3D PRINTING AND THE DRAKE MEMORIAL LIBRARY MAKERSPACE

KEN WIERZBOWSKI, SYSTEMS LIBRARIAN

DRAKE MEMORIAL LIBRARY

# Drake Memorial Library Makerspace

- The Drake Memorial Library Makerspace opened its doors Spring 2014

- 400+ objects printed for students, faculty, and staff

- Collaborations with Art, English, Anthropology, KSSPE, and other departments; more to come!

Drake Memorial Library

Makerspace

- Makerspace is equipped with:
  - 2 Makerbot 3D Printers
  - 2 SeeMeCNC Rostock MAX v.3 3D Printers
  - 1 NextEngine 3D Scanner
  - 1 Filabot Filament Recycling Machine
  - 4 PC workstations
  - 1 Mac workstation
  - 12 Arduino Uno starter kits
  - 1 Full Spectrum CO_2 Laser Cutter/Engraver
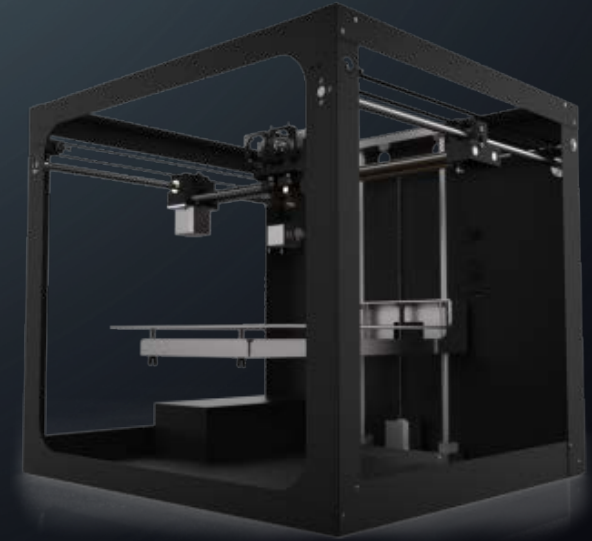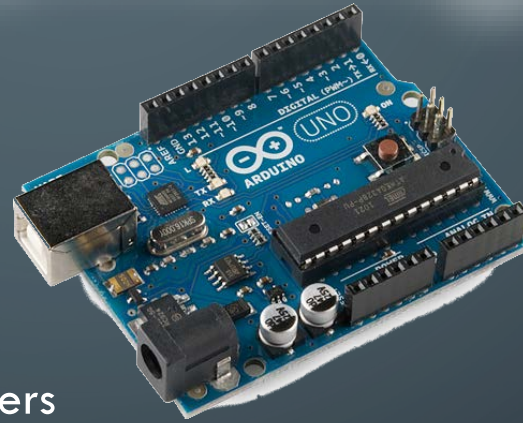
WHAT IS 3D PRINTING?

- 3D printing or 'additive manufacturing' is a process of making three dimensional solid objects from a digital 3D model

- Technology developed in the 1980's

- Can produce complex 'impossible geometries' that cannot be done with traditional injection molding

HOW DOES IT WORK?

- Desktop 3D printers in use at Brockport utilize the extrusion process
  - Akin to a precision 'hot glue gun'
  - Heated extruder lays down successive layers to create objects
    - Print extruder reaches temperatures in excess of 200°**C (~400°F)**
- Uses plastic filament
  - PLA – a corn-based bio plastic that is non-toxic
 - ABS – a common plastic polymer, petroleum based

WHAT ARE SOME APPLICATIONS OF 3D PRINTING?

- Art
- Dentistry
- Industrial metalworking
- Architecture
- Automotive design

- Aerospace
- Biotech
- Fashion
- Education
- Food
- Hobbyist/ Recreational use
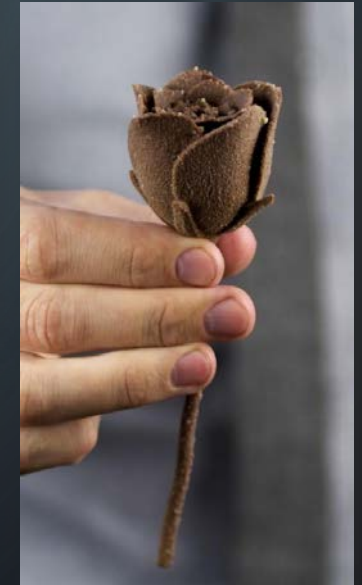
SOURCING 3D MODELS

- Designing models from scratch using CAD software (Tinkercad, Autodesk Fusion, etc.)

