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Yuliya Gorb* (gorb@math.uh.edu), 636 PGH, Department of Mathematics, University of Houston, Houston, TX 77204-3008, **Dmitri Kuzmin** (kuzmin@am.uni-erlangen.de), Institute of Applied Mathematics III, University Erlangen-Nuremberg, Cauerstr. 11, D-91058, Erlangen, Germany, and **Otto Mierka** (omierka@mathematik.uni-dortmund.de), Institute of Applied Mathematics III, Dortmund University of Technology, Vogelpothsweg 87, D-44227, Dortmund, Germany. *Finite element simulation of laminar three-dimensional particulate flows.*

This talk focuses on the modeling of buoyancy effects and effective viscosities in mixture models of particle-laden incompressible fluids. The generalized Navier-Stokes system and the continuity equation for the volume fraction of the disperse phase are discretized using a finite element method, and monotonicity constraints are enforced using algebraic flux correction. A numerical study is performed for the laminar flow of dilute, semi-dilute, and concentrated suspensions over a three-dimensional backward-facing step and driven cavity. (Received September 16, 2013)