



Speaker: Robert Harron
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Tuesday, February 4, 2014
4:00 PM
129 Hayes-Healy Hall

Title: The arithmetic statistics of elliptic curves

Abstract:

Elliptic curves are interesting to number theorists (and others, too!) for many reasons (proving Fermat's Last Theorem, studying non-abelian class field theory, ...). This talk will discuss their rational points as a subject of interest in and of itself. An old construction shows that the set of rational points (over a given field) of an elliptic curve forms an abelian group. In the 1920s, Louis Mordell showed that this group is finitely-generated when the field is the rational numbers. Concretely, this means it consists of a finite group (the "torsion subgroup") together with r copies of the integers (r is called the "rank"). Little is known about the rank, but in the 1970s, Barry Mazur showed that there are only 15 possibilities for the torsion subgroup of an elliptic curve. I will discuss recent joint work with Andrew Snowden in which we determine how frequently each of these given groups occurs. Aside from being a natural question, it leads to the problem of studying asymptotics for the number of points in the image of a map of stacks. If time permits, I will also survey other interesting problems in the arithmetic statistics of elliptic curves.