

Bioengineering Faculty Search, College of Engineering, University of Toledo

Complex Fluids: Nanomaterial Properties Control Bulk Dynamics

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Complex fluids are everywhere: they include suspensions, emulsions, dispersions, and foams. A few examples in biological systems include blood, liquid pharmaceuticals, and even bacterial biofilms. Regardless of locale, the characteristic dynamic properties of complex fluids on the macroscopic scale arise from their microstructure and constituent nanoparticle properties. In this talk, I will present a depth study of the influence of nanoparticle properties on bulk suspension characteristics. As a case study, we will investigate suspensions of asphaltenes, naturally occurring molecules found in petroleum, which can cause clogging in even the largest pipes. Asphaltene is a complex, non-background alkane solvents, these charged molecules phase separate out of solution. At the same time, the characteristics of asphaltenes allows us to control the behavior of these systems with surfactant additives. In particular, we will see how the influences of macroscopic dynamics sedimentation and other phenomena can be discussed in terms of the principles of microscale physics.

Where: SSOE Seminar Room, NI 1027 Fri day,