

In Focus Good Vibrations

The lotus leaf has long been studied for its water-repellant properties. Its surface is pockmarked, filled with tiny crevices and hairs that trap air inside, forcing any moisture, or even a pelting rain, to bead and roll right off the surface. Yet one mystery has stumped researchers for years: how the leaf removes naturally occurring condensation, or dew.

Engineers had shown that under artificial conditions, they could saturate the leaf, filling the nooks with dew and rendering the surface absorbent. Yet when observed in the field, the leaf was never saturated.

It turns out—according to Chuan-Hua Chen, assistant professor of mechanical engineering and materials science at the Pratt School of Engineering, and graduate student Jonathan Boreyko—that the water does accumulate, but is forced out by tiny vibrations caused by the wind that are amplified by the leaf stem's slender structure.

Boreyko and Chen made the discovery by attaching a saturated leaf to a speaker, turning on a low-frequency sound, and watching as the vibrations forced the water out of the leaf.

The two researchers say the findings hold promise for industries in which condensation on, say, condenser pipes or electric wires is a problem: Making coatings that mimic the lotus leaf might allow the vibrations created by flowing water or electricity to push droplets off the surface.

