Free energy landscape of sticky-sphere clusters
Miranda Holmes-Cerfon, Courant Institute of Mathematical Sciences

Particles that live on the mesoscale (nanometres to micrometres) commonly interact over ranges much shorter than their diameters, so it is natural to treat them as "sticky," interacting only when they touch exactly. The energy landscape of a collection of N hard sticky spheres becomes a collection of manifolds (typically) of different dimensions, each one defined by the configuration space of a graph with given edge lengths. I will describe a computational approach to understanding this energy landscape for small N, explain how this has brought insight into experiments on colloidal clusters, and describe some challenges associated with singularities in the landscape, several of them still unresolved.