1032-76-202 **Donald W. Schwendeman*** (schwed@rpi.edu), Department of Mathematical Sciences, Rensselaer Polytechnic Institute, 110 8th Street, Troy, NY 12180. *Mathematical Models of Detonation in Single and Multiphase Reactive Flow.*

Heterogeneous explosives are complex materials, the complexities stemming from their morphology, their thermo-mechanical response and their combustion chemistry. Application of appropriate mechanical and/or thermal stimuli leads to the formation of detonation waves (shocks supported by chemical reaction occurring behind them) in these materials. Mathematical models of detonation behavior are more or less complex depending upon the extent to which averaging and homogenization have been brought to bear (implicitly or explicitly) on the modeling process. This talk will focus on two specific models. The first, called ignition and growth, treats the explosive as a homogeneous mixture of reacting and product species. The second employs a multiphase approach and considers the reactants and products as two distinct phases. At a fundamental level both models are systems of hyperbolic partial differential equations (representing balances of mass, momentum and energy) which may or may not be capable of a conservation form. Adaptive, Godunov-type, high-resolution numerical methods will be described for both models, and examples of detonation formation and propagation will be presented. (Received August 21, 2007)