: A stability criterion for the radial cavitating map in nonlinear elasticity

Abstract: It has long been known that, when stretched radially, some elastic materials respond by forming a cavity at a point in their interior. The map describing the formation of the cavity is a critical point of a polyconvex stored energy function, as was shown by J. Ball. It is still not known whether this map is a local energy minimizer (in a suitable sense), which we might reasonably expect it to be. However, in recent years J. Sivaloganathan and S. Spector identified two inequalities that are necessary for the cavitating map to be a local minimizer. One of the inequalities was established by several authors in the liquid crystal literature; this talk describes a first study of the other Sivaloganathan-Spector inequality

$$\int_B \left| \mathrm{adj} \nabla w \left(\frac{w}{|w|^3} \right) \right|^q \, dx \geq \int_B \frac{1}{|x|^{2q}} \, dx,$$

which is defined on suitable maps $w : B \subset \mathbb{R}^3 \to \mathbb{R}^3$ and where $2q \in (2, 3)$.