

MTCS COLLOQUIUM

Kensey Riley and David Garth

will present

Tilings, Infinite Words, and Long Range Order

3:30 pm

Tuesday, September 13th

Violette Hall 1236

A tiling of the plane is obtained by covering the plane with infinitely many tiles without gaps or overlaps. Usually the tiles are of a finite number of different shapes. In the 1970s, Roger Penrose introduced a series of beautiful tilings which were non-periodic and yet exhibited a large amount of long range order. These and other aperiodic tilings have many remarkable properties that are similar to those of some well known physical and mathematical systems. For example, Physicists use tilings to model the stability of quasicrystals, while in mathematics tilings are often viewed as dynamical systems which generalize symbolic dynamical systems. In spite of these well-known properties, tilings are far from being well understood.

In this talk we will give a brief overview of some of the main properties of tilings. We will describe two common methods for generating tilings. The first is the so-called cut and project method, in which a tiling is obtained by projecting a section of an n -dimensional lattice onto a certain subspace. The other method is the method of substitution, in which the tiles are inflated and then divided up into a union of smaller tiles.

We will then see how to use these methods to study the properties of the tilings they produce. Our attention will be restricted to one dimensional tilings. These are tilings of a line where the tiles are finite line segments of varying lengths. Many of the properties of higher dimensional tilings can be reduced to this simple case.

This talk will be a summary of work that was done for the summer research component of Truman's Next Step Program. So come and get an idea for some of the opportunities for undergraduate research at Truman State University!

Cookies and Refreshments!!!