1086-49-616   **Irene Fonseca*** (`fonseca@andrew.cmu.edu`), Department of Mathematical Sciences, Carnegie Mellon University, Pittsburgh, PA 15213. *Variational Methods in Materials Science and Image Processing.*

Several questions in applied analysis motivated by issues in computer vision, physics, materials sciences and other areas of engineering may be treated variationally leading to higher order problems and to models involving lower dimension density measures. Their study often requires state-of-the-art techniques, new ideas, and the introduction of innovative tools in partial differential equations, geometric measure theory, and the calculus of variations. In this talk it will be shown how some of these questions may be reduced to well understood first order problems, while in others the higher order terms play a fundamental role.

Applications to phase transitions, to the equilibrium of foams under the action of surfactants, imaging, micromagnetics, thin films, and quantum dots will be addressed. (Received September 09, 2012)