

Reconstructing the Geometry of Random Geometric Graphs

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Random geometric graphs are random graph models defined on metric spaces. Such a model is defined by first sampling points from a metric space and then connecting each pair of sampled points with probability that depends on their distance, independently among pairs. In this work we show how to efficiently reconstruct the geometry of the underlying space from the sampled graph under the manifold assumption, i.e., assuming that the underlying space is a low dimensional manifold and that the connection probability is a strictly decreasing function of the Euclidean distance between the points in a given embedding of the manifold in $\mathbb{R}^N$. Our work complements a large body of work on manifold learning, where the goal is to recover a manifold from sampled points sampled in the manifold along with their (approximate) distances. (Joint work with P. Jiradilok and E. Mossel).

In Special Session 39 on Interplay between Asymptotic Geometric Analysis, Discrete Geometry, and Combinatorics at the Mathematical Congress of the Americas 2025.