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**James J Madden**, Baton Rouge, LA , and **Trevor McGuire\*** (tmcguire@iwu.edu),  
Bloomington, IL. *Infinite Neighbor Complexes*.

Scarf introduced the idea of the complex of neighbors in the context of integer programming in 1981. This work was given an algebraic application by Bayer, Peeva and Sturmfels in the late 1990s; that application was a remarkable connection between the neighbor complex and free resolutions of monomial ideals in  $k[x_1, \dots, x_n]$ . This work was later extended by Bayer and Sturmfels to include a similar technique for resolving lattice ideals.

Underpinning both of these applications was the requirement that the set of neighbors be *generic*. However, if the set was not generic, in both applications, there is a technique of *deformations*, in which the ideal in question is replaced with an ideal in the group algebra  $k[\mathbb{R}^n]$ . This application shows the usefulness of considering subsets of  $\mathbb{R}^n$  as a base set for Scarf's construction.

In this presentation, we will look at the original tools that Scarf developed for subsets of  $\mathbb{N}^n$ , and apply them to subsets of  $\mathbb{R}^n$ . The main result is to provide the technicalities and special considerations needed to use infinite neighbor complexes to index resolutions. (Received September 15, 2016)