Department of Mathematics
University of Notre Dame

GRADUATE STUDENT SEMINAR

Guest Speaker: Juanita Pinzon Caicedo

University of Notre Dame

Date: Monday, April 12, 2021

Time: 4:00 PM

Location: Zoom

Zoom URL: notredame.zoom.us/j/95815357423

Lecture Title:
Instantons and Knot Concordance

Abstract

Knot concordance can be regarded as the study of knots as boundaries of surfaces embedded in spaces of dimension 4. Specifically, two knots K_0 and K_1 are said to be smoothly concordant if there is a smooth embedding of the annulus $S^1[0,1]$ into the "cylinder" $S^3[0,1]$ that restricts to the given knots at each end. Smooth concordance is an equivalence relation, and the set C of smooth concordance classes of knots is an abelian group with connected sum as the binary operation. The algebraic structure of C, the concordance class of the unknot, and the set of knots that are topologically slice but not smoothly slice are much studied objects in low-dimensional topology. Gauge theoretical results on the nonexistence of certain definite smooth 4-manifolds can be used to better understand these objects. In particular, the study of anti-self dual connections on 4-manifolds can be used to shown that (1) the group of topologically slice knots up to smooth concordance contains a subgroup isomorphic to $\mathbb{Z}^\infty$, and (2) satellite operations that are similar to cables are not homomorphisms on C.

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