TEMPLE UNIVERSITY
Department of Mathematics

Applied Mathematics and
Scientific Computing Seminar

Room 617 Wachman Hall

Wednesday, February 7 2007, 4:00 p.m.

Threshold-based quasi-static brittle damage evolution

by Christopher Larsen
Department of Mathematics
Worcester Polytechnic Institute

We will first consider a variational model for damage proposed by Francfort and Marigo, and then give an existence result by Francfort and Garroni. A case for a strain-threshold formulation will be made, and precise definitions for both the unrelaxed (i.e., the damage region is a set at each time) and the relaxed version (i.e., the damage is given by a density function, together with an effective tensor that stores the microstructure of the damage) will be given. It turns out that solutions of the unrelaxed variational problem are solutions to the unrelaxed threshold problem, but there is an interesting issue in showing the same for the relaxed problems. The issue is related to a somewhat subtle question regarding G-closure. A new variational formulation, arguably more physical than the earlier one, is given, and it is shown that relaxed solutions of this problem are solutions of the relaxed threshold problem. This is joint work with A. Garroni.