Department of Mathematics and Computer Science

Friday, April 2, 2021, 4:00 pm

COLLOQUIUM TALK

Speaker: Nickolas Castro (University of Arkansas)

Zoom Meeting (ID: 99690482842)

Making sense of smooth 4-manifolds via lower dimensions

Abstract:

Understanding 4-dimensional spaces is a tricky business. We often rely on our intuition in lower dimensional settings to help guide us through spaces which we cannot easily visualize. When we add additional adjectives such as "manifold", "compact", or "smooth," subtleties arise which make investigating 4-dimensional objects very interesting. Even the "simplest" case of a 4-dimensional sphere is mystifying. In fact, it is a famously open question whether or not there are two *different* smooth 4-dimensional spheres.

In this talk, I will discuss ways in which we understand 2 and 3-dimensional manifolds and how these help shape our approach to 4-dimensional spaces. I will begin by defining topological manifolds and building our intuition of what it means for two different spaces to be topologically equivalent, focusing on 2 and 3-dimensional spaces. I will then discuss how we can understand smooth 4-dimensional manifolds by decomposing them into simple pieces. There will be plenty of pictures and much of the talk will be accessible to undergraduate students.