University at Buffalo Spring Lectures in Geometry and Topology

April 28-29, 2022

Speaker: Juanita Pinzón-Caicedo
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Lecture 1: Four-manifolds and knot concordance

April 28 at 4 pm in 250 Mathematics Building

The study of 4-dimensional objects is special: a manifold can admit infinitely many non-equivalent smooth structures, and manifolds can be homeomorphic but not diffeomorphic. This difference between topological and smooth structures, can be addressed in terms of the study of knots as boundaries of surfaces embedded in 4D space. In this talk I will focus on some knot operators known as satellites and will show that satellites can bound very different surfaces in the smooth and topological category.

Lecture 2: Satellite Operations that are not homomorphisms

April 29 at 4 pm in 122 Mathematics Building

Two knots K_0 and K_1 are said to be smoothly concordant if the connected sum $K_0 \# m(K_1^r)$ bounds a disk smoothly embedded in the 4-ball. 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. Satellite operations, or the process of tying a given knot P along another knot K to produce a third knot P(K), are powerful tools for studying the algebraic structure of the concordance group. In this talk I will describe conditions on the pattern P that suffice to conclude that the function P: $C \rightarrow C$ is not a homomorphism. This is joint work with Tye Lidman and Allison Miller.