1 Gallery of locally symmetric manifolds of recurrent and transient type

Brownian motion on manifolds reveals deep connections between geometry, topology, and dynamics. In this project, we will explore these interactions through combinatorial and geometric constructions. Students will build explicit examples of graphs and their associated infinite-volume hyperbolic manifolds, then study how the structural properties of the graphs influence the behavior of Brownian motion on the corresponding manifolds. This project combines ideas from geometry, probability, and combinatorics, offering participants an opportunity to engage in both theoretical and computational aspects of modern mathematical research.

Preliminary: Some knowledge of graph theory is welcome. Math 425 is preferred, but not necessary. Math 433, 490, or equivalent is helpful for understanding the background.