

1058-92-140

**Maria R D'Orsogna\*** ([dorsogna@csun.edu](mailto:dorsogna@csun.edu)), California State University at Northridge, Los Angeles, CA 90405. *Two dimensional swarming patterns: from discrete to continuum descriptions.*

Schools of fish, flocks of birds and swarms of insects arise in response to external stimuli or by direct interaction, and are able to fulfill tasks much more efficiently than single agents. How do these patterns arise? What are their properties? How are individual characteristics linked to collective behaviors? In this talk we discuss various aspects of biological swarming. Starting from a non-linear system of self propelled discrete agents that interact via pairwise attractive and repulsive potentials we predict aggregation morphologies, such as flocks and mills. We also relate the interaction potential to the collapsing or dispersing behavior of aggregates as the number of constituents increases. Finally, we discuss passage to the continuum, via kinetic and hydrodynamic equations. (Received February 11, 2010)