

## Description of additional supplementary files

**Supplementary Movie 1:** A  $D = 9.00$  cm cell containing  $N = 100$  fire ants showing the formation and break up of short-lived clusters of stationary ants. The video plays at  $20 \times$  the speed at which it was recorded.

**Supplementary Movie 2:** A  $D = 4.50$  cm cell containing  $N \approx 625$  fire ants. The ants form dynamic heterogeneities so that there are dense clusters of stationary ants surrounded by a background of actively moving ants. The video plays at  $50 \times$  the speed at which it was recorded.

### Supplementary Software:

“autotracker.mat” – algorithm used to detect the raw ants in images, track them, and then calculate their frame-by-frame correlations.

“lengthscale.mat” – algorithm used to calculate the average size of the clusters in the high-density experiment.

“two\_densities.mat” – algorithm used to detect the average densities of each of the two phases.