Bulletin of the American Physical Society

75th Annual Meeting of the Division of Fluid Dynamics
Volume 67, Number 19
Sunday–Tuesday, November 20–22, 2022; Indiana Convention Center, Indianapolis, Indiana.

Session A36: Turbulence: Flow Generation and Flow Measurements Developments
8:00 AM–9:57 AM, Sunday, November 20, 2022
Room: 245

Chair: Nimish Pujara, University of Wisconsin-Madison

Abstract: A36.00005 : Understanding the influence of atmospheric flow on scalar-mediated insect orientation behavior*
8:52 AM–9:05 AM

← Abstract →

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Under natural conditions, many flying insects locate resources vital to survival and reproduction by responding to, and tracking, plumes of scalar cues present in their surroundings (e.g. odors, humidity, temperature, carbon dioxide). The spatio-temporal distribution of the scalar field is a function of turbulent fluctuations, or other unsteady flow phenomena, that introduce a large range of length and time scales into the flow present in the atmospheric boundary layer (ABL) or in-built environments. Yet, we know very little about the behavioral strategies by which insects accomplish this remarkable feat under the turbulent conditions characteristic of natural habitats. Much of our current understanding of the insect behavioral mechanisms come from no-flow, limited flow, or laminar-flow wind tunnel experiments. Addressing this limitation would have several important implications, including deployment of optimized distraction strategies and innovative tracking strategies for autonomous vehicles in hazardous environments. Here, we present the preliminary field measurements of the environmental conditions correlated with mosquito activity, made using very-large scale bubble velocimetry developed in-house. A novel, cost-effective turbulence generating grid has been developed to reproduce the wide range of flow scales to enable controlled wind tunnel studies.

*This work was supported by National Science Foundation.