1144-41-214 **Wenjing Liao*** (wliao60@gatech.edu), Skiles 258, 686 Cherry St NW, Atlanta, GA 30313, and **Mauro Maggioni** and **Stefano Vigogna**. *Multiscale methods for high-dimensional data with low-dimensional structures.*

Many data sets in image analysis and signal processing are in a high-dimensional space but exhibit a low-dimensional structure. We are interested in building efficient representations of these data for the purpose of compression and inference. In the setting where a data set in R^D consists of samples from a probability measure concentrated on or near an unknown d-dimensional manifold with d much smaller than D, we consider two sets of problems: low-dimensional geometric approximations to the manifold and regression of a function on the manifold. In the first case, we construct multiscale low-dimensional empirical approximations to the manifold and give finite-sample performance guarantees. In the second case, we exploit these empirical geometric approximations of the manifold and construct multiscale approximations to the function. We prove finite-sample guarantees showing that we attain the same learning rates as if the function was defined on a Euclidean domain of dimension d. In both cases our approximations can adapt to the regularity of the manifold or the function even when this varies at different scales or locations. (Received August 25, 2018)