



Ultimaker Printers

The U-SoA Fabrication Lab will foster a culture of learning through making. Its principal purpose is to serve students and faculty in existing and future research pursuits, by providing robust training and broad access to a host of digital and analog tools. The Lab aims to continually improve, incorporating new technologies and expanding its capacities, growing into a resource equal to the substantial ambitions of a top-tier architecture program.

FORM

Ultimaker 3D Printing Request Form

Please download Cura software here: <https://ultimaker.com/software/ultimaker-cura>
Submit Cura file not .stl, .obj, or .3dm.

The name and photo associated with your Google account will be recorded when you upload files and submit this form. Not maxwelljarosz@gmail.com? [Switch account](#)

* Required

Name *

Your answer

UM Email *

Your answer


Phone Number *

Your answer

Date Needed *

Must be at least 48 hours - 72 hours after submission date during down periods. Midterm and Final models should be sent at least 7-10 days prior to the due date to ensure the model will be printed.

Date

mm/dd/yyyy 

File Name *

Your answer

Z (Height) in inches - MAXIMUM 8 INCHES *

Your answer

Extrusion *


☐ Single Extrusion

☐ Dual Extrusion

Special Instructions

Your answer


File Upload *

 [Add file](#)

Submit

Usage

The Ultimaker 3D printers in the Fabrication Lab are free of charge to all users in the School of Architecture. To use the equipment, students must create their own 3d models, produce the appropriate Cura files, and submit the form (shown to the left) via the School of Architecture website (shown below).



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Admissions

- ☐ We recommend that you export your models into Rhino before exporting the final STL file.
- ☐ If you need assistance, don't hesitate to stop by the Fabrication Lab during operational hours or click here for [Rhino Tutorials](#)

View [Status](#).

View [time lapse of 3-D printing](#).

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Fill out form

Google Forms

This content is neither created nor endorsed by Google.

GET STARTED

1 Request Info

2 Visit

3 Apply

Once students have submitted the form, the Fabrication Lab staff will verify the model set up and reach out to users with any issues they might see. Students must come to the lab to confirm their place in the queue. Once their file has been queued, it will be printed in the order of the queue. 3D prints do not always print perfectly and many issues may arise with prints in the queue. The fabrication lab is not responsible for meeting project deadlines and can only offer a rough estimation of when they believe the print will be done, without accounting for potential issues that may arise from other student prints.

If the user print fails, the fabrication lab will reach out to the user to notify them of the failure and what they believe the cause may be. If file adjustments are needed, the user must adjust their file as necessary and resubmit the file. Resubmitting the file will be the same as sending the file for the first time. The user must resubmit and come to the lab to reconfirm their place in the queue. If the user print fails due to a machine issue (e.g. running out of filament or clogged printhead) the fabrication lab will resend that print as the next print sent.

Once a user's file has been successfully printed, they must come to the fabrication lab to pick up the print within one week of printing. All prints left for over one week, will be thrown away at the end of that week.

The fabrication lab only supplies white pla, if a user would like to print on the machines with an alternate color, they may do so but must provide the material they will be printing with. A user should submit a note with their form saying they will supply their own material and bring that material to the lab when they confirm their print.

Procedures

How To Prepare A Model For Printing:

Models are created in 3D programs such as Rhino and must be saved in STL format. Use the following steps to prepare your model in Rhino and Cura.

- Make sure your model unit scale is in millimeters.
- When working with surfaces, use BooleanUnion to combine the objects into one polysurface. Click Solid > Union
If the union doesn’t work, you will likely have errors and other problems later. Rework the model so that the union is successful before going on to the next step.
- After the Union command has been applied, create a Polygon Mesh. Highlight the object, select Mesh > From NURBS Object. With highly curved surfaces, increase the number of triangles in the mesh. Straight surfaces need less.
- Next, click the object to select the Polygon Mesh. With the mesh selected, drag it off the surfaces. Don’t forget to do this otherwise you may export the surfaces as well.

