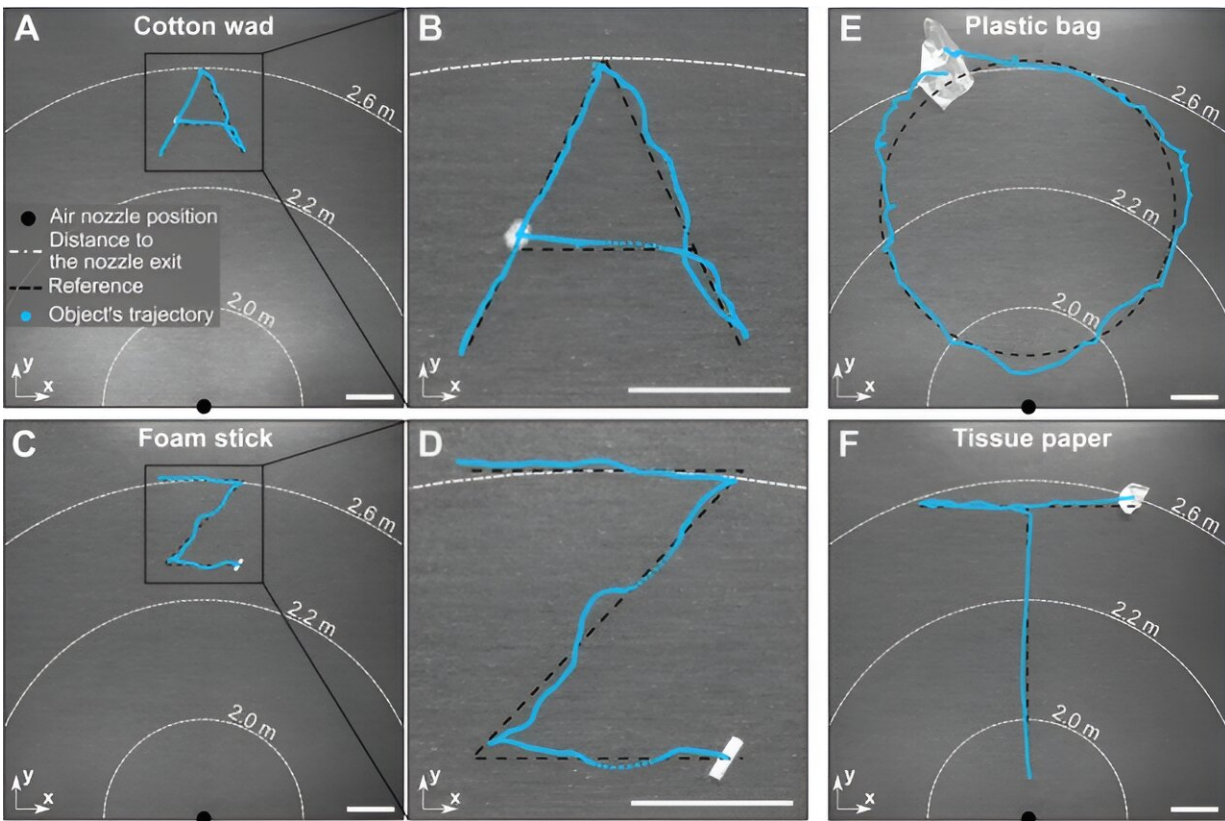


# Scientists harness the wind as a tool to move objects

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Researchers developed a device and algorithm that direct a jet to create an airflow field capable of remotely moving objects along various paths, including circular and complex letter-like trajectories. Credit: Aalto University / Artur Kopitca

Researchers have developed a technique to move objects around with a

jet of wind. The new approach makes it possible to manipulate objects at a distance and could be integrated into robots to give machines ethereal fingers.

The research is [published](#) in the journal *Advanced Intelligent Systems*.

"Airflow or wind is everywhere in our living environment, moving around objects like pollen, pathogens, droplets, seeds and leaves. Wind has also been actively used in industry and in our everyday lives—for example, in leaf blowers to clean leaves. But so far, we can't control the direction the leaves move—we can only blow them together into a pile," says Professor Quan Zhou from Aalto University, who led the study.

The first step in manipulating objects with wind is understanding how objects move in the airflow. To that end, a research team at Aalto University recorded thousands of sample movements in an artificially generated airflow and used these to build templates of how objects move on a surface in a jet of air.

The team's analysis showed that even though the airflow is generally chaotic, it's still regular enough to move objects in a controlled way in different directions—even back towards the nozzle blowing out the air.

"We designed an algorithm that controls the direction of the air nozzle with two motors. The jet of air is blown onto the surface from several meters away and to the side of the object, so the generated airflow field moves the object in the desired direction. The [control algorithm](#) repeatedly adjusts the direction of the air nozzle so that the airflow moves the objects along the desired trajectory," explains Zhou.

"Our observations allowed us to use airflow to move objects along different paths, like circles or even complex letter-like paths. Our method is versatile in terms of the object's shape and material—we can

control the movement of objects of almost any shape."

The [technology](#) still must be refined, but the researchers are optimistic about the untapped potential of their nature-inspired approach. It could be used to collect items that are scattered on a surface, such as pushing debris and waste to collection points. It could also be useful in complex processing tasks where [physical contact](#) is impossible, such as handling electrical circuits.

"We believe that this technique could get even better with a deeper understanding of the characteristics of the [airflow](#) field, which is what we're working on next," says Zhou.

**More information:** Shahriar Haeri et al, Meter-Scale Distance Manipulation of Diverse Objects with Jet-Induced Airflow Field, *Advanced Intelligent Systems* (2024). [DOI: 10.1002/aisy.202400174](https://doi.org/10.1002/aisy.202400174)

Provided by Aalto University

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