Speaker: Alison Miller

Title: Algebraic Knot Invariants, Arithmetic Invariant Theory, and Asymptotics

Abstract: Certain knot invariants coming from the Alexander module have natural number-theoretic structure: they can be interpreted as ideal classes in certain rings. In fact, these invariants fit into the structure of arithmetic invariant theory established by Bhargava and Gross.

I will explain this connection, and show how it raises the following asymptotic counting question: how many different possible values can these invariants take for knots whose Alexander polynomial has bounded size? Although this sounds like a topological question, it can be reduced to a matter of number theory. I will discuss the asymptotics for knots of genus 1 and the connection to binary quadratic forms, and mention possible extensions to higher genus knots.