Short Term 2025

## Intro to FDM 3D Printing





# Where can I 3D print at Bates?

The VizLab is located on the ground floor of Coram Library, one of the oldest buildings on campus. The VizLab hosts all sorts of new technologies at Bates, including laser cutting and virtual reality.



Coram Library from above.

## What can I 3D print?



\*must conform to the laws of gravity, be in accordance with the Bates community principles and policies, and not be a complete waste of materials

## **Types of 3D Printing We Support**



#### **FDM Printing**

- Accessible and inexpensive Melts materials through a hot nozzle on a flat surface, like a hot glue gun Wide range of materials available, including wood, metals, silk, elastic, and various hardened plastics •



#### **SLA Printing**

- Only for specialized projects with advanced users Fires a laser through liquid resin to dry materials upside-down on a . plate
- Must take into account drainage holes for excess resin, support structures for hanging objects, removing solid interiors Creates small objects with extremely fine detail and invisible layer .
- . lines



## **3D Printing Workflow**



Find or build a model



Translate the model into a format the printer can understand (slice)



Print the model

#### Not every 3D file is 3D-printable

- Extraneous details
- Large overhangs requiring complex supports
- Models with floating objects
- Fine details on objects scaled down



Makerworld

Printables

#### Download an existing 3D model

Thingiverse

.stl, .obj, or .3mf file types

Sketchfab

Thangs

Yeggi

Autodesk Fusion

Blender

#### Create your own 3D model

Difficulty: moderate to high

Tinkercad

Sketchup

Onshape

Solidworks

### Slicing 3D Objects in BambuStudio



### What material should I use?

- PLA: By far the most common material for FDM printing. It's inexpensive, easy to print with, and can be used with 0.2mm (fine detail) nozzles. Due to its low softening temperature, it shouldn't be used for models that need high strength or will be in warm environments. PLA requires good ventilation, otherwise the nozzle can clog. Lots of variations, including carbon fiber, wood, silk, matte/glossy, and dual-color.
- **PETG:** Almost as easy to print with as PLA, but offers a higher softening temperature which makes it a good choice for lab devices and other applications requiring higher strength. It should be printed in an enclosed chamber.
- **ABS:** A strong plastic (think LEGO), but quite difficult to print with. It requires an enclosed and heated chamber. It may shrink after printing, so you may need to compensate accordingly. The fumes are toxic.
- **ASA:** A variant of ABS designed for UV resistance.
- **TPU:** A rubber-like material that can be used for objects that need a certain level of sponginess. Due to its stretchy nature, it can't be placed in the AMS bins and must be run directly into the printer.

#### **The Build Plate**

- Plates are magnetic
- Must be lined up properly
- Clear ALL materials after printing
- Different surface options
- Using Glue
- Scrubbing clean with dish soap and hot water





#### The Nozzle

- 0.4mm default for all printers
- 0.2mm for specialty projects requiring high detail
- Consult with a staff member or student employee to replace nozzles



## **Filament Tips**

- Never let filament unspool!
- Using filament clips
- Storing Filament in boxes or dry cabinets
- For attaching new filament to a spool, or loading the AMS, consult with a staff member or student employee



**More Questions?** 

## https://wiki.bambulab.com/



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Student Worker Hours (old) Winter/Spring 25