1056-65-1962 **Joshua D. Snyder*** (jsnyderb@gmu.edu), 800 South State Street, Ephrata, PA 17522. *Analysis of 3D Potts Model Monte Carlo Simulation of Crystalline Grain Growth.*

The Potts Model Monte Carlo simulation is one of the most popular tools for modeling grain growth in polycrystalline materials. Better understanding of how materials crystallize can help improve the quality of materials products and will lead to more efficient engineering techniques. The way the grains are connected to each other through a network of grain boundaries, called microstructure, and the types of such boundaries, determine how materials behave on the macro-scale. The goal of this work is to analyze coarsening rates during microstructure evolution and identify key factors that influence them. In particular, we want to be able to predict the times when new crystals appear, or when old ones disappear, and to track the topological changes of the grain network. We explore the connections between the statistical distributions for various types of microstructures and compare the Monte Carlo model with other models of grain growth. (Received September 22, 2009)