

Abstract Submitted  
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**Frictionless Packings of Rod-like Granular Materials**<sup>1</sup> SCOTT FRANKLIN, RIT — Piles of large aspect ratio granular materials are known to form solid plugs significantly more rigid than piles of ordinary sand or rice. We create random, jammed packings of spherocylinders — cylinders with hemispherical endcaps — using energy minimization techniques. The packing fraction at high aspect ratios agrees with a mean-field model that scales as the inverse of excluded volume, implying that that contact number is constant even for very long, thin particles. This is confirmed by a direct analysis of the average contact number at large aspect ratios. The structure of the jammed state can be investigated through the dynamical matrix of elastic modes. In contrast with other work on ellipsoids, our packings show low energy translational modes and higher energy rotational modes, which we explain as resulting due to the absence of particle curvature.

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