1067-35-620 **Nancy Rodriguez*** (nrodriguez@math.ucla.edu), Department of Mathematics, UCLA, Room MS 7601, Math Sciences Bldg, Los Angeles, CA 90095. *Local Well-Posedness and Blow-up Results for an Aggregation Equations and Patlak-Keller-Segel Models with Degenerate Diffusion.*

Recently, there has been much interest in modeling the competition between a species' desire to aggregate and the desire for personal space, referred to as dispersal. Two mathematical systems which model this competition are aggregation diffusion equations and Patlak-Keller Segel models, originally developed to model chemotaxis. Although the research of these two models have evolved separately they model the same phenomena. Classically, in the PKS equation, aggregation is modeled via convolution with the Newtonian or Bessel potential. On the other hand, the aggregation equation has been studied with more regular kernels. Our work focuses on unifying and extending the well-posedness theory of these equations. In particular, we study the well-posedness of an aggregation equation with degenerate diffusion, to model over-crowding effects, where the aggregation is modeled via the convolution with potentials as singular as the Newtonian potential. We generalize the notion of criticality seen in the PKS model with power-law diffusion and we observe a similar critical mass phenomenon. In this talk I focus on the local well-posedness of weak solutions. Furthermore, I discuss some blow-up results for supercritical systems and for a subclass of critical systems with large enough mass. (Received September 11, 2010)