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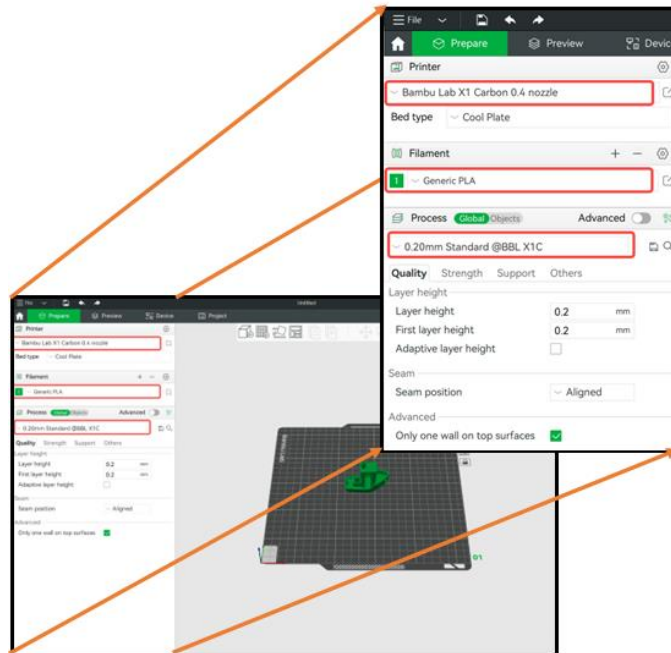
3D Printer and Bambu Studio Badging Guide

The Beginners Guide to the Bambu A1 and Bambu Studio

As a patron of the Ascension Parish Library (APL) system, you have access to learning on a variety of equipment and software, available at our library makerspace! The following is a guide to the introduction to Bambu Studio. Using a 3D Printer you can construct a physical object from a three-dimensional computer model. With this service, you can make use of our printers to create your own design and print it out. To have the option to reserve Makerspace equipment patrons must take a badging class and pass the practical exam to earn a badge for each equipment or software.

This guide will teach you how to:

- In this guide we will cover:
- Definitions
- Choosing a 3D Model to Print
- Loading a 3D Model in Bambu Studio
- Reviewing settings
- Slicing the 3D Model
- Sending the 3D model to the printer



Need to Know

Before you begin, let's review the badging "need-to-knows" so you can add that 3D Printer Badge to your Makerspace repertoire. Materials you will want to review for the badging practical exam are available on the APL Makerspace webpage in detail and include:

- This badging manual's equipment and station specific content
- Makerspace equipment and station reservation, check-in, clean-up, close-down, and check-out procedures
- Materials Consumables Fees documents; procedures for acquiring and purchasing materials (not scrap)
- Location of branch-specific clean-up and safety equipment (e.g. broom, fire extinguisher, eye and hearing protection, first-aid kits).
- Makerspace User Agreement and Release of Liability
- APL & Makerspace Policies, Procedures and Safety Rules

Begin by reading through this badging manual, the library and Makerspace policies and procedures, and review the pathways to Badging. Next, sign up for a badging class with the equipment you are interested in. Search and register for classes on the [Library Events Calendar](#).

Please note, completing the quiz or a class DOES NOT result in a badge. To complete the badging process, patrons must pass an in-person lab practical in the Makerspace. It is recommended that patrons review the relevant online material in addition to attending a badging class prior to reserving a date and time to complete their lab practical to receive their badge. Reservations must be made 48 hours (about 2 days) in advance of the date and time being requested, whether patrons are reserving

time to take their badging practical or reserve time on equipment or software after becoming badged. This ensures library staff have time to reference and approve requests.

Safety

Bambu A1 Safety

Three-dimensional printing (3d printing) does come with a few safety concerns. The printer has several fast moving parts. Always keep any part of your body and clothing out of the operating range of the 3D printer. Examples would be hands fingers and hair. The printer has three axis movement: X, Y, and Z. X refers to the left and right travel of the print head. The print head also moves up and down along the Z axis. Finally the print bed moves on the Y axis, which is forward and backwards. Each axis has wire bundles that could get caught. Make sure the printer is free of all obstacles.

The print nozzle gets up to 300 C (572F). The tip of the nozzle will cause serious burns if you touch it while it is hot. If you need the nozzle changed, contact a staff member to address the issue.

