

3-MANIFOLDS AND GEOMETRIC GROUP THEORY

CIRM, LUMINY, 11-15 JUNE 2018

Mini-courses

Ruth Charney

Boundaries of hyperbolic and CAT(0) spaces

Abstract: This mini-course will focus on the properties of boundaries and their role in geometric group theory. We will begin by introducing boundaries of hyperbolic spaces and discussing their properties and applications to the study of hyperbolic groups. Next we will look at boundaries of CAT(0) spaces and the ways in which they are similar to, or different from, hyperbolic boundaries. We will conclude with a brief introduction to Morse boundaries of more general spaces.

Jason Manning

(Relatively) hyperbolic groups and cube complexes

Abstract: I will talk about non-positively curved cube complexes and their applications to understanding aspects of hyperbolic and relatively hyperbolic groups.

Jessica Purcell

Structure of hyperbolic manifolds

Abstract: In these lectures, we will review what it means for a 3-manifold to have a hyperbolic structure, and give tools to show that a manifold is hyperbolic. We will also discuss how to decompose examples of 3-manifolds, such as knot complements, into simpler pieces. We give conditions that allow us to use these simpler pieces to determine information about the hyperbolic geometry of the original manifold. Most of the tools we present were developed in the 1970s, 80s, and 90s, but continue to have modern applications.

Genevieve Walsh

Hyperbolic manifolds vs hyperbolic groups

Abstract: We will discuss and define the notion of a relatively hyperbolic group and its boundary. These are multiple equivalent definitions and we will focus on only a couple. Relatively hyperbolic groups are a generalization of the fundamental groups of cusped hyperbolic manifolds and we will discuss several different connections. A CAT(0) group along with its collection of flats can sometimes yield a relatively hyperbolic group pair and there is a useful relationship between their boundaries. The second day we will discuss some tools for the study and understanding of these group pairs, and the last day we will briefly discuss boundary rigidity.
