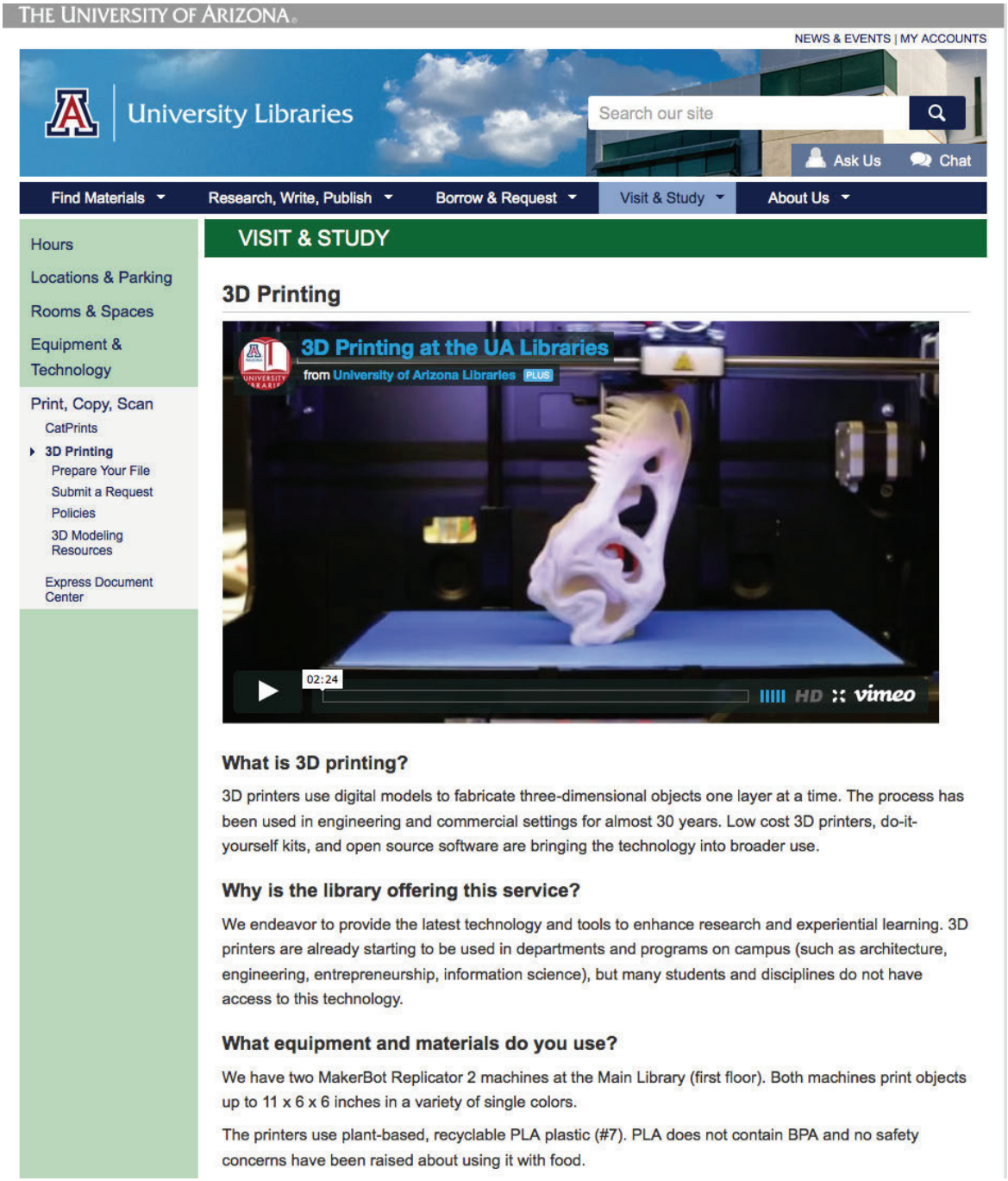
3D Printing Guides

UNIVERSITY OF ARIZONA
3D Printing
http://www.library.arizona.edu/services/print/3D



UNIVERSITY OF ARIZONA
3D Printing
http://www.library.arizona.edu/services/print/3D

Who can use this service?

Priority is for UA students, faculty, and staff. Non UA-affiliates may submit requests, but may be backlogged during peak use during the semester.

What does it cost?

Cost is $0.10 per gram of filament. Total cost is determined once your order is complete.

Charges are added to your library account and must be paid before pick up. Non UA-Affiliates pay at the Express Document Center.

What is the turnaround time?

Printing times vary based on size, complexity, and any backlog. Once you submit your request, we will contact you within two business days with an approximate turnaround time.

How do I submit a request?

1. Get your 3D model ready
2. Save the model as .stl file (maximum size 50 MB)
3. Submit your 3D printing request

Where can I get help?

Visit our 3D Modeling Resources for modeling software, design libraries, and tutorials.

Consultants from the Office of Student Computing Resources are available in the Multimedia Zone (Main Library, first floor) to answer software questions.

Contact Us

(520) 621-6442
3D@lib.arizona.edu

Last modified: April 9, 2015

University Libraries

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Tucson, AZ 85721
(520) 621-6442
Contact us

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Faculty
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Staff sign in

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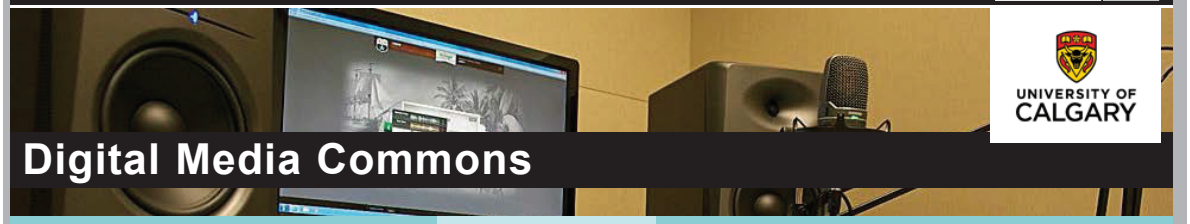
3D Printing Guide: Home
http://guides.lib.byu.edu/3Dprinting

UNIVERSITY OF CALGARY
Digital Media Commons | 3D Printer
http://library.ucalgary.ca/dmc/3d-printer



UNIVERSITY OF CALGARY

Digital Media Commons

3D Printer

What is 3D printing?

A 3D printer works by depositing a substance layer by layer until an object is formed. The printer in the Taylor Family Digital Library (TFDL) is a consumer-level machine, meaning that it creates small-scale objects using a plastic-based material. The process is much cheaper and less messy compared to that of large, industrial 3D printers.

Why offer a 3D printing service?

Libraries and Cultural Resources (LCR) is committed to providing the latest technology and tools that enhance research and hands-on, experiential learning. LCR is providing a valuable service to students and researchers by making 3D printing more accessible. Many experts believe this technology will revolutionize the world of manufacturing.

The consumer-level printer in the TFDL is ideal for experimenting with design and prototyping. It allows students and researchers to test their concepts in a real-world scenario.

Where is the 3D printer located?

The printer is located in the Digital Media Commons on the third floor of the Taylor Family Digital Library.

How do 3D printers affect air quality?

Unlike larger, industrial printers that use resins, our consumer-level 3D printer does not emit fumes. The material used in the printer in the TFDL is a synthetic substance called polylactic acid (PLA). It is derived from plant material and is biodegradable.

How much detail can the printer create?

The 3D printer in the TFDL is capable of producing objects with a resolution of one-tenth of a millimetre, approximately the width of a strand of hair.

Request 3D print job

How much does it cost to print an object and how long does it take?

It costs $1.00 plus 15 cents per gram for a printed item, which could amount to a few dollars. It can take anywhere from a few minutes to a several hours. Cost and time depends upon the size and complexity of the object.

What kind of objects can I print?

You can print anything on a small scale, such as a prototype design, an action figure or a trinket for a necklace.

There are many open-source files available online that can be downloaded for printing, or you can create your own.

Please keep in mind that you can't print everything you find online. Copyright laws and intellectual property rules apply. Ensure that any files you acquire from the internet are open-source or that licensing requirements are met. There are many websites that have Printable 3D models available for free or for sale:

- Thingiverse
- 3D File Market
- Open Education Database
- Dalhousie University Library 3D Model Repository

The Digital Media Commons also has a variety of 3D modeling tools available so that you can create whatever object that you can imagine:

- Rhino 3D
- Autodesk 3DS Max

Autodesk AutoCAD
- SketchUp Pro
- Blender

There are also basic modelling applications available online that can help you get started with CAD and nonCAD 3D modelling:

- Tinkercad
- OpenScad
- SketchUp
- PhotoToMesh

Can I see my object being printed?

You can watch the 3D printer in action anytime during regular business hours. Due to the large number of projects, it is extremely difficult to pinpoint exactly when your project will be printed.

How do I request a print job?

Once you submit your request, it will be added to the queue and staff will notify you when your item is ready for pick-up.

3D Printing Directions

The file must be in .STL, or stereolithographic file format to print it. MeshLab is a freeware program that can be used to view and convert your file to STL format.

Once a request is submitted you can keep in touch with the 3D Printing department through the confirmation email that will be sent to youThe maximum build size is 284 x 154 x 152 millimeters, or 11.2 x 6.1 x 6 inches.

When notified by email that your model is ready you will be sent an invoice listing the print cost. Take this receipt to the TFDL Service Desk to make your payment and collect your model.

How can I learn more about the 3D printing service?

Sign up for an orientation session by visiting the workshop calendar.

UNIVERSITY OF CALIFORNIA, IRVINE
3D Printing Pilot Service
http://www.lib.uci.edu/services/3D-printing/

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Ask ANTswers (BETA) Interactive FAQ

SEARCH Go

Services

- Course Reserves
- Borrow
- Interlibrary Loan
- Computing
- Printing & Copying
- For Users with Disabilities
- Scholarly Communication and Management Program
- Digital Scholarship Service

Quick Links

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- Event Calendar
- Connect from off-campus
- Course Reserves
- Borrowing
- Interlibrary Loan
- My ANTPAC
- Study Space Locator

- Langson Library
- Ayala Science Library
- Grunigen Medical Library
- Libraries Gateway Study Center
- Law Library

- Supporters & Friends

3D Printing Pilot Service

Explore, Make, Fabricate

3D printing has changed the landscape of fabrication. From engineers to artists, entrepreneurs to hobbyists, 3D printing makes it easy to turn an idea into reality. The UCI Libraries have purchased a 3D printer to support such creativity. Located in the Multimedia Resources Center in the Ayala Science Library the 3D printer is available to UCI faculty, students, and staff. During this pilot period while we assess the demand and resources required to provide such a service, printing will be free.

