

**M**echanical **E**ngineering  
Spring 2008 Seminar  
**Wednesday, April 23, 2008**  
1:00-2:30pm  
Room 224 MEC

**Dr. Chao Zhu**  
Professor  
Mechanical Engineering Department  
New Jersey Institute of Technology

## **Mechanistic Modeling of Dense of Powder Flows**

Dense powder flows occur in powder processes of mixing, storage, separation, or suspension. The controlling mechanisms on flow-influenced transport of dense powder include the particle-fluid interactions, particle-wall interaction, and particle-particle interaction. Major differences between the dilute powder flows and the dense powder flows include the strong inter-particle collisions, server damping of turbulence, and particle packing effect on particle-fluid interactions. Due to strong inter-particle collisions, powders can experience agglomeration, breakage, charge generation and discharging. Thus, an appropriate modeling approach of dense powder flow involves the particle-laden flow with a confined wall boundary, the powder charge effect, and the inter-particle collisions. This presentation will review the mechanistic understanding n the particle packing effect on particle-fluid interaction as well as inter-particle collisions. Special attention will be focused on the current modeling approaches on inter-particle collisions, such as the kinetic theory modeling and contact mechanics modeling. Some modeling examples of dense powder flows will be illustrated.

**For More Information Contact: Dr. Ernest Geskin (973) 596-3338, [geskin@njit.edu](mailto:geskin@njit.edu)**