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Reconstructing manifolds and functions from random samples.

We survey the work of Niyogi, Smale and Weinberger which provides explicit bounds on the number of uniform random samples required to reconstruct the homotopy type of an underlying compact Riemannian manifold with high confidence. We also describe an alaogous result for Lipschitz functions between such manifolds: one can recover the action on homotopy of such a function using sampled points on the domain, the codomain, and values of the function restricted to the sampled domain points. (Received September 18, 2015)