

3D PRINTING TRAINING MANUAL
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Revision: 091724

PURPOSE

Hello there! In this manual prepared by the Makerspace Staff you will learn how to 3D print using the Bambu Labs X1 Carbon printer in the Makerspace. It will provide some background on how printing works then guide you through the process of slicing and printing. This manual will not teach you how to use CAD. If at any time you need something don't hesitate to ask a staff member. We'll be more than happy to answer any questions and guide you through the process

Some important notes before getting started:

Disclaimer: This training is required for everyone using the makerspace printers for the first time regardless of previous experience. This guide will not make you a proficient user or give extensive printer details but is intended to get you familiar with the process in the Makerspace for using the printers.

NOTE: "An individual print should not go over 150 grams of filament unless given approval by Dr. Noe Vargas or you provide your own filament, thank you!"- Makerspace Staff

NOTE: For filament, tape end of filament tip to wheel, or make sure it is secured by passing it through two holes on the edge of the spool and pull tight to prevent the filament from tangling during printing process

3D PRINTING TRAINING MANUAL



Overview

The Bambu Lab X1 Carbon is an advanced 3D printing system that represents the top of the line in consumer printing. It is much faster and more reliable than other printers that came before it. Part of this comes from many of the automation systems and sensors built in the printer to calibrate it without much hassle. For more information about the printer's capabilities, size, and specifications please refer to the printer's store page <https://us.store.bambulab.com/products/x1-carbon> or feel free to do further research.

This file will be used during the certification process
<https://www.thingiverse.com/thing:1545913>



