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Louis F Rossi*, Department of Mathematical Sciences, University of Delaware, Newark, DE 19716, **Jennifer Miller**, Department of Mathematical Sciences, University of Delaware, Newark, DE 19716, **Allison Kolpas**, Department of Mathematical Sciences, University of Delaware, Newark, DE 19716, and **Plinio Juchem Neto**, Department of Mathematical Sciences, University of Delaware, Newark, DE 19716. *Continuum modeling and analysis of swarming with three interaction zones.*

In this project, we derive and analyze a continuum model for swarming with three interaction zones. The goal of this project is to develop a theoretical framework so that we can predict swarm phases such as parallel translation and milling from swarm parameters. We present a first order kinematic model and second order dynamic models for swarming. Linear analysis correctly predicts the stability of infinite, uniform translating states. Individual based simulations suggest that in certain regimes, patches evolve away from a uniform state toward an axisymmetric, variable density, coherent attractor. (Received August 17, 2010)