1128-14-101 **Saugata Basu**, **Antonio Lerario**, **Erik Lundberg** and **Chris Peterson*** (peterson@math.colostate.edu). *Computation, expectation, and symmetry for combinatorial problems in real algebraic geometry.*

A well known result in algebraic geometry asserts that 27 lines lie on a general cubic surface in $\mathbb{C}P^3$. From a homogeneous cubic polynomial in $\mathbb{C}[w,x,y,z]$ one can use elimination theory to determine a degree 27 homogeneous polynomial in two variables whose roots correspond to the 27 lines. If one starts with a homogeneous cubic polynomial in $\mathbb{R}[w,x,y,z]$ and again use elimination theory one obtains a degree 27 homogeneous polynomial in two variables with real coefficients. With probability one, it is known that this polynomial always has 3, 7, 15, or 27 real roots and that each of these cases occurs with positive probability. It is natural to ask for the expected number of real roots (i.e. the expected number of real lines on a general real cubic surface). Of course the answer depends on the probability distribution used to choose the cubic. We show that with respect to the Kostlan distribution (a particular O(4) invariant Gaussian distribution on the space of real cubic polynomials in four variables), one expects there to be $6\sqrt{2}-3$ real lines. The goal of this talk is to present the key features that lead to this result. (Received February 16, 2017)