

# Scientists start to unlock secrets of bird flight

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In this photograph provided by the Journal of Science, a female hummingbird is seen in flight. Researchers have determined that when birds, bats or bugs make a turn, all they have to do is start flapping their wings normally again and they straighten right out, an easier process than expected. (AP Photo/Journal of Science, Edwin Yoo)

(AP) -- For millennia, people have watched the birds and bees and wondered: "How do they do that?" Thanks to high-speed film and some persistent scientists, at least one of the secrets of flight is now revealed. When birds, bats or bugs make a turn, all they have to do is start flapping their wings normally again and they straighten right out.

That came as a surprise to researchers who thought turning and stopping took more steps.

Lead researcher Tyson L. Hedrick of the University of North Carolina compared it to sitting at a desk chair and turning left. It's a three-step

process, launch the turn by pushing with one foot, turn, then stop by pushing with the other.

It's a simpler, one-step process for flying animals, he explained in a telephone interview, launch a turn and then simply flap normally to end it and fly away.

The findings are reported in Friday's edition of the journal *Science*.

"We didn't expect things to fall out this neatly," he said, particularly since the process is the same for animals of all sizes from the fruit fly to the bat to the cockatoo.

"It's sort of unusual" to find a general rule to cover six orders of magnitude in size, he said.

The findings should help in the development of robotic flying machines, he said.

But, of course, this study focuses only on one type of maneuver, turning left or right, which is known as yaw in aviation.

There's still pitch - nose up or nose down - and roll, which is tilting left or right, to be dealt with.

"We picked basically the simplest turn you can imagine to make comparison," Hedrick said.

The situation does become more complicated with more complex maneuvers, "and that is clearly the next step," he said.

The report was welcomed by Bret W. Tobalske of the University of Montana, who said "the results will inform all future research into

maneuvering flight in animals and biomimetic flying robots."

"Now that technology has developed to the point where detailed measurements of flapping maneuvers have become feasible, a world of comparative research is opening," Tobalske, who was not part of the research team, said in a commentary on the paper.

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