1094-60-342 **Mauro Maggioni*** (mauro@math.duke.edu), BOX 90320, Department of Mathematics, Duke University, Durham, NC 27708. *Geometric Multi-Resolution Analysis and Approximation of probability measures in high dimensions.*

Given n i.i.d. samples from a probability measure μ in $\mathbb{R}^D$, we study the problem of constructing efficiently an approximation $\hat{\mu}_n$ that is close to μ in a Wasserstein metric. The approximation scheme we propose is suited for the situation when μ is concentrated near a locally-linear low-dimensional set. This is motivated by the analysis of large data sets in high-dimensions, which in many applications appear to have low intrinsic dimension. Our construction is baed on a hierarchical multi-resolution analysis on the data, where at each level of a hierarchy an approximation to μ is constructed, and is suitably refined at finer scales depending on the number of samples available and on the complexity of μ. The approximation guarantees are, under suitable assumptions on μ, independent of the ambient dimension, are non-asymptotic, and show that with high probability we obtain an estimator $\hat{\mu}_n$ of μ that approximates μ suitably rapidly in n. Fast algorithms implement this construction and applications will be demonstrated to real world data sets. (Received August 27, 2013)