If you must address something on the print bed once the print has started, use the touch screen interface to pause or stop the print. Any doubts, ask staff.

Bambu A1 and Bambu Studio

Welcome to the introduction to Bambu Studio. Once a 3D model has been created the model data must be converted into a set of instructions called G-code. The software we use for this is Bambu Studio. This software allows us to visually layout the 3D model in a virtual environment. We can make simple changes to the model like scaling, rotating, and moving. Once we have the model the way we want it, we can slice the model and then print the model as a real-world 3D physical object. At any point in your journey feel free to ask the makerspace staff for any help you might need.

Before we get into the overview of Bambu Studio, let's go over a few basic 3D printing terms.

Definitions:

Virtual object: An idea of an object that does not exist in the physical world. It is a digital construct that we can not touch. The goal of 3D printing is to create a physical object from a virtual concept.

3D Model: A digital file that contains data that describes the three-dimensional values (Height, Width, and Depth) of a virtual 3D object. Models are commonly created using 3D modeling software. There are also thousands of free and paid models available for download online.

***.STL:** Common file format for models used in 3D printing.

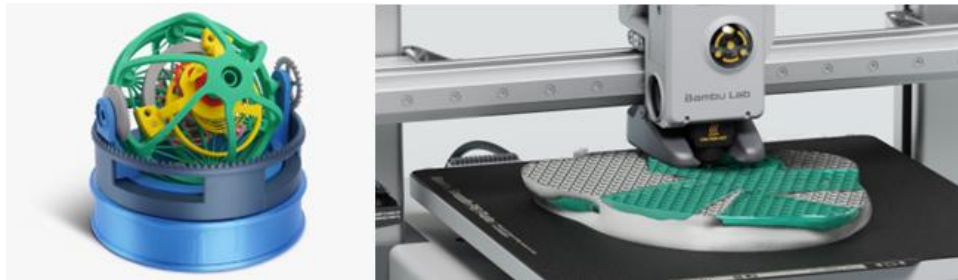
Slicer and slicing: This breaks down the virtual object into thin layers that the 3D printer can build one at a time. These instructions are written as G-code. The slicer we use is Bambu Studio.

G-code: G-code stands for “Geometric Code”. We use this language to tell a machine what to do or how to do something. The G-code commands instruct the machine where to move, how fast to move and what path to follow. -howtomechatronics.com

Filament: 3D printing filament is a thermoplastic wire fed to a fused deposition modeling (FDM) 3D printer. -www.xometry.com

PLA: PLA stands for Polylactic Acid. Made from renewable resources such as corn starch or sugar cane, it's a natural polymer designed to substitute [for] widely used petroleum-based plastics like PET (polyethene terephthalate). In the packaging industry, PLA plastics are often used for plastic films.- lawprintpack.co.uk

This Makerspace primarily uses PLA filament. PLA is inexpensive, biodegradable, and easy to work with. Cons: PLA is a low temperature filament. It gets soft around 80c (176F). This makes PLA prone to warping. It has ridged (not a lot of flex) properties that make it brittle.



Choosing a 3D Model to Print:

There are two main methods for picking a 3D Model: downloading, and modeling.

Download: There are many websites where you can download printable 3D Models. Many are free.

- www.makerworld.com
 - Has a large community driven collection of 3D models. These are tuned specifically for Bambu lab Printers.
- www.thingiverse.com
- www.printables.com

and many more... Use the search term “Free *.STL” , and you will find hundreds of 3D models

3D modeling: You can use software to create your own 3D models. Most 3D printers do not care what software you use to create your own 3D models.

Tinkercad.com : Easy to use web based CAD program for creating 3D models. Designed for kids but has a nice set of tools for creating mechanical type models. FREE!



Autodesk Fusion for personal use. Fusion is a very powerful CAD modeling software that allows you to create complex 3D models. Steep learning curve. Free limited personal version. It very good at creating mechanical models like tools or parts.