- Issue the command CheckMesh to see if you have a good mesh. If you have a bad mesh, search Rhino help for ‘check/repair meshes’. This will give you many fix-it commands. A common problem is naked or unjoined edges, which are revealed with the command ShowEdges, and usually fixed with MatchMeshEdge. FillMeshHoles will repair holes, but is more likely to change the shape of the model. ExtractDuplicateMeshFaces will separate identical faces for easier removal, but be aware it could generate naked edges. It may be helpful to make a copy of the mesh before using these tools in order to check the results.

-When done fixing the model, export the Polygon Mesh as an STL file (export only the mesh and not the surfaces as well otherwise it will be harder to edit if any errors occur). Select the mesh, then click File > Export Selected change the Save As Type to STL. When the File Type Options appears, choose BINARY. Export each model to a separate STL—don’t combine them in one STL.

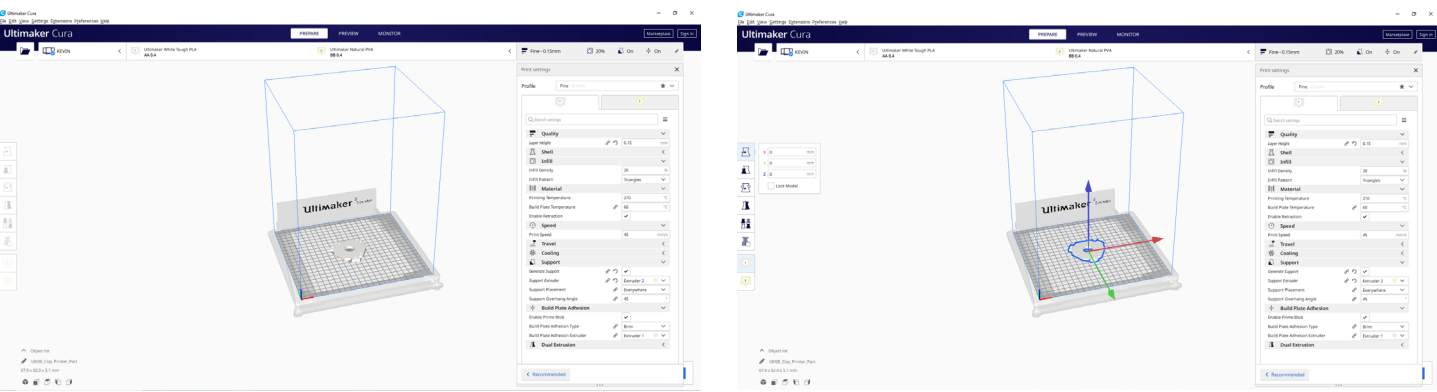
- We recommend that you export your models into Rhino before exporting the final STL file.
- If you need assistance, don’t hesitate to stop by the Fabrication Lab during operational hours.
- You can check the status of your print by visiting the 3D printing section of the School of Architecture website.

SETTING UP PRINTS IN CURA

PRE EXPORT CHECKLIST:

Check that the model space has been set to millimeters so that when imported into Cura the file is correctly scaled.
Check to ensure that the model has no naked edges and is completely closed.
Check to ensure that all models exported are not colliding or single surfaces.

Open Cura:



You can use the buttons below to scale, rotate, mirror, and adjust the settings of your print.

Scale: The “” button allows the user to adjust the scale of the model.

Rotate: The “” button allows the user rotate the position of their model.

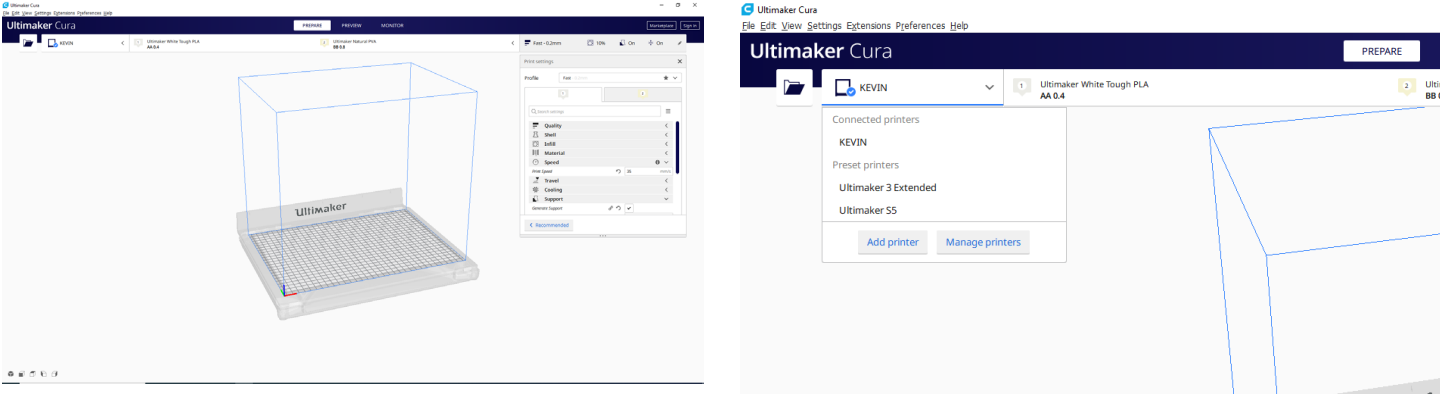
Mirror: The “” button allows the user to mirror their model.

