Center for Fluid Mechanics, Division of Applied Mathematics
Fluids and Thermal Systems, School of Engineering
Joint Seminar Series

TUESDAY – APRIL 2, 2013

3:00pm

Barus & Holley, Room 190

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Patterns from Scale-free Instabilities in Soft Solids

Examples of short wavelength instabilities at fluid interfaces include the the Kelvin-Hemholtz and Rayleigh-Taylor instabilities. Soft solids interfaces also have a variety of short wavelength instabilities, but these instabilities turn out to be deeply subcritical. For example, the nucleation and growth of sharply creased folds---sulci---at an elastomer interface is controlled by a hidden non-linear critical point. The idea for such a critical point was first proposed by Weierstrass around the time that the Rayliegh-Taylor and Kelvin-Helmhotz instabilities were discovered, but progress on the solid front has been markedly slower. I will explain why this hidden critical point exists, how related sulcus patterns form, why these patterns are structurally stable in the absence of any surface tension, and where to look for other examples of this unusual mechanism of instability.