

Abstract Submitted
for the TSF05 Meeting of
The American Physical Society

How the Cookie Crumbles: Data Analysis for Experimental Granular Materials Research¹ VICTORIA WINBOW, Trinity University, R.J. ZIEVE, University of California at Davis — Granular materials are characterized as a conglomeration of macroscopic particles which experience a loss of energy upon interaction, while being large enough to avoid thermal motion fluctuations. Despite centuries of study, their behavior is still mysterious. Theoretical work has traditionally focused on spheres and hard ellipsoids rather than simple polygons or polyhedra. Previous experimental research on polygons created from lattices of welded ball bearings had indicated a link between angle and density in two dimensions immediately prior to an avalanche. The goal of this project was to confirm those findings and attempt to determine what portion of the material was responsible for the correlation. Code was written to analyze photos of a rotating frame containing a sample granular material, making it possible to find density and angle for regions of arbitrary size and calculate correlations from them. Correlations for various granular shapes were most visible when taken over large regions and decreased in smaller regions as noise became dominant with one notable exception.

¹Supported by NSF under PHY-0243904

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Date submitted: 15 Sep 2005

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