Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Suppression and emergence of granular segregation under cyclic shear[1] MATT HARRINGTON, University of Maryland, JOOST H. WEIJS, University of Twente, WOLFGANG LOSERT, University of Maryland — Heterogeneous mixtures of granular materials have a tendency to segregate under various dynamics disturbances, including shear. While several models have been proposed for segregation in various contexts, there is still much to learn about the mechanisms of shear-induced segregation, particularly at the particle-scale. We have performed experiments on a three dimensional (3D) bidisperse mixture in a split-bottom geometry, under both steady and oscillatory shear. The Refractive Index Matched Scanning technique captures dynamics within the full 3D system. While the pile continuously segregates under steady shear, we find that the cyclically driven system either remains mixed or segregates slowly, depending on shear amplitude. We also characterize the segregating and non-segregating regimes by determining local reversibility with respect to space and structure, as well as observing the emergence of a convective flow field.

[1]Support from NSF and Defense Threat Reduction Agency

Matt Harrington
University of Maryland

Date submitted: 31 Jul 2013 Electronic form version 1.4