

ALLEVI 2

User Guide - 2.1.1

BUILD WITH LIFE

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| **WELCOME**



SPECIFICATIONS

MECHANICAL

Construction: Aluminum Frame
Build Structure: Tissue Culture Plates
XY Position Precision: 5 microns
Z Position Precision: 1 micron
Weight: 19 lbs (8.6 kg)
Dimensions: 12.3 x 12.2 x 12.1 in
31.3 x 31.1 x 30.8 cm

PRINTING

Print Technology: Extrusion Printing
Pressure Range: 1- 120 PSI (7- 827 kPa)
Pressure Variance: +/- 1 PSI
Build Volume: 3.5 x 2.4 x 5.1 in (42.8 in³)
9 x 6 x 13 cm (702 cm³)

ELECTRICAL

Power/Voltage Requirements: 6 Amp/
AC 110V - 220V
Desktop Adaptor
Supply Voltage: 12V DC, 7.5A
Connectivity: USB, WiFi

EXTRUDERS

Max Temp (E1): 160°C
Max Temp (E2): 70°C
Min Temp: Room temperature
LED Range: 405 nm OR 365 nm

SOFTWARE

Bundle: Allevi Bioprint Online
Connectivity (via Online Adapter): WiFi,
Ethernet, Allevi Wireless Adapter
Supported File Types: STL, gcode
Operating System: Windows, MacOSX, Linux



WARNINGS



HOT SURFACE WARNING

This symbol indicates potential hot surfaces. The Allevi 2 and its extruder(s) can become hot during the printing process, whether heating or cooling. Always allow time for the extruder to cool before handling.



WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT

This symbol indicates that when the end-user wishes to discard this product, it must be sent to separate collection facilities for recovery and recycling.



UV WARNING

This symbol indicates potential ultraviolet light exposure. The Allevi 2 and its extruder(s) can emit wavelengths of 365-405nm. Wear UV glasses when operating and avoid looking directly at light.



CE MARKING

This mark indicates conformity with health, safety, and environmental protection standards for products sold within the European Economic Area.



SGS MARKING

This mark means a product has been independently tested and certified to meet recognized standards for safety or performance.





ENVIRONMENTAL CONDITIONS

The Allevi 2 should be operated in the following conditions:

- Indoor use
- Altitude of operation: $\leq 2000\text{m}$
- Operating temperature: 5- 40°C
- Relative humidity: 20- 80% (up to 31°C), decreasing linearly to 50% at 40°C
- Pollution degree of the environment: Pollution degree 2

The Allevi 2 should be stored in the following conditions:

- Temperature: 5- 40°C
- Humidity: 20- 80%, decreasing linearly to 50% at 40°C

WARNINGS

- The Allevi 2 includes moving parts that can cause injury. Never reach inside the printer while it is in operation.
- Do not leave the printer unattended while it is in operation.
- Always wear safety goggles when using the printer.
- Do not mount the Allevi 2 on or near a surface of flammable material.
- There are possible hazards of explosion, implosion, or the release of toxic or flammable gases arising from materials being heated.
- If you are working with hazardous materials, you should set up the appropriate extraction system and/or ventilation requirements.
- You are responsible for appropriate decontamination in case of spillage of hazardous materials on or inside of the equipment.
- If the equipment is used in a manner not specified by Allevi, the protection provided by the equipment may be impaired.

MAINTENANCE AND CLEANING INSTRUCTIONS

- Recommended decontamination is spraying with 70% ethanol while the printer is powered down, turning your hood fan on for 30 minutes, and wiping down the printer after at least 10 minutes. Additionally, 30 minutes of UV decontamination may be used to supplement the ethanol wipe down.
- Do not over-spray ethanol directly into the electronics of the Allevi 2. Spray a towel, then wipe the printer down with the towel. Do not use decontamination or cleaning agents which could cause a hazard as a result of a reaction with parts of the equipment or with material contained in it.

SERVICE INSTRUCTIONS

Allevi bioprinters should be serviced by Allevi or Allevi-certified personnel.

