

## **“Similarities and Differences Between MD and DEM Simulations, an Historical Perspective”**

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### **Abstract:**

Dr. Walton plans to review the history of MD and DEM simulation development and point out both similarities and differences between those related numerical methods. This talk will include a description of the modes of motion and degrees of freedom associated with the contact forces in granular materials – features that (along with particle shape and size distributions) ultimately control the bulk behavior of assemblies of mesoscopic particles. The approximate models usually used to simulate the physical interactions will be covered along with gotchas that often occur. In addition to a comparison of the historical development of both molecular-dynamics (MD) and discrete-element method (DEM) simulation approaches, the results of recent DEM simulations of granular solids in unusual engineering environments that show some somewhat unexpected behavior will be described, along with others that verify some old theories of granular mechanics.