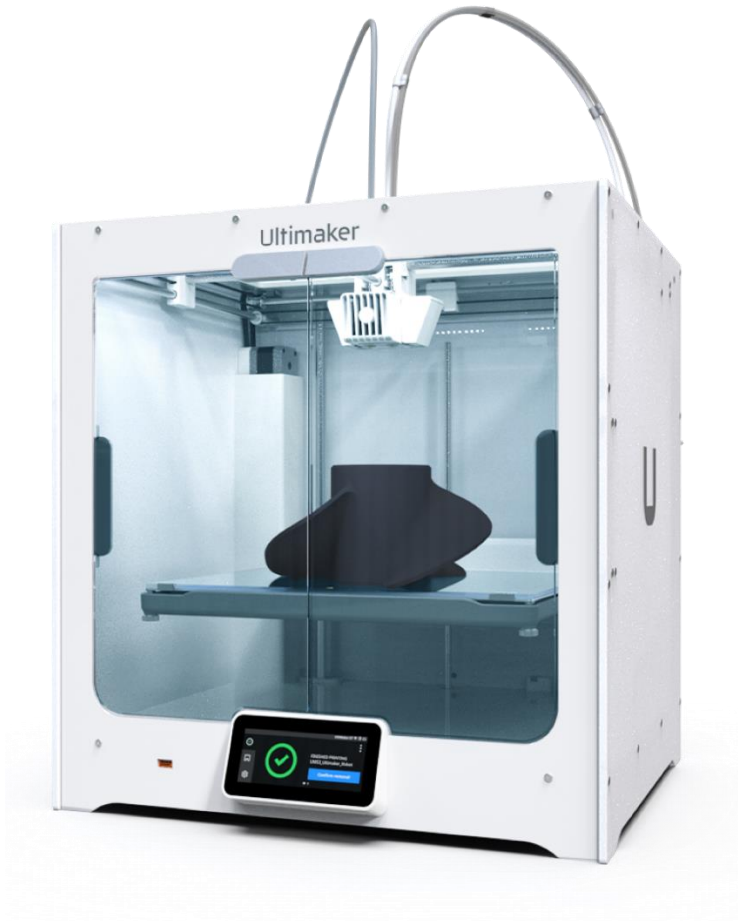


Ultimaker S5 Documentation



Training: Required

Reservation: Required

You must be 18 to use the 3D printer without supervision. Patrons between 12 and 17 may use the printer after taking a certification class and in the presence of an adult who is certified.

Certification

To become certified on this piece of equipment you will need to attend a training class that lasts approximately 30 minutes. By the end of the class you will be able to: Load and Unload Filament Download and process 3D .stl files Begin a 3D print job Remove your print job from the machine Clean up the workstation To sign up for a training session please visit please see the calendar at norfolkne.gov/library.

Reservation

To reserve this piece of equipment you will need to first be certified on this equipment. After you have attended a training class for the equipment you may sign up for a time slot. To sign up for a time visit our website at <https://norfolk-ne.libcal.com/reserve/makerspace> to view available times and reserve a time.

Specifications:

Dual-extrusion print head with a unique auto-nozzle lifting system and swappable print cores

Ultimaker Cura software for print setup. Provided on 3D printer and design computers and available at ultimaker.com/software for installation on patron computer.

Approved Materials:

The library will provide Ultimaker brand PLA / PVA / PET for use with the Ultimaker S5 this will be charged at .10 cents per gram. Makers that would like to bring in their own filament will need to OK it with library staff prior to appointment.

Build volume: 13 x 9.4 x 11.8

Layer resolution: variable

Filament diameter:

Nozzle Diameter:

2.85 mm

0.4 or 0.8

Machine Accessories:

- Putty knife (for removing print)
- USB flash drive (**provided by patron**)

Important Information: Filament that is not in use should be stored in vacuum canisters or plastic lock bags with desiccant pouches. Improperly stored filament will become unusable.

