

Abstract Submitted
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Mapping an outdoor odor plume using a mobile chemical sensor¹

ARUNAVA NAG, FLORIS VAN BREUGEL, University of Nevada, Reno — How insects follow turbulent odor plumes over long distances under shifting wind conditions is an active area of investigation. Small scale wind tunnel experiments and simulations have hypothesized that they may use odor plume encounter intermittency as an indicator of the distance to the odor source. To determine if this strategy might work under natural outdoor wind conditions at large spatial scales on the order of 10 meters, we set out to map a real world odor plume using a mobile chemical sensor. The experiment was set up in an open space with no high-rise buildings, land surfaces, or trees within a mile radius. The setup included a propylene odor plume source, which was surrounded by three wind sensing stations coupled with GPS units. A mobile sensor hub was assembled which was mounted with a high precision GPS, wind and odor sensor, an inertial measurement unit, and a camera for visual odometry. The data we collected will be analyzed to estimate outdoor odor plume dynamics on a scale of 10 meters to test the hypothesis that plume encounter intermittency is correlated with distance to the source. Furthermore, we will explore the possibility of using our data to build an efficient virtual odor plume simulator to test algorithms for tracking turbulent odor plumes.

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