Particle-size segregation in granular avalanches MICHAEL SHEARER, North Carolina State University — Particle size segregation in avalanches occurs through shearing within the granular flow. In such a flow, large particles migrate upwards, their vacated spaces being filled by smaller particles. Gray and Thornton recently proposed a simple model to capture this segregation, based on conservation of mass for two-phase flow, and basic mixture theory. The equation is a scalar conservation law in two space variables and time, but with variable coefficients corresponding to the spatially dependent velocity in shear flow. In this talk, I describe initial boundary value problems for this equation, and show numerical simulations. In simple circumstances, the problem can be solved explicitly, by combining basic multidimensional solutions to understand the overall flow and segregation. Interfaces with large particles below small are physically unstable, and this property can be explained mathematically. Indeed, unstable interfaces provide the richest multidimensional structures, one of which is analyzed in this talk.

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