## Oklahoma State University

## Colloquium

Title

Supersingular Loci: A Meeting of Algebraic Geometry, Number Theory, and Representation Theory

Speaker:Maria Fox, University of OregonDate:Jan 18, 2022Time:3:30 PMRoom:Via Zoom

**Abstract:** Modular curves were first studied in the 1800s as moduli spaces of elliptic curves over the complex numbers. Shimura varieties are higher-dimensional analogues of these modular curves. Though they are constructed as algebraic varieties, they have important applications to both number theory and representation theory.

In this talk, we'll focus on a certain subvariety of a Shimura variety called the supersingular locus. We'll discuss how the *p*-adic Uniformization Theorem of Rapoport and Zink (analogous to the complex uniformization theorems of the 1800s) makes it possible to use linear-algebraic techniques to study the supersingular locus. Next, we will see several concrete examples of supersingular loci and their geometry. Finally, we'll consider some specific applications of supersingular loci to problems in number theory and representation theory.

This talk has been written with a broad mathematical audience in mind, including graduate students!