1154-43-2555 **John Jasper*** (john.jasper@sdstate.edu), Brookings, SD 57006. *Harmonic equiangular tight fames and their combinatorial generalizations.*

It is a well established phenomenon that optimal packings of points in metric spaces often exhibit large amounts of symmetry. One of the richest classes of optimal packings, the so-called equiangular tight frames (ETFs), are no exception. Indeed, a large family of ETFs known as harmonic ETFs arise as the orbit of a single vector under the action of some abelian group. However, when we look closely at these harmonic ETFs we often observe that the group that seems to be calling the shots can actually be replaced by a more common combinatorial object. In this talk we will see a couple of instances of this generalization from algebra to combinatorics and how these generalizations greatly enrich the theory of ETFs. (Received September 17, 2019)