1135-49-1644 **Kathleen Craig*** (kcraig@math.ucsb.edu), Santa Barbara, CA 93111. *From slow diffusion to a hard height constraint: characterizing congested aggregation.*

For a range of physical and biological processes—from dynamics of granular media to biological swarming—the evolution of a large number of interacting agents is modeled according to the competing effects of pairwise attraction and (possibly degenerate) diffusion. In the slow diffusion limit, the degenerate diffusion formally becomes a hard height constraint on the density of the population, as arises in models of pedestrian crown motion. Motivated by these applications, we bring together new results on the Wasserstein gradient flow of nonconvex energies with the theory of free boundaries to study a model of Coulomb interaction with a hard height constraint. Our analysis demonstrates the utility of Wasserstein gradient flow as a tool to construct and approximate solutions, alongside the strength of viscosity solution theory in examining their precise dynamics. By combining these two perspectives, we are able to prove quantitative estimates on convergence to equilibrium, which relates to recent work on asymptotic behavior of the Keller-Segel equation. This is joint work with Inwon Kim and Yao Yao. (Received September 24, 2017)