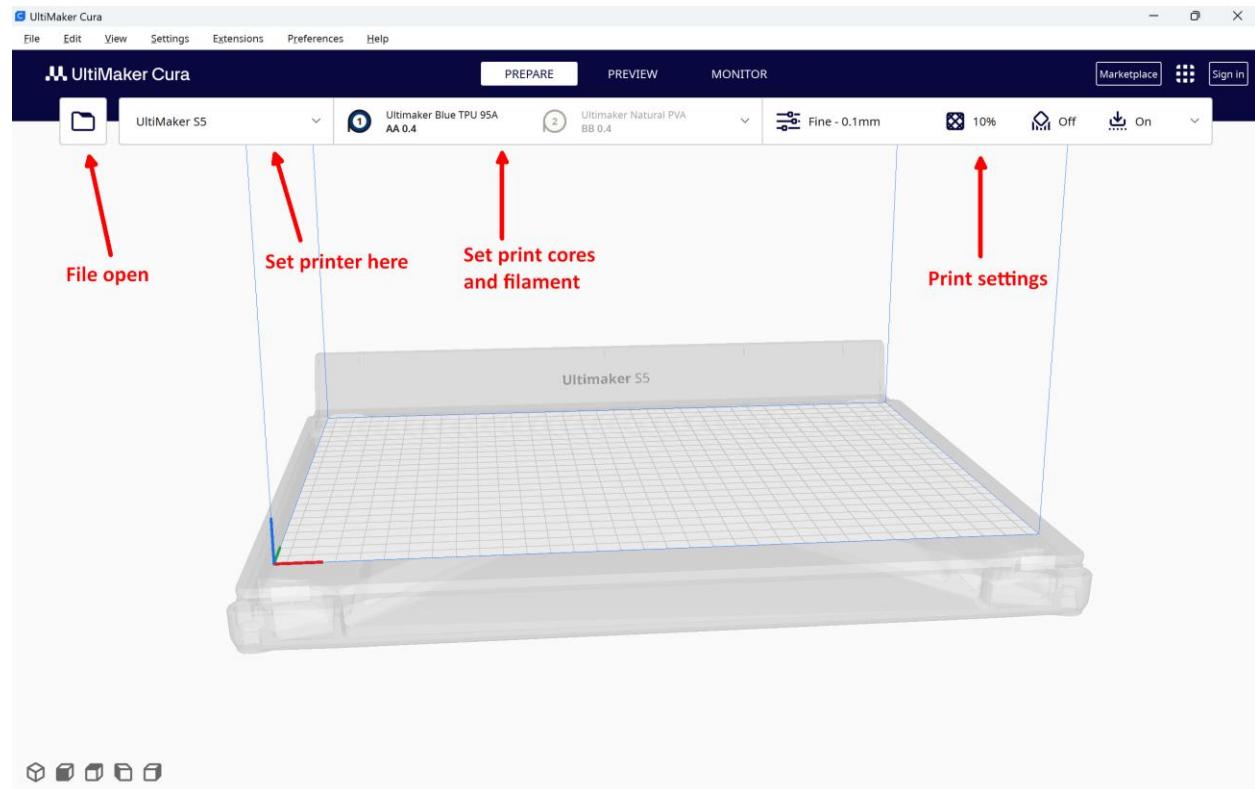
Setting up the print job

Cura is the software used to create the files to send to the computer. It will take a standard .stl or other common 3D file and convert it into the necessary format for the Ultimaker printer.

Cura is free software and can be downloaded from <https://ultimaker.com/software/ultimaker-cura/>.

This software can be installed on any Mac, Windows or Linux computer so that you can set up your print job on your own computer. The library will also have computers in the makerspace with Cura on them for you to use. This document will deal with basic setup of print jobs and not go over every situation.

1. In the upper left hand corner of the screen click on the file button to insert your .stl files
2. Just to the right of the file button click to set your printer. This should be set to “Ultimaker S5”
3. Next set your print cores and filaments. You don’t need to set both if only using one color.
4. Adjust print settings. These can be set per print head.
5. Once you have loaded an .stl and adjusted all of the settings there will be a button in the bottom right corner of the window that says “Slice”. Clicking on that will prepare your file for printing with the Ultimaker and offer to save your file to a removable drive.



Adjusting the viewing area:



Move – select your print and click this to move your print on the plate



Scale – select this to resize your print



Rotate – Select this to rotate your print on the plate.