Infill: The “” button allows to select the infill for the print.

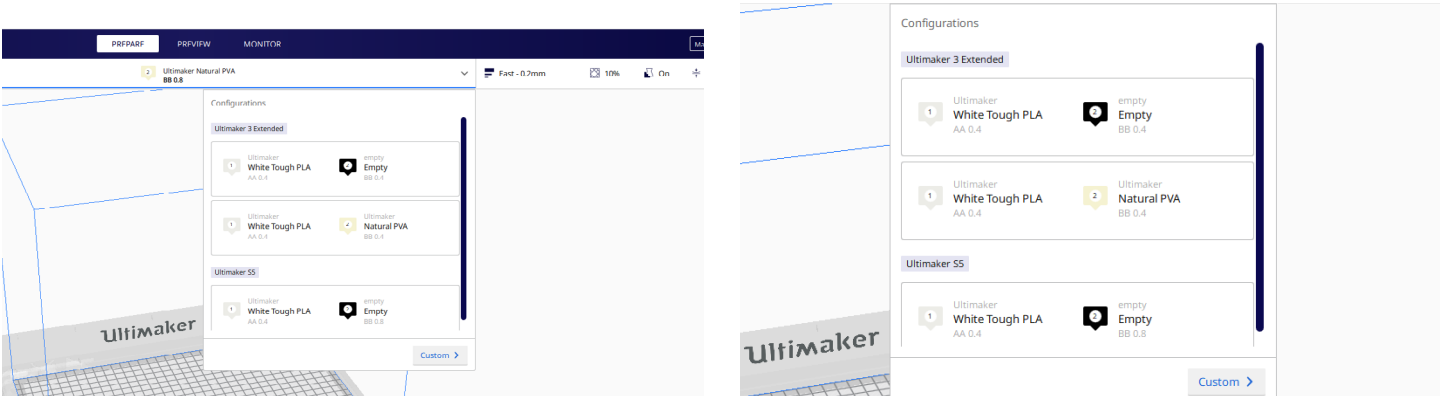
Procedures

SETTING UP PRINTS IN CURA

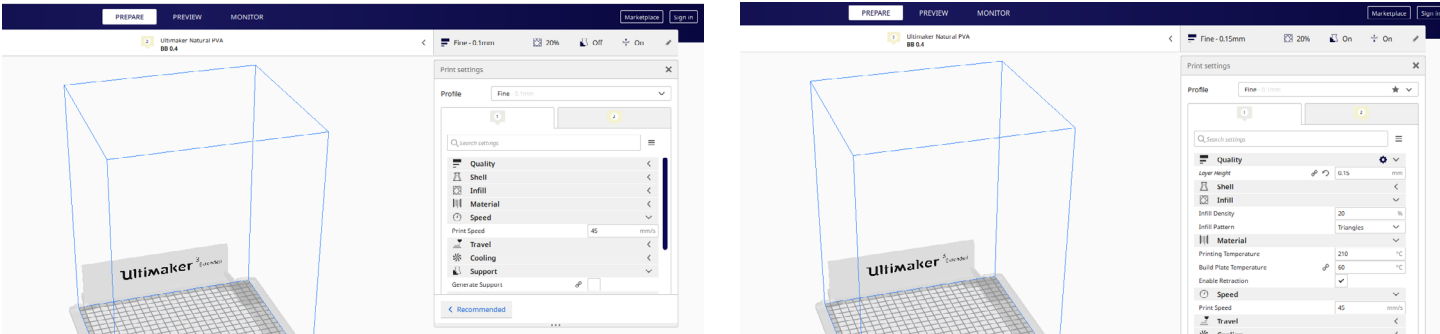
Selecting Configuration: In the upper left hand corner select Kevin as the Configured Printer.



