

Abstract Submitted
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How do dragonflies recover from falling upside down? Z. JANE WANG, JAMES MELFI JR, Cornell University, ANTHONY LEONARDO, Janelia Farm Research Campus, HHMI — We release dragonflies from a magnetic tether so that they fall from an initially upside down orientation. To recover, the dragonflies roll their body 180 degrees every time. This set up offers an effective method for eliciting a stereotypical turn so that we can collect a large amount of data on the same turn. From the wing and body kinematics, we can tease out the strategy dragonflies use to roll their body. We record these flights with three zoomed in high-speed video cameras. By filming at 4000 to 8000fps, we measure the wing twist along each of the four wings as a part of the 3D wing kinematics. The shape of the wing twist depends on the interaction between the aerodynamic torque and the torque exerted by muscles, therefore providing clues on which of their four wings actively participate in creating the turn. By applying dynamic calculations to the measured kinematics, we further deduce the amount of torques dragonflies exert in order to turn.

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