

B I-CO MATHEMATICS COLLOQUIUM

Dave Futer

Temple University

"Can You Hear the Shape of a 3-Manifold?"

Monday, October 29, 2018

Talk at 4:00 – Park 338

Tea at 3:30 – Park 361, Math Lounge

Abstract:

In the 1960s, Mark Kac popularized the question, "Can you hear the shape of a drum?" In slightly more mathematical language, the question asks: "Can you determine the shape of a domain in the plane from the spectrum of frequencies at which it vibrates?" The study of this question has been extended to surfaces and manifolds of other dimensions.

We now know that the answer is usually "no." There exist planar domains (and surfaces, and 3-dimensional manifolds) that have the same spectrum but different shapes. However, essentially all known counterexamples are related by a rigid cut-and-paste procedure. I will explain how this works in the context of 3-dimensional manifolds, leading up to on some recent joint work with Christian Millichap.

BRYN MAWR COLLEGE