

ALGEBRA
SEMINAR

*Odd order transcendental obstructions to the Hasse principle
on general K3 surfaces*

Jennifer Berg
Rice University

Abstract: Varieties that fail to have rational points despite having local points for each prime are said to fail the Hasse principle. A systematic tool accounting for these failures is called the Brauer-Manin obstruction, which uses [subsets of] the Brauer group, $\text{Br } X$, to preclude the existence of rational points on a variety X . After fixing numerical invariants such as dimension, it is natural to ask which birational classes of varieties fail the Hasse principle, and moreover whether the Brauer group (or certain distinguished subsets) always explains this failure. In this talk, we will focus on K3 surfaces (e.g. a double cover of the plane branched along a smooth sextic curve) which are relatively simple surfaces in terms of geometric complexity, but whose arithmetic is more mysterious. For example, in 2014, Skorobogatov asked whether any odd torsion in the Brauer group of a K3 surface could obstruct the Hasse principle. We answer this question in the affirmative; via a purely geometric approach, we construct a 3-torsion transcendental Brauer class on a degree 2 K3 surface which obstructs the Hasse principle. Moreover, we do this without needing to explicitly write down a central simple algebra. This is joint work with Tony Varilly-Alvarado.

Tuesday, April 3, 2018, 4:00 pm
Mathematics and Science Center: W304

MATHEMATICS AND COMPUTER SCIENCE
EMORY UNIVERSITY