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Susan E. Morey* (morey@txstate.edu), Department of Mathematics, Texas State University, 601 University Dr., San Marcos, TX 78666. *Interactions Between Commutative Algebra and Discrete Mathematics.*

There is a natural one-to-one correspondence between square-free monomial ideals generated in degree two and graphs through the construction of edge ideals. This correspondence extends naturally to one between arbitrary square-free monomial ideals and simple hypergraphs, also called clutters or Sperner families, or to facets of a simplicial complex. Using this correspondence, algebraic properties of ideals can be translated into graph theoretic, combinatorial, or combinatorial optimization properties. For example, the Alexander dual of an edge ideal corresponds to the blocker of the associated clutter, or the transversal hypergraph. This lexicon allows techniques from one of these fields to be used to answer questions from another. This talk will consist of an introduction to recent results in this area and examples of both how graph theoretic and combinatorial techniques are used to prove algebraic results and how algebraic techniques are used to prove results in areas of discrete mathematics. Algebraic properties and invariants of particular interest for this talk include regularity, Cohen-Macaulayness, depth, and associated primes. Discrete properties will include maximal matchings, independent sets, parallelizations, and the Conforti-Cornuéjols conjecture. (Received March 02, 2011)