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SPRING 2006 COLLOQUIUM SERIES

# GRANULAR AND MULTIPHASE FLOWS

*Sponsored by*

**Mechanics Research Communications and the Granular Science Laboratory**

**Professor E. Bruce Pitman**  
*Professor of Mathematics*  
*Associate Dean for Research & Sponsored Programs*  
*College of Arts & Sciences*  
*State University of New York at Buffalo*

March 27, 2006  
11:30 a.m. – 1:00 p.m.  
ME Center: Room 224

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## **The Modeling and Computing of Geophysical Mass Flows**

The range of scale and the complexity of the rheology for geological materials, coupled with the mathematical problem of describing a multi-phase free surface flow, makes modeling and computing geophysical mass flows a significant challenge. Several model systems of equations have been proposed for describing such flows. These range from the early viscoplastic models of mud flows to more recent one and two phase models based on granular flow ideas. Examination of different models and testing these predictions is difficult. In recent work we have developed and implemented in a large scale computational platform a set of models ranging from simple dry granular flow to two-phase flows. We will illustrate recent results from these models on tests using a set of well constrained laboratory scale flows and field observations of well documented field sites. We will address a range of questions related to the significance of different modeling assumptions and the implications of modeling assumptions on numerical computations of large scale flows. We will also briefly outline our approach to dealing with parametric uncertainty in the models and the characterization of its impact on selected output quantities.

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Bruce Pitman received his Ph.D. in mathematics from Duke University in 1985, working on a problem in the flow of granular materials in hoppers. After post-doctoral appointments at the Courant Institute and the Institute for Mathematics and its Applications, and two years at NJIT, he was appointed as Assistant Professor in the Department of Mathematics at the University of Buffalo in 1989. He was promoted to Professor in 1998, and is an Adjunct Professor in UB's Department of Mechanical and Aerospace Engineering Department. From 2000 until 2003 he was Vice Provost for Educational Technology. Since 2003 he has been Associate Dean for Research in the College of Arts and Sciences. Professor Pitman's continues to study the broad field of granular materials, and he maintains a research interest in renal hemodynamics.

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