CHEMICAL ENGINEERING

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“Using DEM to Develop Constitutive Models for CFD Simulations of Granular Flows”

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REFRESHMENTS – CHEMICAL ENGINEERING DEPARTMENT AT 3:30 PM
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Granular processes pervade the chemical, pharmaceutical, agricultural and mining industries. Many of these processes have significant opportunities for cost savings and productivity enhancements. However, advances are currently unrealized due to the lack of understanding of particle flow behavior in industrial scale processes. Reliable simulation tools can aid in this understanding and accelerate the achievement of substantial process improvements. Recent advancements in multiphase computational fluid dynamics (CFD) can help facilitate these improvements. In multiphase CFD, in all but extremely dilute flows, the particle phase is treated as a continuum and constitutive models are necessary to describe the effective particle-phase stress. However, state-of-the-art, multiphase CFD is currently limited due to the lack of constitutive models that adequately describe the range of particle characteristics (particle shape, particle size/size distribution, etc.) in a typical particle mix. In this talk, I will show how discrete element method (DEM) simulations, which describe the detailed motion of individual particles, can be used to develop and test constitutive models employed in multiphase CFD codes.