



NCSU Society for Undergraduate Mathematics

SUM Series

Thursday, September 11, 2008

3:00–3:50 p.m.

Harrelson 330

Mathematics and pizza!

Tiling the Aztec diamond with dominoes

Nathan Reading

The study of domino tilings goes back to early 20th century physicists, who used domino tilings in a statistical-mechanical model of diatomic molecules on a surface. A domino is a 2×1 rectangle. Tiling a region in the plane by dominoes means completely covering the region with non-overlapping dominoes. Consider the following simple question: How many ways can a given region of the plane be tiled by dominoes? For example, there are two domino tilings of a 2×2 square. For a general rectangular region, the formula looks strange and is difficult to prove. For a different planar region called the Aztec diamond, the formula is quite simple. We'll discuss and illustrate a beautiful proof of the formula due to Elkies, Kupberg, Larsen, and Propp. Time permitting, we'll also see what domino tilings have to do with the Arctic Circle. The talk will be accessible to all undergraduates. No prior knowledge of tilings will be assumed.