--Table of Contents--

- **Part 1: Background**

3D PRINTING TRAINING MANUAL

1-1 Geometry

1-2 Slicing

1-3 Printing

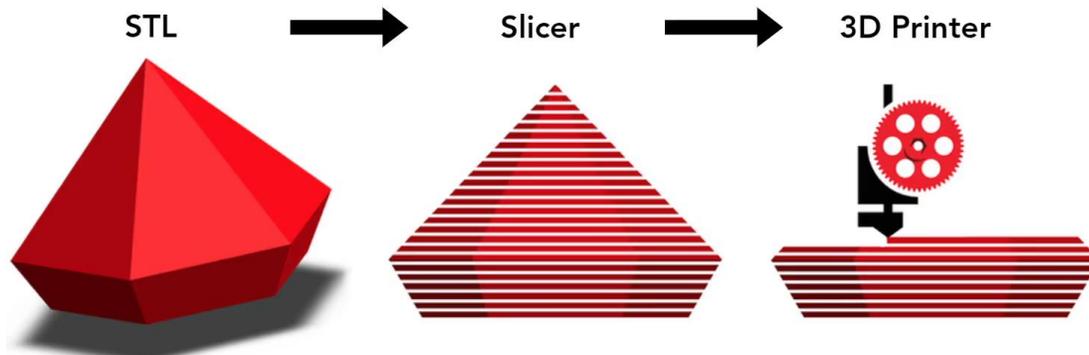
- **Part 2: Training**

2-1 Geometry

2-2 Slicing

2-3 Printing

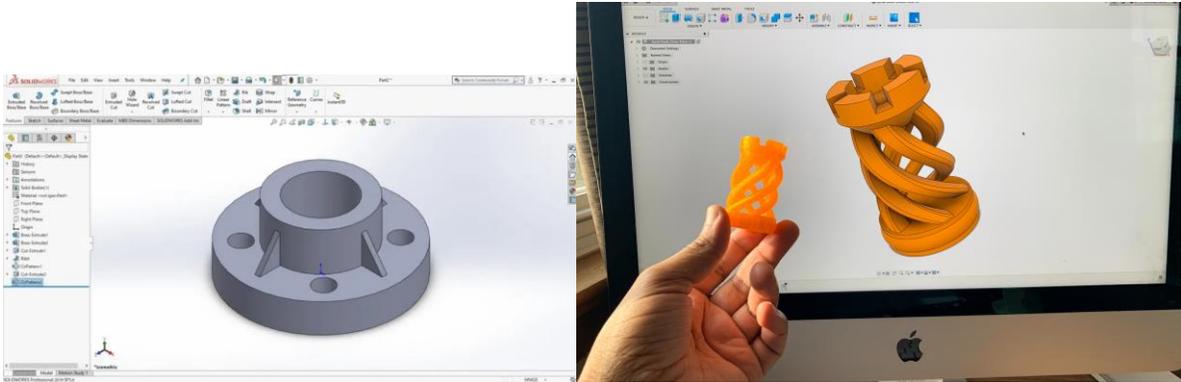
Part 1: Background



1-1 Geometry

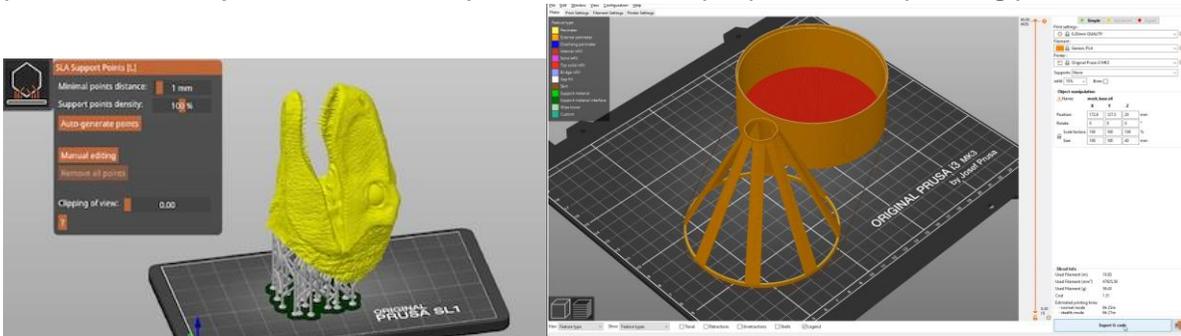
All 3D printed parts start off as a 3D model or 3D geometry. This refers to the computer's representation of objects. These models are created by us, the users, through various programs like Maya, Blender, Inventor, Fusion 360 or SolidWorks.

3D PRINTING TRAINING MANUAL



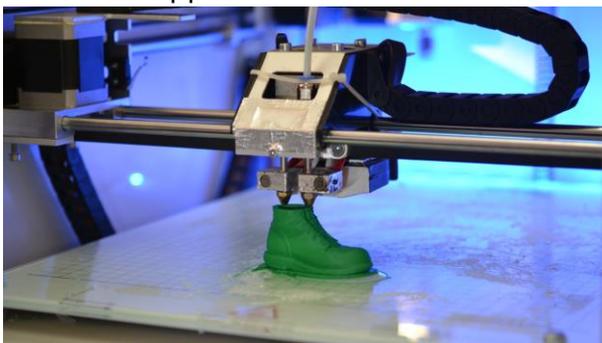
1-2 Slicing

Before a model can be printed it has to be sliced. This refers to the process of breaking down the 3D model into layers and movements that the 3D printer follows. “Slicing” comes from how the model is sliced up into layers. This will output gcode, which is a series of commands, like heating and movement, to the printer that will allow it to print your model. There are a lot of different slicing software, some tuned for specific brand or printers, but they all fundamentally serve the same purpose in the printing process.



1-2 Printing

Now the 3D printer finally comes into play. This is the last major step in a design to become a physical 3D printed part. The material, which is loaded in through filament spools is pushed through a heated nozzle using the gcode given to it, can then be formed into the model its supposed to be.

