

Abstract Submitted  
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**Passive Separation of Granular Materials** JOSEPH MCCARTHY, DIANA LIEVANO, University of Pittsburgh — Despite its industrial importance, particle separation techniques remain typically quite “low tech” and often are energy-intensive (e.g., sieving) or environmentally unfriendly (e.g., froth floatation) or both. Rate-based separation processes, on the other hand, represent a unique approach to particle separation that has the potential to be more flexible, more efficient, and more environmentally friendly than existing “low tech” techniques. In the present paper, we highlight a passive granular separation technique, where particles of differing properties flow through a device often called a Galton board. In this type of device, the gravity-driven flow of particles down an inclined plane causes collisions between the particles and distributed pegs along the board. Collisions between particles as well as between particles and pegs results in a diffusion-like motion of particles perpendicular to the flow. The extent of separation (i.e., how far one type of particle is removed from another) depends on the different distances traversed by the two types of particles and, ultimately, on the collision rate and energy dissipation for particle-peg events. A simple theory, based on statistics and single-collision mechanics, will be set forth for comparison with our results.

Joseph McCarthy  
University of Pittsburgh

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