1163-68-1548 **Matthew J Hirn*** (mhirn@msu.edu), 428 South Shaw Lane, East Lansing, MI 48824. *Spectral Theory and Geometric Deep Learning.*

Neural networks on graphs and manifolds generalize convolutional neural networks for images and other signals by arranging their artificial neurons according to the underlying structure imposed by the graph or manifold. Ideas from spectral graph theory and spectral geometry play a prominent role here, particularly for so-called "spectral-based" networks. In this talk we'll consider a wide class of networks, including those that would not be classified as spectral-based, and we'll show that nevertheless ideas from spectral graph theory can still be used to obtain insights into the nature of the network, including properties related to invariance and stability. In many cases analogous results on manifolds hold as well. Time permitting, we'll discuss some problems for the case when the graph approximates a manifold, and the role manifold learning can play here. (Received September 15, 2020)