Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Force network in a three-dimensional sheared material NICOLAS BRODU, INRIA Bordeaux, JONATHAN BARES, Duke University, JOSHUA DIJKSMAN, Wageningen UR, ROBERT BEHRINGER, Duke University — Force chains in 2D granular material have been widely studied over the past decade. However the force network evolution when a 3D granular medium is sheared remains poorly unterstood due to the complexity of experimental observations. We present an experimental set-up to measure interparticle forces in the case of the quasi-static deformation of a 3D sphere packing subjected to shear and compression. We perform these experiments on slightly polydisperse and los-friction soft hydrogel spheres. We resolve the microscopic force network in a this three dimensional packing through imaging the entire packing at each loading steps. By resolving particle deformations via custom image analysis software, we extract all particle contacts and contact forces with a very good accuracy. We address the rising up of the Reynolds pressure from the microscopic force network and a statistical ensemble analogous to equilibrium counterpart for 3D frictionless particles.

Jonathan Bares
Duke University

Date submitted: 14 Nov 2014 Electronic form version 1.4