Divisors on graphs, Connected flags, and Syzygies

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This talk is based on joint work with Farbod Shokrieh. We study the binomial and monomial ideals arising from linear equivalence of divisors on graphs from the point of view of Gr\"obner theory and hyperplane arrangement. We explicitly construct free resolutions for these ideals using Schreyer's algorithm. Indeed we describe, combinatorially, a minimal Gr\"obner basis for all higher syzygy modules. The description of the Betti numbers is in terms of the ``connected flags'' of the graphs. If time allows I will go over some interesting connections with the oriented matroids and Lawrence ideals.