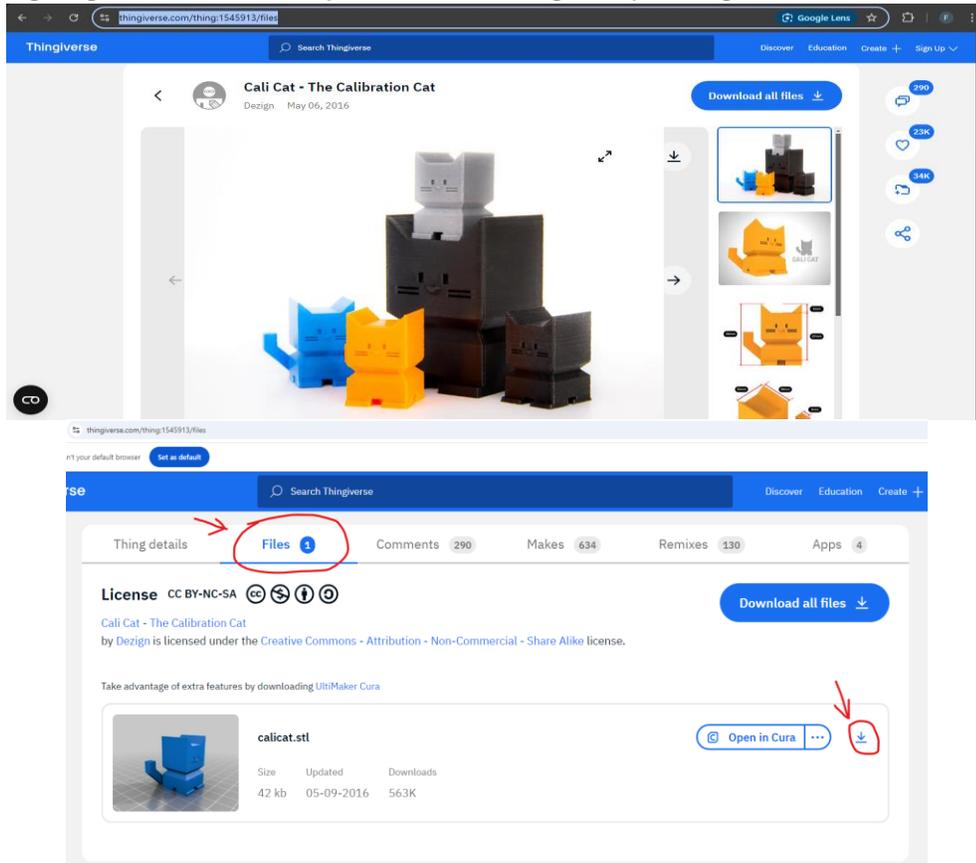


3D PRINTING TRAINING MANUAL

Part 2: Training

2.1 Geometry

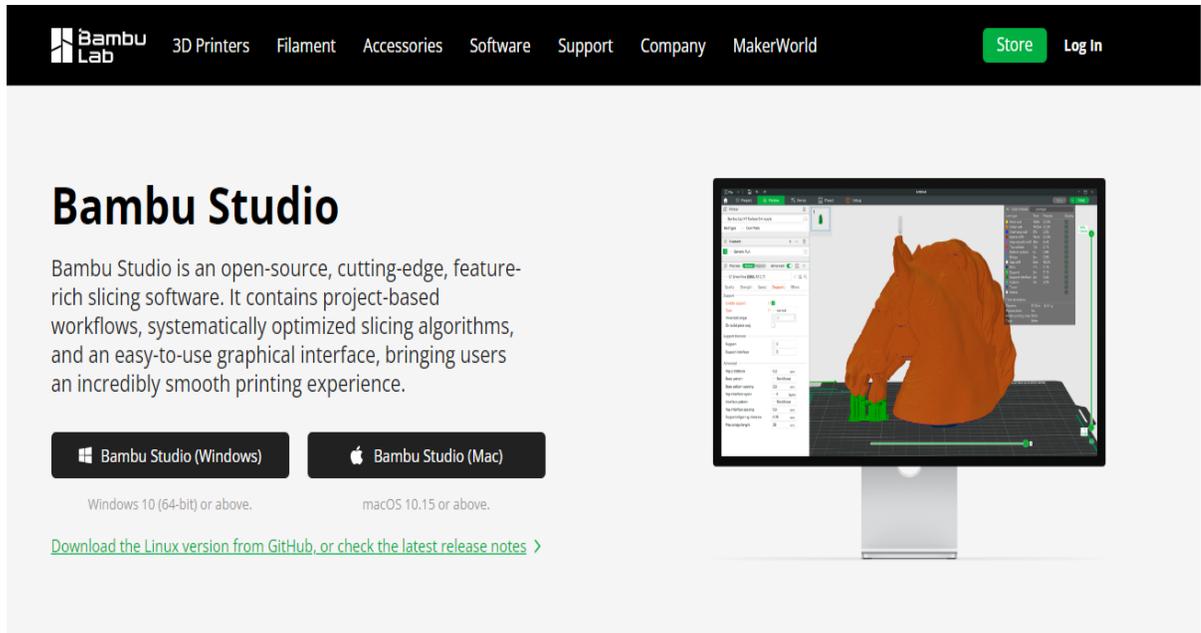
2.1.1) Download the Cali-Cat file from <https://www.thingiverse.com/thing:1545913/files>. This is going to be the model you will be slicing and printing out in the next sections



2.2 Slicing

2.2.1) Download and install Bambu Studio on your Device [Software Studio - Bambu Lab](#) . If you are unable to do so or need help, ask a staff member for help.

