Sinn, *Degree bounds in Hilbert 17*

I will present joint work with Greg Blekherman, Greg Smith, and Mauricio Velasco on degree bounds in Hilbert 17th problem. Concretely, given a positive polynomial f in two variables, we are interested in upper bounds on the degree of a multiplier g such that gf is a sum of squares of polynomials. In terms of rational functions, such results can be used to obtain upper bounds on the denominators for an expression of f as a sum of squares of rational functions. Our work is in the more general context of algebraic surfaces; the above example is the special case of the projective plane. Our main result gives an asymptotic improvement of Hilbert's 1893 result with a first improvement for polynomials of degree 10.