SHUNTARO YAMAGISHI, Queen's University

Zeroes of polynomials in many variables with prime inputs

(This is a joint work with S.Y.Xiao)

Given a non-zero form $f(\mathbf{x}) \in \mathbb{Q}[x_1, ..., x_n]$, the h-invariant of f is defined to be the smallest positive number $h = h(f)$ such that there exists a representation $f = u_1 v_1 + ... + u_h v_h$, where u_i, v_i are rational forms of positive degree $(1 \leq i \leq h)$. Let $b(\mathbf{x}) \in \mathbb{Z}[x_1, ..., x_n]$ be a degree d polynomial, and $f_b(\mathbf{x})$ be the degree d portion of $b(\mathbf{x})$. We build on the work of Cook and Magyar to prove that the equation $b(\mathbf{x}) = 0$ is soluble in primes provided that $b(\mathbf{x})$ satisfies suitable local conditions and f_b has a representation $f_b = u_1 v_1 + ... + u_h v_h$, where $h = h(f_b)$, u_i, v_i are rational forms of positive degree $(1 \leq i \leq h)$, and sufficiently large number of u_i are linear.