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Department of Mathematics, 601 University Dr., Texas State University, San Marcos, TX 78666,  
and **Liana Segal and Sandra Spiroff**. *Cellular Resolutions and Powers of Monomial Ideals*.

Using combinatorial structures to obtain resolutions of monomial ideals is an idea that traces back to Diana Taylor's thesis, where a simplex associated to the generators of a monomial ideal was used to construct a free resolution of the ideal. This concept has been expanded over the years, with various authors determining conditions under which simplicial or cellular complexes can be associated to monomial ideals in ways that produce a free resolution.

In a research project initiated at a BIRS workshop "Women in Commutative Algebra" in Fall 2019, the authors studied simplicial and cellular structures that produced resolutions of powers of monomial ideals. This talk will focus on powers of square-free monomial ideals of projective dimension one. Faridi and Hersey proved that a monomial ideal has projective dimension one if and only if there is an associated tree that supports a free resolution of the ideal. The talk will show how, for each power  $r > 1$ , to use the tree associated to a square-free monomial ideal  $I$  of projective dimension one to produce a cellular complex that supports a free resolution of  $I^r$ . Moreover, each of these resolutions will be minimal. These cellular resolutions can also be viewed as strands of the resolution of the Rees algebra of  $I$ . (Received January 14, 2021)