1116-00-3001 **Thomas Wanner***, George Mason University, Fairfax, VA 22030. *Bifurcations and An Application in Materials Science*

The diblock copolymer model is a fourth-order parabolic partial differential equation which models phase separation with fine structure. The equation is a gradient flow with respect to an extension of the standard van der Waals free energy functional which involves nonlocal interactions, and the long-term dynamical behavior of the diblock copolymer model is described by its finite-dimensional attractor. However, even on one-dimensional domains, the dynamics on the attractor is not fully understood, and rigorous mathematical results on the long-term dynamics of solutions created via phase separation seem to be out of the reach of classical mathematical methods.

In the recent paper [2], it was shown that the location of certain numerically computed bifurcation points in the equilibrium bifurcation diagram can shed light onto this problem. In this lecture we therefore describe how rigorous computational techniques can be used to obtain computer-assisted existence proofs for these bifurcation points. While our presentation is focusing on the diblock copolymer case, the method applies more generally to bifurcation points in infinite-dimensional problems. (See more at http://www.ams.org/meetings/short-courses/short-course-general#wan.) (Received December 04, 2015)