Who can print?

The 3D printer is available for use by all UCI students, faculty, and staff on a first-come first-served basis.

What can I print?

The 3D printer must be used exclusively for lawful, non-commercial purposes and in compliance with all University of California policies. Users may not collect, upload, transmit, display, create or distribute content that violates or may violate any law or third-party right, including, without limitation, any copyright, trademark, patent, trade secret, moral right, privacy right, right of publicity, or any other intellectual property or proprietary right. The UCI Libraries reserve the right to decline any print request for any reason.

What 3D printer does UCI Libraries own?

UC Irvine Libraries has a Makerbot Replicator Desktop 3D printer. This 3D printer uses 1.75 mm polylactic acid (PLA) filament.

- Build Volume: 25.2 L x 19.9 W x 15.0 H cm [9.9 x 7.8 x 5.9 in] or 7,522 cubic centimeters [456 cubic inches]
- Include photos of objects with dimensions here

Additional specifications and information about the Makerbot Replicator can be found at http://store.makerbot.com/replicator.

Where is the 3D printer?

The 3D printer is in the Multimedia Resources Center in the Ayala Science Library.

How much does it cost?

During this assessment period 3D printing is free.

How do I design my object?

Designing a 3D object to print is done using 3D modeling software. There are many 3D modeling programs available, including professional programs like SolidWorks and Autodesk Inventor (which are available in the MRC), and free software programs like Blender, Wings3D, FreeCAD, and Sketchup. You will need export your 3D model into .STL (STereoLithography) format in order to print it.

How do I print my object?

Users must bring their design to the MRC during business hours. The print object must be an .STL file on a USB flash drive formatted in any format (preferably ntfs, or fat32). All submissions are subject to approval based on scheduling and availability of the 3D printer.

What colors can I print in?

Your printed object will be printed in one solid color. Available colors vary. You will be given your choices when you submit your request.

What if I have more than one object?

Each file must be submitted separately by filling out a separate 3D Printing Request Form available at the MRC.

How long will my object take to be printed?

The time it takes to print an object can vary widely. See our time guidelines for estimates. Using the UCI Libaries' 3D printer may take up to a week depending on the queue. For more time efficient options, check out these alternate providers. If you have more than one object and there is high demand for the 3D printer, the Libraries may choose to schedule only one printed object per person/entity per day.

How will I know when my printed object is done?

You will receive an email from the UCI Libraries and can pick up your printed object from the MRC during normal business hours. Printed objects will be held for 3 business days.

Can I watch my object print?

coming soon

Why does my printed object look unfinished?

Users may see imperfections in their printed objects. Small bumps or holes and rough edges at the base of an object may occur with 3D printing. Imperfections can be cleaned up with fine sand paper, file and/or tools. The Makerbot Replicator is very accurate but there may be some instances where objects do not fit precisely together. Objects are built from the ground up and in certain instances prints will require support material and / or rafts to ensure proper printing. Support materials is often needed if the design has large overhangs or parts suspended in mid-air. Rafts are often used as support at the base of the model. Users may receive their print job with the tape still on. These types of are easily removable by the user. Staff will not be responsible for removing materials and / or rafts. All finishing must be done by the user outside of the Libraries' buildings. See our tips for finishing a printed object.

Is there somewhere else I can print my object?

Check out these alternate providers.

How can I find out more about the 3D Printing Service Pilot?

If you have more questions about 3D printing email libmrc@uci.edu or visit the MRC during business hours.

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3D Printing @ Columbia

Upload a 3D Model | Categories | PrinterCam | Timelapse | Printed | Sort by | Featured

Introduction

Tips for Designers

3D models can be designed in any number of software programs, including:

- 123D Design – free
- 3DS Max @ DSC
- AutoCAD @ DSC
- blender – free
- FreeCAD – free
- Maya @ DSC
- MeshLab – free
- OpenSCAD – free
- Rhino3D
- SketchUp – free
- SolidWorks
- Thingiverse Customizer – free
- Tinkercad – free version
- ZBrush

Models submitted below must be submitted in .stl format. Most software programs can export 3D models in .stl format, but get in touch if you need help.

Tips on 3D printing

The Libraries recently purchased a MakerBot Replicator 2 as an experiment to engage users in a number of software programs already provided by the Libraries (AutoCAD, 3DS Max, Maya, etc.). If use of the Replicator 2 is high, we hope to expand our offerings in this 3D ecosystem in the future.Before an .stl file can be printed on the MakerBot Replicator 2, it must be converted from .stl into G-code using the free Makerware software.

To properly print, 3D models must be closed forms, meaning that there are no improper openings in the data file. You can check to see if your model is closed at willit3dprint.com.

Looking for other places to print?

GSAPP students can have models fabricated in the Digital Output Shop (3D printing info).
A number of laboratories in SEAS have 3D printing facilities.
Vendors such as Shapeways will print models for a fee.

Submit your design to be printed

Ready to have your model printed? Now you can upload an .stl file, pick a view that best represents the model, and fill out some brief information. Then we'll print the most up-voted models from time to time!

We will evaluate designs that are submitted to ensure they are printable, appropriate, and will not consume an unreasonable amount of our limited resources.

Frequently Asked Questions

1. How much does it cost to print on the Libraries' 3D printer?

Right now there is no cost to print something in 3D, but we also do not guarantee that everything that is submitted will be printed.

2. I need to have something printed by tomorrow – can you do it?

The Libraries' 3D printer is not intended to be like one found in a fabrication shop. We encourage you to get in touch early in the design process if you would like to have

something printed. Items submitted via the submission interface will likely not be printed immediately following approval for the site.

3. How will you choose what items to print?

Periodically the staff of the Science & Engineering Library will print some of the most up-voted models, so be sure to share your models with your friends so they can vote for them!

Printing will ultimately be at the discretion of the staff in the Science & Engineering Library; items that will be used for research, teaching, classwork, or other stated missions of the University and the Libraries will, however, be favored over items that are for personal use.

4. What are the specs of the MakerBot Replicator 2? How big can it print? What's the resolution?

All of the specifications for the MakerBot Replicator 2 are listed on the product feature list.

Questions? Comments?

Get in touch via email or online!

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Your email address will not be published. Required fields are marked *

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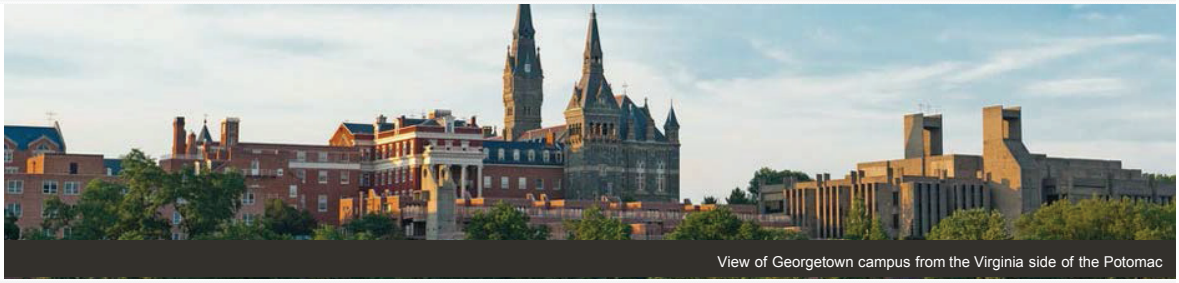


View of Georgetown campus from the Virginia side of the Potomac

3D Printing/Scanning at Georgetown University Libraries: PRE-PRODUCTION & PLANNING

3D Printing/Scanning at Georgetown University Libraries

WHAT IS 3D PRINTING?

3D printing or additive manufacturing is a process of making three dimensional solid objects from a digital file. The creation of a 3D printed object is achieved using additive processes. In an additive process an object is created by laying down successive layers of material until the entire object is created. Each of these layers can be seen as a thinly sliced horizontal cross-section of the eventual object.

(From http://3dprinting.com/what-is-3d-printing/)

HOW DOES IT WORK?

It all starts with making a virtual design of the object you want to create. This virtual design is made in a CAD (Computer Aided Design) file using a 3D modeling program (for the creation of a totally new object) ór with the use of a 3D scanner (to copy an existing object). This scanner makes a 3D digital copy of an object and puts it into a 3D modeling program.

To prepare the digital file created in a 3D modeling program for printing, the software slices the final model into hundreds or thousands of horizontal layers. When this prepared file is uploaded in the 3D printer, the printer creates the object layer by layer. The 3D printer reads every slice (or 2D image) and proceeds to create the object blending each layer together with no sign of the layering visible, resulting in one three dimensional object.

(From http://3dprinting.com/what-is-3d-printing/#howitworks)

WHAT MATERIALS ARE AVAILABLE?