To request servicing, email: support.allevi3d@3dsystems.com





| GETTING STARTED



WHAT'S IN THE BOX



1 Allevi 2 bioprinter



2 Starter bioink kit



3 Power supply



4 Air compressor*



5 Compressor hose



6 Allevi Wireless Adapter

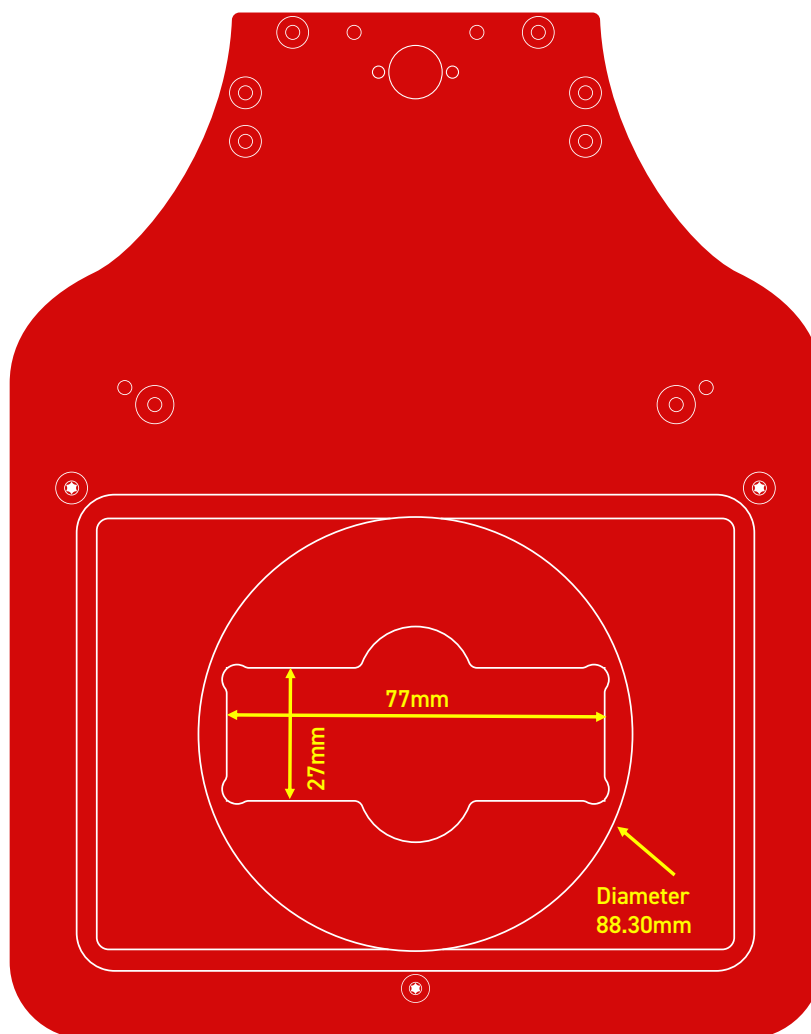


7 USB cable

*Air compressor arrives separately



PRINT BED DIMENSIONS





ALLEVI 2 DIAGRAM



- A.** Air Compressor Lines
- B.** Dual Extruder (Left: Extruder 1, Right: Extruder 2)
- C.** Build Plate
- D.** Power On/Off



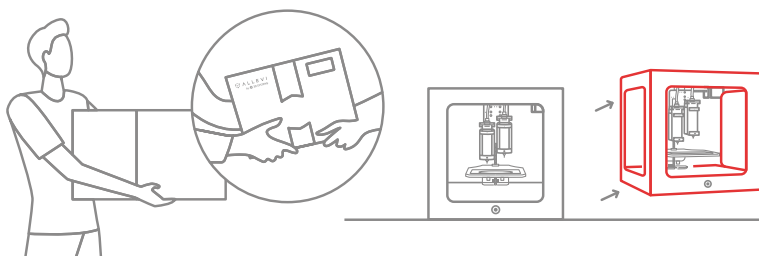


SETTING UP YOUR PRINTER

Step 1

Carefully remove your printer from the packaging by grasping the printer frame firmly with both hands. We recommend holding onto the packaging for future moving or shipping the printer.

CAUTION: The Allevi 2 weighs ~ 19 lbs (8.6 kg). Two people may be required to safely lift it. Always carry the printer by the frame/bottom.



Step 2

Plug the power cable into the power port located on the first from the left side of the back of the printer. Then plug the other side into a wall outlet.

Step 3

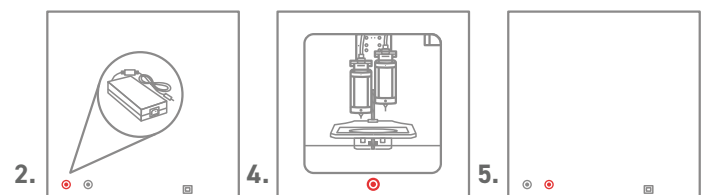
Insert the microSD card included in the box into the Online Adapter. Attach your current Allevi 2 USB cable to the Online Adapter. You can use any USB port. To power the adapter, attach the microUSB power supply to the power button adapter, then insert that into the Online Adapter. This will allow you to restart the Online Adapter without unplugging it. Turn on the Online Adapter and keep it on for the entirety of your print session.

Step 4

Power on the printer by pressing the power button located on front of the printer. It will turn red.