3D PRINTING TRAINING MANUAL



The screenshot shows the top navigation bar of the Bambu Lab website with links for 3D Printers, Filament, Accessories, Software, Support, Company, and MakerWorld. A 'Store' button and 'Log In' link are also present. The main content area features the 'Bambu Studio' heading and a descriptive paragraph. Below the text are two buttons for Windows and Mac versions, with their respective system requirements listed underneath. A link to download the Linux version from GitHub is provided. On the right, a monitor displays the Bambu Studio software interface, showing a 3D model of a horse head being sliced on a grid.

Bambu Studio

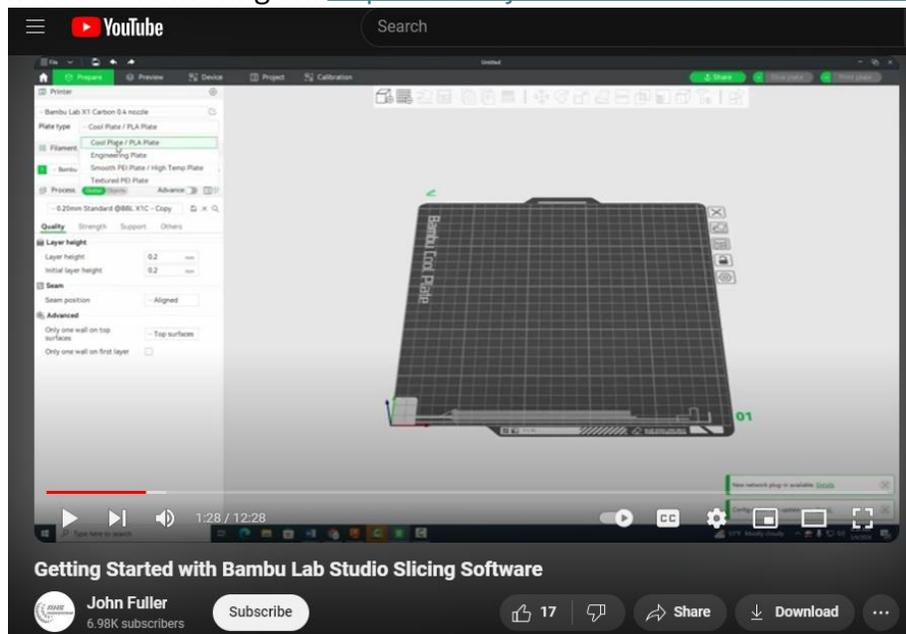
Bambu Studio is an open-source, cutting-edge, feature-rich slicing software. It contains project-based workflows, systematically optimized slicing algorithms, and an easy-to-use graphical interface, bringing users an incredibly smooth printing experience.

Bambu Studio (Windows)
Windows 10 (64-bit) or above.

Bambu Studio (Mac)
macOS 10.15 or above.

