

# **Undergraduate Mathematics Colloquium**

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## **The Geometry and Topology of Slums: Optimal Reblocking**

**Friday April 6**

Talk at 4:00 in Herman Brown 227

Tea and cookies at 3:30 in Herman Brown 438

**ABSTRACT:** The world is urbanizing quickly, with more than half of the world's population living in urban areas. As city populations increase, infrastructure generally lags behind. The consequence is that about 1 billion people live in urban slums. Slums are characterized by informal land use, lack of physical accesses, and restricted access to or poor quality urban services. The question of how to transform informal settlements into formal urban areas is an important one that is being studied across many disciplines.

In this talk, we will explore how geometry and topology can provide tools to: 1. Characterize the complicated access and connectivity issues that plague informal settlements, such as "blocks" of urban slums, and 2. Provide algorithms designed to optimally upgrade (or reblock) a slum in a way that makes each structure in the settlement accessible to urban services but minimizes disruption and cost. This talk will be most accessible to students with some linear algebra background, but all students will be able to follow.

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