ONLINE SEMINAR

ARITHMETIC ALGEBRAIC GEOMETRY

(organizers: Grzegorz Banaszak, Piotr Krasoń)

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The Coleman-Oort Conjecture

Abstract: In the 1980s, Coleman made the conjecture that for a given integer $g \ge 4$, there are only finitely many complex curves C (smooth projective) of genus g for which the Jacobian Jac(C) is an abelian variety of CM type. Counterexamples are known in genera 4, 5, 6 and 7; the construction of these is non-trivial. For $g \ge 8$ the conjecture is open.

In the 1990s, a new view on Coleman's conjecture was formulated by Oort. Via the (now proven!) André-Oort conjecture, the problem becomes equivalent to a question about special subvarieties in the Torelli locus in the moduli space A_g of abelian varieties. In my talk, I will discuss several ideas, coming from Topology, Differential Geometry and Arithmetic Geometry, that have led to a better understanding. Based on recent progress, the conjecture can be reduced to some very particular cases, and there is certainly hope we might one day see a full solution.