1067-65-396 **Lauren A. Ferguson*** (lafergus@tamu.edu), Department of Mathematics, Texas A&M University, Mailstop 3368, College Station, TX 77843-3368. *A Numerical Model of Fracture using Curvature Dependent Surface Tension.*

The classical theory of linear elastic fracture mechanics for a static crack in an infinite linear elastic body has two significant defects: it predicts unbounded crack-tip stresses and an elliptical crack opening profile. A new model of fracture based on extending continuum mechanics to the nanoscale corrects these anomalous effects, predicting finite crack-tip stresses and a cusp-like opening profile. The fundamental attribute of this model is its incorporation of long-range intermolecular forces and surface excess properties, one of which is surface tension computed as a function of curvature. We describe the method for determining the surface tension constants that guarantee bounded crack-tip stresses. We also discuss strategies for developing and implementing the resulting numerical model of fracture. (Received August 31, 2010)