Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

**On the study of force-balance percolation** J. M. SCHWARZ, Syracuse University, M. JENG, Microsoft Corporation — We study models of correlated percolation where there are constraints on the occupation of sites that mimic force-balance, i.e. for a site to be stable (remain occupied) requires occupied neighboring sites in all four compass directions in two dimensions. We prove rigorously that $p_c < 1$ for the two-dimensional models studied. Numerical data indicate that the force-balance percolation transition is discontinuous with a growing crossover length, with perhaps the same form as the jamming percolation models, suggesting the same underlying mechanism driving the transition in both cases. In other words, force-balance percolation and jamming percolation may indeed belong to the same universality class. We find a lower bound for the correlation length in the connected phase and that the correlation function does not appear to be a power law at the transition. Finally, we study the dynamics of the culling procedure invoked to obtain the force-balance configurations and measure a dynamical exponent similar to that found in sandpile models.

J. M. Schwarz
Syracuse University

Date submitted: 21 Nov 2008 Electronic form version 1.4