# U3DP

# Online Printing Manual

## 1. Prepare 3D CAD Model

CAD software, 3D scanning or download from On-line sites

## 2. Prepare the .MAKERBOT file

Prepare a slicing file on MakerBot CloudPrint

## 3. Submit . MAKERBOT file

Submit the .MAKERBOT file at U3DP or Online

## 4. Complete printing & Receive email with payment notifications

Receive email with payment notifications for settle the payment

## 5. Settle payment

Settle the payment at Finance Office's Cashier Counter (located at VA205)

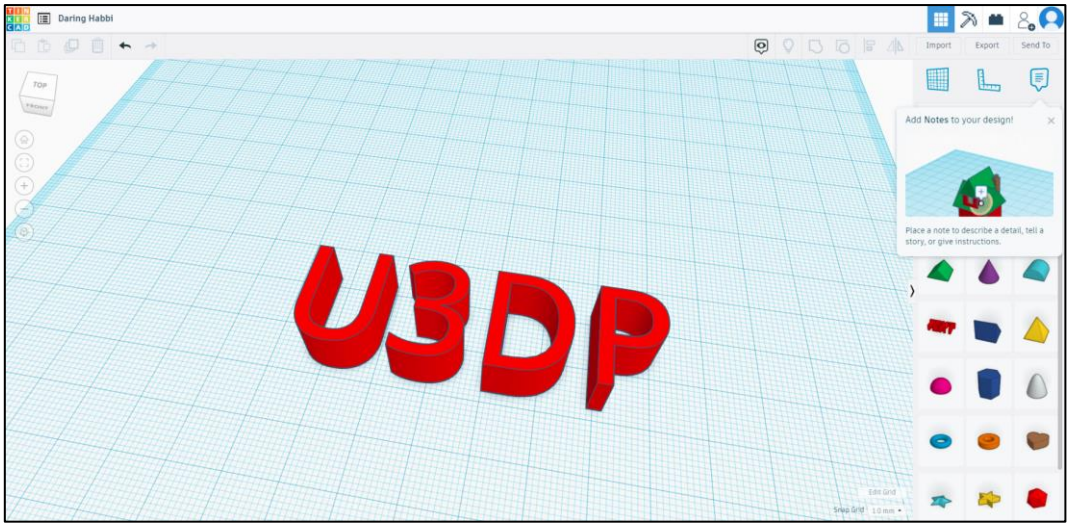
## 6. Present or upload receipt to Collect printing parts

Collect the printing parts at W501, U3DP & and Removal the support if necessary

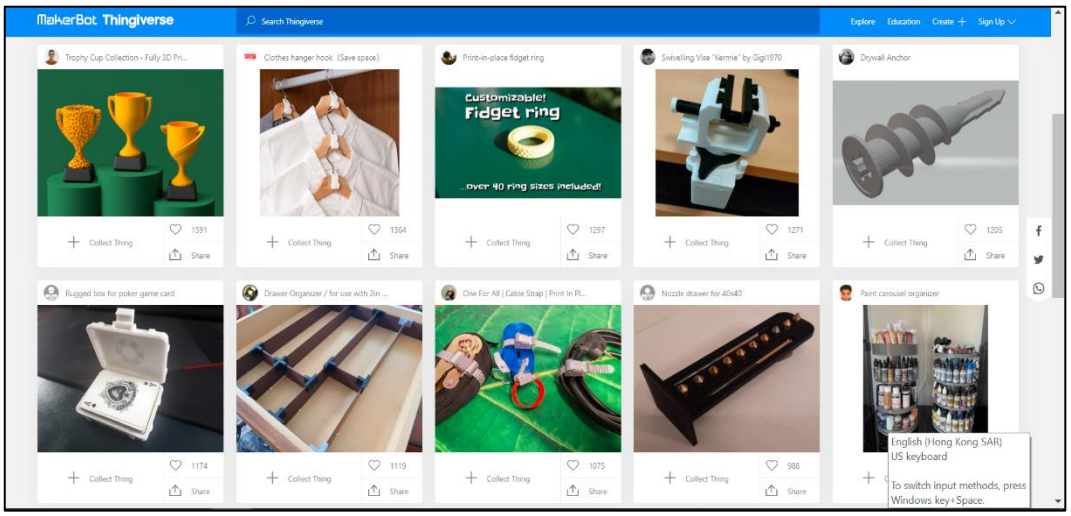
# 1. Prepare 3D CAD Model

3D CAD model can normally be achieved by:

1. CAD software, i.e. Solidworks, Tinkercad, Rhino, etc.
2. 3D scanning (*You may seek for 3D scanning support from IC at Room W503c)
3. Download from On-line sites, i.e. Thingiverse, Yeggi, Pinshape, etc.




**Tinkercad**




**Thingiverse**

# 2. Prepare the .MAKERBOT file

You need to login at cloud base **Makerbot Cloud print** application via below link.

***https://login.makerbot.com***

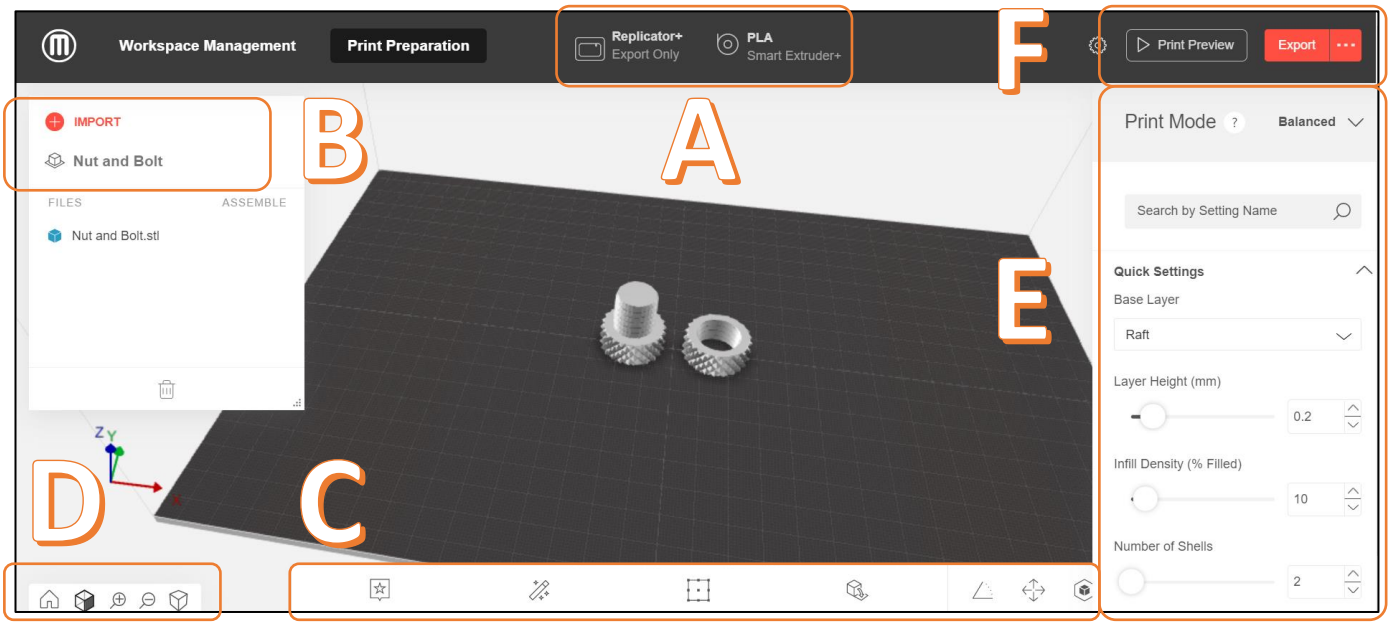
**Sign in** with below username & Password and select **Start a new print.**

Username or Email: ***u3dp.online@gmail.com***

Password: ***u3dp.online@gmail.com***

The steps for preparing the slicing basically include:

A. Select type of Printer: **MAKERBOT REPLICATOR+** & & **SMART EXTRUDER+**
B. Import model: **.STL** format file
C. Model placement (i.e. how to place your part on the platform)
D. View tools
E. Print mode and setting (Add **SUPPORT** on model with overhang position)
F. Print preview & Export a **.MAKERBOT** file




**MakerBot Cloud Print Prepare Screen**

# A. SELECT TYPE OF PRINTER

## MakerBot Replicator+

| | |
|---|---|
| Print Technology: | FDM, Fused Deposition Modelling |
| Build Volume: | 29.5 L x 19.5 W x 16.5 H CM [11.6 x 7.6 x 6.5 IN] |
| Layer Resolution: | 100 microns [0.0039 IN] |
| Material Diameter: | 1.75 mm [0.069 in] |
| Material: | PLA |

**Technical Specs**
https://www.makerbot.com/3d-printers/replicator/

# B. IMPORT MODEL

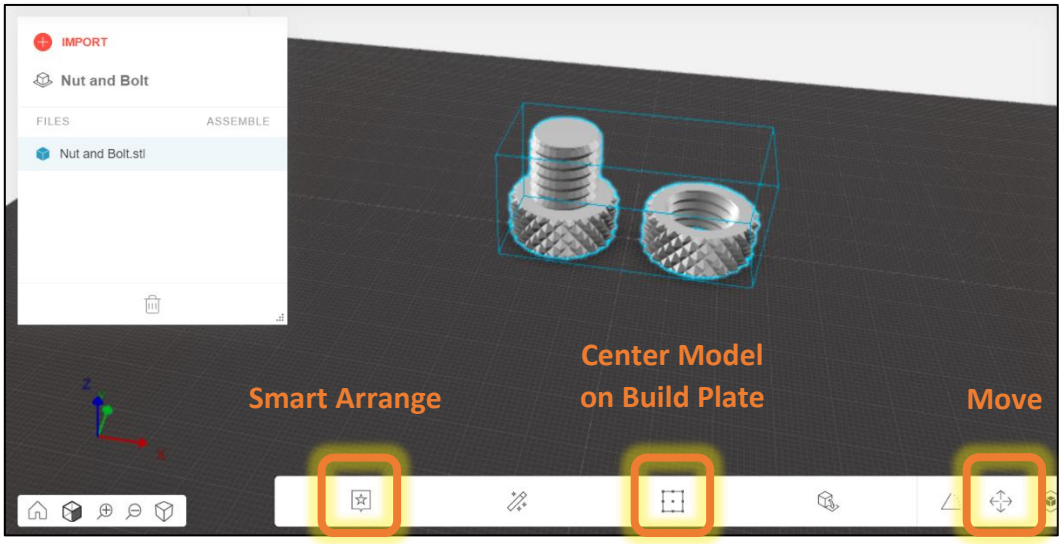
## Import a Model to Your Virtual Build Plate

You can import a model to your build plate in a few ways. You can drag files on the build plate or go to Import > File or Folder. If you don't yet have files of your own to print, you can access demo files to try out by going to > Demo files.