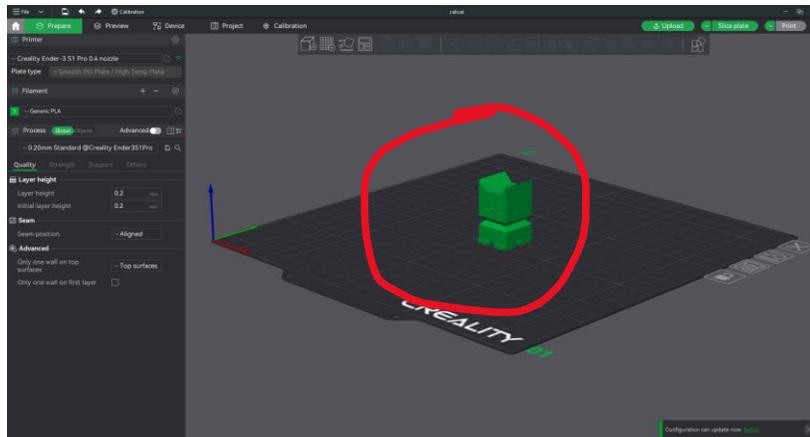
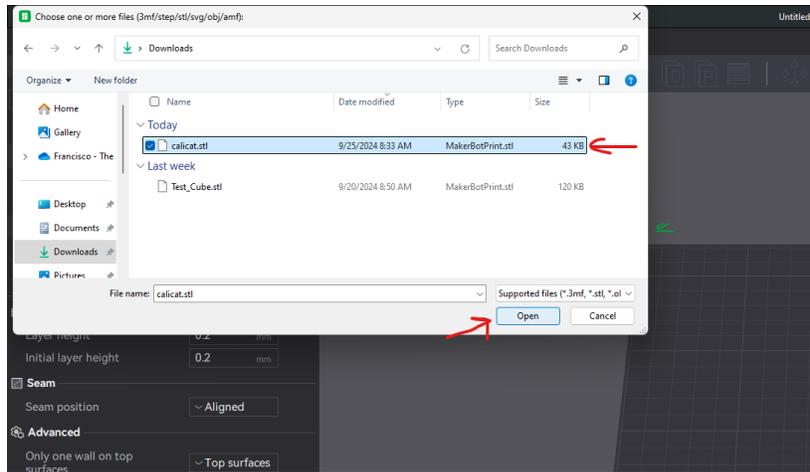
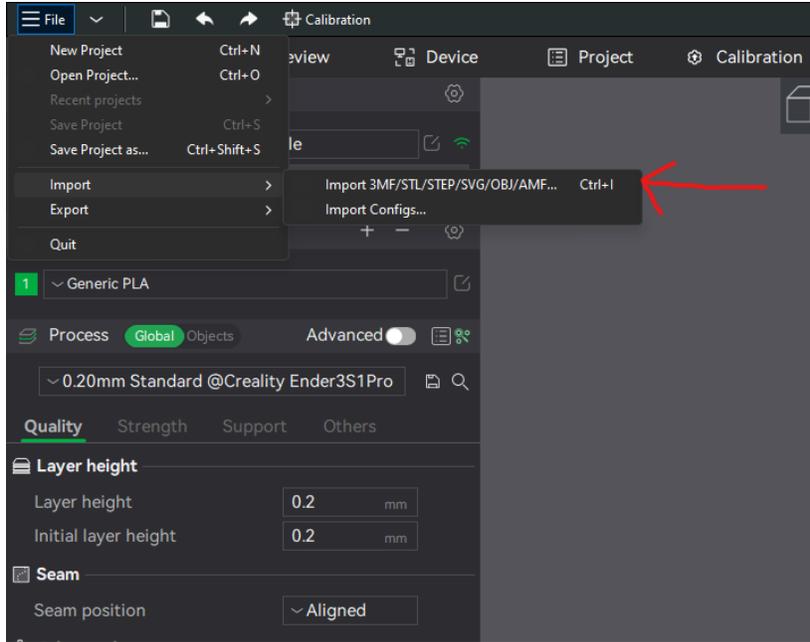
[Download the Linux version from GitHub, or check the latest release notes >](#)

2.2.2) Here is a video about slicing using Bambu Slicer. It'll help you get acquainted with the software before moving on. <https://www.youtube.com/watch?v=wIVZNQahrLY>



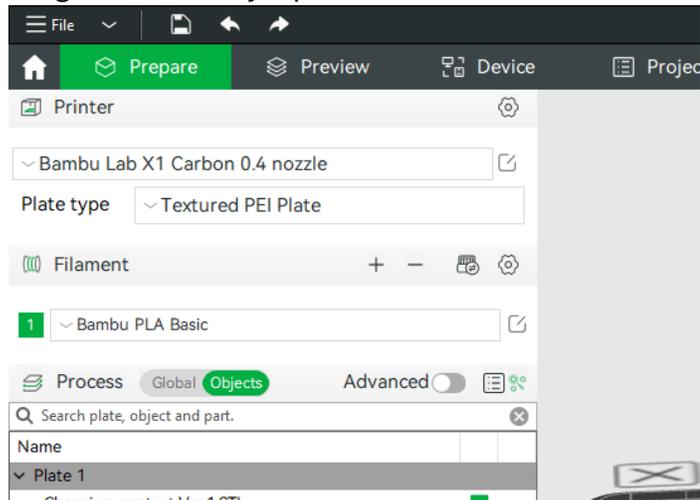
2.2.3) Import the Cali Cat File into Bambu Studio.

