

College of Arts and Sciences  
**Department of Mathematics**  
University of South Carolina

# Math Colloquium

*Self-organized dynamics: Aggregation and Flocking*

Changhui Tan, Rice University



**Thursday**  
February  
**8th**

**4:30 PM**  
**LeConte 412**

Self-organized behaviors are commonly observed in nature and human societies, such as bird flocks, fish swarms and human crowds. In this talk, I will present some celebrated mathematical models, with simple small-scale interactions that lead to the emergence of global behaviors: aggregation and flocking. The models can be constructed through a multiscale framework: from microscopic agent-based dynamics, through kinetic mean-field descriptions, to macroscopic fluid systems. I will discuss some recent analytical and numerical results on the derivation of the systems in different scales, global wellposedness theory, large time behaviors, as well as interesting connections to some classical equations in fluid mechanics.