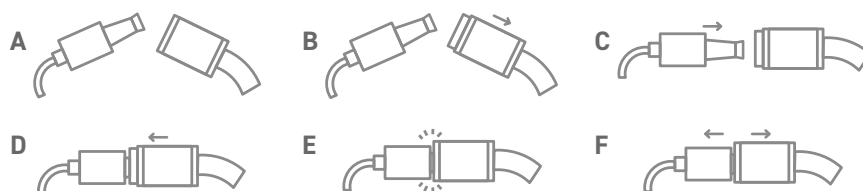
Step 5

Attach the air input junction to the air port on the left side (second from the left) of the back of the printer.



Step 6

Connect the air compressor to the black air hose, and the air hose to the air input junction on the printer. The connection between the hose and the junction can be tricky. Follow this diagram:



A Gather both the air input junction (left) and the air hose (right). **B** Pull back the collar of the air hose. **C** Insert the air input junction in the air hose. **D** Slide the collar of the air hose back into place. **E** The connection should be formed! **F** Give the connection a light tug to ensure it is secure.

! Note: The air compressor must remain turned on for the entirety of the print.

Using the knob near the outlet valve, set the pressure on both gauges to 120 PSI. This will ensure you have plenty of pressure to use during printing. Any adjustment to your printing pressure is made in the software, so leave the air compressor on this setting. After use, turn the air compressor off.

! Note: The air compressor needs to be periodically drained to eliminate any condensation inside. To do so, refer to the air compressor manufacturer manual. This should be done following every day of use. Please refer to the air compressor manufacturer manual for all preventative maintenance.



SETTING UP YOUR SOFTWARE

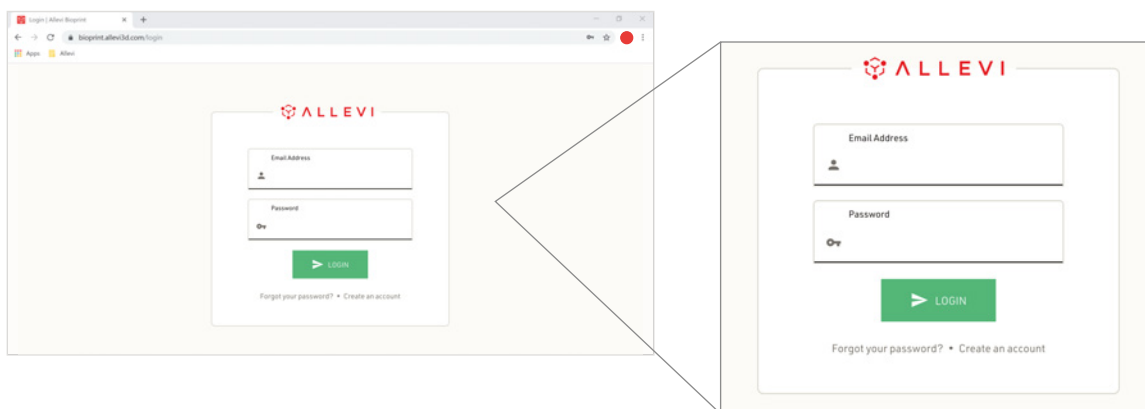
You can also follow a video at allevi3d.com/getting-started

Step 1

Go to bioprint.allevi3d.com. Our software runs out of a browser and requires no downloads. We recommend [Google Chrome](#) or [Firefox](#), but Safari and Edge are also acceptable.

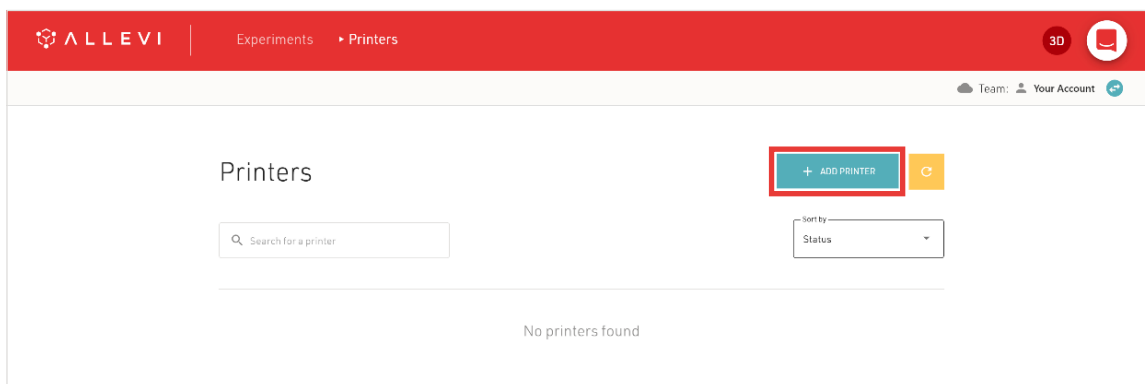
Step 2

Login to the software. To set up an account, click 'Create an account'.



