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Anton Dochtermann* (anton@math.miami.edu), Department of Mathematics, University of Miami, Coral Gables, FL 33146. *Topological methods in combinatorial commutative algebra.*

We survey some new topological/geometric methods of studying monomial and binomial ideals arising from graphs and other combinatorial objects. These include cellular resolutions arising from algebraic mapping cones, deformations of associahedra and other polytopes via algebraic discrete Morse theory, as well as the encoding of syzygies via graphical hyperplane arrangements. These methods provide a unifying setting for some existing constructions from the literature and also lead to new results. Parts of this represent joint work with Fatemeh Mohammadi and with Raman Sanyal. (Received September 25, 2012)