1056-68-1536 **Partha Niyogi*** (niyogi@cs.uchicago.edu), 1100 E. 58th Street, Ryerson 167, Chicago, IL 60637. *A Geometric Perspective on Learning Theory and Algorithms.*

Increasingly, we face machine learning problems in very high dimensional spaces. We proceed with the intuition that although natural data lives in very high dimensions, they have relatively few degrees of freedom. One way to formalize this intuition is to model the data as lying on or near a low dimensional manifold embedded in the high dimensional space. This point of view leads to a new class of algorithms that are "manifold motivated" and a new set of theoretical questions that surround their analysis. A central construction in these algorithms is a graph or simplicial complex that is data-derived and we will relate the geometry of these to the geometry of the underlying manifold. Applications to embedding, clustering, classification, and semi-supervised learning will be considered. (Received September 22, 2009)