Step 3

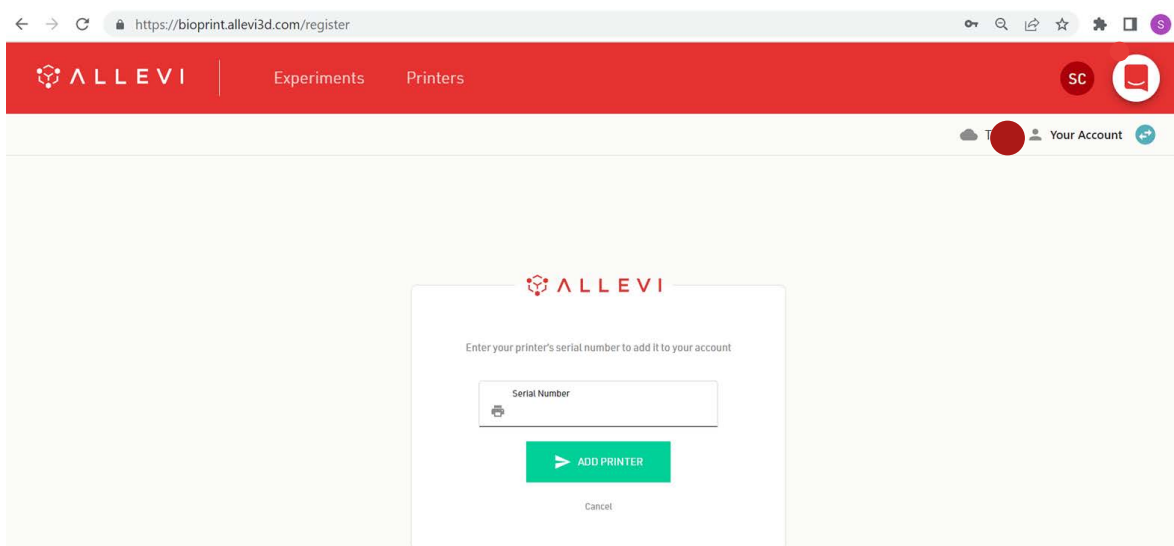
To register your printer, scroll down in your printer list and click 'Add printer'. If you're planning on having multiple users work with your printer, we would recommend that you first make a Team and add the printer to your Team. A guide to do this can be found [here](#).





Step 4

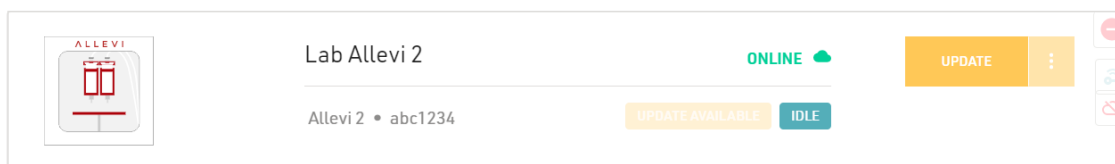
Type in your device serial number and click 'Add printer'. Your serial number can be found on the Online Adapter or in your onboarding email from the Allevi Support Team.



Note: The serial number has 7 characters and should be limited to letters between a-f and numbers.

Step 5

Once your printer is registered, it will appear as an available printer in your printer list. You can also see its Internet connection status.





CONNECTING TO YOUR PRINTER

Ethernet connection:

To connect your Allevi bioprinter via ethernet, plug an ethernet cord to the port on the Online Adapter and to an ethernet port in your lab. You need to power cycle with the ethernet connected.

Wi-Fi Connection:

With a Wi-Fi connection, your printer will be online.

Step 1

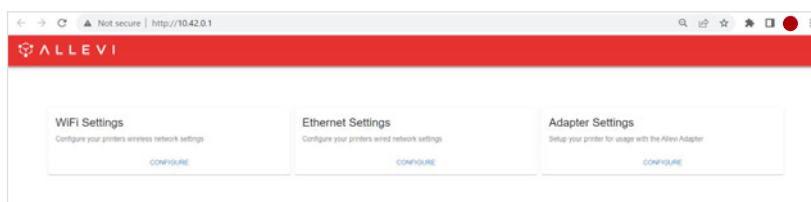
Open your WiFi settings and look for a network called **“Allevi Printer <serial number>.”** By connecting to the Allevi hotspot, your computer will briefly lose access to the Internet.

Step 2

Go to <http://10.42.0.1/> in your browser.

