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Fruit flies modulate passive wing pitching to induce in-flight turns ATTILA BERGOU, LEIF RISTROPH, JOHN GUCKENHEIMER, ITAI COHEN, JANE WANG, Cornell University — To control their ?ight, insects must have mechanisms to modulate their wing kinematics. Exactly how insects control their wing motions to execute observed flight maneuvers is poorly understood. Here, we measure the wing and body kinematics of freely flying fruit flies performing turns and, in conjunction with numerical simulations and mathematical models, probe how they control their wing motion to ultimately alter their flight path. We find that these flies induce sharp turns by applying an overall bias to the passive pitching motion of their wings. We present a simple mechanical model for the wing actuation that quantitatively predicts the turning dynamics of the insect.

> Attila Bergou Cornell

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