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John Eagon, Ezra Miller* (ezra@math.duke.edu) and **Erika Ordog**. *Minimal resolutions of monomial ideals.*

It has been an open problem since the 1960s to construct closed-form, canonical, combinatorial minimal free resolutions of arbitrary monomial ideals in polynomial rings. This talk explains how to solve the problem, in characteristic 0 and almost all positive characteristics, using sums over lattice paths of combinatorial data from simplicial complexes, one simplicial complex for each lattice point. Any minimal free resolution of any monomial ideal must—either implicitly or explicitly—produce homomorphisms between various homology groups of these simplicial complexes. Therefore an important aspect of the solution is an explicit way to write down canonical homomorphisms between these homology groups without choosing bases. Joint work with Jack Eagon and Erika Ordog. (Received August 02, 2020)