Prym varieties and the Schottky problem for cubic threefolds

Sebastian Casalaina-Martin
Department of Mathematics
Harvard University

Abstract

A theorem of Mumford's states that for a smooth cubic threefold X, the intermediate Jacobian JX is a principally polarized abelian variety of dimension 5 whose theta divisor has a unique singular point, which has multiplicity three. This talk describes joint work with R. Friedman, in which we prove a converse: if A is a principally polarized abelian variety of dimension 5 whose theta divisor has a unique singular point, which has multiplicity three, then A is the intermediate Jacobian of a smooth cubic threefold. The method of proof is to view A as a generalized Prym variety and to use this description to analyze the singular points of the theta divisor. Along these lines, I will also discuss recent work which gives a sharp upper bound on the multiplicity of a point on the theta divisor of an irreducible principally polarized abelian variety of dimension at most five.