1156-35-316 **Matias G. Delgadino**, **Xukai Yan*** (xukai.yan@math.gatech.edu) and **Yao Yao**. *Uniqueness and non-uniqueness of steady states of aggregation-diffusion equations.*

In this talk, I will discuss a nonlocal aggregation equation with degenerate diffusion, which describes the mean-field limit of interacting particles driven by nonlocal interactions and localized repulsion. When the interaction potential is attractive, it is previously known that all stationary solutions must be radially decreasing up to a translation, but uniqueness (for a given mass) within this class was open, except for some special interaction potentials. For general attractive potentials, we show that the uniqueness/non-uniqueness criteria are determined by the power of the degenerate diffusion, with the critical power being $m = 2$. In the case $m \geq 2$, we show the stationary solution for any given mass is unique for any attractive potential, by tracking the associated energy functional along a novel interpolation curve. In the case $1 < m < 2$, we construct examples of smooth attractive potentials, such that there are infinitely many radially decreasing stationary solutions of the same mass. (Received January 27, 2020)