Step 3

Click Configure under **‘Wifi Settings’** and enter your network credentials on the next screen. **The chosen WiFi network should be a private network without a ‘Click to accept’ intermediate page.** Once the network has been successfully added, a green message will pop up at the bottom of the page. You can now close this window.



Adapter Connection:

With this connection method, your Allevi bioprinter will not be connected to the internet itself, but it will communicate with your computer via the Allevi Adapter.

Step 1

Download the official driver [here](#). Extract the downloaded .zip file and run the installer. This allows your computer to connect to two Wi-Fi networks at the same time.



Download the Allevi Client app [here](#). Extract the downloaded .zip and run the application. You'll need to keep this open whenever you are using your Allevi bioprinter.

Step 2

Plug your Allevi Adapter into your computer's USB port.

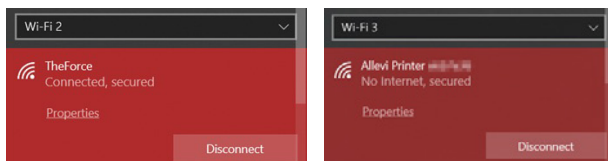
Step 3

Turn your printer and Online Adapter on.

Step 4

In your Wi-Fi list, you should see a dropdown to select different Wi-Fi networks. The dropdown allows you to switch between "Wi-Fi 1" and "Wi-Fi 2"; however on some computers this may be called "Wi-Fi 2" and "Wi-Fi 3". See the screenshot below for an example. It does not matter what your networks are called, as long as they are connected as follows:

- **Wi-Fi 1:** Connect this to your home or work Wi-Fi network
- **Wi-Fi 2:** Connect this to the Allevi Printer Wi-Fi Access Point "Allevi Printer <serial number>"

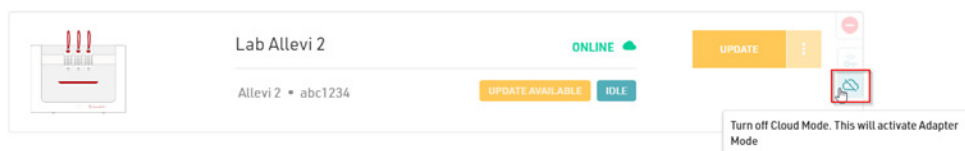


Step 5

Navigate to <https://bioprint.allevi.app> and log in as normal using your Bioprint credentials.

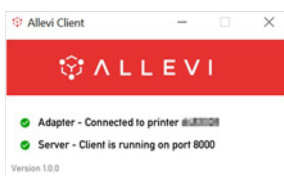
Step 6

On your printer dashboard, turn off your printer's Cloud Mode using the cloud icon and follow the system prompts. This will take 3- 5 minutes to complete.



Step 7

If connection is successful, you will see the following state on the Allevi Client Application and a green Connect button in the printer dashboard.





| **START PRINTING**



YOUR FIRST BIOPRINT

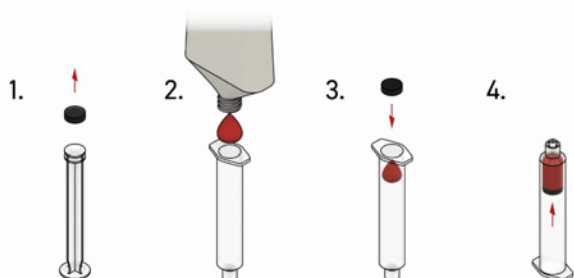
The Allevi Bioprint Online software is the most comprehensive and versatile bioprinting software. If you prefer watching videos, visit allevi3d.com/getting-started and watch the 'Your First Bioprint' video.

Step 1

Store your jar of sample pluronic at 4° C until the pluronic is easily pourable.

- a) Remove the plunger from a printing syringe. Detach the rubber seal from the plunger and set it aside.
- b) Add viscous biomaterial to the wide opening of the syringe barrel. If your material comes in a tube or another syringe, squeeze it out directly. You can also use a spatula to place some material in the barrel.
- c) Place the rubber seal in the syringe barrel.
- d) Use the plunger to push the rubber seal to move the material all the way to the tip of the syringe. Invert the syringe and push the plunger pointing the syringe upwards. This can also help reducing bubbles.

! Note: If you are using the syringe plunger, make sure it doesn't lock back into the rubber seal.



! Note: Bioinks may be loaded differently and use different needles depending on the type of material. View our [General Bioink Parameters](#) guide on Allevi Support.

Step 2

Attach a 30 gauge 0.25" (pink) needle to the pluronic syringe, and load syringe into the printhead. The extruder you're loading should be in the down position so you don't jump the rack and pinion. Slide syringe into extruder canister. Make sure the twist cap lowers beneath the brim of the canister by slipping through the notches. Turn the twist cap until you feel the twist cap reach divots in





the brim. Tighten the wheel on front to lock the syringe in place while the twist cap is in those divots.

