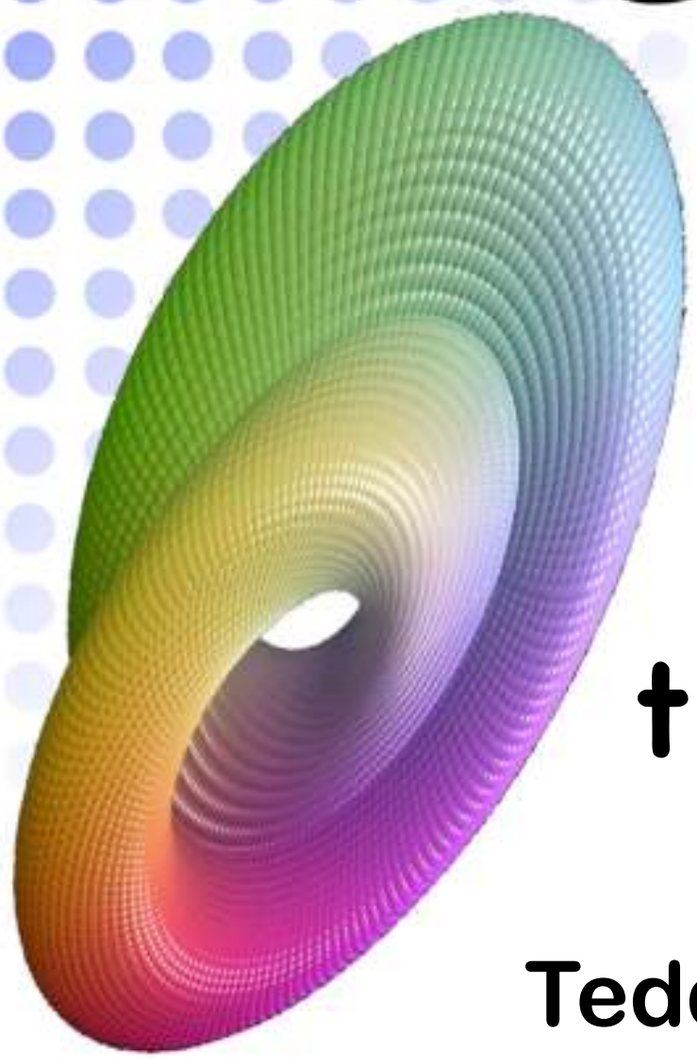
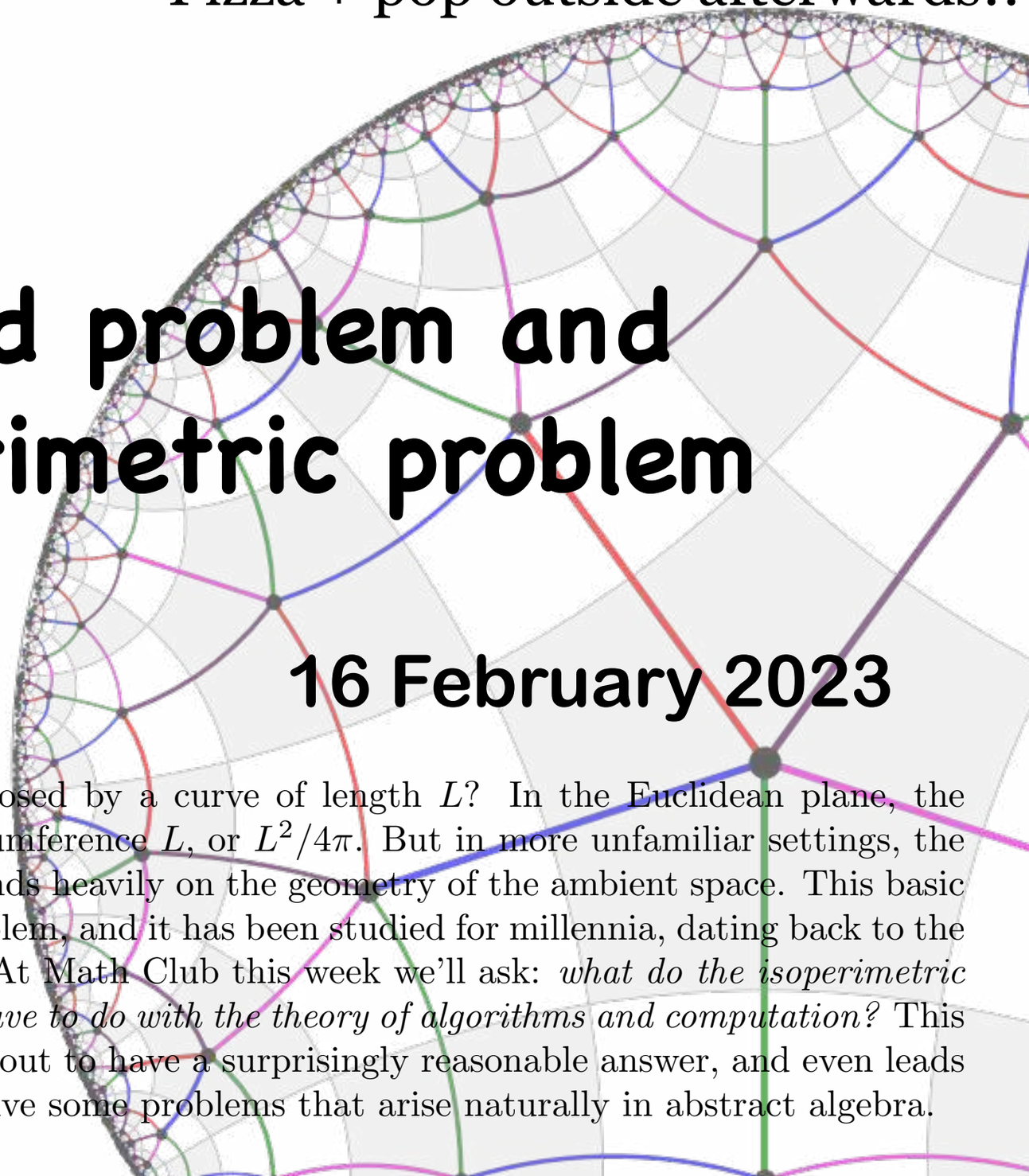
Michigan Math Club

Thursday at 4pm in EH1360
Pizza + pop outside afterwards!!





The word problem and the isoperimetric problem

Teddy Weisman **16 February 2023**

What is the largest possible area enclosed by a curve of length L? In the Euclidean plane, the answer is the area of a circle with circumference L, or $L^2/4\pi$. But in more unfamiliar settings, the answer can be very different, and depends heavily on the geometry of the ambient space. This basic question is called the isoperimetric problem, and it has been studied for millennia, dating back to the days of ancient Greece and Carthage. At Math Club this week we'll ask: *what do the isoperimetric problem and non-Euclidean geometry have to do with the theory of algorithms and computation?* This seemingly unreasonable question turns out to have a surprisingly reasonable answer, and even leads to the construction of algorithms to solve some problems that arise naturally in abstract algebra.