

Abstract for an Invited Paper
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A review of mesoscale simulations of granular materials¹

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With the advent of increased computing power, mesoscale simulations have been used to explore grain level phenomenology of dynamic compaction events of various heterogeneous systems including foams, reactive materials and porous granular materials. This paper presents an overview of several mesoscale studies on a variety of materials including tungsten carbide and epoxy mixtures, wet and dry sand, and reactive materials (Al-MnO₂-Epoxy mixtures). The simulations encompass a variety of geometries including one-dimensional planar and spherical shock configurations. This talk will focus on relating mesoscale modeling to experimental data and the role of material constitutive relations in this effort. In addition, lessons learned during these explorations, modeling techniques, strengths and weaknesses of hydrodynamic mesoscale simulations will also be presented.

¹In collaboration with Tracy Vogler, Sandia National Laboratories and Andrew Fraser, Marquette University.