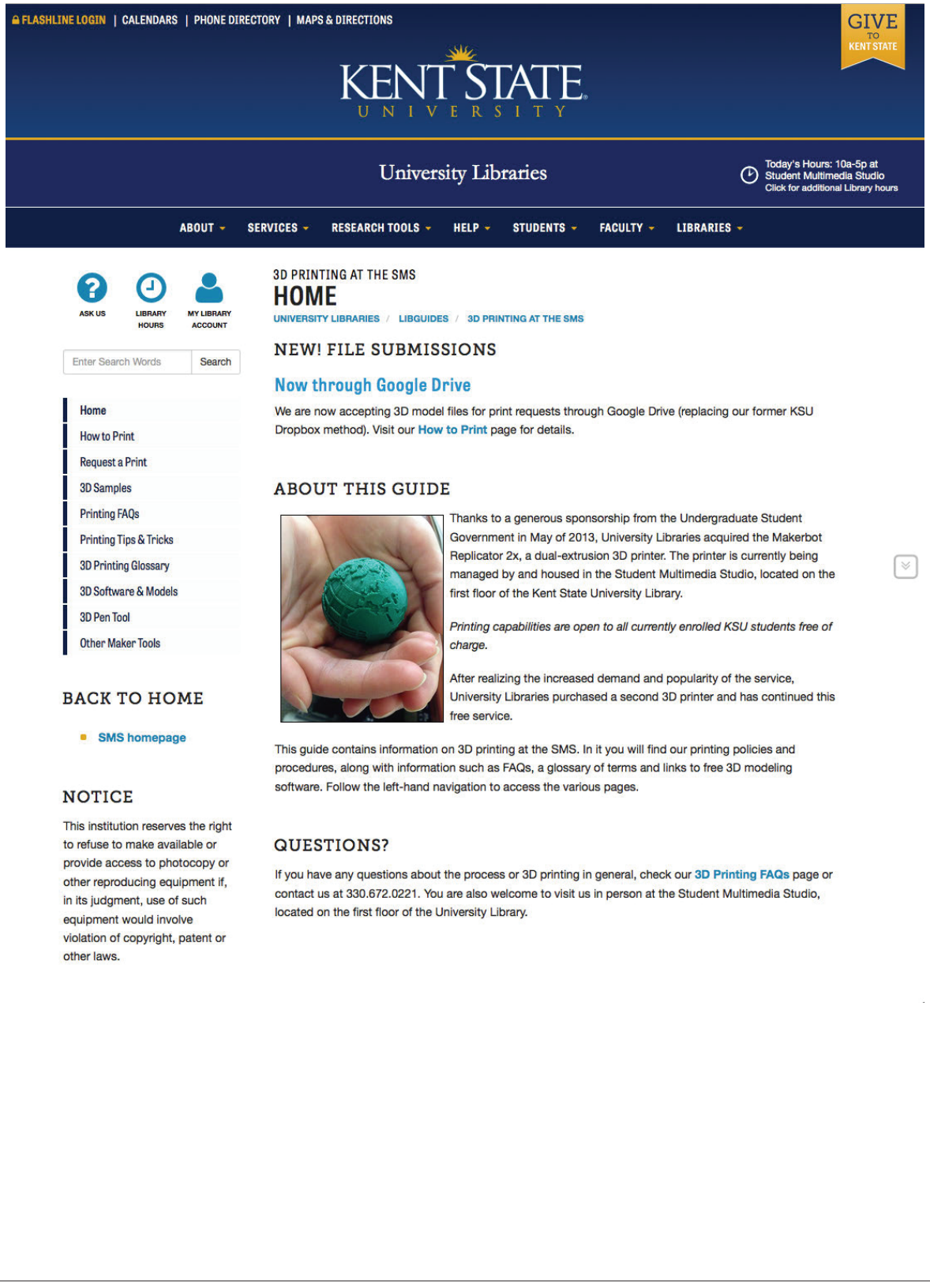
MakerBot PLA Filament is a nontoxic resin made of sugar derived from field corn and has a semisweet smell (like waffles) when heated. It is the best and most consistent PLA filament for your MakerBot Replicator 3D Printer and guaranteed to have no heavy metals, phthalates, or BPA.

(From https://store.makerbot.com/pla-filament)

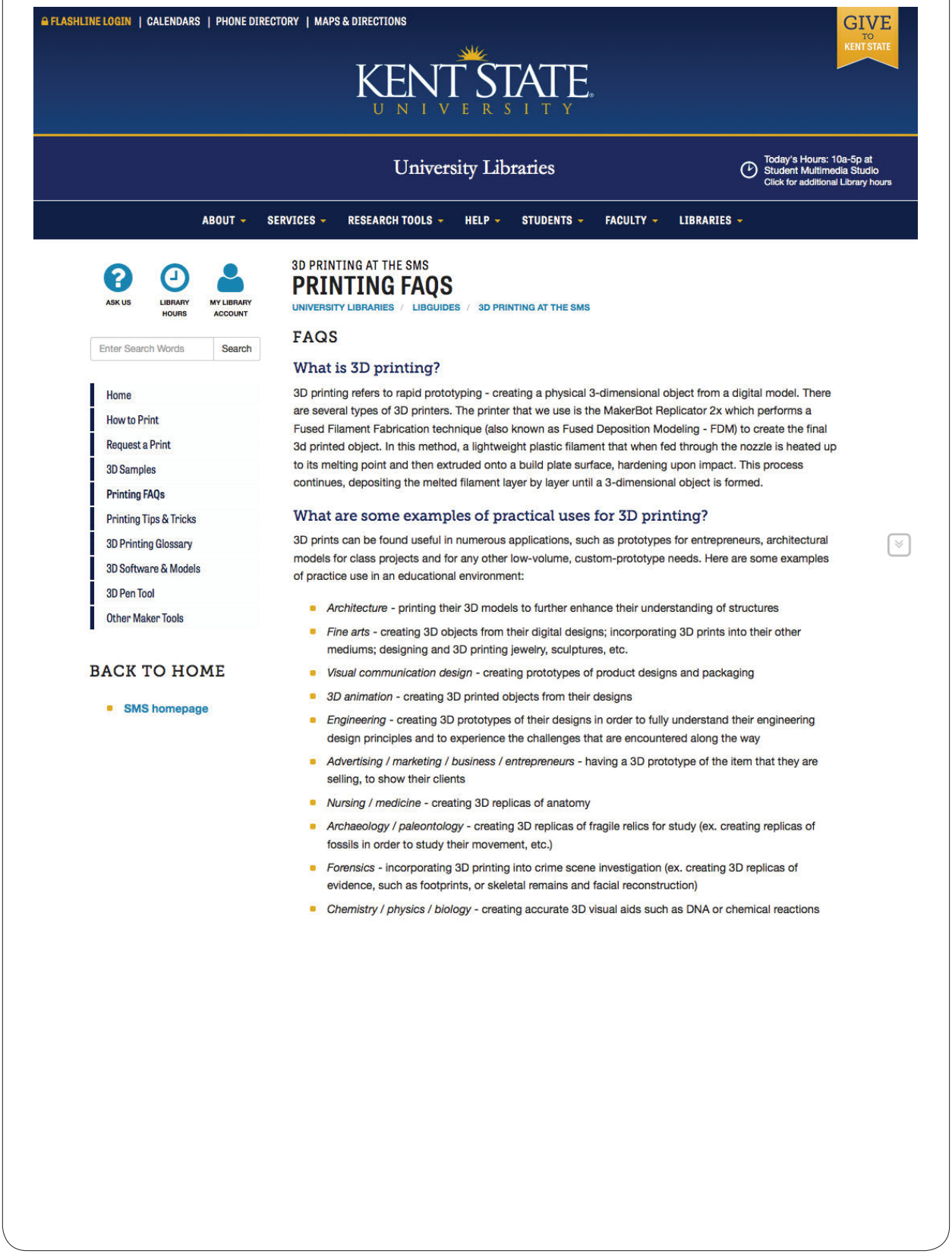
INFO

- MAKE
  DIY projects, how-tos, and inspiration from geeks, makers, and hackers
- www.3ders.org
  3D printer and 3D printing news
- 3D Printing
  Features the latest news on 3D printers, jobs and additive manufacturing companies.

KENT STATE UNIVERSITY
3D Printing at the SMS
http://libguides.library.kent.edu/3d



KENT STATE UNIVERSITY
3D Printing at the SMS | Printing FAQs
http://libguides.library.kent.edu/c.php?g=278293&p=1854417



Who can use the 3D printing service?

The 3D printing service is open to all currently enrolled Kent State students in all disciplines. The actual printing process is performed by our SMS consultants. Have a class of students who wish to 3D print? Contact us first to discuss the assignment so that we can review our policies with you and discuss any limitations that you may have in printing.

How large of an object can you print?

The maximum build volume that we prefer for the Makerbot Replicator 2x is 150 (X) x 150 (Y) x 140 (Z) mm. The max build volume for the Ultimaker 2 is 190 (X) x 195 (Y) x 174 (Z) mm. However, since the printers only run while we are open, the total printing time for a particular model must be under 12 hours, which for a cube-shaped model would equate to a 94 x 94 x 94mm design.

Please be aware that we may ask to print your model at a smaller scale than you would like. We do this with the goal of ensuring the best success of your print. With creative design, though, you can print larger simply by separating your model into smaller printable pieces. So keep that in mind as you prepare your file for printing.

Which 3D modeling software should I use to create a printable design?

We do not have any limitations in the modeling software that you use. We have two file formats that we accept (STL and OBJ) and as long as your software can save or export as one of those formats we should be able to print your model.

Which file formats do you accept?

We accept STL and OBJ files. Most 3D modeling programs can save/export as at least one of those two. Please note, if creating a model in Tinkercad please download your design as an STL file (not an OBJ). For some reason we have difficulty opening OBJ files that have been produced in Tinkercad.

For the full specifications on our 3D printers, visit their official websites:

- Makerbot Replicator 2x
- Ultimaker 2

Last Updated: Aug 19, 2015 1:06 PM **URL:** http://libguides.library.kent.edu/3d Print Page
Tags: 3d modeling, 3d printing, student multimedia studio

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Makers in Libraries < Program on Information Science

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3D PRINTING GUIDE

HOW CAN I MAKE MODELS SUITABLE FOR PRINTING?

Models may need cleanup and adjustment before they can be printed. These tools and tutorials can help when you are processing your models:

Netfabb Tutorials

Repair Software, helps to fix and repair 3D Files.

A Step-by-step guide with exercise files can be downloaded. 2 video tutorials show how to repair files, check printability and do automatic packing.

Makerbot Customizer on Thingiverse

A Web App, allows to modify existing models. Click **here** to download the App.

Makerbot provides a simple and basic tutorial.

GrabCAD Workbench Tutorials

A cloud-based PDM (product data management) solution, helps to manage, view and share **CAD** files.

8 video tutorials give an overview of GrabCAD Workbencn.

ONLINE RESOURCES

Rapid Prototyping Applications

Finding Models and Scanning Objects

Creating New Models

Preparing Models for Printing

PRINTING SERVICES

Services Inside MIT

Services Outside MIT

INFORMATION

Learning More at MIT

WHAT IS THIS SITE?

This guide contains top information resources for Makers who are interested in making stuff with 3D printers. It is a starting place for your project.

NEED MORE HELP?

More information on how to make stuff from the libraries

Ask the Libraries if you have questions.

Research Consultations - appointments with subject experts for in-depth help.