**Supported File Types: STL (.stl)**

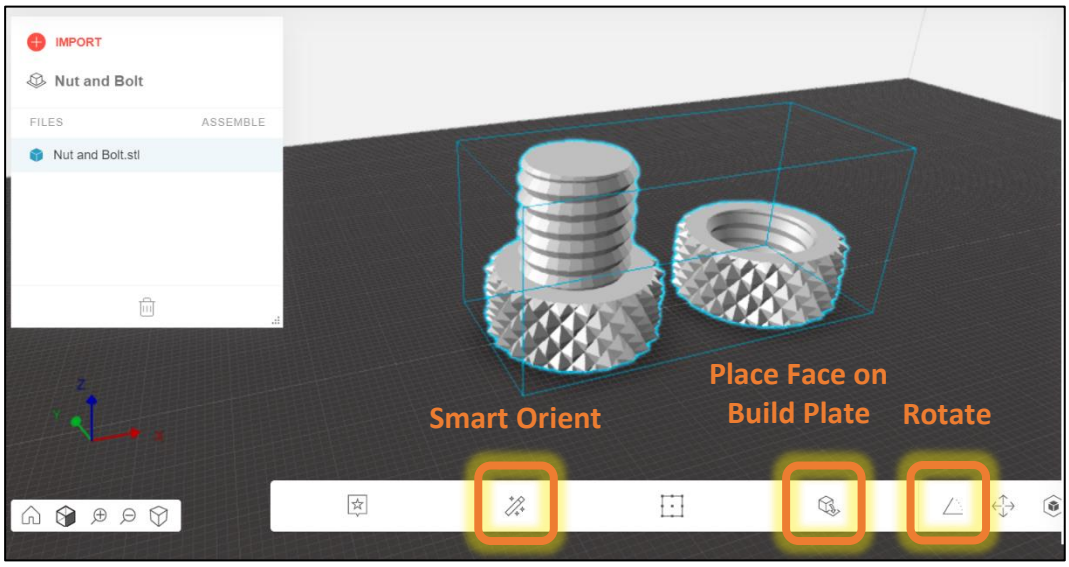
# C. MODEL PLACEMENT

## MOVE



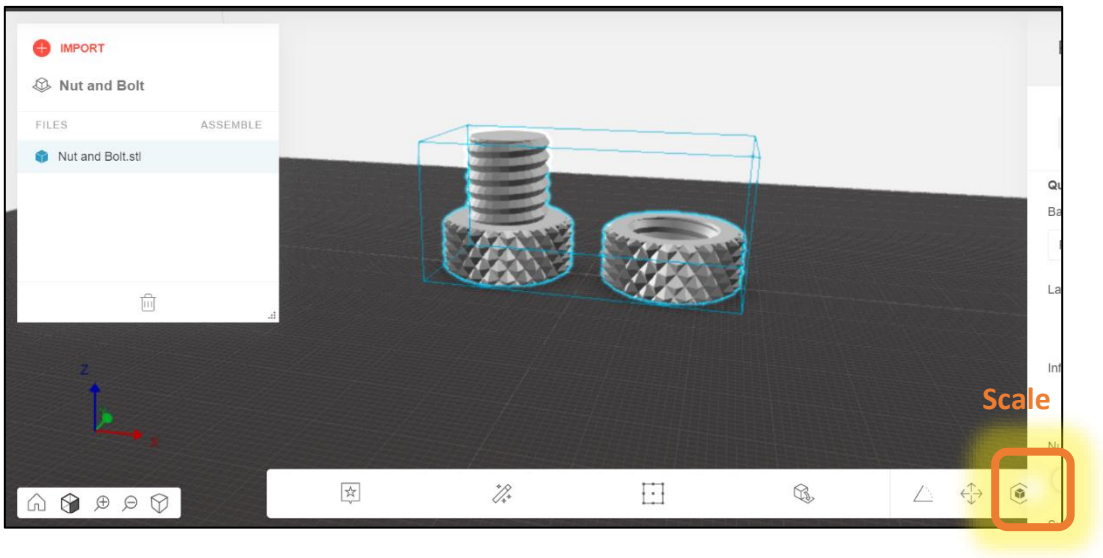

If there are multiple objects on the build plate and all of the objects can't fit on the original build plate, select **Smart Arrange** to automatically arrange position of all visible components on build plate.

## ROTATE



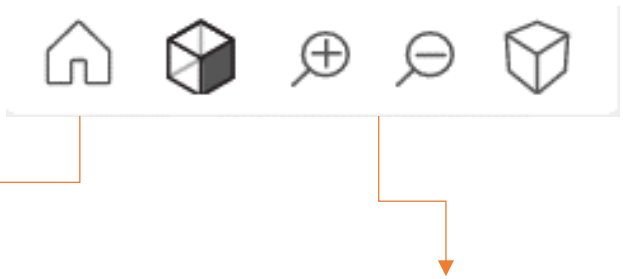

- Select **Smart Orient** to automatically re-orient a selected model to use the least amount of support material.
- Select **Place Face on Build Plate** to rotates model to align selected face to build plate.
- **Rotate** your model by 45 degrees or by a specific number of degrees along the x-, y-, or z-axis.

