

Modeling and Predicting Suspension Flows with the Aid of Computer Simulation

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It's morning. You pour cereal in your bowl, shake the orange juice, fill your glass, and pour milk over your cereal. Why did you shake the orange juice and not the milk? Why do you *pour* cereal? These are just some everyday examples of complex fluids – materials that often behave like water or air, but just as often display quite different behavior. Many complex fluids are in the form of particles dispersed in a host liquid or gas, and it is the particle-level interactions that give rise to interesting macroscopic phenomena, such as shear thinning and thickening, viscoelasticity and structure formation. This talk will discuss the micromechanics of particulate dispersions and how the interplay of colloidal, Brownian and hydrodynamic forces set the material's microstructure and determine its macroscopic properties. Examples of hard-sphere systems ranging in size from a few nanometers, where Brownian motion is important, to larger sand-grain-size mixtures will be investigated via computer simulation and the results compared with theory and experiment. So why did you shake the orange juice and not the milk?