- Downloading models created by others (Thingiverse, Pinshape, etc.)

- Creating 3D scans from existing 3D objects
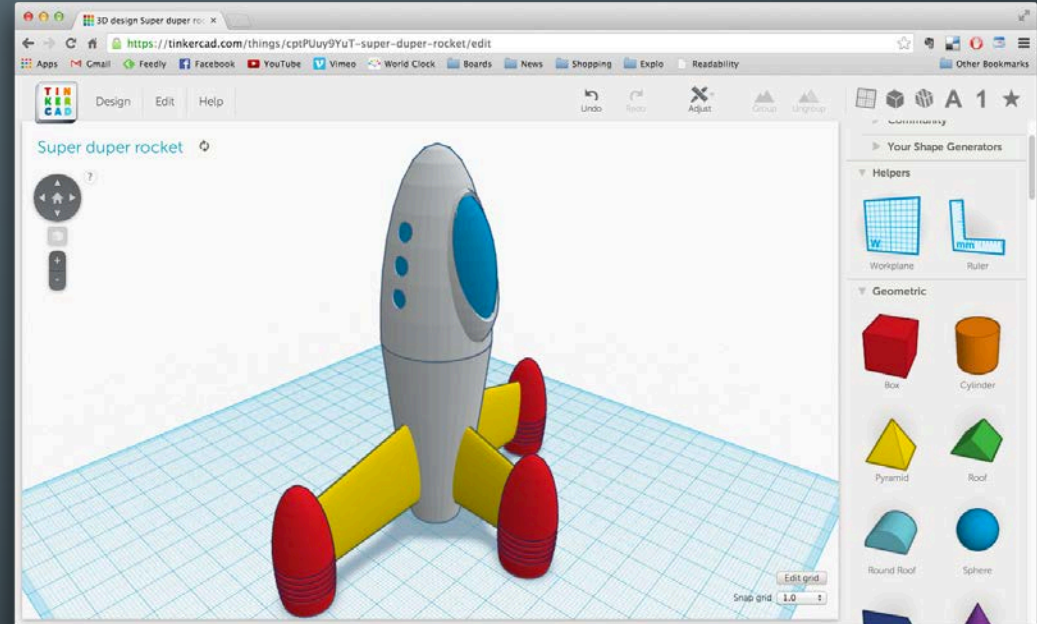