Tell the Libraries how to serve you better. We want to hear from you.

MICHIGAN STATE UNIVERSITY
Make@State | 3D Printing
https://www.lib.msu.edu/3DPrinting/

MICHIGAN STATE UNIVERSITY
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- Overview
- 3D Printing
  - 3D Print Submission Form
  - 3D Printer Policy
  - 3D Printing FAQ
- Laser Cutter
- Vinyl Cutter
- Borrowable Circuit Tech

3D Printing

Location and Hours

Location: Main Library Copy Center, located on the 2nd floor of the West Wing.
Hours of operation for 3D Printing are in accordance with the Copy Center.

Access

In order to have something printed on our 3D printer, please fill out the 3D Print Submission Form. Prints will be performed in the order they are received and may take a few days depending on order volume.

If you have questions, you can email Make@State Staff or call 517-884-0844.

Cost

Cost will be determined by the filament weight of the item printed. The current rate is $0.20 per gram (All prints under 5 grams will be rounded up to $1.00.) of the total weight of the final print.

General Size to *Price Comparisons:

*Price of object shown subject to change with each individual print.

Why 3D Printing?

3D Printing is a new technology that promotes creativity and innovation. This revolutionary machine provides an opportunity for our patrons to further their learning experience.

How does 3D Printing fit in an Academic Library? It advances the Libraries' Mission...

- By supporting the University's mission of preservation, creation, transmission and application of knowledge
- By providing access to resources to serve educational needs
- Through appropriate facilities and quality service by helpful and expert staff using current technologies, collaborative strategies, and expanding information networks
- By providing an essential facility where emerging and established scholars access information and gather in an atmosphere conducive to learning and other creative endeavors

Some of the departments on campus that are using 3D Printing:

- Apparel/Textile Design
- Arts and Letters
- Business
- Communication Arts and Sciences
- Education
- Engineering
- Interior Design
- Packaging
- Veterinary Medicine

Equipment

MakerBot Replicator 5th Generation

- Affordable, Consumer 3D Printing
- Filament: PLA Plant-based Plastic
- 9.9L x 7.8W x 5.9H inches Build Volume
- 100 Microns (.0039 in) Layer Resolution
- Fused Deposition Modeling (FDM) Technology
- Manufacturer's Details

Filament

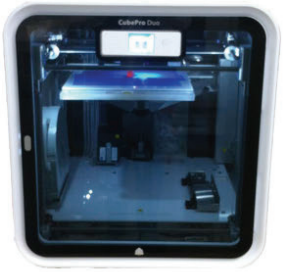
- MakerBot PLA Filament is a bioplastic derived from corn. It is guaranteed not to contain any heavy metals, phthalates or BPA.
- PLA filament comes in a variety of colors. 18 filament colors are available for use on the Copy Center 3D Printer.
- Multi-Colored printing will not be an available service.

Filament Colors Available in the Copy Center:

MakerBot Digitizer 3D Scanner

- $2.00 per scanned object
- 8" x 8" Scan Volume
- Consumer-level 3D scanner optimized for 3D printing
- Fast scan time
- Medium to low resolution scans
- Does not scan color data
- Manufacturer's details

Cube Pro Duo 3D Printer



- Affordable, Consumer 3D Printing
- Filament: ABS
- Build volume: 11.2x9.06x10.6 inches
- Print Resolution: 70 microns in HD, 200 microns in SD, 300 microns in fast mode
- Can print two colors on one print
- Manufacturer's detail

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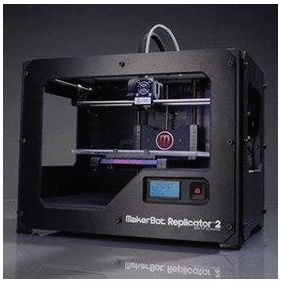
3D Printing



Tools for 3D printing

Software

The following applications are available on computers in Kenan Science Library. They are also freely available to download to use on your own computer.

3D Design Software

Tinkercad
An easy-to-use web-based tool for creating objects that are ready to be 3D printed. If you haven't done 3D design before, this is a great place to start.

SketchUp
A 3D modeling program for applications such as architectural design, interior design, civil and mechanical engineering, film, and video game design. SketchUp models can be exported to an .OBJ file, which can then be converted to an .STL file using MeshLab (see under "3D Editing and Repair Software").

Blender
A free professional 3D computer graphics software product used for creating animated films, visual effects, art, 3D printed models, interactive 3D applications and video games.

Maya
Maya is a 3D animation, modeling, simulation, rendering, and compositing program. This is licensed software that is available in the Kenan Science Library.

OpenSCAD
A free software application for creating solid 3D CAD objects. It is not an interactive modeler, but rather a 3D-compiler. OpenSCAD reads from a script and renders a 3D model from it.

Getting started

Interested in getting started with 3D printing?

- Read our 3D Printing FAQs
- Read some library resources about 3D printing.
- Jump right in and start using some of the design tools below!

Then,

- Sumit a 3D printing request using this form.
- Set up a consultation to bring in your file and go over search options.

Browse 3D Models

- Thingiverse is a repository of 3D files from hundreds of users.
- The NIH 3D Print Exchange allows for searching, browsing, downloading, and sharing biomedical 3D print files, modeling tutorials, and educational material.
- NASA 3D Resources has a a growing collection of 3D models, textures, and images from inside NASA.
- Smithsonian x 3D is a project to share 3D models developed from scans of their diverse collections.

3D Editing and Repair Software

MeshLab
An open-source general-purpose system aimed at the processing of the typical not-so-small unstructured 3D models that arise in the 3D scanning pipeline. MeshLab is oriented to the management and processing of unstructured large meshes and provides a set of tools for editing, cleaning, healing, inspecting, rendering and converting these kinds of meshes.

MeshMixer
An experimental 3D modeling tool whose goal it is to make it easy to compose new 3D models from existing meshes.

NetFabb
An .STL viewer and repair tool.

Molecular Software Applications

Print your favorite protein using these easy steps

PyMOL
An open-source, user-sponsored, molecular visualization system that can produce high-quality 3D images of small molecules and biological macromolecules, such as proteins.

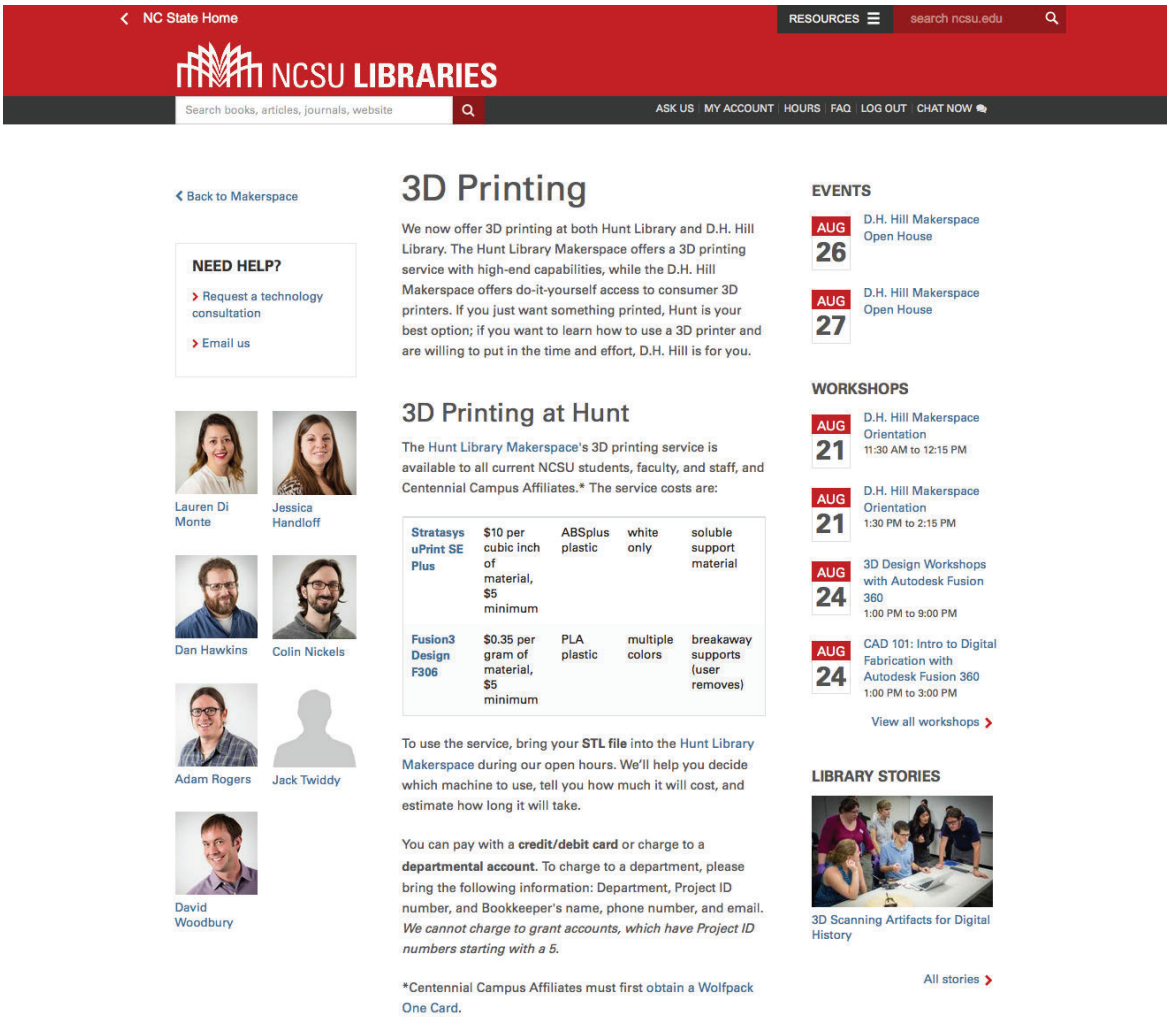
Kokopelli (Mac and Linux only)
Kokopelli is an open-source tool for computer-aided design and manufacturing (CAD/CAM). It uses Python as a hardware description language for solid models. A set of core libraries define common shapes and transforms, but users are free to extend their designs with their own definitions.

