

Alpha geek  
Jenn Rossmann

# Ballistics Expert

An engineer puts Wiffle balls through wind-tunnel torture until they give up their flighty secrets.

Wiffle balls are very poorly behaved. They curve wildly, practically bouncing around in midair. No surprise, given the eight holes molded into one side. But to learn how the little plastic balls twist and spin through space, the go-to researcher is Jenn Rossmann, a mechanical engineer at Lafayette College in Easton, Pennsylvania, who specializes in how fluids, especially blood, circulate. In 2003, she started thinking that Wiffle balls might be more interesting for her students to study than the baseballs she'd been discussing in class. "It's all about trying to trick them to do fluid mechanics, which I think is the most fascinating thing ever," Rossmann says.

So over the past eight years, she and her students have built the world's most advanced Wiffle-ology lab, using wind tunnels and computer models to measure aerodynamics. The key to the ball's unpredictability? Air flowing over the perforated side of the ball is more turbulent, as you'd expect,

which pulls it in the direction the holes are facing. But two vortices of air trapped inside push it in the opposite direction. Assuming the ball isn't spinning, external airflow wins at low speeds; the internal vortices dominate at high speeds. At 40 to 60 mph—the speed at which most casual players throw—the two forces are about equal, making it hard to predict which way the ball will break.

Rossmann has figured out how to put all that science to use. Scuffing the ball, she says, disrupts the already turbulent external airflow. Result: The internal vortices become more predominant, which "can nudge it into that higher regime, where it's more predictable," Rossmann says. Competitive players—yes, there are those—often scuff, and some of them have sent doctored balls to Rossmann for analysis. But she doesn't play the game herself. "I imagine I would enjoy it, but now I'm worried," she says. "Everyone would assume that I'm really good." —DANA MACKENZIE



## JARGON WATCH

### Lightfoils

*n. pl.* Nanoscale glass rods designed to fly on a ray of light. Like solar sails, lightfoils are propelled by the pressure of photons. Unlike solar sails, they bend light, giving them controlled lift like airplane wings. Arrays of lightfoils could someday power micromachines.

### Gelivable

*adj.* Chinese Internet slang for "cool." Based on the characters *gei* and *li*, for "giving power," *gelivable* recently made news when it was used in a headline on the front page of the linguistically traditional *People's Daily*.

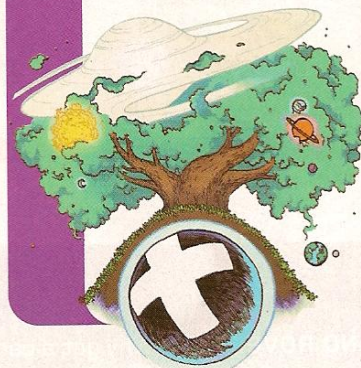
### Exposome

*n.* The master list of toxins encountered by the typical human body over a lifetime, ranging from environmental pollutants to natural byproducts of metabolism. The exposome may be bigger than the genome, and it almost certainly has a greater influence on health.

### Particle X

*n.* A supermassive particle theorized to be the common ancestor of all matter. Shortly after the big bang, it decayed to make everyday atoms as well as the elusive dark matter that gives galaxies most of their heft.

—Jonathon Keats  
(jargon@wired.com)



PHOTOGRAPH BY Noah Kalina