

Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

Pitch-Perfect: How Do Flies Control Their Pitch Angle During Aerial Stumbles? SAMUEL WHITEHEAD, Cornell Univ, LUCA CANALE, École Polytechnique, TSEVI BEATUS, ITAI COHEN, Cornell Univ — The successful flight of flapping-wing insects is contingent upon a complex and beautiful relationship between sensory input, neural response, and muscular actuation. In particular, the inherent instabilities of flapping-wing flight require insects like *D. melanogaster* to constantly sense, process, and adjust for in-flight stumbles. Here we present an analysis of the mechanisms for pitch control in *D. melanogaster*. By gluing small ferromagnetic pins to the backs of the flies and applying an external magnetic field, we induce torques along the flies' pitch axis during free flight. Using an automated hull reconstruction technique developed in the lab, we analyze these torque events and the flies' subsequent recoveries in order to characterize the flies' response to external perturbations. Ultimately, we aim to develop a reduced-order controller model that will capture the salient aspects of the flies' recovery mechanism.

Samuel Whitehead
Cornell Univ

Date submitted: 31 Jul 2014

Electronic form version 1.4