Polycrystalline materials have many uses in the industrial world. In my presentation we explore the impact of grain growth on the viability of industrial materials and demonstrate the value of an accurate simulation. We have modified a preexisting one dimensional model of polycrystalline materials to produce a probability distribution of the misorientations of individual grains. We will examine the effects of varying the initial conditions of the simulation and demonstrate how the Radon-Nikodym Theorem can be used to quantify the differences between two probability distributions. This quantity is known as the distributional sensitivity. It will be used to illustrate how sensitive the grain boundaries of a polycrystalline material are to changes in initial conditions, and how the information gathered from these experiments can be used in the future.

This work has been completed as a part of the 2010 REU Program at George Mason University funded by the NSF-REU and DOD-ASSURE Programs. (Received September 21, 2010)