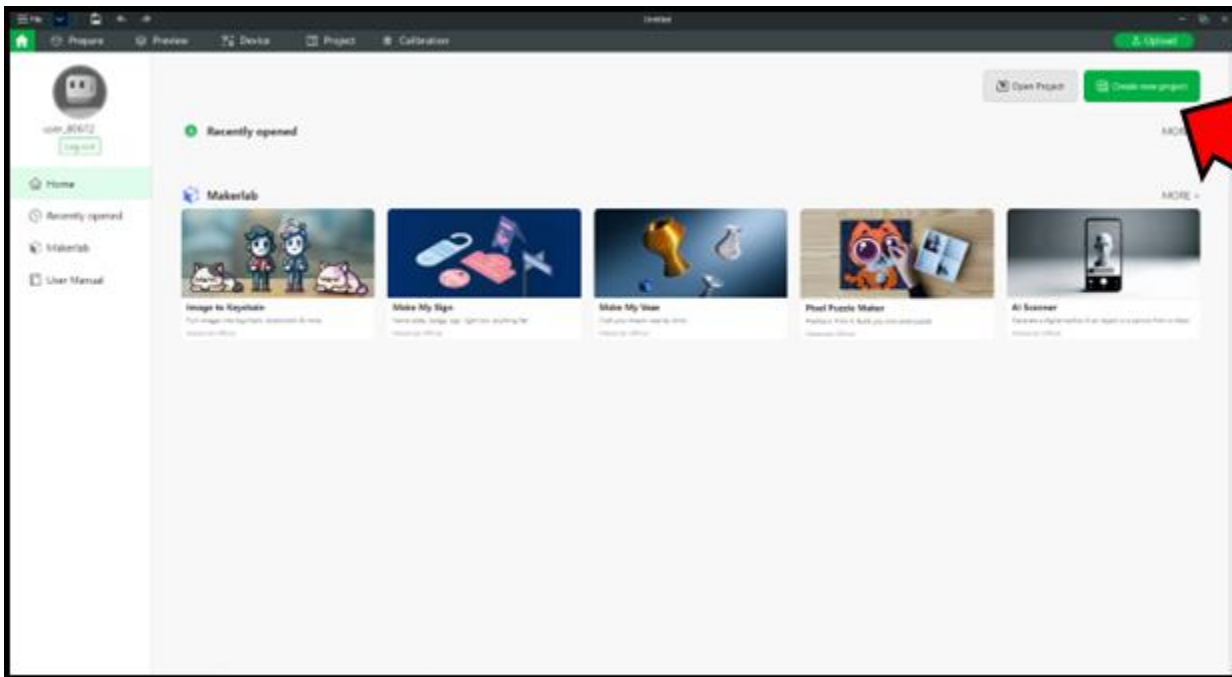
Blender3D: Free, open source 3D modeling software that allows you to create both mechanical and organic models. Mechanical models are things like tools or parts with lots of straight edges and sharp corners. Organic models are typically things from nature like plants and animals. They have soft curves rounder edges. Blender has a steep learning curve.



Once you have downloaded a 3D model, open Bambu Studio. Look for this icon.