## SCALE




- Select **Uniform Scaling** to adjust the scale of your model equally along the x-, y-, or z-axis. Enter the percentage of how much you want your model scaled.
- De-select **Uniform Scaling** to scale the model by a specific amount along the x-, y-, or z-axis.

# D. VIEW TOOLS



Click the Home View button to return to the default view of the build plate.

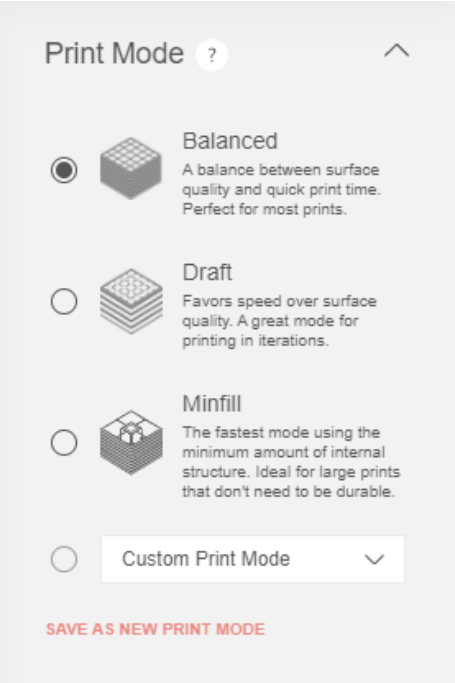
Click the Plus and Minus buttons to zoom in and out.

You can also zoom using a track pad or the scroll wheel on your mouse.

# E. Print modes & setting

## DEFAULT PRINT MODES

**Print Modes** are customized sets of recommended print settings.



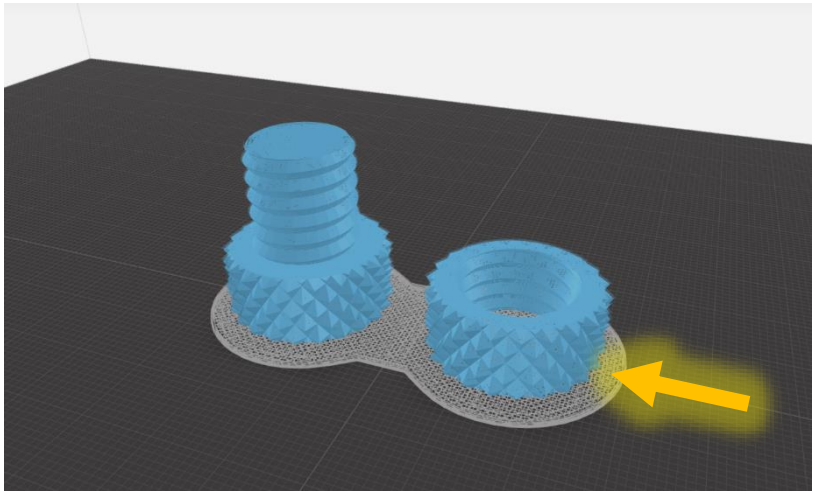

**Balanced:** Standard Mode - a balance of high surface quality and quick print time.

**Draft:** Quicker "sketch" mode - favours speed over surface quality. Great for multiple iterations.

**MinFill:** Fastest mode - uses the absolute minimum amount of internal structure. Ideal for large prints that don't need to be durable.

