

3D Printing at Morris Library - Printing Policy

This policy governs 3D printing at Morris Library.

What is 3D Printing?

3D printing, or additive manufacturing, is the process of building physical objects from digital models. Successive layers of material (filament) are laid down in thin layers to create a physical object. 3D printing has applications in numerous fields. A listing of some of these applications can be found on the Morris Library 3D printing web page.

What is available at Morris Library?

Currently, Morris Library has a Makerbot Replicator 2 3D Printer. This 3D printer uses 1.75 mm polylactic acid (PLA) filament. PLA is a bioplastic made from renewable resources such as corn starch. Current colors available are listed on Morris Library's 3D printing web page.

The Makerbot Replicator 2 has the following build volume:

28.5 L x 15.3 W x 15.5 H cm (11.2 L x 6.0 W x 6.1 H in)

Additional specifications and information about the Makerbot Replicator 2 can be found at: <http://store.makerbot.com/replicator2>.

Who can print?

The 3D printer is available for use by all Southern Illinois University students, faculty, and staff. Community members will also be eligible to use the library's 3D printer. Printing is done on a first-come first-served basis taking into account the following priority order: students printing objects for course work, students printing other works, faculty, staff, and then the community.

Terms of Use and Copyright:

Those wishing to utilize the library's 3D printer must do so for lawful purposes. Users must abide by all applicable laws, University policies, and library policies while respecting the health and safety of the University community. Morris Library staff reserve the right to decline any print request for any reason.

Southern Illinois University abides by the copyright laws of the United States (Title 17, U.S. Code). These laws govern photocopying or creating other reproductions of copyrighted materials. All users of the 3D printer must abide by copyright laws. For more information, Morris Library has a research guide discussing copyright considerations: <http://libguides.lib.siu.edu/copyright>.

Cost of 3D printing

Fees for 3D printing at Morris Library are based on a cost-recovery system. Costs are determined by the amount of filament and other materials used during the printing process. After the object is created, it will be weighed. Users will be charged \$0.25 per gram rounded up to the nearest gram. There is a minimum cost of \$1.00 for any print request. For example, a 1 gram object will cost \$1.00 to print (the minimum fee), not \$0.25. Upon request, users may wish to print with a more expensive type of filament such as flexible filament. This type of filament is more expensive than regular PLA filament. The cost for this type of filament will be \$1.00 per gram. The cost of other types of filament will be determined by library staff.

Users must pay for prints before they will be turned over. Prints will be kept for two weeks. After two weeks, prints will become the property of Morris Library and may be disposed of at that time. Printing may be paid for by cash, check, or credit card. Payment and pick up of prints will be done at the library's Circulation Desk on the first floor of Morris Library.

Refunds will only be given if the printer malfunctions or library staff accidentally break the model. The user is responsible for all errors that occur during printing involving the stereolithographic (.STL) file and design of the model. If the object does not print correctly due to design errors, it is the responsibility of the user to pay for the object. It is recommended that before you submit your .STL file for printing, you utilize a software that checks for errors and helps repair them. One such software is [Netfabb](#). It will help you repair errors such as bad edges, holes, and reversed normals.

Designing your model for printing

The first step in printing your idea is to design the 3D object using a computer-aided design (CAD) software program. There are numerous open source and free software options to render your digital model including [Blender](#), [OpenSCAD](#), and [Sketchup](#). A more complete listing of these options can be found on the Morris Library 3D printing web page. Users will need to submit their file in .STL file format in order for library staff to convert the file to one that the Makerbot Replicator 2 will read.

If you do not wish to design your own 3D object, there are sources to find models already designed that you may print or alter and then print. Two of these resources are [Thingiverse](#) and [Yeggi](#).

File approval

Users must submit their files in .STL format. Users will need to fill out and submit the 3D Printing Request Form along with their .STL file. Library staff will review the file and send a confirmation email to the address provided that the submission has been received. The email will state whether the file has been approved and any important information for the user. Library staff may need additional information about the print job or may need to schedule a consultation with the user. Once the file has been printed, staff will send another email informing the user of the cost of the print and the due date to pick up the model.

If you have several files to print, please submit each of these separately by filling out a separate 3D Printing Request Form for each print.

All submissions are subject to approval based on scheduling and availability. There may be times that the printer is malfunctioning, being repaired, or is being used for an event or a course. During such times, the 3D printer may be unavailable for use and there will be a delay in approving submissions and printing objects. Any significant lapses in printing time will be noted on the 3D printing web page.

After the submission has been printed and the print has been picked up or the two week time limit to pick up the object is over, the submitted file will be deleted by library staff.

If a user wishes to print their object themselves, they will need to schedule an appointment with library staff to receive training on the 3D printer. Users will be supervised by a library staff member during the printing process. The submission form will include this option and a library staff member will contact the user to schedule a training session.

Quality

Users may see slight imperfections in their prints. Small bumps or holes and rough edges at the base of an object may occur with 3D printing. You can clean up some of the imperfections with fine sand paper or other tools. The Makerbot Replicator 2 is very accurate, but there may be some instances where objects do not fit precisely together.

The Makerbot Replicator 2 builds objects from the ground up. There are instances where certain prints will require support material and / or rafts to ensure proper printing. Support material 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. These types of

additions are easily removable by the user. Staff will not be responsible for removing any supporting material and / or rafts for the user.

Contact

If you would like to meet with a library staff member for additional information about 3D printing or if you have questions, please email Jennifer Horton at jhorton@lib.siu.edu.

Approved by: Steering Committee, January 16, 2014

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