3D Printing Service Terms of Use

Those utilizing the library's 3D printer must do so for lawful purposes. Users must abide by all applicable laws (including copyright law (Title 17, U.S. Code) and patent law (Title 35, U.S. Code)), UNC policies, and library policies, while respecting the health and safety of the University community. Kenan Library staff reserve the right to decline any print request for any reason. The Library cannot guarantee model quality or stability, confidentiality of designs, or specific delivery times.

UCSF Chimera
An extensible program for interactive visualization and analysis of molecular structures and related data, including density maps, supramolecular assemblies, sequence alignments, docking results, trajectories, and conformational ensembles. High-quality images and movies can be created.

NORTH CAROLINA STATE UNIVERSITY
Makerspace | 3D Printing
http://www.lib.ncsu.edu/do/3d-printing



3D Printing at Hill

The D.H. Hill Makerspace's 3D printers are available for first-come, first-serve use by current students, faculty, and staff who have attended our D.H. Hill Makerspace Orientation. If you have never used a 3D printer before, our staff can help you get started, though you may want to attend a 3D Printing workshop first for a more thorough introduction.

To use a 3D printer at D.H. Hill, you will need to purchase a spool of filament. We currently sell **PLA filament in a variety of colors for $13.25 per 0.5kg spool** in the Makerspace. You may also bring your own filament in, but be aware that filament varies in quality and print settings across suppliers, even for the same type of plastic.

The 3D printer options at Hill are:

LulzBot Mini	3mm filament	Cura LulzBot Edition software
MakerBot Replicator 2	1.75mm PLA filament	MakerBot Desktop software

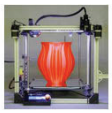
Software

- MeshMixer
- Tinkercad

Spaces

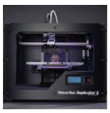
- D.H. Hill Makerspace
- Hunt Library Makerspace

Use in the library



Fusion3 F306 Gen I 3D Printer

Lulzbot Mini



MakerBot Replicator 2 3D Printer

Stratasys uPrint SE Plus 3D Printer

Wanhao Duplicator 4S

FAQ

What is 3D printing? How does it work?

3D printing is the process of making a physical object from a 3D digital model. It is also known as additive manufacturing because the physical model is built up one layer at a time. All of our current 3D printers use a process called Fused Deposition Modeling (FDM), in which a plastic filament is fed through a heated nozzle which melts the plastic. Computer-controlled motors move the nozzle around to create the shape of a layer, which hardens immediately. The object is built this way, one layer at a time, from the bottom up.

What are some practical uses of 3D printing?

There are a multitude of practical applications for 3D printing, from aerospace and automotive engineering to prosthetics and other medical uses. 3D printing enables rapid prototyping of design concepts and functional, working models, and is also used for low-volume, custom, or on-demand manufacturing.

What software can you use to make printable 3D models?

For beginners, we recommend starting with Tinkercad. It is web-based, optimized for 3D printing, and easy to get started with. For a free account, you can join the NCSU Libraries Tinkercad team using this link: http://go.ncsu.edu/tinkercad

However, almost all 3D modeling software will output the filetype (STL) our machines require. There are many options; a few popular ones are SolidWorks, AutoCAD, Inventor, 3DS Max, Creo, Blender, Rhino 3D, and Sketchup. In general, *solid* modelers will be easier to print from than *surface* modelers. Information on software available to students and staff can be found at software.ncsu.edu and www.eos.ncsu.edu/software

Is the library the first place at NCSU to have 3D printers?

No, we are not, but we are the first to offer 3D printing services to all NCSU students, faculty, and staff. The Center for Additive Manufacturing and Logistics on campus has long done research on 3D printing, including with cutting edge processing and advanced materials such as titanium. The College of Design has also long had a 3D printing service for its students.

What if I need to 3D print with higher resolution, faster turnaround time, or different materials?

There are many professional 3D printing services available, including Fineline Prototyping (based in Raleigh) and Shapeways (online).

Contact

D. H. Hill Library
2 Broughton Drive
Campus Box 7111
Raleigh, NC 27695-7111
(919) 515-3364

James B. Hunt Jr. Library
1070 Partners Way
Campus Box 7132
Raleigh, NC 27606
(919) 515-7110

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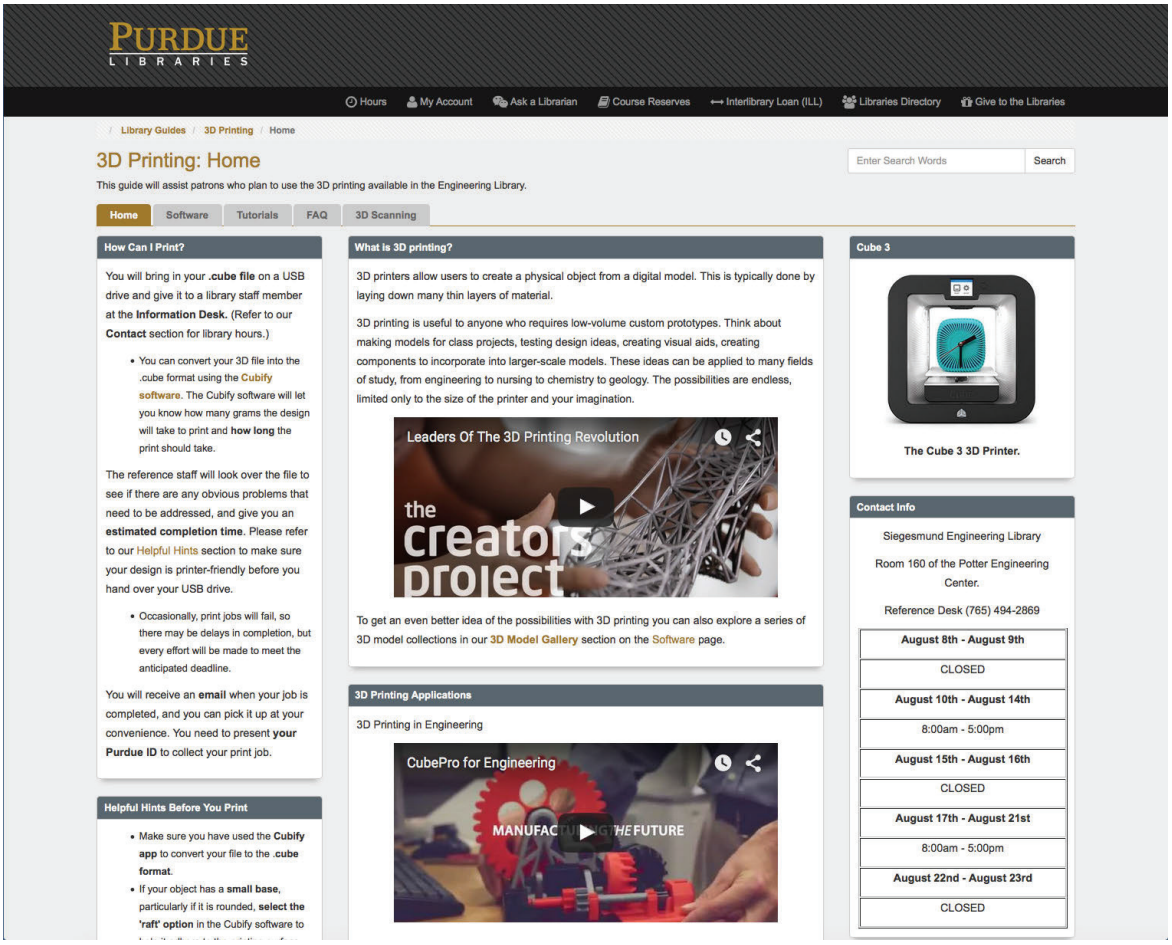
3D Printing: Home
http://guides.lib.purdue.edu/3dprinting



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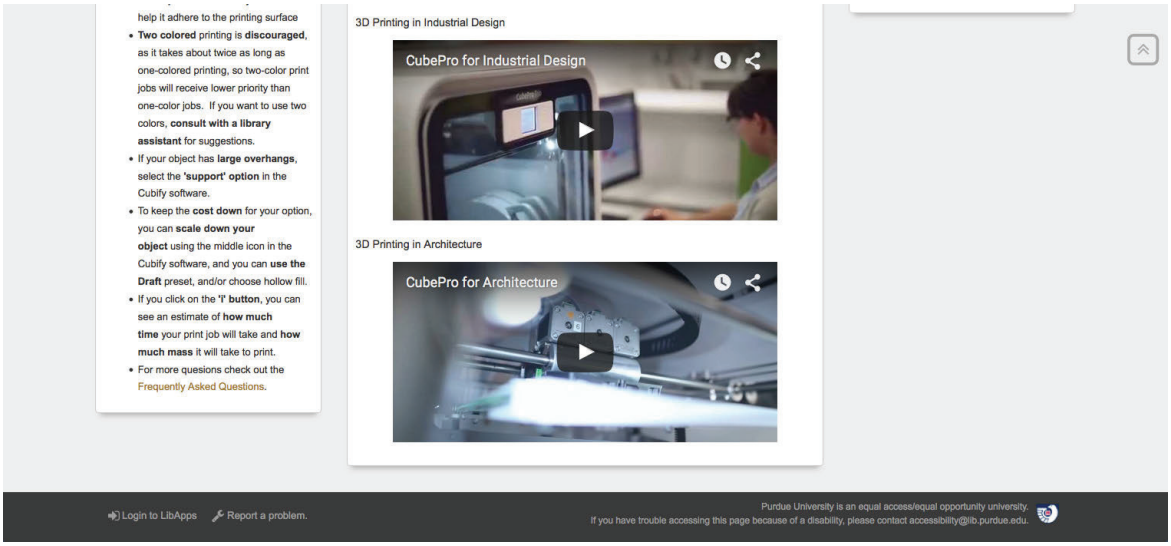

