Fall 2006 COLLOQUIUM SERIES

GRANULAR AND MULTIPHASE FLOWS

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Mechanics Research Communications and the Granular Science Laboratory

Professor David J.Horntrop

Department of Mathematical Sciences

New Jersey Institute of Technology

September 18, 2006
11:30 a.m. – 1:00 p.m
GITC – Room 3710

Mesoscopic Simulation for Self-Organization in Materials

One commonly observed phenomenon in materials is self-organization. When this organization is caused by a diffusive mechanism, it is referred to as Ostwald ripening. This talk will introduce a multiscale mesoscopic model appropriate for Ostwald ripening. This model equation is a stochastic partial differential equation that was derived from molecular-level description of this physical process. Recently developed spectral methods for stochastic partial differential equations will be described and verified using exactly solvable models. Results from the use of this method on the mesoscopic model equation will be compared with various theories and effects of changing interparticle interactions will be discussed.

Prof. Horntrop has bachelor's degrees in Mathematics and in Systems Science and Engineering from Washington University in St. Louis. He received his Ph.D. in Applied and Computational Mathematics from Princeton University. He has held research and/or faculty positions at the Courant Institute of Mathematics Sciences at NYU, the University of Massachusetts in Amherst, and the New Jersey Institute of Technology. His research on the simulation of mesoscopic models has been partly supported by NSF DMS-0219211 and NSF DMS-0406633.

For further information, please contact Dr. A. Rosato, ME Department (rosato@adm.njit.edu; 973-596-5829), or Ms. Barbara Valenti (Valenti@adm.njit.edu; 973-596-3332)