

# 2011 SIAM Conference on Analysis of Partial Differential Equations

Part of [MS5 Recent Developments in Self-organized Dynamics](#)

## A New Model for Self-organized Dynamics and its Flocking Behavior

**Abstract.** Self-organized dynamics is driven by 'rules of engagement', which describe how each agent interacts with its 'neighbors'. They consist of long-term attraction, mid-range alignment and short-range repulsion. Many self-propelled models are driven by the balance between these three forces, which yield emerging structures of interest. Here, we introduce a new particle-based model driven by self-alignment, which addresses several drawbacks of existing models for self-organized dynamics. We will explain the emerging behavior of flocking in our proposed model, when the non-symmetric pairwise interactions between its agents decays sufficiently slow. The methodology presented here is based on the new notion of active sets, which carries over from particle to kinetic and hydrodynamic descriptions.

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