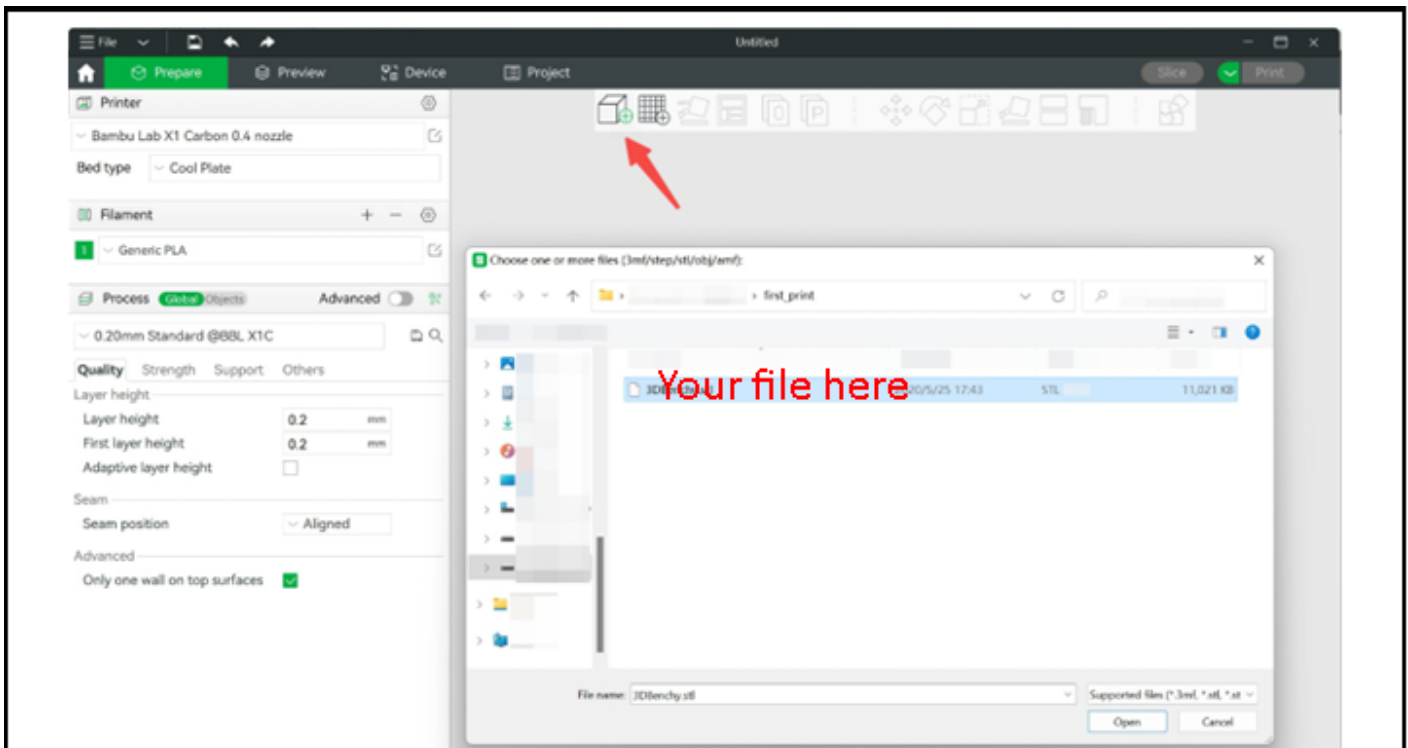
Bambu Studio

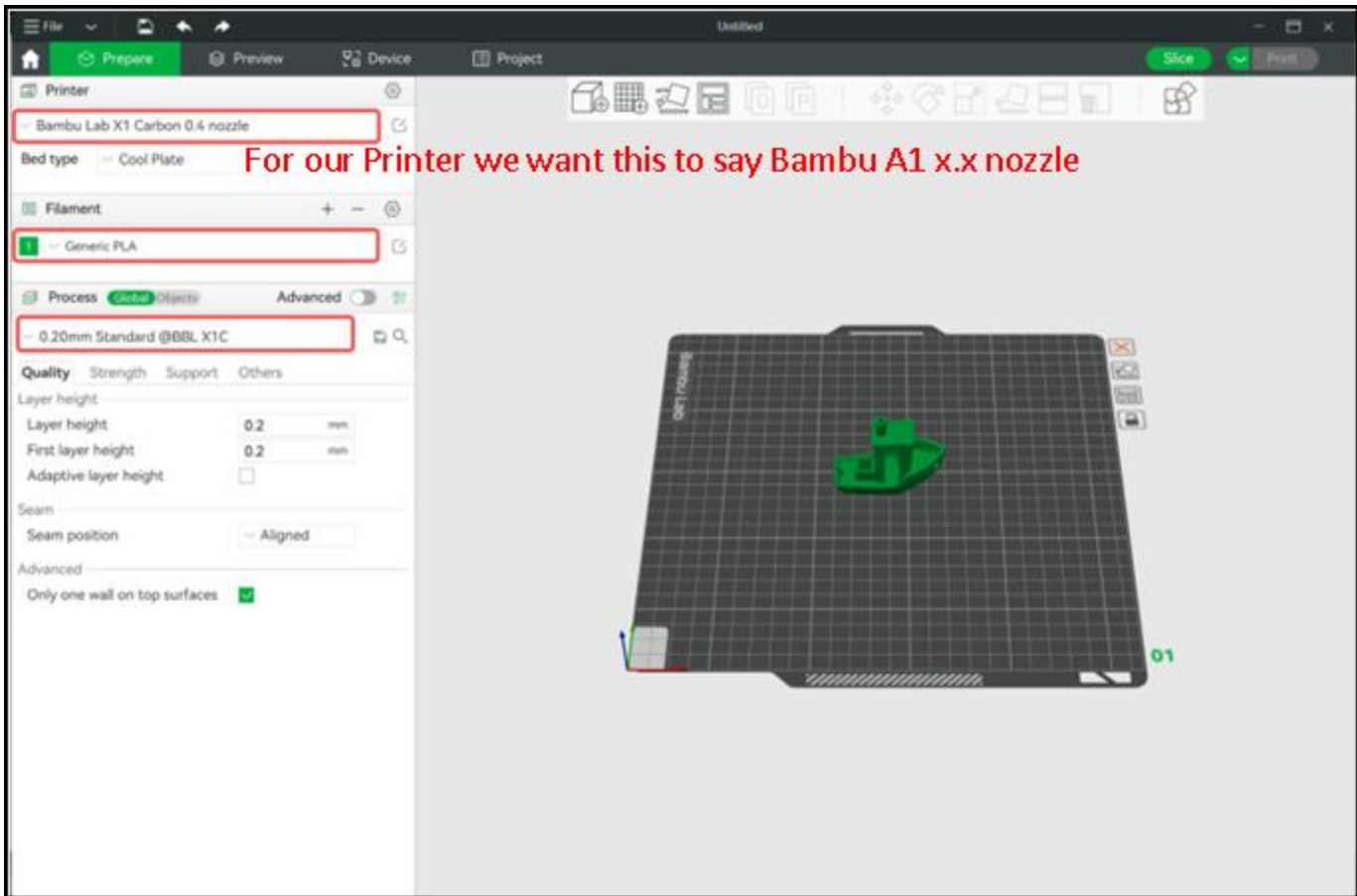


To start slicing a model, click on "New Project"

Load a file

On the top menu bar of the preview pane, click on the cube image with a "+" sign on it to import a model. Supported files include .3mf .stl .stp .step .amf .obj



