Micro-interactions play a fundamental role in molding the macroscopic behavior of processes involving a dispersed system, such as spray fluidized bed agglomeration. In spray fluidized bed agglomeration, particles get aggregated and dried simultaneously by passing through many complex micro-processes which change the physical properties of the particles such as flowability, density or porosity, shape etc. The presentation will explain the probabilistic aspect of translating effects of such micro-interactions onto a macroscale level such as population balances.