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Aerodynamics of puffball mushroom spore dispersal GUILLERMO AMADOR, ALEX BARBERIE, DAVID HU, Georgia Institute of Technology — Puffball mushrooms *Lycoperdon* are spherical fungi that release a cloud of spores in response to raindrop impacts. In this combined experimental and theoretical study, we elucidate the aerodynamics of this unique impact-based spore-dispersal. We characterize live puffball ejections by high speed video, the geometry and elasticity of their shells by cantilever experiments, and the packing fraction and size of their spores by scanning electron microscope. We build a dynamically similar puffball mimic composed of a tied-off latex balloon filled with baby powder and topped with a 1-cm slit. A jet of powder is elicited by steady lateral compression of the mimic between two plates. The jet height is a bell-shaped function of force applied, with a peak of 18 cm at loads of 45 N. We rationalize the increase in jet height with force using Darcy's Law: the applied force generates an overpressure maintained by the air-tight elastic membrane. Pressure is relieved as the air travels through the spore interstitial spaces, entrains spores, and exits through the puffball orifice. This mechanism demonstrates how powder-filled elastic shells can generate high-speed jets using energy harvested from rain.

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