Back in the nineties Pak and Stanley introduced a labeling of the regions of a $k$-Shi arrangement by $k$-parking functions and proved its bijectivity. Duval, Klivans, and Martin considered a modification of this construction associated with a graph $G$. They introduced the $G$-Shi arrangement and a labeling of its regions by $G$-parking functions. They conjectured that their labeling is surjective, i.e. every $G$-parking function appears as a label of a region of the $G$-Shi arrangement. Later Hopkins and Perkinson proved this conjecture. In particular, this provided a new proof of the bijectivity of Pak-Stanley labeling in the $k = 1$ case. We generalize Hopkins-Perkinson’s construction to the case of arrangements associated with oriented multigraphs. In particular, our construction provides a simple straightforward proof of the bijectivity of the original Pak-Stanley labeling for arbitrary $k$.

In this talk, I will introduce necessary background and definitions and sketch the proof of the surjectivity of the labeling. (Received August 14, 2014)