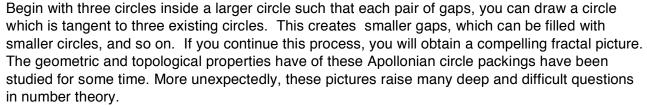# Michigan Math Club

Thursday at 4pm in the Commons
Free Pizza and Pop

Integral Apollonian Packings
Michael 'Cap" Khoury

Abstract for 24 Sept 2009

Begin with three circles inside a larger circle such that each pair of gaps, you can draw a circle which is tangent to three existing circles. This creates smaller gaps, which can be filled with smaller circles, and so on. If you continue this process, you will obtain a compelling fractal picture. The geometric and topological properties have of these Apollonian circle packings have been studied for some time. More unexpectedly, these pictures raise many deep and difficult questions in number theory.

What kind of numbers can appear in such a packing? What kinds of sequences of numbers can appear along chains of circles? We will talk about some of the surprising things that are known about integral Apollonian packings as well as some questions that still lie well out of reach.This talk does not require any prior knowledge more advanced than high-school geometry and some modular arithmetic.