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Fungi use water droplet cannons to fling spores into the breeze

By Leah Crane

SOME fungi have a special talent: they shoot out their spores at high speed. Travelling just a centimetre away from the fungus is enough for the spores to catch the breeze and disperse, but exactly how fungi eject them has been a mystery for a century.

“Spore launching is responsible for [reproduction in] tens of thousands of species – about one-third of the fungal kingdom,” says Chuan-Hua Chen at Duke University in North Carolina, whose team has observed a cannon-like aspect to the process.

We have long known that the trick involved spores with a half-egg shape and two water drops: an elongated drop that forms on the flat side, and a small, spherical “Buller’s drop” near the spore’s rounded base. When the drops merge, the energy that maintained surface tension in the original drops is converted into kinetic energy, which launches the spore away from the parent fungus.

Chen’s team mimicked this in the lab for the first time. Using an inkjet printer, they built up a pair of droplets on a 200-micrometre-long styrofoam “spore” and watched with a high-speed camera (*Journal of the Royal Society Interface*, [doi.org/b93m](https://doi.org/10.1098/rsif.2017.1231)).

When the droplets merged, energy spread down the length of the new drop on the flat side of the spore. “This is like a cannon, with a spore as the cannonball,” says Chen. “The Buller’s drop is like the ammunition.”

The merger imparts momentum that can briefly move the spore at up to 1 metre per second, though air drag quickly slows it down.

“We knew about the droplets: basically, how much gunpowder there was,” says David Hu at the Georgia Institute of Technology in Atlanta. “But now they know if you put it all together what direction the cannon will fire.”

Such knowledge is key to applying it, such as in self-cleaning surfaces where water droplets latch on to dirt and fling it into the air.

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