CCSU

DEPARTMENT OF MATHEMATICAL SCIENCES

COLLOQUIUM

Friday, April 20
2:00 – 3:00 PM
Maria Sanford, Room 101

THE REPRESENTATION PROBLEM FOR INHOMOGENEOUS QUADRATIC POLYNOMIALS

ANNA HAENSCH

WESLEYAN UNIVERSITY

Abstract: A polynomial $f(x_1, x_2, \dots, x_n)$, with integer coefficients is said to represent an integer a, if the equation

$$f(x_1, x_2, \dots, x_n) = a$$

is solvable in the integers. Hilbert's 10 Problem asks: Is there a finite algorithm to determine if $f(x_1, x_2, \dots, x_n)$ represents an integer a? Due to work of J. Robinson, M. Davis and H. Putnam in the 1960's, and J. Matijasevič in the 1970's, the answer, in general, is no.

Given a linear polynomial, then a well known algorithm exists, namely the Euclidean algorithm. More difficult, is the representation problem for quadratic polynomials, which asks for an effective determination of all integers represented by a given quadratic polynomial. This problem has a rich history and has been widely studied. One related problem asks, can we determine when a quadratic polynomial represents all natural numbers? What about all but finitely many? Polynomials satisfying such conditions are called universal, or almost universal, respectively. Imposing some mild arithmetic conditions, I will give a complete characterization of inhomogeneous quadratic polynomials, which are almost universal. This generalizes the recent work by Chan and Oh on almost universal ternary sums of triangular numbers.

For further information:
gotchevi@ccsu.edu 860-832-2839
http://www.math.ccsu.edu/gotchev/colloquium/