Dissertation
Defense

Topics in Abelian Varieties: Canonical Rings of Stacks

Michael Cerchia
Emory University

Abstract: We investigate two of the problems from my thesis "Topics in Abelian Varieties". The flavor of these problems and the techniques used to solve them vary, but a common theme is the use of geometric techniques (and in particular moduli theory) to solve concrete questions from arithmetic. The two problems we will focus on today involve section rings of algebraic varieties, which are classical objects of study and play a central role in the minimal model program. In the first of these problems, we describe the section ring of elliptic curves for arbitrary divisors, and we give a complete description when the underlying divisor is supported by up to two points. In the second, we investigate canonical rings of moduli stacks of principally polarized abelian varieties, with particular focus on the $g = 2$ case. These have additional arithmetic significance: the canonical ring of modular curves, when equipped with the structure of an algebraic stack, gives rise to rings of modular forms. By considering higher dimensional analogues, we can determine explicit presentations for rings of Siegel modular forms.

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Advisor: David Zureick-Brown

Mathematics
Emory University