Emergent Behavior in Collective Dynamics

A fascinating aspect of collective dynamics is the self-organization of small-scales and their emergence as higher-order patterns -- clusters, flocks, tissues, parties.

The emergence of different patterns can be described in terms of few fundamental “rules of interactions”. I will discuss recent results of the large-time, large-crowd dynamics, driven by anticipation that tend to align the crowd, while other pairwise interactions keep the crowd together and prevent over-crowding.

In particular, I address the question how short-range interactions lead to the emergence of long-range patterns, comparing geometric vs. topological interactions.

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