Select Specific Printer: After selecting Kevin, use the drop down menu to select a configuration for the 3 extended or 5S printer. These configurations will adjust the size of the printer in Cura to match the printer’s cability. The 5S printer has a larger print bed than the 3 Extended. Make sure the configuration you are choosing (e.g. White Tough, Natural PVA) match the material loaded into the printer. If it does not match perfectly, the print will have an error when sending it to print.



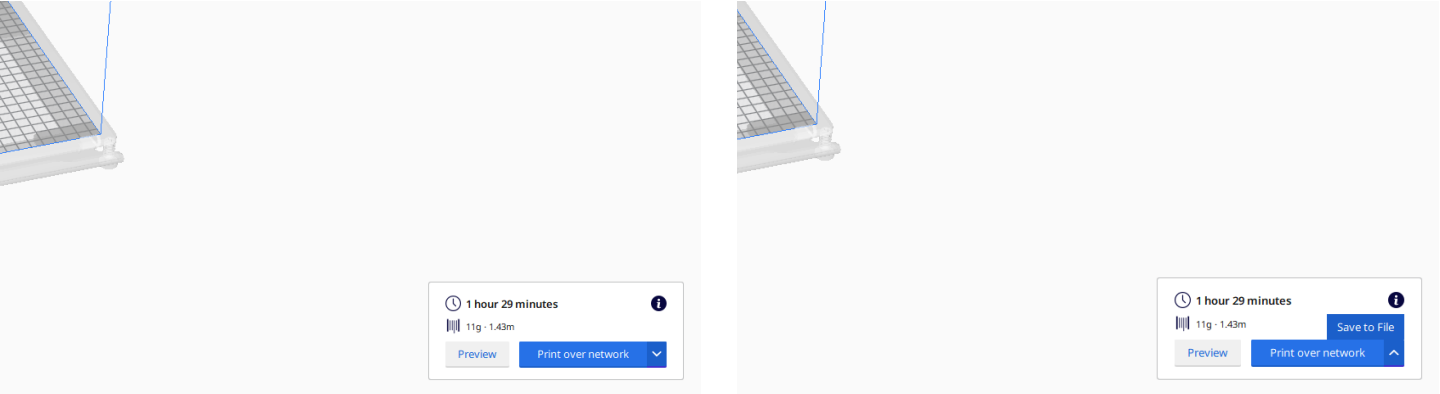
Setting: The printers should have default settings set-up for printing. You may want to decrease or increase layer height to adjust the quality and time of the print. If using supports make sure the support material is set to the second print head, otherwise make sure it is set to the first print head.



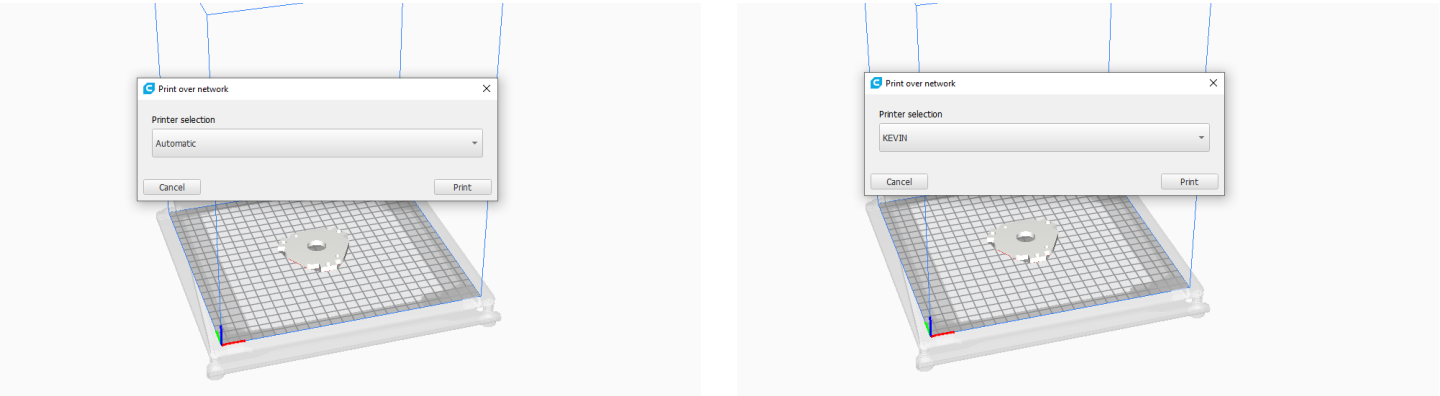
Procedures (cont.)