**Default setting:** Balanced

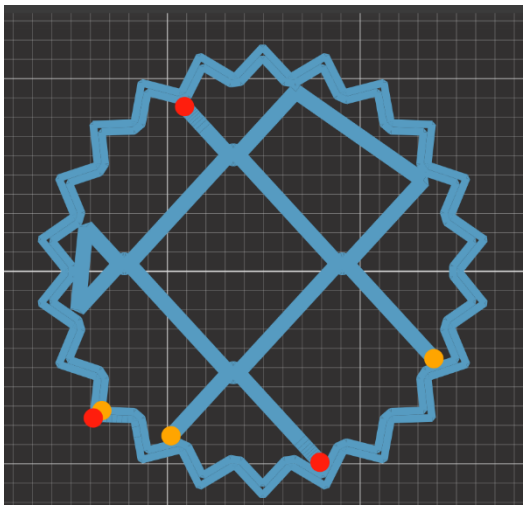
## BASE LAYER



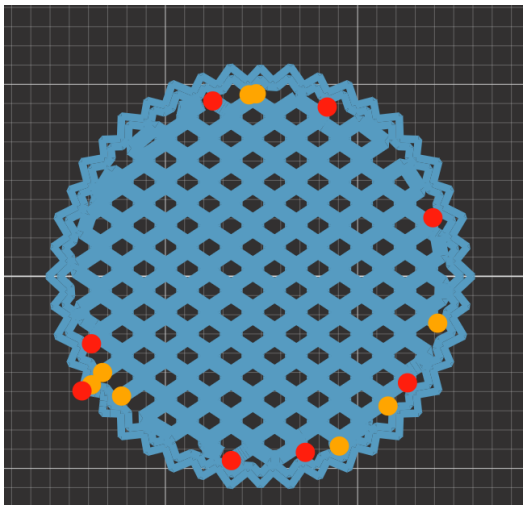
**Rafts:** Rafts help models adhere to the build surface and help create an even first layer. Printing without rafts can cause models to curl up and/or become dislodged from the build plate during printing.

**Default setting:** Raft

## INFILL DENSITY



**Infill Density: 10%**

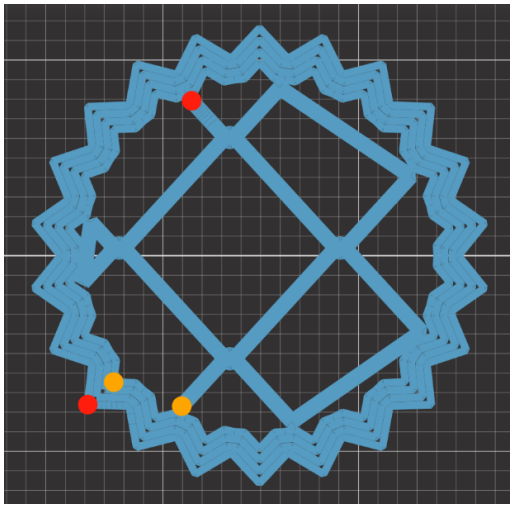


**Infill Density: 50%**

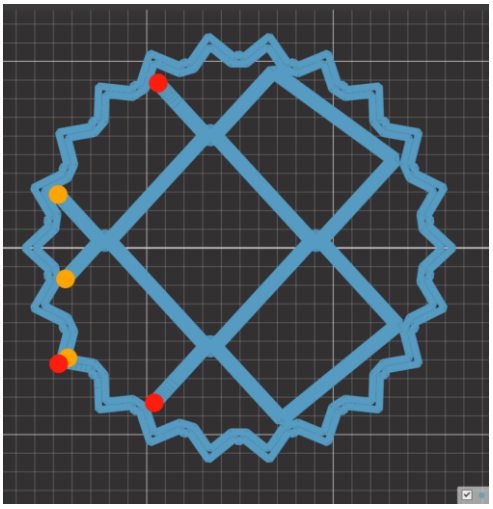
**Infill Density:** Adjusts the density of the infill on the inside of the print. If the top of the model is collapsing during a print or the model feels to brittle, increasing the infill density may help. Increasing the density will increase print time.

