B. Seguin: Stability of a Soap Film in a Cylindrical Tube

Recently, Cox and Jones studied an interesting variant of the classical Plateau problem involving a soap film confined to a cylindrical tube. Through experiments and some analysis, they found that the dimensions of the tube strongly influence the equilibrium shape of the confined soap film. In this talk, an area minimization problem associated with determining the shape of the film will be formulated and analyzed to determine which surfaces are local minima. The connection between a functional inequality and the associated eigenvalue problem plays an important role in the analysis. One finding that is of interest is that more candidates for local minima exist when the length of the cylinder is small compared to its radius than when the length is large compared to its radius.

This is joint work with E. Fried.