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**Beata Casiday** and **Selvi Kara\*** ([selvi@math.utah.edu](mailto:selvi@math.utah.edu)), Salt Lake City, UT 84103. *Betti numbers of weighted oriented graphs.*

Let  $\mathcal{D}$  be a weighted oriented graph and  $I(\mathcal{D})$  be its edge ideal. In this talk, we investigate the Betti numbers of  $I(\mathcal{D})$  via upper-Koszul simplicial complexes, Betti splittings and the mapping cone construction. In particular, we provide recursive formulas for the Betti numbers of edge ideals of several classes of weighted oriented graphs. We also identify classes of weighted oriented graphs whose edge ideals have a unique extremal Betti number which allows us to compute the regularity and projective dimension for the identified classes. Furthermore, we characterize the structure of a weighted oriented graph  $\mathcal{D}$  on  $n$  vertices such that  $\text{pdim}(R/I(\mathcal{D})) = n$  where  $R = k[x_1, \dots, x_n]$ . This is joint work with Beata Casiday (who was a high school student at the time of this project). (Received January 06, 2022)