



General Motors/Brown Collaborative Research Lab on Computational Materials Science



A. Bower, W. Curtin, K. Kim, S. Kumar, Sheldon, Division of Engineering, Brown University
L. Hector, P. Krajewski, L. Lev, R. Mishra, T. Perry, A. Sachdev, Qi, Verbrugge, General Motors R&D Center

The laboratory for computational materials research at Brown University is one of several collaborative research laboratories established worldwide by General Motors to accelerate the pace of innovation in strategic technology areas. The goal of the laboratory is to develop computer simulations that predict the mechanical properties of materials used in automotive applications, and to use these simulations to help General Motors to develop materials with enhanced performance. The computations are guided and verified by experiments. The laboratory has three focus areas: (i) Development of aluminum alloys with enhanced room temperature formability; (ii) Hot forming of magnesium and aluminum alloys; and (iii) Engineered surfaces with improved wear resistance and friction. These areas of research leverage and apply work performed within the Brown MRSEC while providing technological motivation for new MRSEC work.

Notable achievements of the laboratory include the development of new multi-scale simulation methods to predict the influence of chemical composition on the rate sensitivity of aluminum alloys; new constitutive equations that model the behavior of aluminum during room temperature forming; development and experimental validation of computer simulation methods to predict constitutive behavior and microstructure evolution in aluminum alloys during hot forming; computer simulations of microstructure evolution in Aluminum-Silicon alloys under development for linerless engines; and the development of novel wear resistant diamond coatings.

For further information see

http://www.engin.brown.edu/facilities/GM_CRL

