Abstract Submitted
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**Analysis of Dragonfly Take-off Mechanism: Initial Impulse Generated by Aerodynamic Forces**[1] RUIJIE ZHU[2], AYODEJI BODE-OKE[3], YAN REN[4], HAIBO DONG[5], University of Virginia, FLOW SIMULATION RESEARCH TEAM — Take-off is a critical part of insect flight due to not only that every single flight initiates from take-off, but also that the take-off period, despite its short duration, accounts for a relatively large fraction of the total energy consumption. Thus, studying the mechanism of insect take-off will help to improve the design of Micro Air Vehicles (MAVs) in two major properties, the success rate and the energy efficiency of take-off. In this work, we study 20 cases in which dragonflies (species including *Pachydiplax longipennis*, *Epitheca Cynosura*, *Epitheca princeps* etc.) take off from designed platform. By high-speed photogrammetry, 3-d reconstruction and numerical simulation, we explore how dragonflies coordinate different body parts to help take-off. We evaluate how aerodynamic forces generated by wing flapping create the initial impulse, and how these forces help save energy consumption.

[1]Supported by NSF CBET-1343154
[2]Undergraduate Student
[3]Undergraduate Student
[4]Graduate Student
[5]Research Advisor

Haibo Dong
University of Virginia

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