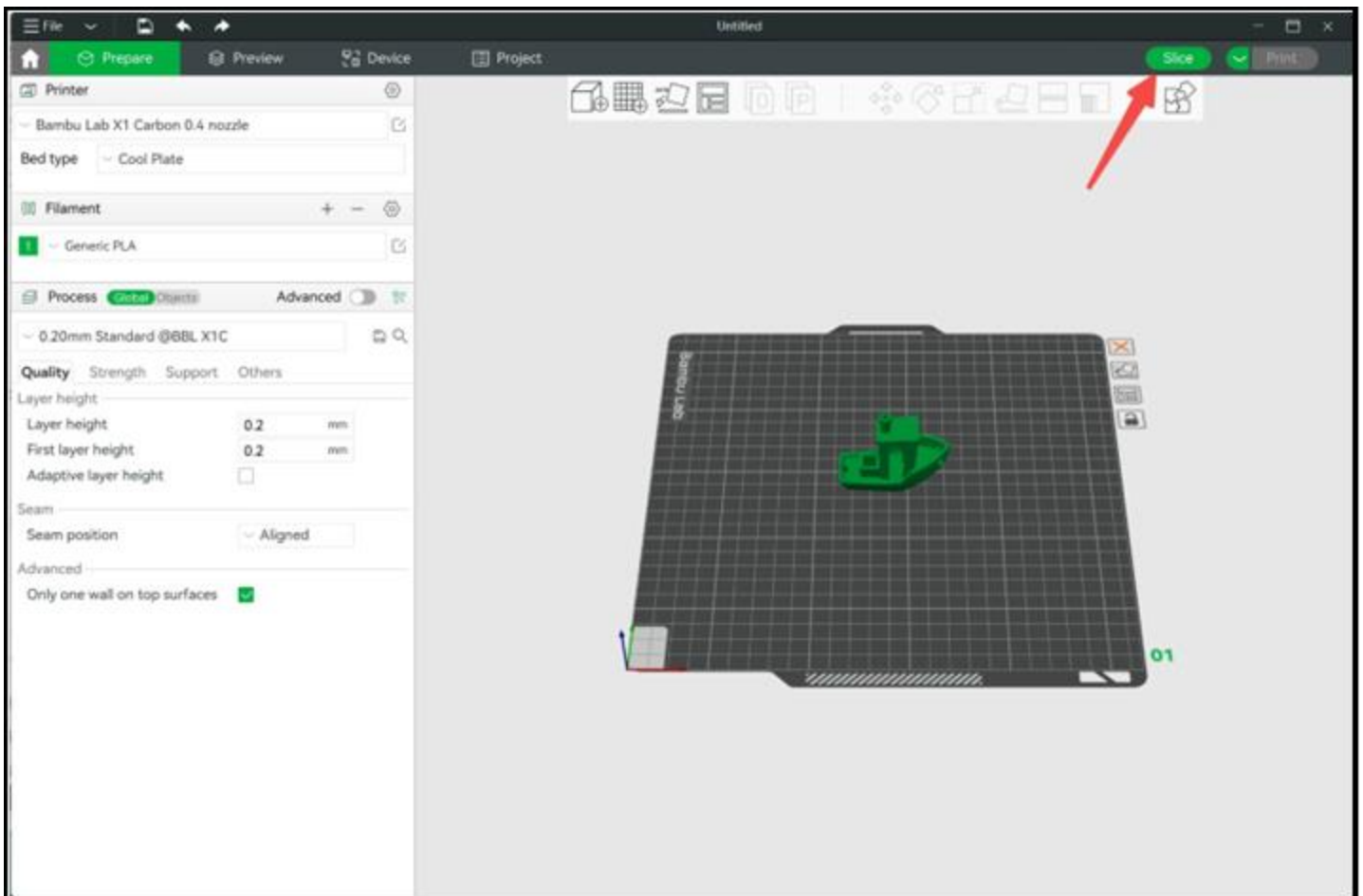


Check Printer/Filament/Process presets

To start slicing the model, you need to choose the presets for the machine you are using, for the filament you will print with and also the settings you want to print the model in.

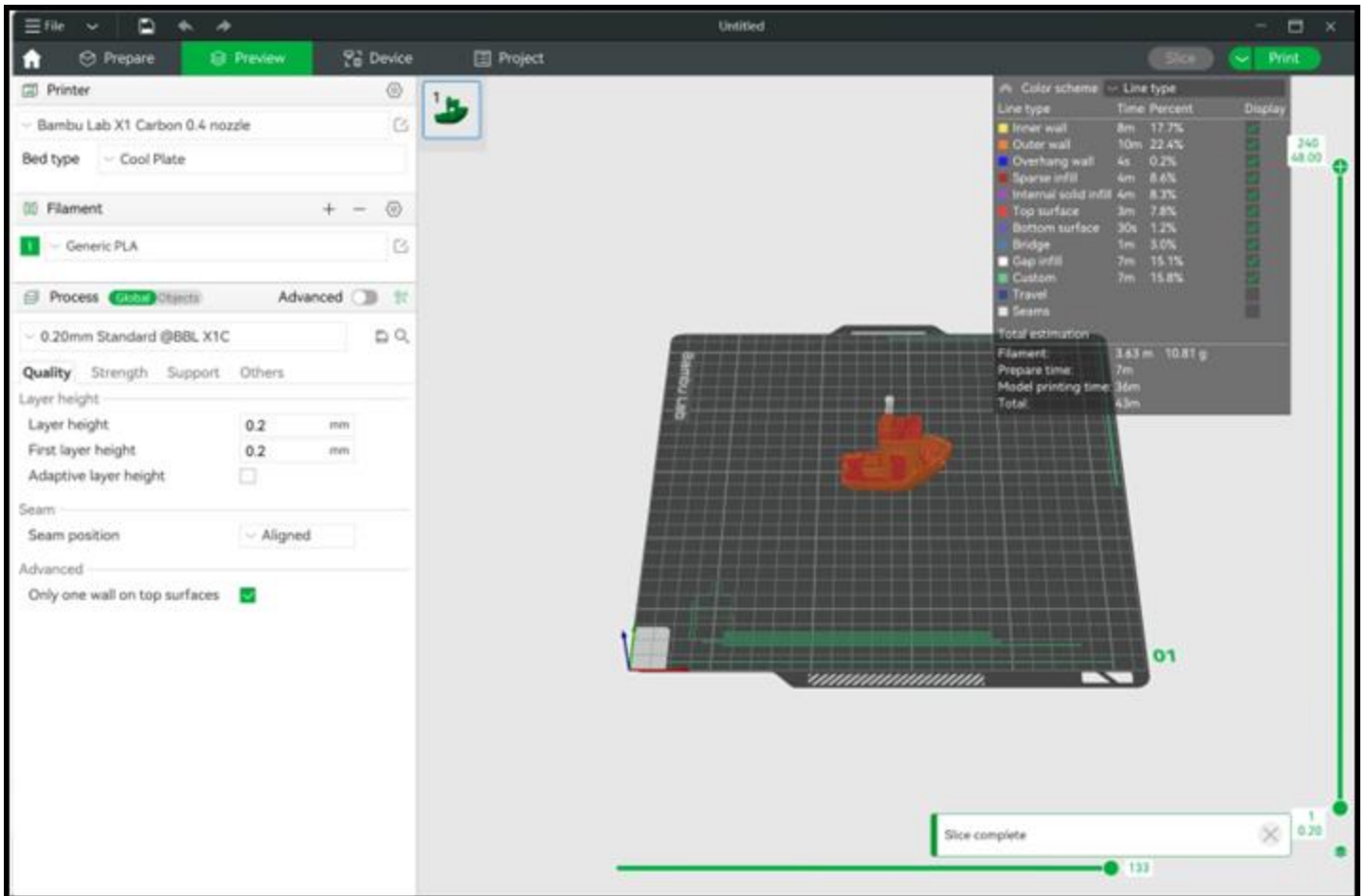
1. Select the printer you are using from the drop-down list under “Printer”. This will also include the nozzle size you will be printing with. **Bambu A1 is our printer.**
2. Under the "Filament" section, select the type of filament you intend to use from the drop-down list. **Here you can change the color of your print.**
3. Finally, choose the layer height you want your model to be printed in from the “Process” drop-down menu. Always remember that the smaller the layer height, the longer the print will take. For the majority of prints, a 0.20mm layer height is the norm.