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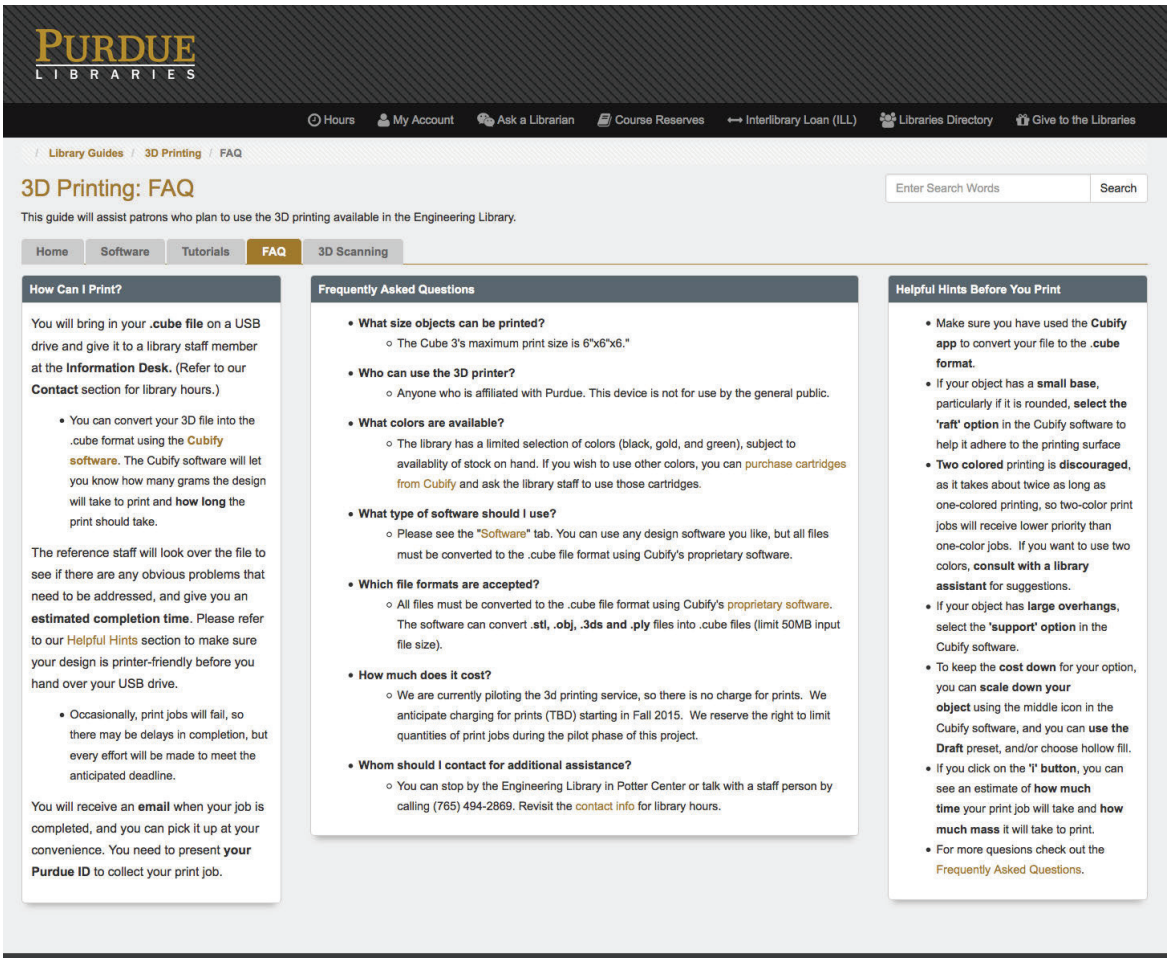

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http://libguides.rutgers.edu/FabLab

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Multimedia Creation Resources at the Fordham Commons: FabLab/ Makerspace

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Available colors

Black

Blue

Orange

Red

Translucent

Translucent Blue

Translucent Purple

Translucent Red

Translucent Yellow

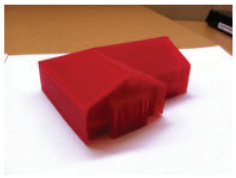
White

Yellow

Printed at the FabLab- Giraffe

Giraffe printed by Chris in Transparent Blue

Building



3D Printing

3D printing is available to members of the Rutgers community

Welcome to 3D printing at the Fordham FabLab on the ground level of the Douglass Library. Just follow signs to the Fordham Commons to find the 3D printers.

We have two MakerBot Replicator 2 printers.

Visit the MakerBot website for more information about MakerBot, Replicator 2, and Makerware

Please contact Stacey Carton at the Media Center or at 848 932 5042 for an appointment. Or email sacarton@rutgers.edu

http://www.makerbot.com/

Getting started

Create a file for 3D printing using our software or one of your own. (.stl file)

Be sure to visit the Makerbot Replicator 2 page to be aware of size and other limitations

Make an appointment with Stacey at the Media Center (848) 932 5042 or ask for details at the Fordham Commons help desk. We will provide you with the cost for printing your project and set up a printing appointment.

Printing costs are $.25/gram, rounded up to the nearest dollar. PLEASE BRING EXACT CHANGE- CASH ONLY. (RIAS available- ask for details)

We will also convert your project to a .x3g file which is compatible with our printers.

You will have a chance to preview your project before printing begins.

Please visit the websites below for more specific information:

http://www.makerbot.com/faq/

http://www.makerbot.com/support/guides/design/

The largest build volume the Replicator can print is

28.5 L x 15.3 W x 15.5 H cm
[11.2 x 6.0 x 6.1 in]

However, we are also limited by time and staff constraints. Please inquire if you have questions about a specific project

Multimedia Resources

Stacey Carton

Email Me

Contact:
Stacey Carton MLIS

sacarton@rci.rutgers.edu

Manager- Fordham Commons- A Multimedia Collaboration Space

Mabel Smith Douglass Library

8 Chapel Drive

New Brunswick, NJ 08901-8527

phone: 848 932-5042

Printed at the FabLab- Raven and Phoenix

Printed by Michael

Printed at the FabLab- Lowpoly Bunny

Examples- Stretchlet Bracelet $2

Examples- Chain Links $1

Examples- House Fly $1

Programs/ Websites

The following software has been installed on the Macs in the Fordham Commons:

Blender 2.70
Makerware 2.4.1.35
Makerware for Digitizer 2.4.1.35
Sculptris Alpha 6
SketchUp Pro 2014 v.14.0.4

We also recommend:

TinkerCad.com. This site requires users to create a login, but offers free "easy-to-use tool for creating digital designs that are ready to be 3D printed into physical objects."

Also, many designs have been uploaded by users to **Thingiverse.com**. Many offer free downloads and many are customizable. Please be aware that there is NO GUARANTEE that these designs will print properly! We cannot be responsible for projects that print incorrectly due to design flaws

The **NIH** offers downloadable designs at http://3dprint.nih.gov/

From the NIH website: "The NIH 3D Print Exchange provides access to a community-contributed database of bioscientific 3D-printable files." The site also offers tools to create 3D printable models from medical images, molecular data, or image stacks. (Login required)

Prosthetic limbs at **E-nabling the Future**

http://enablingthefuture.org/upper-limb-prosthetics/

"A network of passionate volunteers using 3D printing to give the World a "Helping Hand.""

"The e-NABLE community has developed a collection of different 3D-printable assistive devices that are free for download and fabrication by anybody who would like to learn more about the designs or fabricate a device for somebody in need."

Tips and advice

10 tips, including rafts and shells http://talesofa3dprinter.blogspot.com/2013/12/top-10-tips-for-3d-printing-design-from.html

holes and overhangs http://www.instructables.com/id/3D-Design-For-3D-Printing/step2/Overhangs-Part-1-Holes/

extreme overhangs and supports http://www.protoparadigm.com/blog/2012/01/printing-with-support-extreme-overhangs/

45 degree rule and droop http://printa3d.blogspot.com/p/design-tips.html

Creating solid objects http://jcflowers1.iweb.bsu.edu/rlo/makerbot.htm

3D Digitizer

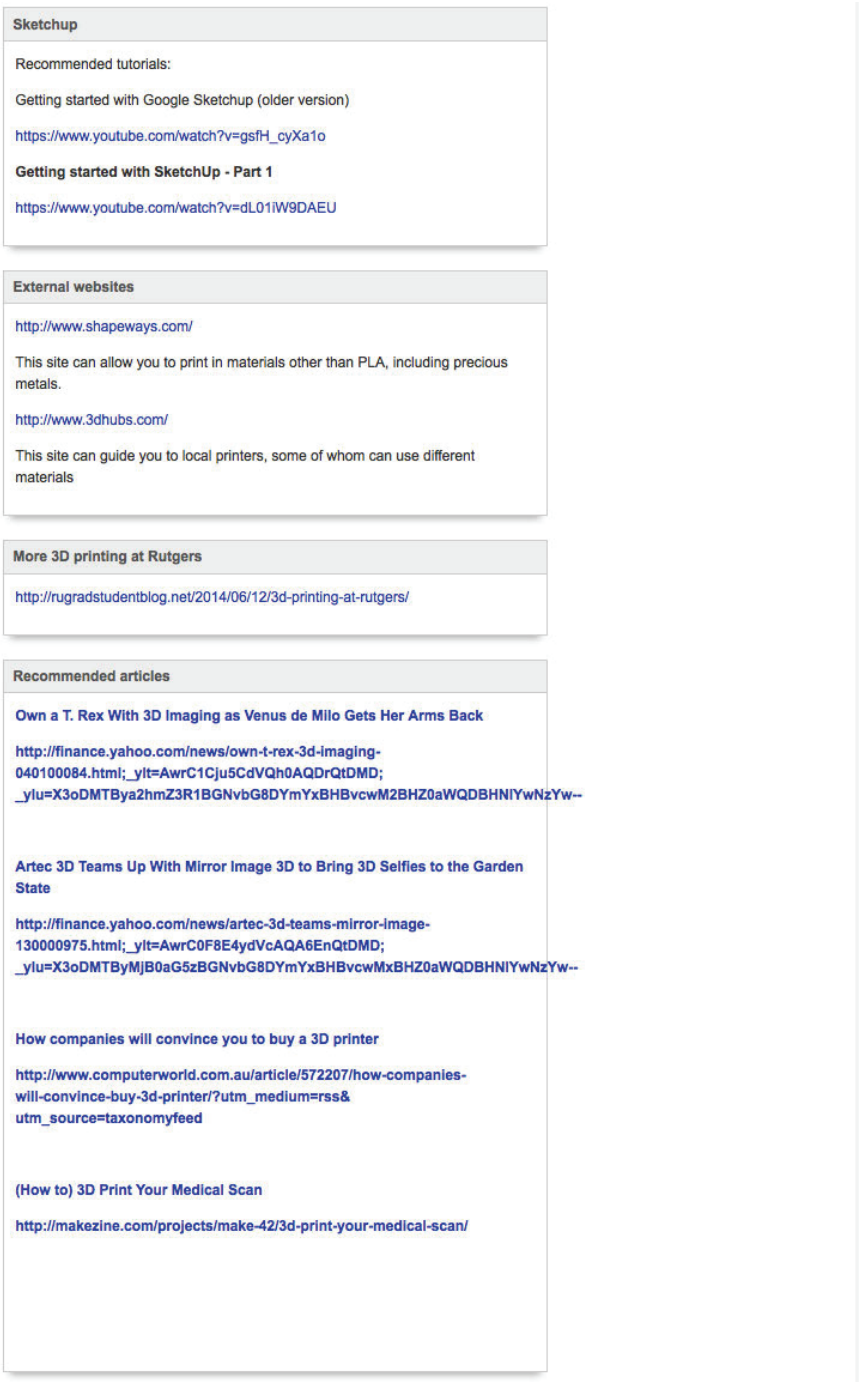
Now available!

