1096-60-2654 **Seonja Kim*** (sjkim@njit.edu), New Jersey Institute of Technology, University Heights, Department of Mathematical Sciences, Newark, NJ 07102-1982, and **Maxim J. Goldberg** (mgoldber@ramapo.edu), Ramapo College of New Jersey, 505 Ramapo Valley Rd., Mahwah, NJ 07430. *Using l_1 to define a natural diffusion distance.* Preliminary report.

Diffusion approaches have been used in the last several years to describe and analyze the underlying geometry of a given data set. One starts by constructing a diffusion matrix—a Markov matrix modeling discretized heat flow (or possibly a nearest neighbor random walk) on the data. The eigenvalues and eigenvectors of this matrix (or its symmetric version) can be used to build an isometric embedding of the data points. This isometry is expressed in the l_2 metric, and often leads to l_2 being used in defining a related diffusion distance. However, l_2 does not seem very natural for this situation since the rows of the diffusion matrix are probability densities which are normalized in l_1. Another indication that l_1 is more desirable than l_2 arises from considering the continuous case situation of heat flow in n-dimensional Euclidean space. An L_2 analog gives rise to Euclidean distance with time scale dependent on the dimension n, while an L_1 analog involves Euclidean distance with time scale independent of n, which seems intrinsically more desirable.

In this talk we present our investigation of defining and exploring the properties of l_1-based diffusion distances. (Received September 17, 2013)