# Philadelphia Area Number Theory Seminar

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## Infinite Families of Monogenic Trinomials

**Abstract:** A monic irreducible polynomial $f(x) \in \mathbb{Z}[x]$ is said to be monogenic if $\mathcal{O}_K = \mathbb{Z}[\theta]$ for $f(\theta) = 0$ and $K = \mathbb{Q}(\theta)$. One strategy to guarantee that $f(x)$ is monogenic is to determine conditions for which the discriminant of $f$ is squarefree. In 2012, Kedlaya proved that infinitely many monic irreducible polynomials with squarefree discriminant exist for any fixed degree. More recently, Bhargava, Shankar, and Wang determined that the density of such polynomials exists and is positive. A squarefree discriminant is not necessary for $f(x)$ to be monogenic, and indeed, Bhargava et al. also established the density of monogenic polynomials as a whole.

In contrast to many previous examinations of specific trinomial forms with squarefree discriminant in the literature, we identify explicit infinite families of monogenic trinomials whose discriminants are not squarefree. One of the main tools in our analysis will be a recent theorem of Jakhar, Khanduja, and Sangwan which provides necessary and sufficient conditions, based solely on $n$, $m$, $A$, and $B$, for an irreducible trinomial $f(x) = x^n + Ax^m + B$ to be monogenic. In certain situations when $A = B \geq 2$ with fixed $n$ and $m$, we develop an asymptotic to count the number of such trinomials with $A \leq X$, showing positive density. This is based on recent joint work with Lenny Jones.

Wednesday, November 7, 2018, 2:40 – 4:00 PM

Bryn Mawr College, Department of Mathematics
Park Science Center **328** · Tea and refreshments at 2:20PM in Park 361