Mirror – select to quickly change the orientation of your print on the plate



Per model settings – select this to change the print setting on each individual model on the plate



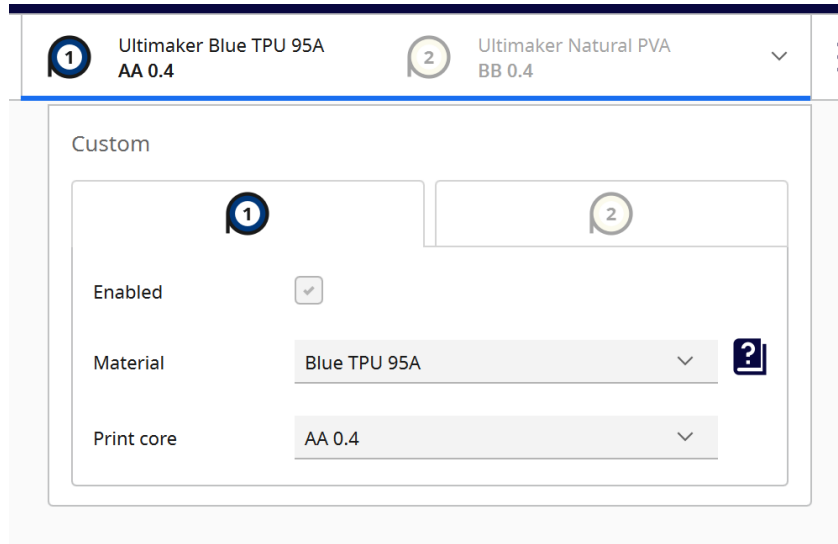
Support blocker – click this and then click on your model where you don't want Cura to add supports



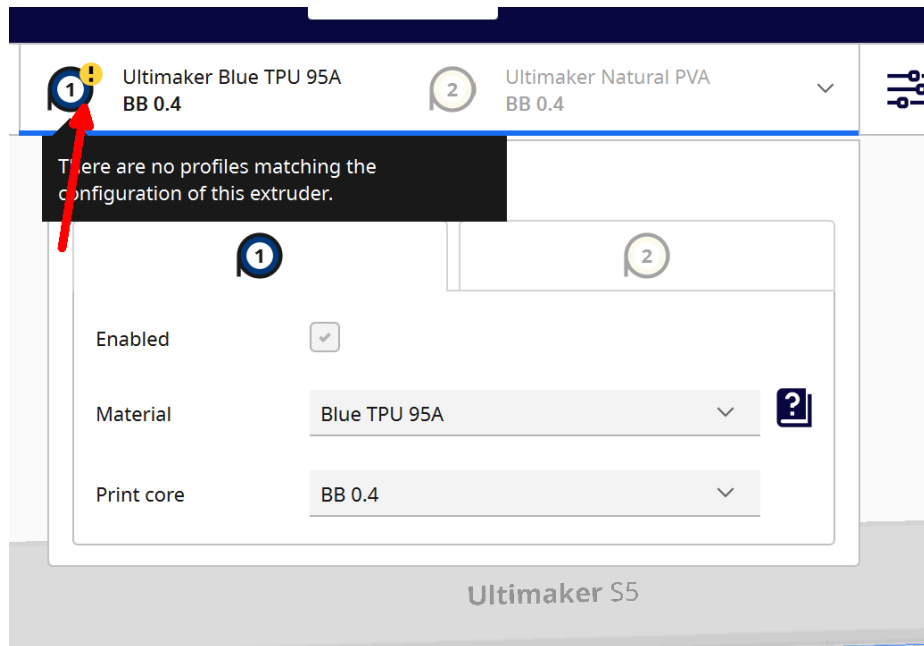
Extruders – select your model and then click on the extruder you want to use for each model. This is for when you have more than one model and need to use different extruder for each.



Material setup:



The upper middle part of the window is where you will set what kind of material you will be using. The library supplies a selection of Ultimaker PLA material. This is the easiest to use as it has a built in RFID tag that helps the printer make sure the correct material is loaded and the optimum settings for the material are selected. There are two print heads that can be set up although only one needs to be set up for a print if you are not using multiple kinds or colors of filament. This is also where the print cores are selected. If the material selected does not match the print core selected the program will display an informational “i” by the extruder. A matching print core can then be selected.



The following graphic shows recommended print cores for each type of material:

UltiMaker material and print core compatibility

The overviews below show you which material is compatible with which print core size. This compatibility table is based on single-extrusion prints.