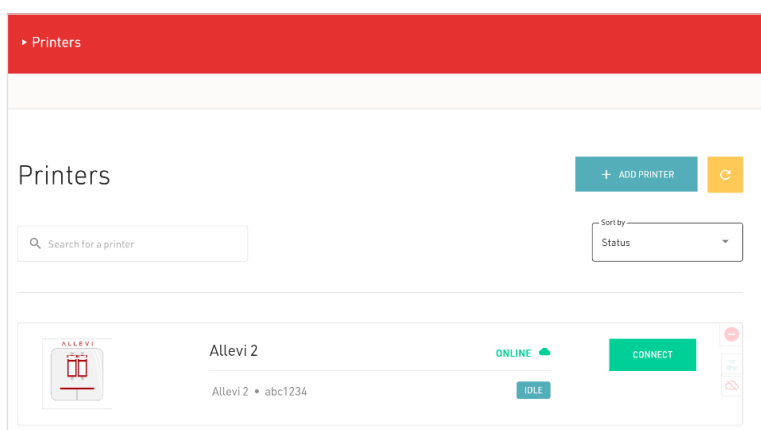
Step 3

Turn on your printer and Online Adapter.

Step 4

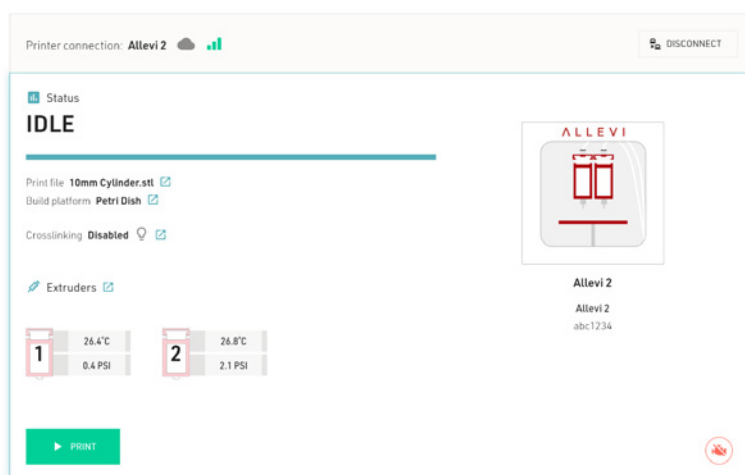
Login to bioprint.allevi3d.com. Select your printer from the printer list and click 'Connect'.

! Upon start up, your printer will automatically home your Z and X/Y axes. Makes sure the printer is clear of any loose materials.



Step 5

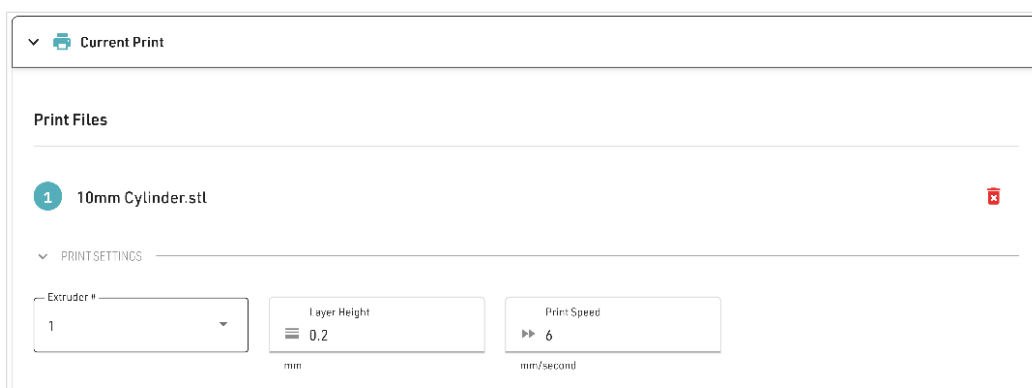
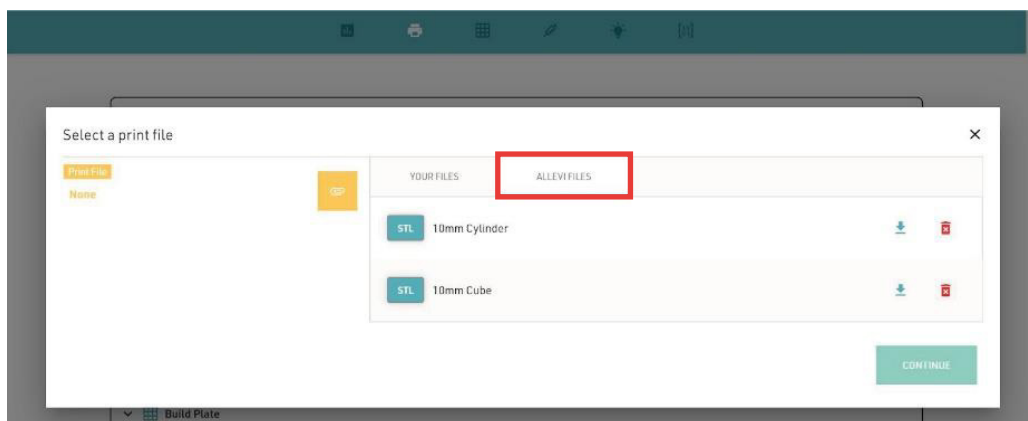
This will bring you to your printer **Status** section. Here you can get an overview of your print settings.





