3D Project

This project will have you designing and creating 3 dimensional geometric objects. The first half will focus on 3D digital designs and familiarizing yourself with 3D printers available on campus. Following this you will develop your own design, print/cut/create it, and share either the experience or details about the object in a public forum.

During this project you will:

- learn how to create nontrivial objects in TinkerCad,
- export original work into 3D printable files,
- investigate an interesting geometric phenomenon with a printable 3D object,
- work collaboratively on researching, printing, and explaining a 2nd 3D object, and
- verbally share your 3D product making experience or relevant math details with a poster at Undergraduate Showcase poster session.

The tentative schedule for the project:

- Week 1: Introduction to 3D Project & TinkerCad
- Week 2: 3D Printing HW1 Due (introduction to TinkerCad)
- Week 3: 3D Printing HW2 Due (first 3D file to print)
- Week 4: Field Trip to Maker Space in Library for tour (including 3D printer)
- Week 5: Report on project intend to complete for poster.
- Week 7 & 8: Project Check-in's for poster
- Week 9: Poster (marked) Drafts exchanged
- Week 10: Public poster session!

Some ideas of things you might want to try to 3D print for the poster session:

- Lost area puzzles:
    - Liu Huis cube `https://www.maa.org/book/export/html/842718`
    - The square in Sam Loyd's paradox (`https://en.wikipedia.org/wiki/Missing_square_puzzle`).
    - The square in Mitsuobu Matsuyama's paradox (`https://en.wikipedia.org/wiki/Missing_square_puzzle`).
- Reproducing the London Building whose concave shape was responsible for melting cars (`https://globalnews.ca/news/1334377/car-melting-london-skyscraper-to-be-permanently`
- Create two drums that are different shapes but sound the same.
  M. Kac, *Can One Hear the Shape of a Drum?*, American Mathematical Monthly 73 (1966), 1-23.
- Estimate a Gőmőc. (Given its nature you'll need to build parts and then attach...)
- Optical Illusions (`https://3dprint.com/141890/3d-printing-optical-illusion/`)
- The 17 different ways to tile the plane.
- Estimate hyperbolic planes or objects in space.