3D PRINTING TRAINING MANUAL

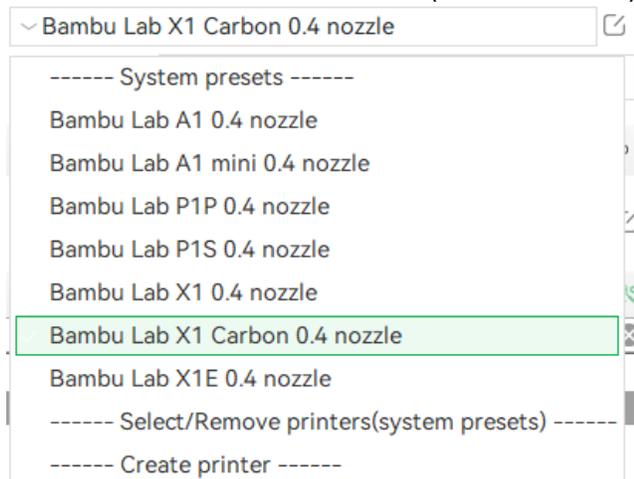


3D PRINTING TRAINING MANUAL

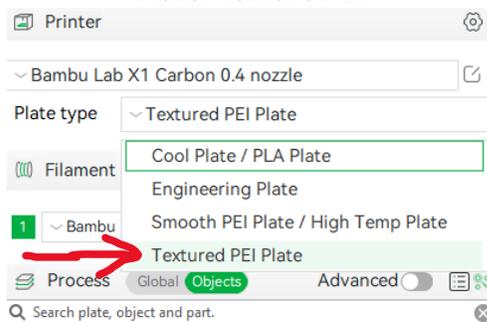
2.2.4) Set printer parameters in Bambu Studio. This is so the slicer knows what machine you. Each setting is followed by a picture of what it looks like in the software.



- Printer: BambuLab X1 Carbon (0.4mm nozzle)



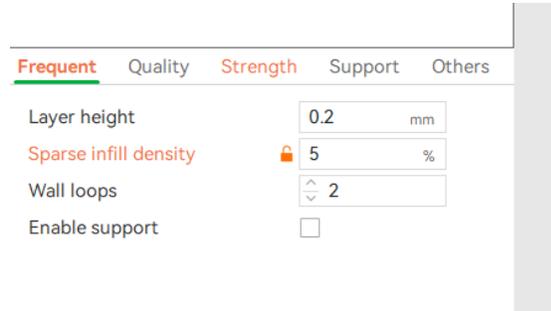
- Plate: Texture PEI



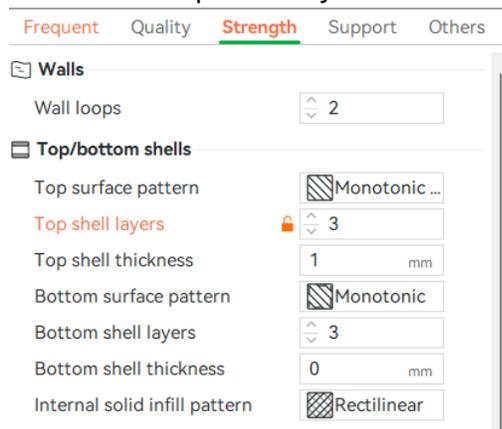
3D PRINTING TRAINING MANUAL

2.2.5) Set print parameters in Bambu Studio. These specify how the part should be printed. Like before each parameter is followed by a screenshot of the slicer.

