

*Department of Mathematics,  
University of California San Diego*

\*\*\*\*\*

# Math 295 - Mathematics Colloquium

**Elena Mantovan**

Caltech

## Shimura varieties and the Torelli locus

### Abstract:

The Schottky problem is a classical and fundamental question in arithmetic algebraic geometry, about the characterization of Jacobian varieties among abelian varieties. This question is equivalent to studying the Torelli locus (i.e., the image of moduli of curves under the Torelli map) inside Siegel modular varieties. In positive characteristics, a first approximation to this problem is understanding the discrete invariants (e.g.,  $p$ -rank, Newton polygon, Ekedahl–Oort type) occurring for Jacobians of smooth curves. The Coleman–Oort conjecture predicts that if the genus is large, then up to isomorphism, there are only finitely many smooth projective curves over the field of complex numbers, of genus  $g$  and Jacobian an abelian variety with complex multiplication. An effective version of the Coleman–Oort conjecture proposes 8 as an explicit lower bound.

After introducing the framework for these problems, I will discuss recent progress towards the Schottky problem in positive characteristics which is inspired by the Coleman–Oort conjecture, and which relies on our understanding of special subvarieties (a.k.a, Shimura subvarieties) of Siegel varieties.

Host: Elham Izadi

**Thursday, October 11, 2018**

**4:00 PM**

**AP&M 6402**

\*\*\*\*\*