



Bats cause a stir: The secret of a bat's agile and acrobatic flight lies in its elastic and highly flexible wing membranes, which function like hands with skin between each finger. This allows the bat to control the curvature and compartmentation of their wings. Engineers and biologists call this membrane, which is so well adapted to flying, "aerodynamically active." Now, the mystery of the aerodynamics of bat flight has been revealed in Lund, Sweden: researchers, including scientists from the Max Planck Institute for Ornithology in Seewiesen, filmed the aerodynamic footprint of *Glossophaga soricina*. Brief laser flashes traveled through the air, which held tiny reflective drops of water, taking momentary images of the eddies. Like a flip-book, the series of reflective images show the characteristic turbulence caused by the bat's flight. Each beat of its wings creates turbulence on both the up and the down stroke

(the flow direction is indicated by the arrows; the length of the arrows shows the speed of the air molecules at each point). With the impact, the eddies at the center of the wings and at the wing tips rotate in different directions, creating a force that lifts the body with a down force on the wing tips. The agile bats were trained to stay in one position and allow the air to flow past them in the wind tunnel in Seewiesen. *Glossophaga soricina* is particularly suitable because it hovers to drink from flower calyxes, like a hummingbird. The researchers used this fondness for sweet nectar to attract the bat into the wind tunnel, setting up a thin tube containing diluted honey. As the bat drinks the honey, it hovers in one place for several seconds, which allowed scientists to observe the wake created by the wing beats.

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