SENDING PRINTS TO THE PRINTER:

To Send Prints: Click Slice in the bottom right hand corner. Next click “Print Over Network”



Selecting a Printer: After clicking to send over the network a pop-up box will appear asking you to select the printer. Do not use “Automatic”. Click the drop down box and select a printer that matches your configuration. Alejandro and Daniela are 3E and Vicky and Kevin are 5S printers. If these do not match the selection you made in the initial print set up, the print will cause an error when send.



After Sending: Verify that the print has started to print and that there are no issues created when sent. The most common issues are:

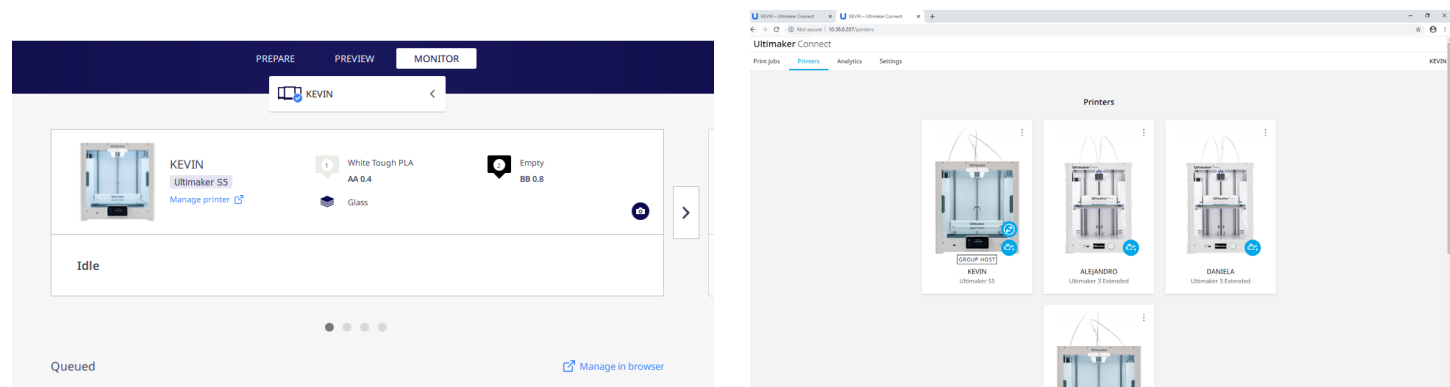
The print configuration doesn’t match the set up. This is caused either by sending a print to the wrong type of printer based on the configuration you chose, or the material set up does not match what the printer currently has loaded.

Often times, this is caused by the wrong filament choice (white instead of tough white) or when the printer does not have PLA loaded and dual extrusion was chosen.

Procedures

MONITORING PRINTS:

Monitor Screen: In the center tab of CURA click “Monitor”. This will bring up a menu to see prints that have been sent. If you click “Manage in Browser” it will load a browser menu that shows all the printers connected to the network. If you are experiencing an issue with a printer not showing up on the network, it can be added here by clicking “Add Printer”. Make sure the printer is connected to the LAN cable and that the computer is connected to the UM network and the computer should show up.



STUDENT MONITORING:

Print Queue: If students return to the School of Architecture website and navigate to “Labs and Centers” - “Fabrication Lab” - “3D Printing” and scroll to the bottom of the page, there is a link that will load a Google Sheet that shows the print queue.