Note: The default setting will typically work 90% of the time. The important setting is Bambu A1 for the printer.

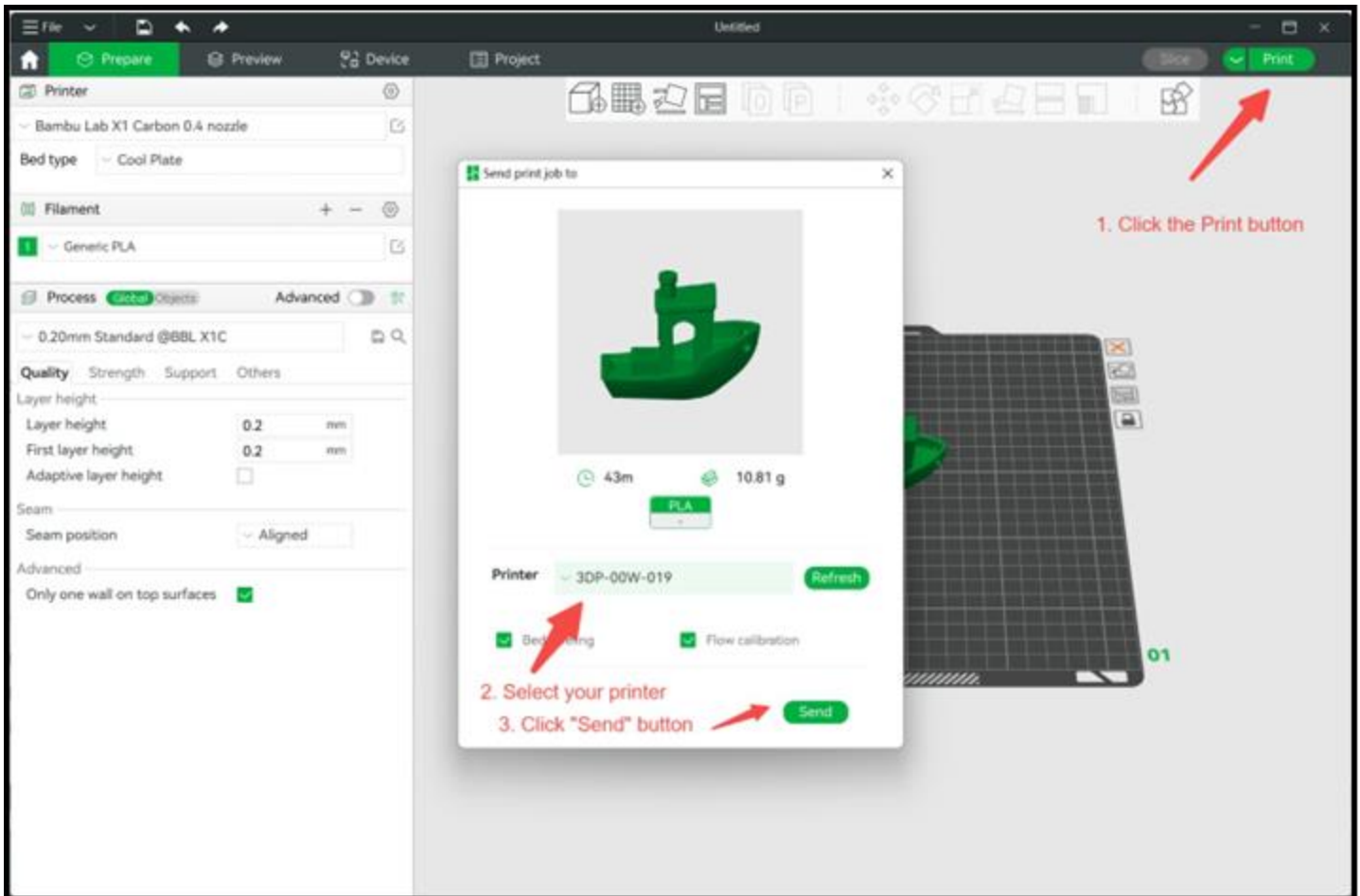


Click the "Slice" button

Once done, click on the "Slice" button located on the top hand right of Bambu Studio. This will generate a .3mf file which is the file format used for the printer to be able to print the model.



The slicer will take you to the **Preview** pane which will show you what the sliced model looks after processing the .3mf file. The histogram on the right hand side will also show you information on the printing times for each parameter of the print.



Send print job via WLAN (wireless local area network)

To send the print job to the printer via WLAN, click “Print” on the top right-hand corner. This will prompt a pop-up window with a quick preview of the model and will also ask you to select the Printer you want to send it to from the drop-down list, and you will have the option to choose whether or not you want the printer to perform certain functions like Bed Leveling, flow calibration, etc before the print starts. Before you send your print, physically inspect the printer to make sure it is ready and safe to print. Once you are ready, click “Send” to send the file to the printer and start printing

The computer will upload your print job to the printer and your print should start printing.

YOU DID IT!

What next?

Print some more. Make mistakes. Learn. Get comfortable with the basics, then you can explore what the different settings do. Repeat!

Makerspace Workstation Closing Procedures

When your reservation time has ended, follow the closing procedures for ALL workstations. Maker culture and community rely on a shared value of leaving the Makerspace like you found it, or better.

Closing Checklist:

- Turn off the equipment.
- Place all salvageable materials in their appropriate bin (paper, cardboard, 3D filament (plastic), fabric, metal, wood, etc.)
- Recycle or throw away all the remaining non-salvageable scraps and materials. Be sure to place recyclable materials in their appropriate bin.
- Return all accessory tools used to their appropriate locations.
- Inspect all station equipment at the reserved workstation and ensure its functionality.
- Report any concerns to Makerspace staff immediately.
- If you used a Makerspace computer, log off your personal account only. DO NOT log off the workstation computers or shut them down.
- Clean the workstation. This may include: (1) using alcohol spray and a paper towel to wipe down the workstation table and chair(s), as well as equipment handles and buttons; and (2) sweeping the workstation area of visible debris.
- Push Makerspace chairs and stools back under the workstation tables and ensure all electrical cords are tucked away so others will not trip over them.

Once the checklist is completed, check out with the Makerspace staff on duty so they can review/inventory the workstation and charge the total of consumables used to your LS2 account. If you are leaving earlier than your reserved time, and reserved time during Open Hours of Innovation, please let the staff member know so they can allow others to use the workstation.