

# TEMPLE UNIVERSITY MATHEMATICS COLLOQUIUM

**Eitan Tadmor**

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will speak on

## **A New Model for Self-Organized Dynamics**

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. Examples in social contexts include the consensus of voters, traffic flows, or evolution of languages, and examples of biological processes include the formation of flocks of birds or school of fish, tumor growth, etc.

We will survey a few recent examples of such models driven by self-alignment. In particular, we introduce a new particle-based model which, we argue, addresses several drawbacks of existing models for self-organized dynamics. The model is independent of the number of agents: only their geometry in phase space is involved. We will explain the emerging behavior of flocking in the proposed model, when the pairwise long-range 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, and we discuss the unconditional flocking at the level of hydrodynamic description.

MONDAY, 12 SEPTEMBER 2011

LECTURE AT 4:00 PM

COFFEE, TEA, AND REFRESHMENTS FROM 3:30-5:00 PM

ROOM 617, WACHMAN BUILDING

DEPARTMENT OF MATHEMATICS