1106-91-1213 **Dane Taylor*** (taylordr@live.unc.edu). *WTM maps for complex contagion on noisy geometric networks.*

Social and biological contagions are often strongly influenced by the spatial embedding of networks. In some cases (e.g., Black Death), contagions spread as a wave through space. In many modern contagions, however, long-range edges (e.g., due to airline transportation or communication media) allow clusters of a contagion to arise in distant locations. We study these competing phenomena for the Watts threshold model (WTM) of complex contagions on empirical and synthetic noisy geometric networks, which are networks that are spatially–embedded on a manifold and consist of both short-range and long-range edges. Our approach involves constructing WTM maps that use multiple contagions to map the nodes as a point cloud, which we analyze using tools from data topology and homology. Importantly, for contagions predominantly exhibiting wavefront propagation, we often identify a noisy geometric network's underlying manifold in the point cloud, highlighting our approach also as a tool for inferring low-dimensional (e.g., manifold) structure in networks. Our work thereby finds a deep connection between the fields of dynamical systems and nonlinear dimension reduction. (Received September 11, 2014)