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GRANULAR AND MULTIPHASE FLOWS

Sponsored by

The Granular Science Laboratory

Prof. Carl Wassgren

School of Mechanical Engineering

Purdue University

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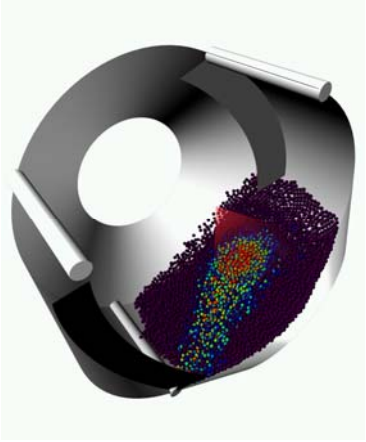
11:30 a.m. – 1:00 p.m.

MEC 224

Modeling Uniformity in Particulate Coating Processes

Spray coating of particulate materials is commonplace in industry. For example, most pharmaceutical tablets are coated for either aesthetic or functional purposes. The success of the coating depends upon many factors, especially inter- and intra-tablet coating uniformity. For a pharmaceutical tablet, the coating may be designed to control the release and bioavailability of the drug and, therefore, variations from the prescribed range of coating thickness (and mass) can adversely impact the effectiveness of the product.



A discrete element method computer simulation of spheres being coated in a horizontal pan coater.

Despite its significance, there have been few models proposed in the literature for predicting coating variability. Most of the previous work has focused on experimental measurements, but analytical and computational predictions are lacking. First principles models that predict variability would be useful for process optimization and could significantly reduce the number of experiments required to characterize a coating operation.

This talk will present recent efforts to model inter- and intra-tablet coating variability. An overview will be given of the discrete element method, Monte Carlo, and analytical models used to investigate this topic. Implications from the models will also be discussed, and potential avenues for model improvement will be described.

Carl Wassgren is a Professor in the School of Mechanical Engineering and the Department of Industrial and Physical Pharmacy (by courtesy) at Purdue University. Prof. Wassgren's research has focused on developing models and experiments for predicting the dynamics of particulate systems. He has worked on a wide range of projects such as coating, blending, hopper flow, segregation, wet granulation, powder compaction, and attrition. He also teaches several powder-related courses at Purdue and has received a number of awards concerning his research and teaching activities. Prof. Wassgren also serves as Purdue's Education and Outreach Director for the NSF Engineering Research Center (ERC) for Structured Organic Particulate Systems.
