

# *Finding and Counting Points on Curves – Or – How to Discover a Million Dollar Problem Using Ancient Technology*

**John Bergdall**

An old math problem is to determine all the solutions to equations --- geometrically, all the points on a curve --- subject to constraints like being integers, being rational, and so on. Tonight, we'll start by looking at the degree two case, i.e. the case of conic sections that has been studied and pretty well understood for centuries. We'll then move toward the case of degree three equations which, surprisingly, is the limit of 21st century technology! The 2nd half of the talk will focus on how two mathematicians, Brian Birch and Peter Swinnerton-Dyer, in the late 1950's and early 1960's discovered a statistical law for the rational solutions to cubic equations in terms of counting solutions to the same curve in a completely different world (the integers modulo primes). If time remains we will try to go a little further and describe exactly what the million dollar problem is, or you'll have to wait for MATH 317 in the spring.

**Date: November 7, 2018**

**Time: 7:00 pm**

**Place: Park 328**