

Abstract Submitted
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Mimicking Atmospheric Flow Conditions to Examine Mosquito Orientation Behavior. YI-CHUN HUANG, Princeton University, NEIL VICKERS, University of Utah, MARCUS HULTMARK, Princeton University — Host-seeking female mosquitoes utilize a variety of sensory cues to locate potential hosts. In addition to visual cues, other signals include CO₂, volatile skin emanations, humidity, and thermal cues, each of which can be considered as passive scalars in the environment, primarily distributed by local flow conditions. The behavior of host-seeking female mosquito vectors can be more thoroughly understood by simulating the natural features of the environment through which they navigate, namely the atmospheric boundary layer. Thus, an exploration and understanding of the dynamics of a scalar plume will not only establish the effect of fluid environment on scalar coherence and distribution, but also provide a bioassay platform for approaches directed at disrupting or preventing the cycle of mosquito-vectored disease transmission. In order to bridge between laboratory findings and the natural, ecologically relevant setting, a unique active flow modulation system consisting of a grid of 60 independently operated paddles was developed. Unlike static grids that generate turbulence within a predefined range of scales, an active grid imposes variable and controllable turbulent structures onto the moving air by synchronized rotation of the paddles at specified frequencies.

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