The color system is as follows:

Green - Print complete

Orange - Currently printing

Yellow - Print in queue

White - Print has not been processed yet.

Red - Print failed

Procedures

Print Queue Management

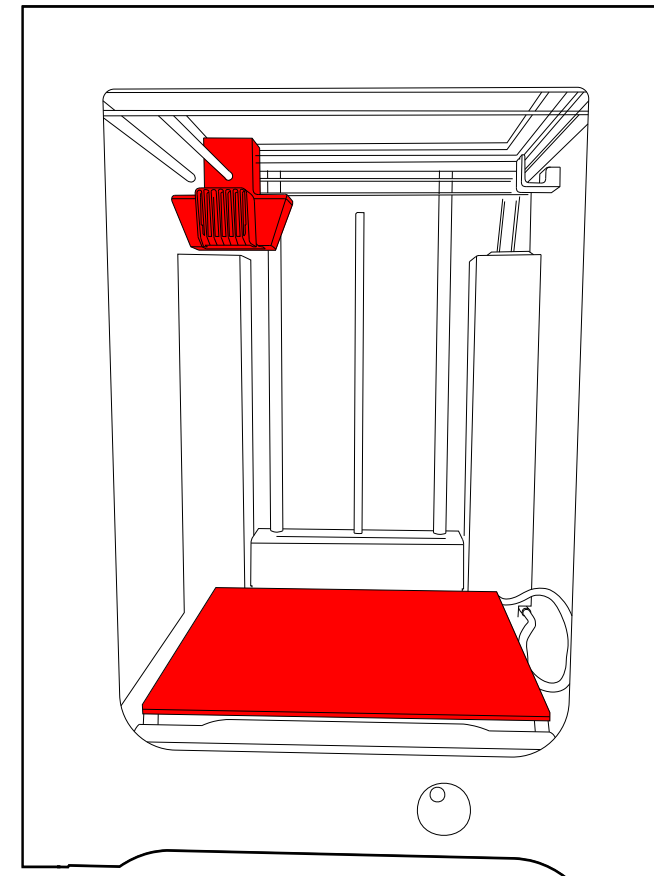
Lab Monitors: Lab Monitors are responsible for managing the print queue. During their shift, the list should be monitored. When files are submitted monitors should check the file to ensure the student has submitted a cura model. If not, monitors should email the students and ask them to submit a cura file. This ensures the model is scaled appropriately by the student. If the student has submitted a Cura file, it should be processed following the previous steps and saved into the desktop 3D printing folder in either the 5S or 3E folder based on it's configuration.

[illegible]

Print Queue: Once a model has been set up and saved into the desktop folder, the monitor should highlight the row in yellow, and move it behind the last yellow row above it. Monitors need to then fill out their name, the weight, the configuration (3E or 5S) and the expected print time. When sending a print, the monitor should change the row to orange, and fill in their name as well as overwriting the configuration to fill in the specific printer they sent the print to. When a print is complete, the student should highlight the row in green and move the print to the print storage area. Please ensure the active prints highlighted in orange, match the existing prints on the printer. This is the main source of confusion in the printing process and should be checked at the beginning and end of every shift.

	M	N	O	P	Q
	Processed By	Sent By:	Volume	Printer	Time Estimated
5OHJPMG5z3C	Regyne	Regyne	14g	Kevin	1hr46min
LeJi935wfmRH7	Regyne		23g	3E	2hr48min

SAFETY



SAFETY DURING PRINTING:

PRINT HEAD: The print head heats to extreme temperatures and should not be touched when heated. The heat will cause painful burns. The indicators lights on the print core signal orange and blue when the print core is heating up and when it is hot. Please be extremely cautious with your hands and ensure the print cores and head has fully cooled before handling the unit. The print head also moves and can cause harm if a hand is placed inside the print area while the machine is active. Do not stick your hand in the machine for any reason while the printer is active.

PRINT BED : The print bed heats to a lesser degree than the print cores but caution should be taken when it is heated. Avoid touching the build plate at any point once it has begun heating. The print bed also moves rapidly up and down in the machine, this movement can crush your hand and cause serious harm. Do not stick your hand into the machine for any reason when the machine is active.