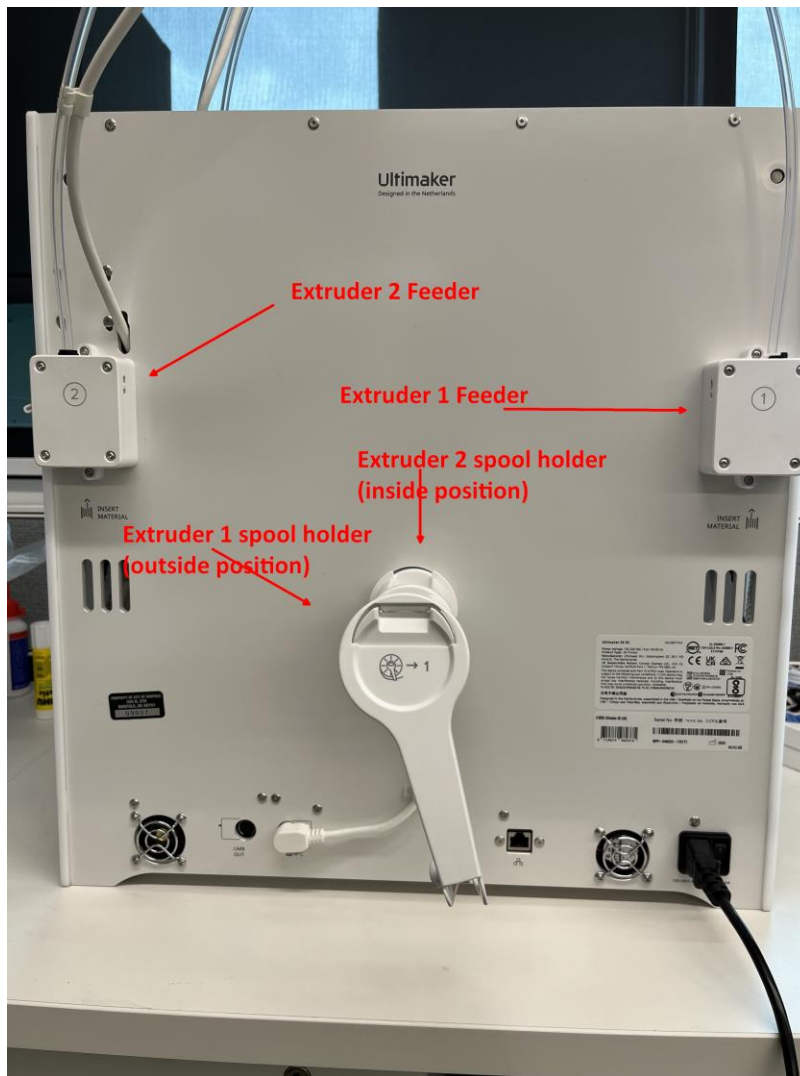
Print core AA	0.25 mm	0.4 mm	0.8 mm
PLA	✓	✓	✓
Tough PLA	✓	✓	✓
PETG	✓	✓	✓
ABS	✓	✓	✓
Nylon	✓	✓	✓
CPE	✓	✓	✓
CPE+	X	✓	exp
PC	exp	✓	exp
TPU95A	X	✓	✓
PP	exp	✓	✓
Breakaway	X	✓	X

Print core BB	0.25 mm	0.4 mm	0.8 mm
PVA	X (N/A)	✓	✓

Setting print settings:

In the top right corner of the program is where the settings for the print job are set. For most prints you will just need to set the profile (Fine, Normal or Fast) and then set if supports are needed and build plate adhesion settings. Supports are needed for prints that have an overhang. Printing models with an overhang can cause the part to collapse and make the print job fail. The build plate options are (Brim, Skirt and raft). This selection is dictated by the designer of the model if downloaded from a site like Thingiverse.com or by trial and error or experience with prior models.