Thingiverse

PRINTABLE 3D DESIGN BASICS

- You can use almost any CAD program

- Model needs to be exported to an STL or OBJ file format

- STL – Standard Tessellation Language
  - Describes the surface geometry of a 3D object
  - Made up of small triangles that are 'faced' with a front and back orientation
  - Contain no color information
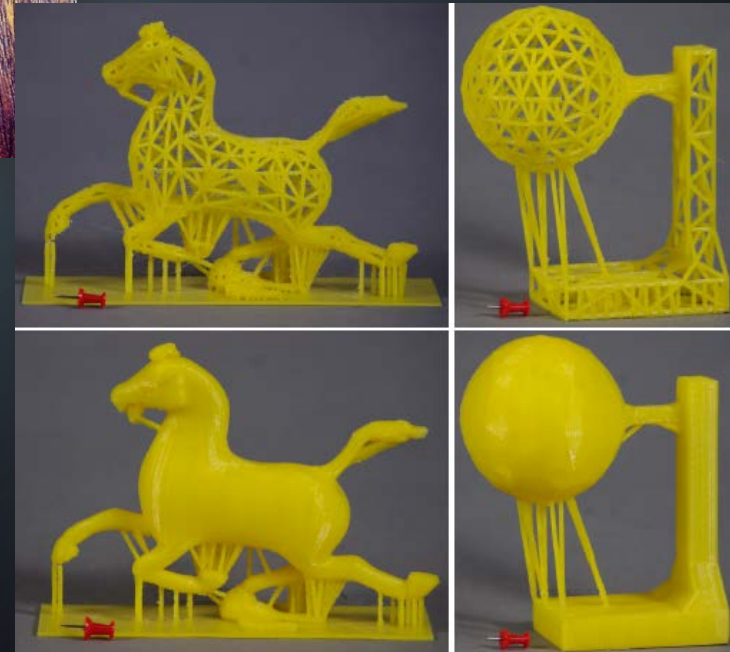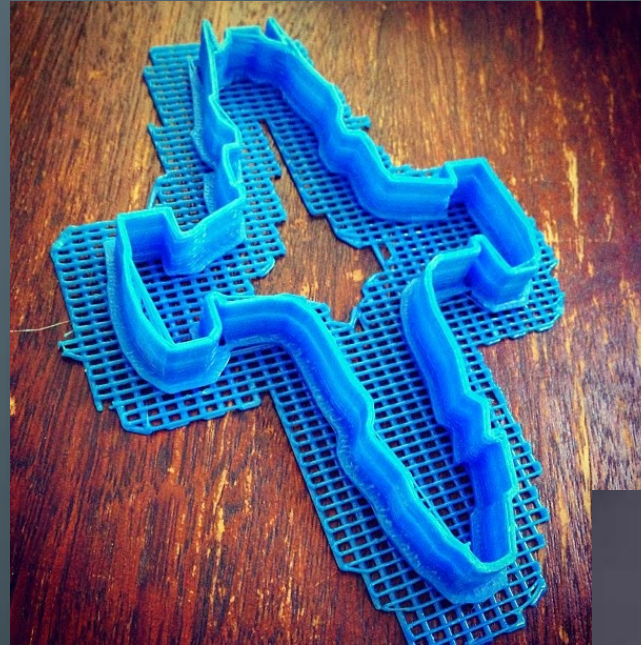 - Needs to have volume and a water-tight geometry – 'manifold'
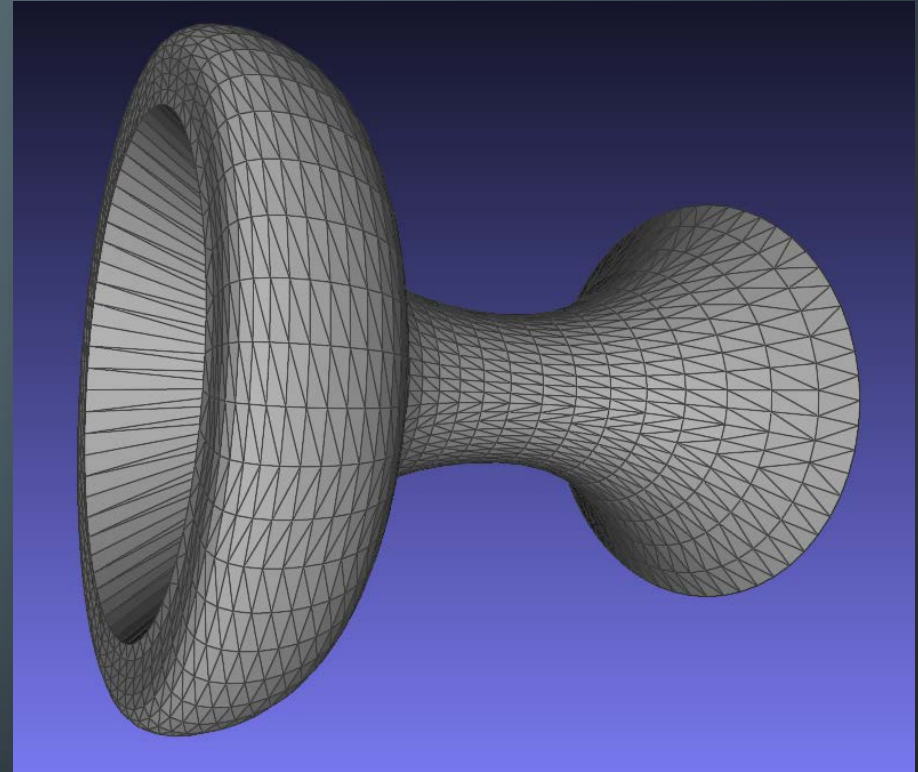
MANIPULATION & SLICING

