

Abstract Submitted
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Characterization of a multi-fan-array wind tunnel studying insect flight behavior.¹ AUSTIN LOPEZ, FLORIS VAN BREUGEL, University of Nevada, Reno — How flying insects navigate dynamic wind environments with turbulence and shear flow remains an activate area of investigation. To study their behavior in a controlled manner, we are developing a multi-fan-array wind tunnel with a 90x45x45 cm cubed working section. The fan array consists of 36 80mm fans laid out in a 6x6 grid, and each fan can be independently controlled to provide wind speeds between 0 and 50 cm/s. The fans can be operated in three different configurations designed to produce laminar, shear, and turbulent flow. To characterize the fluid flow in each of these conditions, we will use a hot wire anemometer mounted to a 2D plotter to measure with wind speed and turbulent intensity in several cross sections of the wind tunnel, for each of these three configurations. Preliminary results indicate that after the addition of a horizontal dividing plate we could measure a significant change in wind speed between the top and bottom sections of 20cm/s. After characterizing the fluid flow we will determine how each of the three conditions influences the flight behavior of fruit flies using a 3D multi-camera tracking system. Our results will lay a foundation for studying how insects behave in turbulent wind environments, with a particular future interest in how turbulence modulates their odor plume tracking behavior.

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