

# Balanced vertex decomposable simplicial complexes and their h-vectors

*Jennifer Biermann*  
*Lakehead University*

Given any finite simplicial complex  $\Delta$ , we will discuss how to construct a simplicial complex  $\Delta_\chi$  that is balanced and vertex decomposable. This new simplicial complex has the property that  $h$ -vector of the simplicial complex  $\Delta_\chi$  is precisely the  $f$ -vector of the original complex  $\Delta$ . This construction generalizes the “whiskering” construction of Villarreal, and Cook and Nagel. As an application, we will show how to use this construction to construct a square-free monomial ideal with a particular sequence of Betti numbers obtained from the  $f$ -vector of a simplicial complex.