Featuring Makerbot Digitizer

3D Scanner

http://store.makerbot.com/digitizer

Scanning is free, but please call ahead for an appointment



Sketchup

Recommended tutorials:

Getting started with Google Sketchup (older version)

https://www.youtube.com/watch?v=gsfH_cyXa1o

Getting started with SketchUp - Part 1

https://www.youtube.com/watch?v=dL01iW9DAEU

External websites

http://www.shapeways.com/

This site can allow you to print in materials other than PLA, including precious metals.

http://www.3dhubs.com/

This site can guide you to local printers, some of whom can use different materials

More 3D printing at Rutgers

http://rugradstudentblog.net/2014/06/12/3d-printing-at-rutgers/

Recommended articles

Own a T. Rex With 3D Imaging as Venus de Milo Gets Her Arms Back

http://finance.yahoo.com/news/own-t-rex-3d-imaging-040100084.html;_ylt=AwrC1Cju5CdVQh0AQDrQtDMD;_ylu=X3oDMTBya2hmZ3R1BGNvbG8DYmYxBHBvcwM2BHZ0aWQDBHNlYwNzYw--

Artec 3D Teams Up With Mirror Image 3D to Bring 3D Selfies to the Garden State

http://finance.yahoo.com/news/artec-3d-teams-mirror-image-130000975.html;_ylt=AwrC0F8E4ydVcAQA6EnQtDMD;_ylu=X3oDMTByMjB0aG5zBGNvbG8DYmYxBHBvcwMxBHZ0aWQDBHNlYwNzYw--

How companies will convince you to buy a 3D printer

http://www.computerworld.com.au/article/572207/how-companies-will-convince-buy-3d-printer/?utm_medium=rss&utm_source=taxonomyfeed

(How to) 3D Print Your Medical Scan

http://makezine.com/projects/make-42/3d-print-your-medical-scan/

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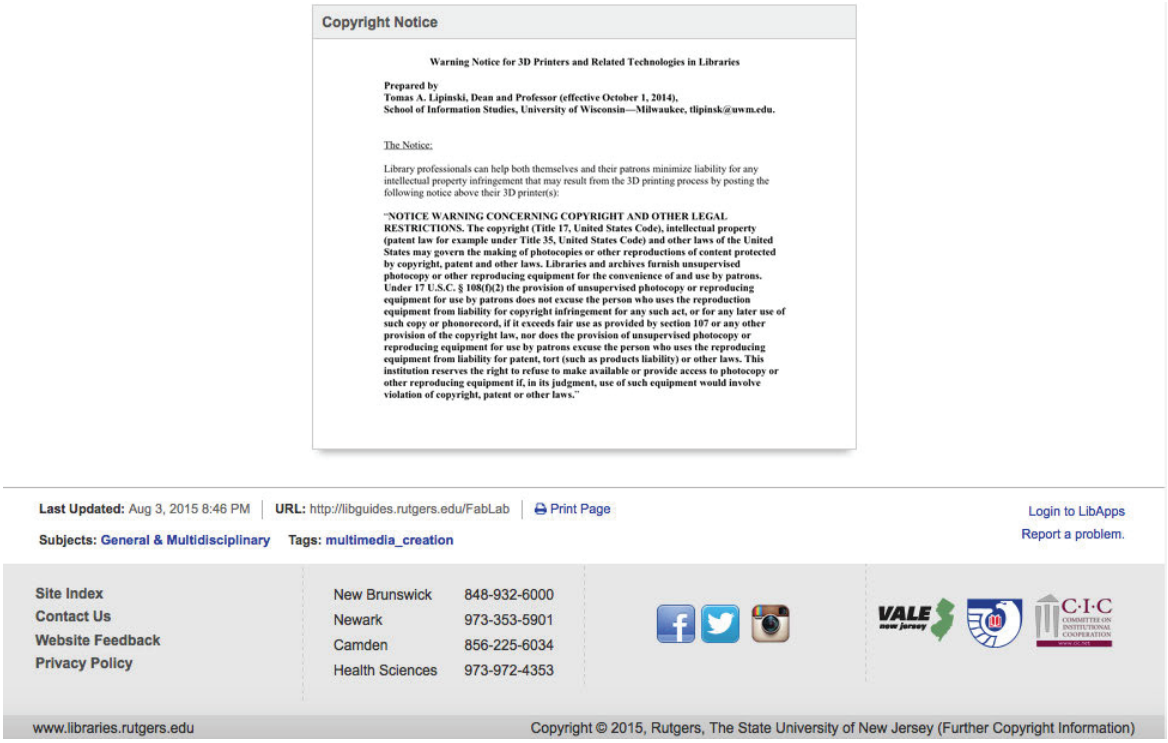
http://libguides.rutgers.edu/FabLab



Copyright Notice

Warning Notice for 3D Printers and Related Technologies in Libraries

Prepared by
Tomas A. Lipinski, Dean and Professor (effective October 1, 2014),
School of Information Studies, University of Wisconsin—Milwaukee, tlipinsk@uwm.edu.

The Notice:

Library professionals can help both themselves and their patrons minimize liability for any intellectual property infringement that may result from the 3D printing process by posting the following notice above their 3D printer(s):

"NOTICE WARNING CONCERNING COPYRIGHT AND OTHER LEGAL RESTRICTIONS. The copyright (Title 17, United States Code), intellectual property (patent law for example under Title 35, United States Code) and other laws of the United States may govern the making of photocopies or other reproductions of content protected by copyright, patent and other laws. Libraries and archives furnish unsupervised photocopy or other reproducing equipment for the convenience of and use by patrons. Under 17 U.S.C. § 108(f)(2) the provision of unsupervised photocopy or reproducing equipment for use by patrons does not excuse the person who uses the reproduction equipment from liability for copyright infringement for any such act, or for any later use of such copy or phonorecord, if it exceeds fair use as provided by section 107 or any other provision of the copyright law, nor does the provision of unsupervised photocopy or reproducing equipment for use by patrons excuse the person who uses the reproducing equipment from liability for patent, tort (such as products liability) or other laws. This institution reserves the right to refuse to make available or provide access to photocopy or other reproducing equipment if, in its judgment, use of such equipment would involve violation of copyright, patent or other laws."

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TAGS: 3D, 3D PRINT, 3D PRINTER, 3D PRINTING, 3D SCANNER, 3D SCANNING, MAKERBOT

A guide to 3D Printing at Morris Library.

Last Updated: Aug 17, 2015 | URL: http://libguides.lib.siu.edu/3d | Print Guide | RSS Updates | Email Alerts

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IMPORTANT INFORMATION

Required File Format:

.STL or .OBJ

Maximum Object Size:

225 x 145 x 150 mm

8.85 x 5.7 x 5.9 in

PLA filament colors currently available:

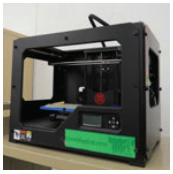
Silver
Black
Red
White
Orange
Green
Natural
Glow In the Dark
Blue
Yellow
Purple

Cost per object:

$0.25 per gram

$1.00 minimum

INTRODUCTION



3D Printing can turn your ideas into actual objects.

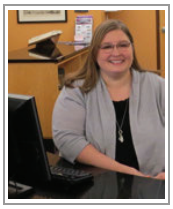
Through a generous loan by the non-profit organization New Blankets, Morris Library now has a 3D Printer. This printer allows the user to create physical objects from digital models. All members of the university community and the public are encouraged to make use of this exciting technology.

3D printing is sometimes referred to as additive manufacturing or rapid prototyping. It is the process of creating a three dimensional physical object from a digital model. The 3D printer builds the object vertically by putting down layer upon layer of a plastic filament called PLA.

3D PRINTING STEPS

1. Design a 3D model or find one on a site like Thingiverse.
2. Read the Morris Library Printing Policy. If your print is time sensitive, please allow adequate time. Most prints will be finished in a few days, but there may be times that the printer is malfunctioning, being repaired, experiencing heavy use, or is being used for an event or a course.
3. Make sure your file is in .STL or .OBJ format.
4. Fill out and submit a **3D Printing Request Form**. If you have any special instructions, please include them in the Additional Comments box on the form. After you have submitted the form, the next screen will include the location to submit your .STL or .OBJ file. To upload your .STL or .OBJ file, click Browse under the Attach files option. Find and select your file. Only .STL or .OBJ files will be accepted. Once you have added your .STL or .OBJ file, click the Upload file button. If you want to print more than one object, make sure to submit a file and form for each one.
5. Optional - If you wish, set up a consultation or appointment with a member of the library staff to print your model yourself or watch it print. If you choose this option, someone will contact you about scheduling a time.
6. Library staff will email you with a confirmation of your submission and any follow-up questions.
7. Once your model has been printed, you will receive another email letting you know the cost of the object and how long you have to pick it up.
8. Pick up your model at the Morris Library Circulation Desk on the first floor. You will also pay for your object at the Circulation Desk.
9. Enjoy your object and start designing something new!

