1102-14-224 **Corey Irving** and **Hal Schenck*** (schenck@math.uiuc.edu). *Geometric modeling and barycentric coordinates for polygons.*

Let P_d be a convex polygon with d vertices. The associated Wachspress surface W_d is a fundamental object in approximation theory, defined as the image of the rational map w_d from P^2 to P^{d-1}, determined by the Wachspress barycentric coordinates for P_d. We show w_d is a regular map on a blowup X_d of P^2, and if $d > 4$ is given by a very ample divisor on X_d, so has a smooth image W_d. We determine generators for the ideal of W_d, and prove that in graded lex order, the initial ideal of $I(W_d)$ is given by a Stanley-Reisner ideal. As a consequence, we show that the associated surface is arithmetically Cohen-Macaulay, of Castelnuovo-Mumford regularity two, and determine all the graded betti numbers of $I(W_d)$. (Received July 29, 2014)