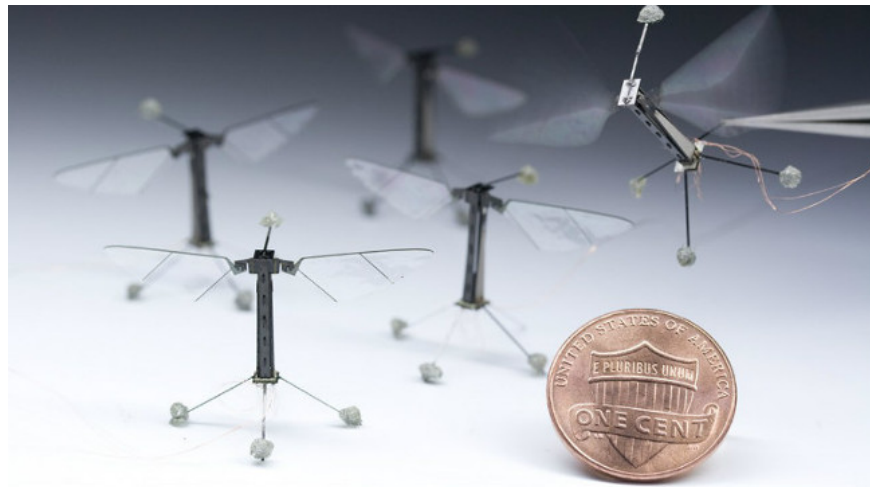


# Small autonomous robots can think and act like insects

Scientists are developing a new type of program that allows small robots to think and act like insects, making them more autonomous and adapting to a more complex environment.

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Researchers at Cornell University in the US, in collaboration with Harvard Microbiology Laboratory, have developed a 80 milligramme robot called RoboBee equipped with a variety of vision sensors, motion sensors and operations. Although the robot is still tied to electricity, Harvard researchers are developing new energy sources to eliminate this constraint.



Cornell algorithms will help RoboBee be more automated and adapt to complex environments without significantly increasing its weight. *"Being hit by a wind or a knocking door will make these small robots lose control. We are developing sensors and algorithms to allow RoboBee to avoid collisions, or if dropped, it still survived and still flew normally,"* said Silvia Ferrari, professor at Cornell University.

It will take the processing power of a computer to feel a strong wind, using hair-like metal probes like needles on real bees' wings, which use adjustment and planning to fly when it tries to land, researchers say.

As a way to narrow down the power consumption of robots, Ferrari saw the emergence of neuromorphic computer chips, processing electricity flowing in complex combinations, similar to neurons in the brain.

Unlike traditional chips, the combination of numbers 0 and 1 is binary, neuromorphic chips dramatically increase the current flowing in complex combinations, similar to neurons in the brain. Ferrari's lab is developing a new event-based sensor and control algorithm that mimics neural activity and can be implemented on neuromorphic chips.

The chips allow engineers to calculate more on the same load that requires significantly less energy than traditional processors. In addition to autonomy and resilience, Ferrari's lab also plans to equip RoboBee with new micro devices such as cameras, expandable antennas for tactile feedback, and contact sensors. Robot legs and air sensors are like tiny hairs.

Ferrari said: *"We are using RoboBee as a standard robot because it brings many challenges, but we think other robots will benefit from this development ."*

Robots can move at 0.44 m / sec, but Ferrari's lab is developing event-based algorithms that will help complement the robot's speed with greater agility.

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