Setting up the Printer

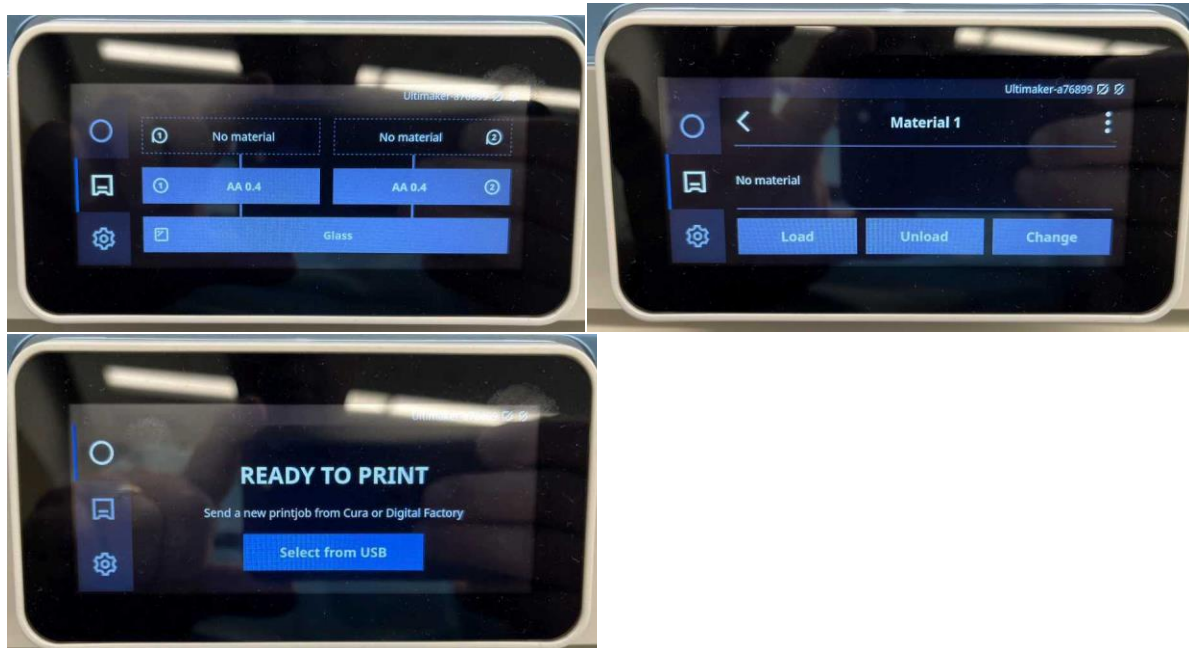


Power on the printer. The front display is used to load filament and change print cores. If loading filament for both extruders always load extruder two first. Once it is loaded you can proceed to load extruder one.

To load filament:

1. Press the icon on the left of the panel that looks like the printer. It is the middle left one.
2. Press the button for the extruder you want to load. It will have a 1 or 2 by it for the extruder it represents.
3. This will take you to the next screen where filament can be loaded, unloaded or changed if there is already filament loaded. Make your selection and follow the prompts to load, unload or change filament. We'll select load for this document.
4. Place the new spool on the corresponding holder for the extruder you are using and select confirm on the screen.

5. Remove the filament you are using from its storage container and unclip it from the spool. There is a plier there to cut the end back past where it bends from being in the spool clip. There always needs to be a fresh clean end to load the filament.
6. Extruder 1 has a bracket that needs to be inserted into the spool first and the filament will be threaded through the bracket. The spool for filament 1 needs to be placed so it feeds toward the right of the machine (facing the back) towards the power cord. Filament 2's spool will be placed so it feeds toward the left side of the printer.
7. Once the spool is placed hit confirm on the display and the printer will detect the material. Hit confirm again.
8. Insert the end of the filament into the feeder for the extruder being loaded and apply gentle pressure while hitting confirm on the display. The feeder should start pulling the material in.
9. Wait for the extruder to start extruding filament and then press confirm again. (it will take some time and the filament needs to push enough through to clean out the last color)
10. Hit back to get to the main load screen.
11. Repeat for the other extruder if necessary.
12. If extruders need changed follow the instructions on the display to change.
13. Plug in the USB thumb drive containing the model to be printed.
14. Click on Select from USB Drive and click on the model to be printed
15. Click on start print.
16. Once the print job has finished let the bed cool down for approximately 5 minutes before removing the print job. Cooling will make it easier for the print job to release.



Considerations:

- Some print jobs will have trouble adhering to the bed. If the print job does not adhere properly there is a stick of glue that can be applied to the bed. Place light coat where the model will be on the bed and let it dry before printing.
- To clean up the bed when glue is used there is a spray bottle of water by the laser cutter. Please spray a little water on a paper towel and wipe gently and dry with a dry paper towel.
- Filament must be kept in the storage containers. There are some vacuum sealed containers and some plastic bags. If using the vacuum storage containers place the spool inside and lock the four holders. There is a pump to pump air out of the containers. Place it on the rubber valve at the top and give the pump about ten pumps.
- To open the vacuum containers press the valve to release the air and then unlock the clamps and remove the filament from the container.
- The library provides Ultimaker brand filament that costs 10 cents per gram. This filament will provide the best results with less configuration. If a patron wants to use their own filament please talk to a library staffer before proceeding.