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Aggregation models with limited choice and the multiplicative coalescent

The last few years has seen an enormous amount of interest on various random graph models. A tremendous number of models have been proposed ranging from static models (such as the famous Erdos-Renyi random graph model and the configuration model) to more dynamic models, models that change over time such as the preferential attachment model. Many of these models are formed via the addition of edges to an existing configuration. In such models there exists a critical "time" λ such that below this time, all components are small (the maximal component scales like $\log n$, where n is the number of vertices) while above this time a giant component emerges (where a unique component which scales like cn). We study the emergence of the giant component in a particularly famous example called the Bohman-Frieze process that incorporates limited choice in this process of growth, wherein at each stage one chooses two edges uniformly at random and then uses the first if it connects two singletons, else we use the second edge. We study fine scaled asymptotics of the component sizes at criticality and show how after proper rescaling and recentering, the process of emergence of the giant component through the critical scaling window is described by the standard multiplicative coalescent.

Joint work with Xuan Wang and Amarjit Budhiraja at UNC Chapel Hill