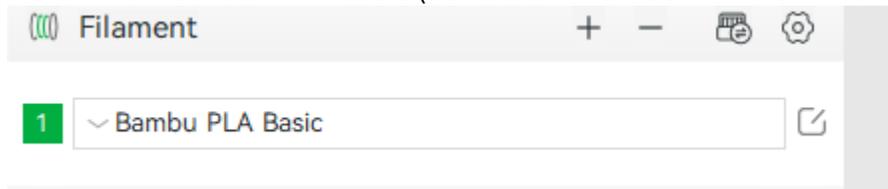
- Layer Height: 0.1mm - 0.3mm (lower values will take longer)
 - Infill: 5%



- Top Shell layers: 3



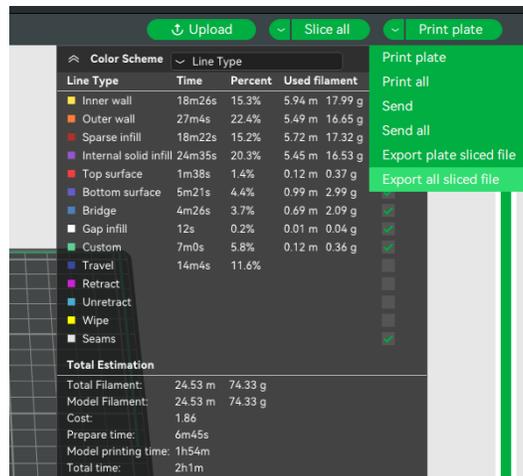
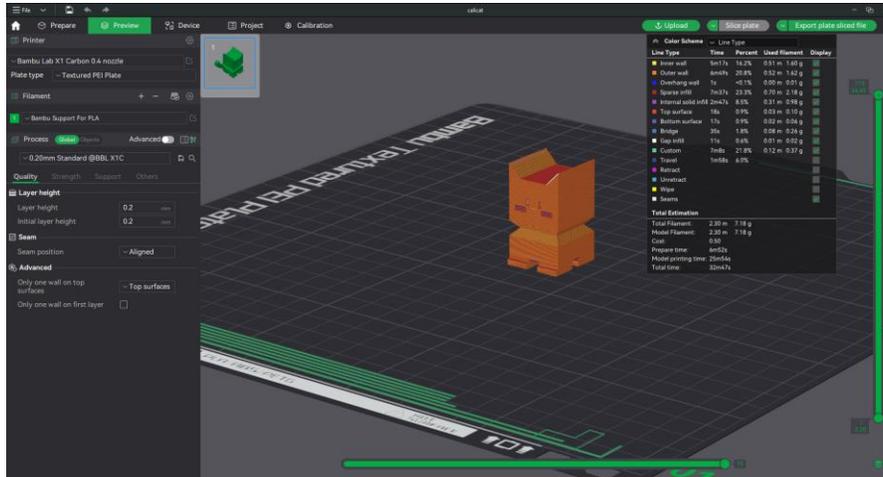
- Material: BambuLab PLA –basic (ask a staff member when on this setting)



***Ask a staff member if you need help with any of these or are having trouble navigating the slicer. ***

3D PRINTING TRAINING MANUAL

2.2.6) Slice the file and save it for later.



***Make sure to get approval from a staff member before moving on. One of us needs to check your slicer settings before you can print. ***

2.3 Printing

Staff Supervision required for following steps

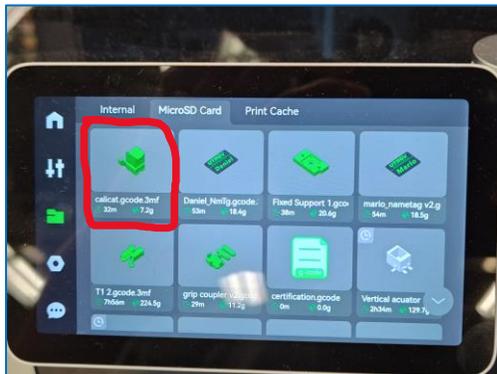
3D PRINTING TRAINING MANUAL

2.3.1) Ask a staff member for an SD card and transfer the sliced file to the card

2.3.2) Take your SD card along with a staff member and insert the SD card into the slot on the bottom right of the touchscreen.



2.3.4) Select the printing tab on the touchscreen and select your file.



3D PRINTING TRAINING MANUAL

2.3.5) If the material is not set, select the filament you selected when slicing. A staff member will help you with this step if you are unsure.



