

# Michigan Math Club



Thursday at 4pm in EH1360

Free pizza and pop afterwards!

DRP Presentations • 14 April 2022



## Josef Sajonz: Triangle Reflection Groups on the Hyperbolic Plane



A major contrast between Euclidean and Hyperbolic geometry is the number of possible plane tilings we are able to perform. On the Euclidean plane, there are only three possible tilings, whereas on the Hyperbolic plane there are not only infinitely many tilings, there are infinitely many distinct equilateral triangle tilings. We will begin by introducing some motivating triangle tessellations of the hyperbolic plane. We will then prove a special case of the Gauss-Bonnet Theorem and a few short results in order to justify our claim. We will conclude by reexamining the earlier tilings and discussing a few intriguing consequences.

## Pranjal Sharma: Reflection Symmetries and Root Systems

Imagine standing within a collection of mirrors. Looking around, one will notice reflections, reflections of reflections, and so on. In some particularly symmetric configurations, one might expect to see only a finite number of reflections. Such configurations are described by root systems, mathematical objects which appear in many contexts, such as the language of permutations or classification of higher dimensional polyhedra. Starting with symmetries of regular polygons, we will introduce the concepts of root systems and mirror systems, and conclude by describing important families of higher dimensional root systems.