- After converting to the STL format, you need to import your file to a CAM (Computer Aided Manufacturing) program
  - ie.- Makerbot Desktop, Matter Control

- The CAM program allows you to change the orientation and scale of your model as well as its position on the build platform

- Slicing
  - Once manipulated, 'slicing' software is utilized to break the STL file into layers
  - The resulting 'G-Code' is the instructional coordinates that the 3D printer follows in order to print the object
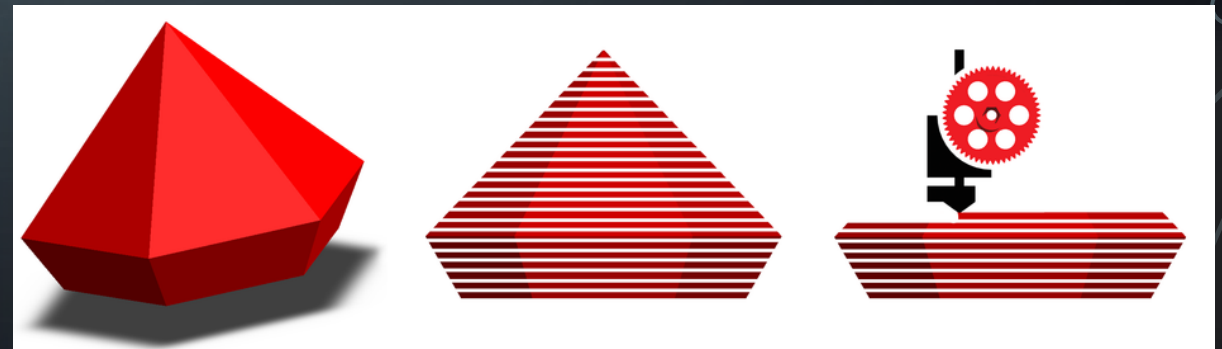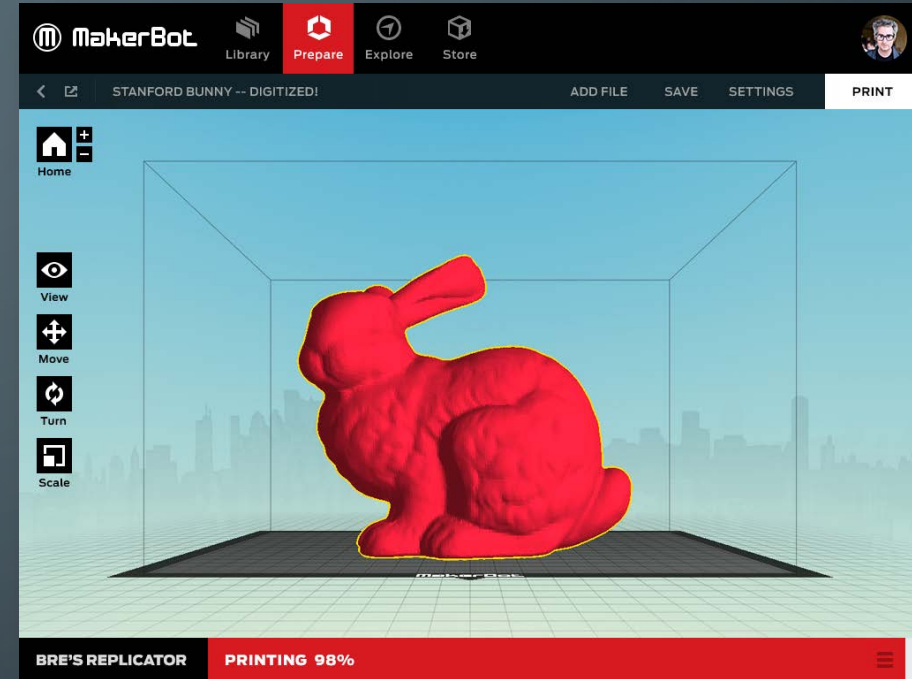
RAFTS & SUPPORTS

- Rafts
  - Helps prevent warping and allows the print to better adhere to the build platform
  - Almost always recommended
- Supports
  - Breakaway scaffolding that is utilized for prints that have significant horizontal overhangs

Contact Us!
http://library.brockport.edu/make
makerspace@brockport.edu