SUBJECT GUIDE



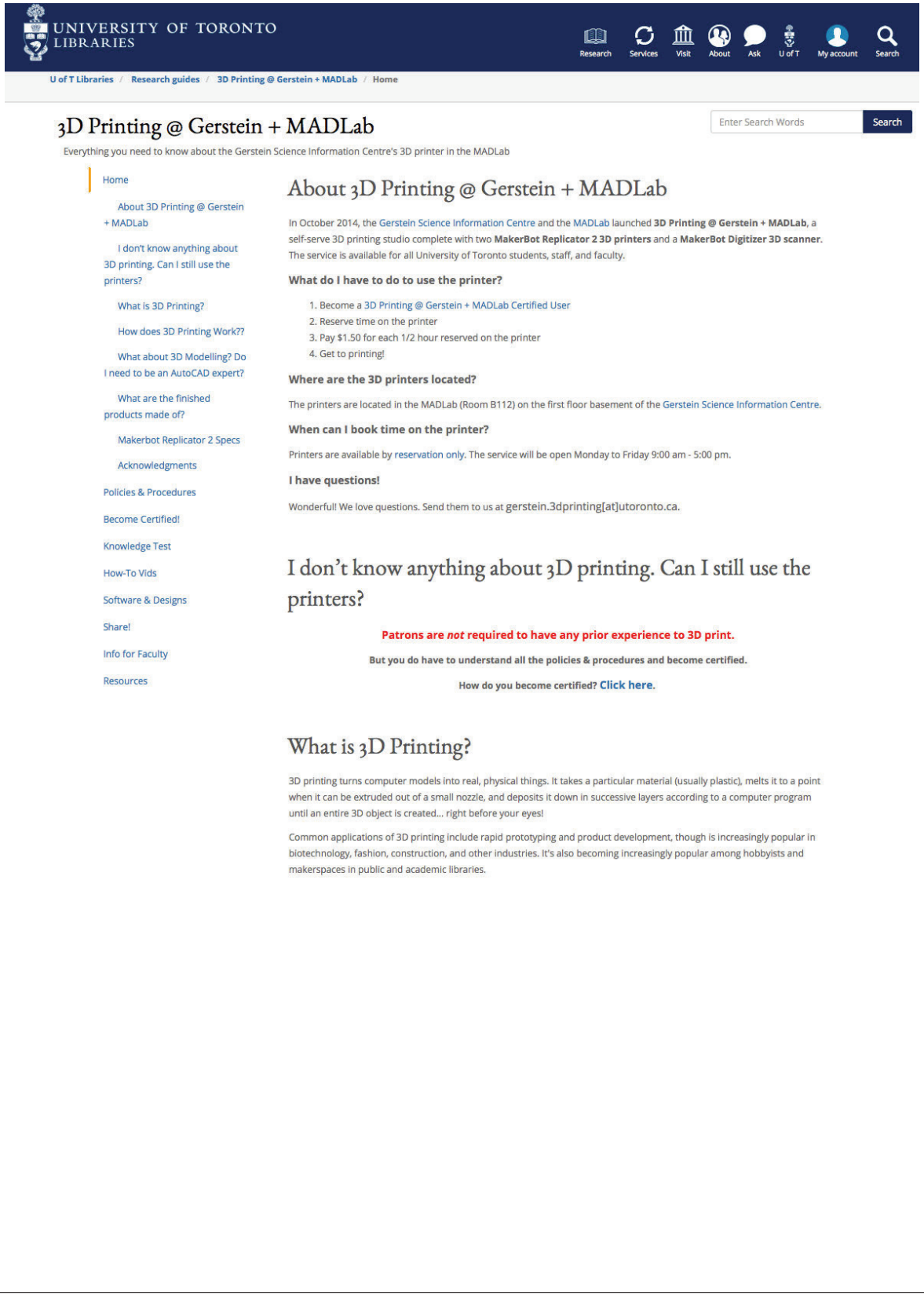
Jennifer Horton

Contact Info
Morris Library
Room 260D
Southern Illinois University
Carbondale, IL
(618) 453-2663
Send Email

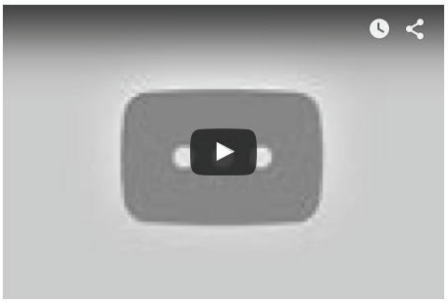
Links:
Profile & Guides

Subjects:
Chemistry and Biochemistry, Computer Science, Geology, Mathematics, Physics, Civil and Environmental Engineering, Industrial Technology, Electrical Engineering, Mechanical Engineering and Energy Processes, Mining and Mineral Resources Engineering

UNIVERSITY OF TORONTO
3D Printing @ Gerstein + MADLab
http://guides.library.utoronto.ca/3dprinting



How does 3D Printing Work??



What about 3D Modelling? Do I need to be an AutoCAD expert?

no AutoCAD required! no 3D modelling *at all* required!

There are a ton of fun, innovative, and simple designs that you can download for free from online libraries of 3D designs. We recommend that if you are new to 3D printing, try printing something small and quick. We've put together a list of objects you can print to get experienced.

We love Thingiverse. Browse or search the HUGE collection of free pre-designed models that you download free of charge! Still a little unsure? Choose designs that have a picture of the finished object.

want to design your own 3D object?

There are also loads of free, easy-to-use 3D modelling software programs out there. Stay tuned for information about free workshops we'll be offering on how to use these software programs or check out these handy online resources.

you're an AutoCAD expert who wants to print your own designs?

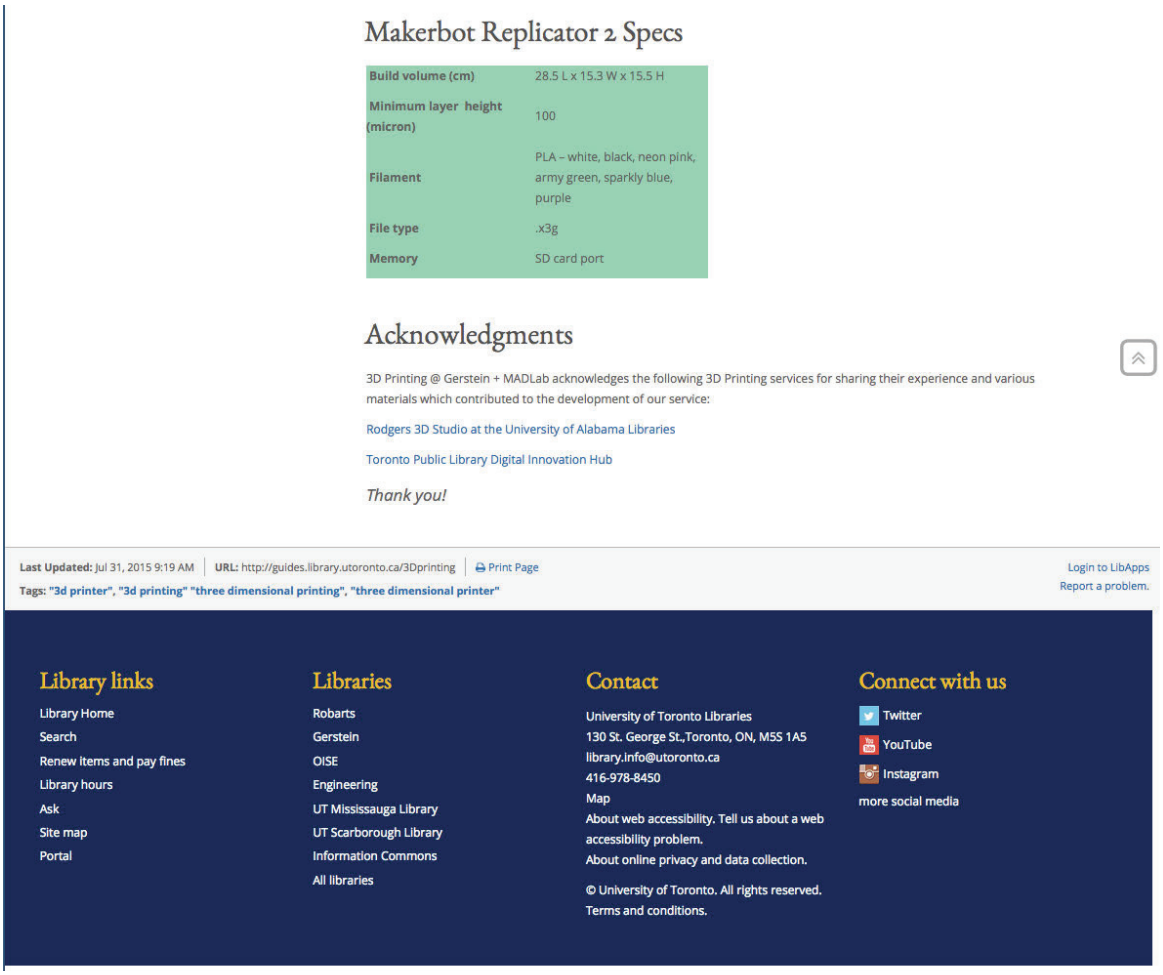
Great! As long as you run your design through the MakerWare software to check for problematic design elements and adhere to the policies and procedures of our service, you **can** print your objects of your own design. We're excited to see what you can do!

What are the finished products made of?

The 3D printers at Gerstein + MADLab use PLA (polyactic acid), a biodegradeable thermoplastic aliphatic polyester dervied from corn starch. It's safe to use in our space. You can view the PLA Material Data Safety Sheet.

We currently have filament in 6 colours: white, **black**, neon pink, army green, sparkly blue and purple. Unless otherwise requested, you'll print your job in whatever colour is loaded into the printer when you begin your reservation. If you would like to print in a specific colour that we offer, please email us ahead of time and we can help you switch out the filament.

Also note that white PLA can easily be painted.



Makerbot Replicator 2 Specs

Build volume (cm)	28.5 L x 15.3 W x 15.5 H
Minimum layer height (micron)	100
Filament	PLA – white, black, neon pink, army green, sparkly blue, purple
File type	.x3g
Memory	SD card port

Acknowledgments

3D Printing @ Gerstein + MADLab acknowledges the following 3D Printing services for sharing their experience and various materials which contributed to the development of our service:

Rodgers 3D Studio at the University of Alabama Libraries

Toronto Public Library Digital Innovation Hub

Thank you!

Last Updated: Jul 31, 2015 9:19 AM | **URL:** http://guides.library.utoronto.ca/3Dprinting | Print Page

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