Robot jellyfish takes to the air

Ultralight machine uses biologically inspired wing movements to achieve stable flight.

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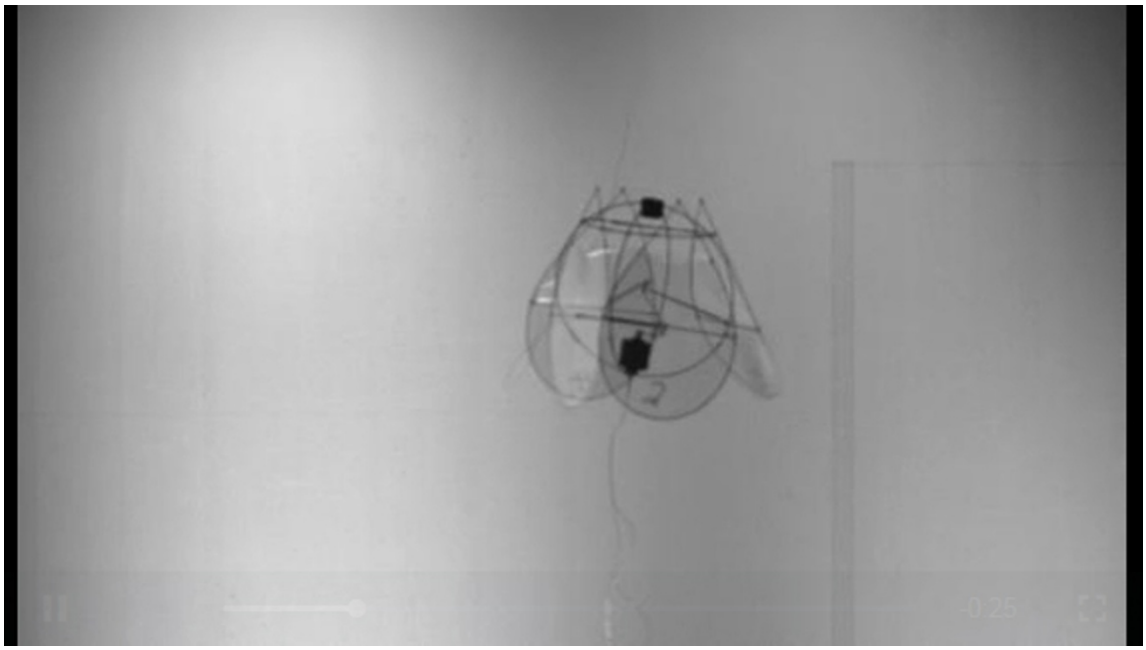
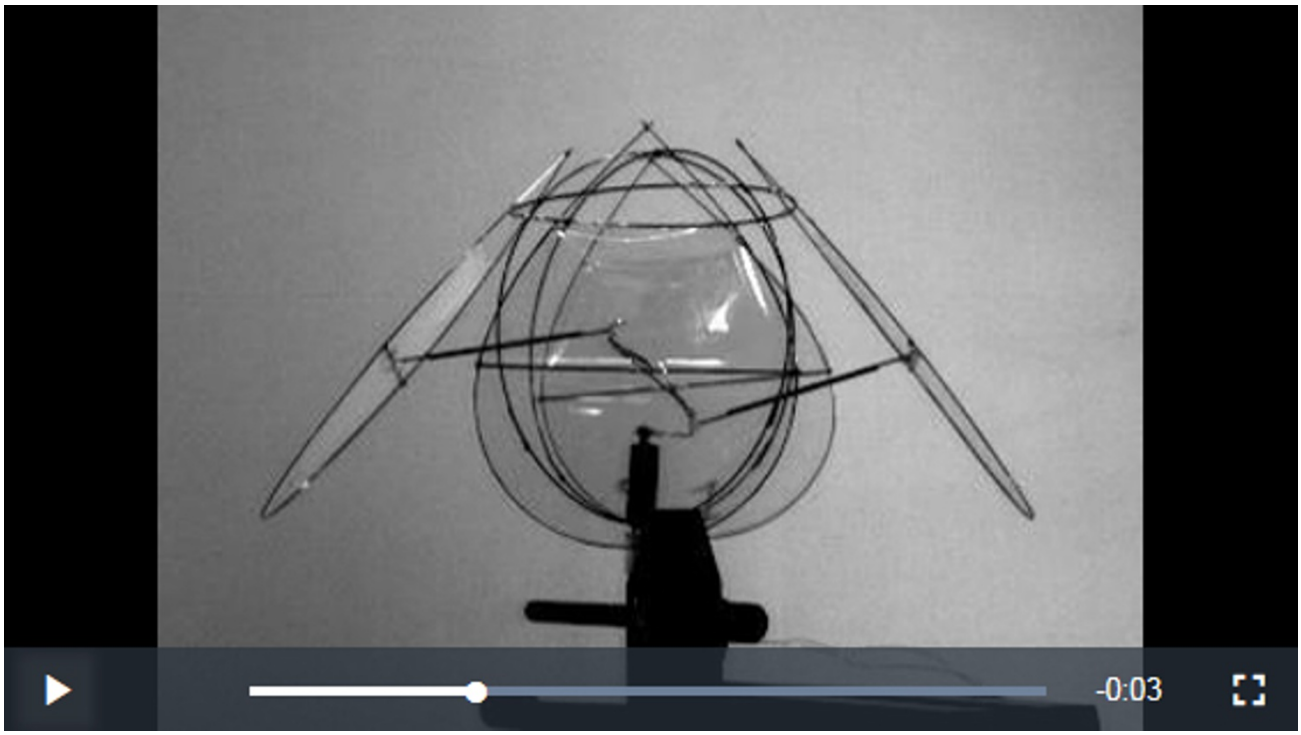


Its transparent wings fixed to a delicate wire framework recall the diaphanous, veined wings of an insect. But when the flying machine rises gracefully into the air, the undulations of its conical form resemble nothing so much as a jellyfish swimming through water, the device's electrical power lead trailing like a tentacle. It is, in short, like no other flying machine you have seen before.

This contraption[1], built by applied mathematicians Leif Ristroph and Stephen Childress of New York University, is not the first small ornithopter — a flying machine capable of hovering by a flapping-wing motion, such as that of dragonflies and hummingbirds. But what distinguishes Ristroph and Childress's craft from those such as the flapping insectoid robots reported by researchers last year[2] is that it can remain stable in flight using the movement of its wings alone, without the need for additional stabilizers or complex feedback control loops to avoid flipping over.

The jellyfish-like ornithopter has four droplet-shaped wings of Mylar plastic film about 5 cm wide, arranged in a cone. The wings are connected to an articulated carbon-fibre framework driven by a tiny motor (see video below), and the whole machine weighs just 2.1 grams in total. It can execute forward flight and stable hovering, and can right itself automatically from tilting. The researchers say that the motion of the wings generates a downward jet, as do the undulations of a jellyfish bell. The absence of this strategy among flying animals, they say, remains a mystery. The work is reported today in *Journal of the Royal Society Interface*[1].



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References

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2. Ma, K. Y., Chirarattananon, P., Fuller, S. B. & Wood, R. J. *Science* **340**, 603–607 (2013).