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Identifying and quantifying interactions in a laboratory swarm JAMES G. PUCKETT, Yale University, DOUGLAS H. KELLEY, Massachusetts Institute of Technology, NICHOLAS T. OUELLETTE, Yale University — Emergent collective behavior, such as in flocks of birds or swarms of bees, is exhibited throughout the animal kingdom. Many models have been developed to describe swarming and flocking behavior using systems of self-propelled particles obeying simple rules or interacting via various potentials. However, due to experimental difficulties and constraints, little empirical data exists for characterizing the exact form of the biological interactions. We study laboratory swarms of flying *Chironomus riparius* midges, using stereoimaging and particle tracking techniques to record three-dimensional trajectories for all the individuals in the swarm. We describe methods to identify and quantify interactions by examining these trajectories, and report results on interaction magnitude, frequency, and mutuality.

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