In this talk, we discuss the proof of a large sieve type inequality for the roots of quadratic congruence: let $D$ be a squarefree positive integer. For any complex numbers $\alpha_n$, $0 < \alpha < \beta$ and $J > 1$, we have

$$\sum_{\alpha J < d \leq \beta J} \sum_{\nu^2 + D \equiv 0 \pmod{d}} \left| \sum_{n \leq N} \alpha_n e^{2\pi i \nu n/d} \right|^2 \ll (\log J)^2 (J + N) \sum_{n \leq N} |\alpha_n|^2.$$ 

The case of $D = 1$ was proved by Fouvry and Iwaniec and they used this inequality to show that the number of primes $p$, of the form $p = x^2 + y^2$ with integer $x$ and prime $y$, is infinite. (This is a joint work with Peter Cho-Ho Lam) (Received January 26, 2017)