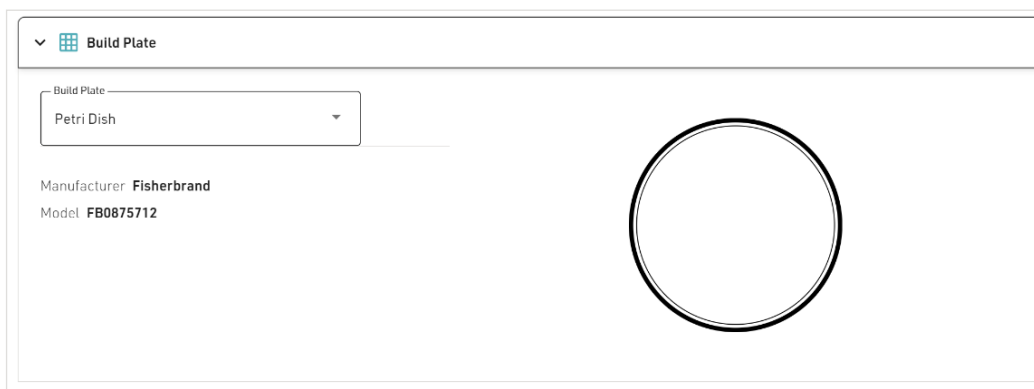
Step 6

The next section is your **Current Print** section. You can either upload STL or gcode files. We recommend starting with the cylinder or cube under “**Allevi Files**”.



Step 7

Next, choose your dish in the **Build Plate** section. For your first bioprint, we'll be using a petri dish. For wellplates, print files will automatically be replicated in all wells.





Step 8

In the **Extruder** section, you can set extruder temperature, pressure, and test extrude by holding the button. For pluronic, set the pressure to 80 PSI and leave it at room temperature.

The interface shows two main sections: Temperature and Pressure. The Temperature section has an 'Active' toggle switch, a 'Current' display showing 27.0 °C, and a 'Set' input field showing 0.00 °C (with a range of 20-160). The Pressure section has an 'Extrude' button, a 'Current' display showing 0.3 PSI, and a 'Set' input field showing 0.00 PSI (with a range of 1-120). Arrows indicate the flow of data or settings between the sections.

Step 9

Before starting the actual print, it is important to prime the syringe tip.

- a) First, lower the bedplate so that there is space between the syringe tip and any print surface. This will let you see how well the material flows when you extrude (ie. If there are bubbles or if you need to change the pressure slightly).
- b) Place a paper towel or wipe under the point of extrusion to catch any material.
- c) After setting the pressure, click and hold the extrude button. The ideal case is that the material flows in a continuous, steady, downward stream.
- d) If the material curls upward, or extrudes in an uncontrolled stream, try lowering the pressure by 2-3 PSI.
- e) If the material struggles to come out, or appears in discrete chunks try increasing the pressure by 2-3 PSI.

Step 10

The **Extruder** section also allows you to move and calibrate your extruders.

The interface shows the 'Extruders' section with tabs for 'EXTRUDER1' and 'EXTRUDER2'. The 'Position' section includes 'UP', 'DOWN', and 'Home' buttons. Below these are input fields for X (23.14 mm), Y (-14.54 mm), and Z (-14.06 mm). A 'SET CALIBRATION' button is at the bottom. To the right, there are movement controls for X/Y and Z, including a cross-shaped directional pad and a vertical slider for Z (ranging from 0.05 to 20). A circular inset image shows a close-up of the extruder tip with a red square highlighting the extrusion point.





To calibrate the printer, open the jog panel:

a) Click the origin button under the X/Y controls. This will center your first extruder over your chosen build plate.

b) Using the Z controls, move the bedplate closer to the loaded extruder to the point where the dish is almost touching the needle.