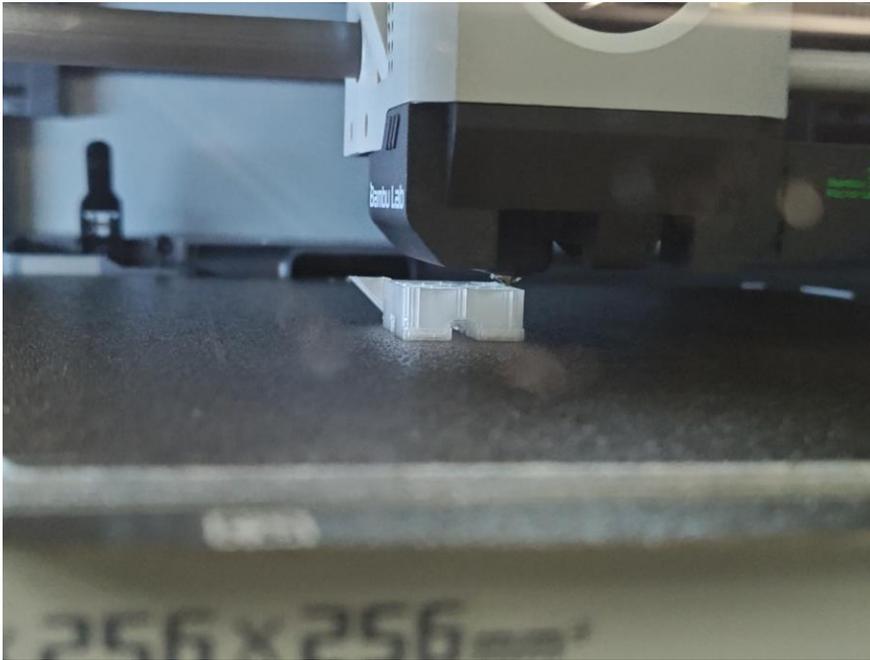
2.3.6) Start your print! The printer will begin a calibration sequence before starting



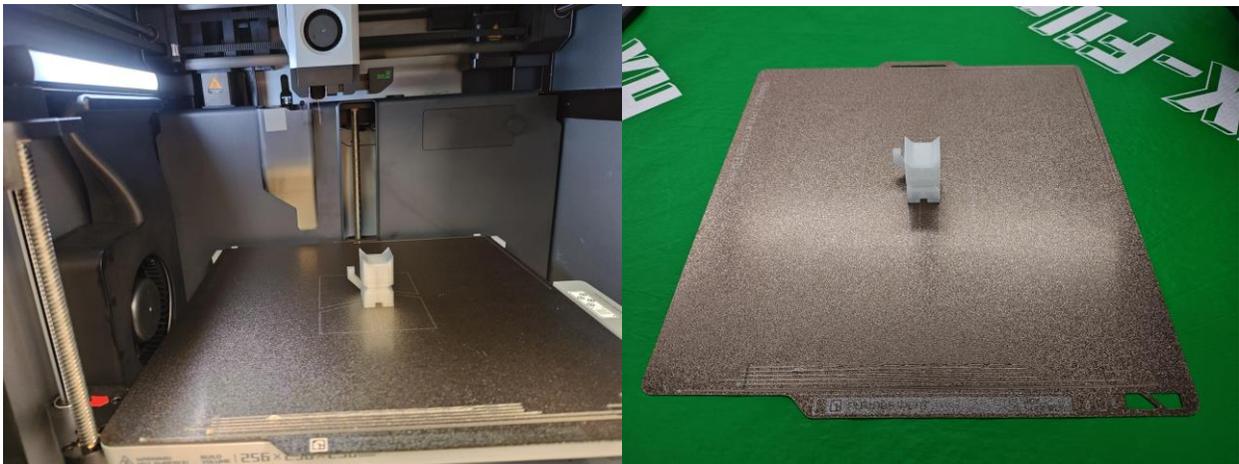
3D PRINTING TRAINING MANUAL

2.3.7) Wait while the printer makes your part. Feel free to stick around and watch through the glass door if you are interested.

Do not open glass or touch anything inside printer. The bed and nozzle get very hot and can burn you



2.3.8) Come back to pick up your finished part! Make sure to ask a staff member to help you get the print out.



3D PRINTING TRAINING MANUAL

CONTACT

If you have any questions, contact the Makerspace staff at makerspace@utrgv.edu