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**Stephen J Young\*** ([stephen.young@pnnl.gov](mailto:stephen.young@pnnl.gov)), **Tobias Hagge**, **Patrick Mackey**, **Kathleen Nowak** and **Jennifer Webster**. *Not all communities are far apart: Incorporating community distance into community detection*. Preliminary report.

Recently Mendel and Naor, Dumitriu and Radcliffe, and Radcliffe and Williamson have generalized the idea of associated eigenvalues and eigenvectors to a graph to a non-linear (non-Euclidean) setting. We combine their ideas with the well studied techniques of spectral community detection to develop a new non-linear means of community detection. These techniques naturally incorporate distance between communities and can give insight into the relationship between various communities present in a network. (Received September 20, 2016)