1040-65-55 **Carlos Beltran*** (beltranc@math.utoronto.ca), 40 St. George Street, Toronto, ON M5S 2E4, Canada. *Measure and Geometry in Smale's 17th Problem.*

Smale's 17th problem reads: *Can a zero of n complex polynomial equations in n unknowns be found approximately, on the average, in polynomial time with a uniform algorithm?*

I will present an Average Las Vegas algorithm that performs the task demanded by Smale. More specifically, let f_0, f_1 be two systems of n equations and n unknowns, and assume that f_0 has a known solution ζ_0. The homotopy continuation method follows the curve of solutions ζ_t of $f_t = (1-t)f_0 + tf_1$, $t \in [0,1]$, to approximate a zero of f_1. I will show that the choice of the initial pair (f_0, ζ_0) can be made such a way that the average complexity of this continuation method is polynomial in the size of the input. Here, "average" is to be understood in the sense of the Bombieri-Weyl metric.

The most recent and sharp proof of this result uses a geometric reduction of the problem to the linear case. This and other geometrical aspects of the algorithm will be discussed. This is joint work with Luis Miguel Pardo. (Received January 16, 2008)