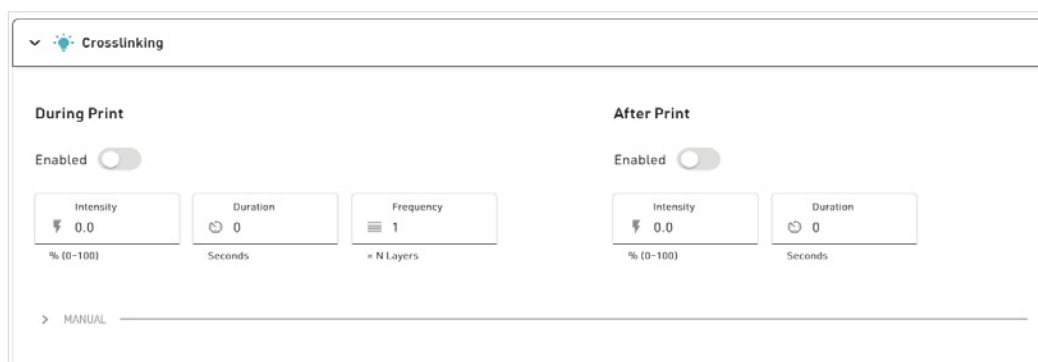
! Note: Sometimes the syringe moves down slightly when you hit extrude. Use the test extrude button to see if the needle pushes into the dish. If the needle is too low, no material will come out. If it is too high, then a dangling line will be created.

c) Under extrusion, the needle should just touch the dish. **Do not leave a big gap between the needle and dish as the gcode automatically adds the appropriate layer height.** Finer 0.1mm and 0.05mm movement can be used when approaching the dish.

d) Click 'Set Calibration' to calibrate. Repeat with the second extruder. With single extruder prints, you can click 'Calibrate' on the second extruder without moving it.

Step 11

For photocurable bioinks, the Allevi 2 offers either UV or Visible light crosslinking, depending on your purchase. In the **Crosslinking** section, there are three main settings: Always On, During Print, and Post Print. They use variables such as light intensity, layer frequency, and duration. For this print, leave this off.

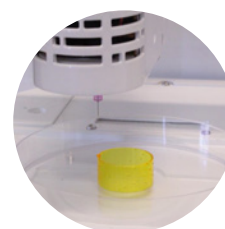


Step 12

Once everything is ready to go, 'Print' to start building with life!

Step 13

Sit back and watch your printer go!





MAINTENANCE & TROUBLESHOOTING



TROUBLESHOOTING AND CONTACT US

When you buy an Allevi bioprinter, you're not just getting a biofabrication platform; you're gaining the Allevi Advantage, which is all the experience and expertise Allevi has to offer. We regularly write and publish new protocols, product guides, and support articles on our website to help you be more successful with bioprinting.

Visit us at www.allevi3d.com and check out our:

- [Protocols](#) page for step-by-step bioprinting instructions!
- [Support](#) page for informational articles and troubleshooting guides!
- [Services](#) page for help accelerating your research!
- [Blog](#) for the latest in bioprinting news!

You can also visit the [Allevi YouTube channel](#) for video instructions.

Have more questions or need help?

Visit us on the [Allevi Support](#) page or email us at support.allevi3d@3dsystems.com





EC DECLARATION OF CONFORMITY (DoC)

We

Manufacturer: 3D Systems, Inc.
Address: 333 Three D Systems Circle Rock Hill, SC 29730

declare under sole responsibility for issuing this declaration of conformity in relation to the following Product(s):

Product Description: 3D Bioprinter
Model: Allevi 2
Serial Number:

For the above given Product(s) is hereby declared that it conforms to the essential requirements set out in community harmonization legislation mentioned below:

Machinery Directive 2006/42/EC

Electromagnetic Compatibility Directive 2014/30/EU of 14 October 2014

Restriction of use of certain Hazardous Substances (RoHS2) Directive 2011/65/EU of 7 January, 2011, Directive EU 2015/863 of 21 March, 2015

Statement about the relevant harmonized standards that have been used, or statement about the specifications in relation to which conformity is declared (Standard: Date of Issue):

EN 12100:2010
EN 61010-2-010:2019
EN 55035:2017+A11:2020
EN 61000-3-3:2013

EN 61010-1:2010+A1:2019
EN 55032:2015+A11:2020
EN 61000-3-2:2014
IEC 63000:2018


Name of Person Authorized to compile the technical construction file: Jasper Vandendriessche
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Local contact for regulatory topics only:	North America	Europe
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Signed for and on behalf of:

San Diego, CA, USA
Place of issue

22 October 2021
Date of issue


Doug Hoffman, Engineering Director

Allevi, Inc | 2929 Arch St | 17th Floor | Philadelphia PA | 19104

