

Expanding wings in crowded environments: hydraulics of wing expansion

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Background and Aims:

When a flying insect metamorphoses from juvenile to adult, it must unpack, unfold, and hydraulically open its wings with hemolymph. A critical bottleneck, if the mechanics of wing expansion are disturbed, an insect may lose the ability to fly, mate, or even feed. Some insects, such as locusts, have additional pressures: when reared in close quarters, locusts will eat each other during wing expansion. This type of environmental pressure (crowded vs. solitary) may influence the rate of wing expansion and behavior of the insect. When scientists investigate wing expansion, it is often through genetic pathways; however wing mechanics, specifically how the wing is structurally changing in real-time, is often ignored. This proposal examines the effects of crowding on wing expansion mechanics, rate, and a unique strategy called “autoexpansion”, which potentially supports faster expansion and expansion even if an individual is disturbed.

As a team member on this project, you will learn biomechanical experimental methods, in fast-paced experiments, about animal behavior and the process of wing expansion. There will be three teams, each led by one of the key scientists. Your responsibilities and skills learned on these teams may include — observing cages of locusts to time emergence, freezing locusts at specific times throughout wing expansion, fine-dissection of wings off of frozen locusts, imaging of wings, and data organization. All those who enjoy this project, and want to be an author on the manuscript, then we invite you to be apart of one or more of the manuscript prep. This includes: data organization, analysis of wing images, writing, editing, graphing, making figures, and statistics. **We will train you through this process, and work together as a team of scientists!**

