Meeting: 1003, Atlanta, Georgia, MAA CP T1, MAA Session on Mathematics Experiences in Business, Industry, and Government

1003-T1-1088 **Katharine F Gurski*** (kgurski@gwu.edu), Department of Mathematics, George Washington University, Washington, DC 20052, and **Geoffrey B McFadden** and **Michael J Miksis**. *The Effect of the Rayleigh Instability on Anisotropic Crystalline Rods.*

We study the effect of anisotropic surface energy on the stability of a solidifying crystalline rod, both free-standing and on a surface. The rod is assumed to be smooth with a uniform cross-section given by a two-dimensional equilibrium shape. The stability analysis is based on computing the sign of the second variation of the total energy, which is examined by solving an associated eigenvalue problem. The eigenproblem is a coupled pair of second-order ordinary differential equations with periodic coefficients that depend on the second derivatives of the surface energy with respect to orientation variables. We apply the analysis to examples with uniaxial or cubic anisotropy and show that the anisotropic surface energy plays a significant role in establishing the stability of the rod. (Received October 03, 2004)