Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

A continuum theory for two-phase flows of particulate solids: application to Poiseuille flows[1] DAVIDE MONSORNO, CHRISTOS VARSAKELIS, MILTIADIS V. PAPALEXANDRIS, Université catholique de Louvain — In the first part of this talk, we present a novel two-phase continuum model for incompressible fluid-saturated granular flows. The model accounts for both compaction and shear-induced dilatancy and accommodates correlations for the granular rheology in a thermodynamically consistent way. In the second part of this talk, we exercise this two-phase model in the numerical simulation of a fully-developed Poiseuille flow of a dense suspension. The numerical predictions are shown to compare favorably against experimental measurements and confirm that the model can capture the important characteristics of the flow field, such as segregation and formation of plug zones. Finally, results from parametric studies with respect to the initial concentration, the magnitude of the external forcing and the width of the channel are presented and the role of these physical parameters is quantified.

[1]Financial Support has been provided by SEDITRANS, an Initial Training Network of the European Commission's 7th Framework Programme

Miltiadis V. Papalexandris
Université catholique de Louvain

Date submitted: 15 Jul 2015 Electronic form version 1.4