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Susan Morey* (morey@txstate.edu), Department of Mathematics, 601 University Dr., San Marcos, TX 78666. *Square-free Monomial Ideals: Where Commutative Algebra, Graph Theory and Combinatorics Meet.*

In this talk, the direction presented will be toward the intersection of Commutative Algebra and Discrete Mathematics. There is a natural one-to-one correspondence between square-free monomial ideals and clutters, which are also called simple hypergraphs. Using this correspondence, algebraic properties of ideals can be translated into graph theoretic or combinatorial properties, thus allowing techniques from one field of mathematics to be used to answer questions from another. When the ideal is generated in degree two, the corresponding clutter is a graph. The Past for this talk will start with the introduction of edge ideals of graphs in 1990. Exploiting the dual algebraic and combinatorial natures of square-free monomial ideals has proven to be a fertile source of mathematical results in recent years. A survey of some recent results in this area, including examples of how both algebraic and combinatorial proof techniques can be used to extract information about edge ideals, will constitute the Present. The Future will consist of a discussion of a few of the open problems in this area. Results presented will focus on algebraic invariants, such as depth, projective dimension, and associated primes of square-free monomial ideals and their powers. (Received July 15, 2014)