1067-74-1037 **Russell J Mahoney*** (rmahone1@gmu.edu), 9581 Bronte Dr., Burke, VA 22015, and **Maria G Emelianenko** (memelian@gmu.edu), Department of Mathematical Sciences, MS 3F2, 4400 University Dr, Fairfax, VA 22030. *Mathematical modeling of interface-dominated materials properties.*

Many materials used today are polycrystalline aggregates composed of large numbers of minuscule grains. These grains are separated by grain boundaries which determine the properties of the material, such as elasticity or conductivity. A combination of macro- and mesoscopic tools such as the finite element microstructure analysis package OOF2 and in-house grain growth evolution models is used to perform a comprehensive study of the dynamical effects grain coarsening has on these materials properties. By analyzing how these materials respond to stress, electricity, or heat, we learn more about the impact of grain boundary distributions. (Received September 17, 2010)