**Default setting:** 10%

## NUMBER OF SHELLS



**Number of Shells: 4**

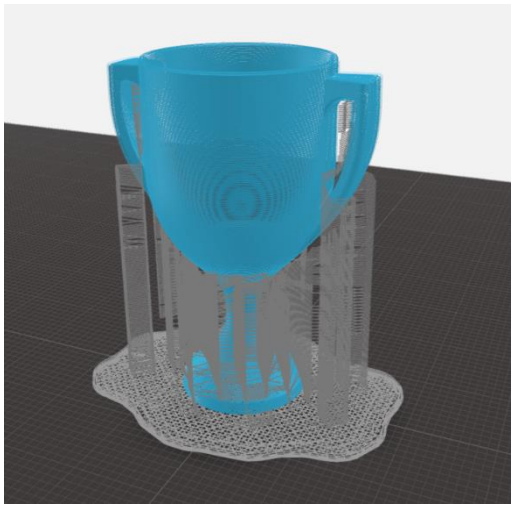


**Number of Shells: 2**

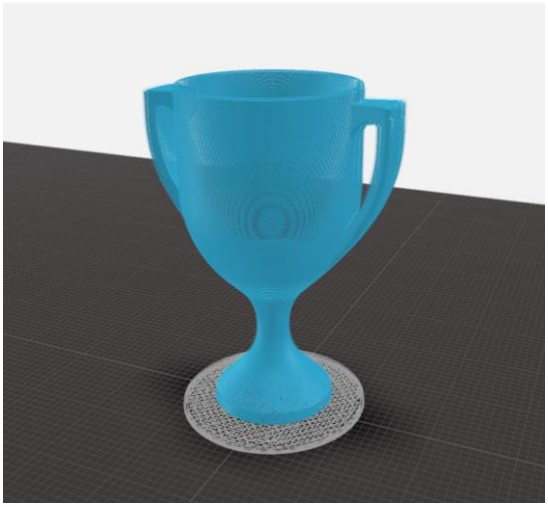
**Number of Shells:** The number of outermost layers of the printer model. Increasing the number of shells creates thicker stronger walls, but slower prints.

**Default setting:** 2

# SUPPORT



**With support**



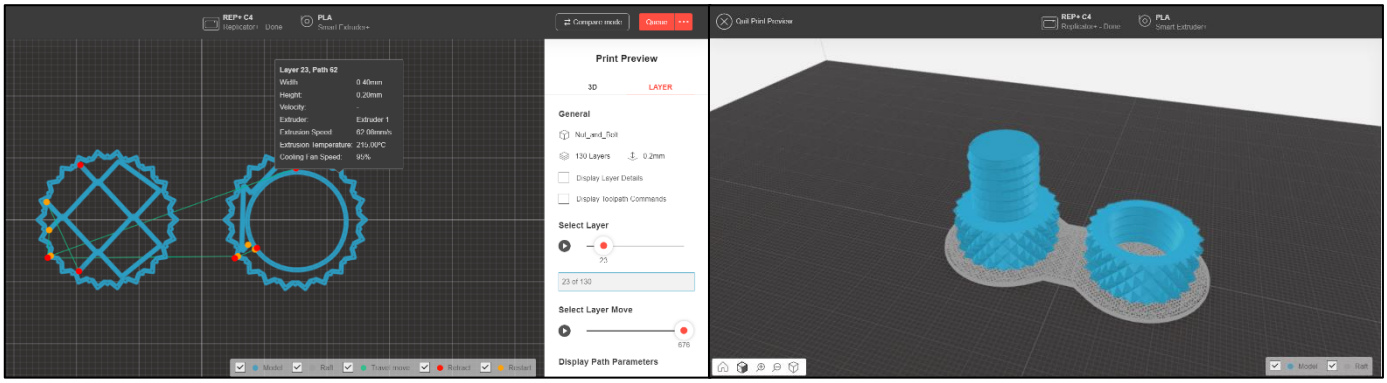
**Without support**

**Support:** Select the Supports checkbox to have your model print with support structures. MakerBot Print will automatically generate supports for any overhanging sections of your object. Supports will be easily removable once you remove your finished object from the build plate.

Supports are breakaway structures that provide support where your print needs them during the printing process. Because MakerBot printers cannot print into thin air, supports provide a base for overhanging parts of a print. You can easily remove supports after building the object by tearing it away with a pair of pliers or your fingers. Supports can leave surface imperfections that require finishing of the object. You can use a file to smooth them away.

**Default setting:** **No support**

# F. Print preview & Export a .MAKERBOT file

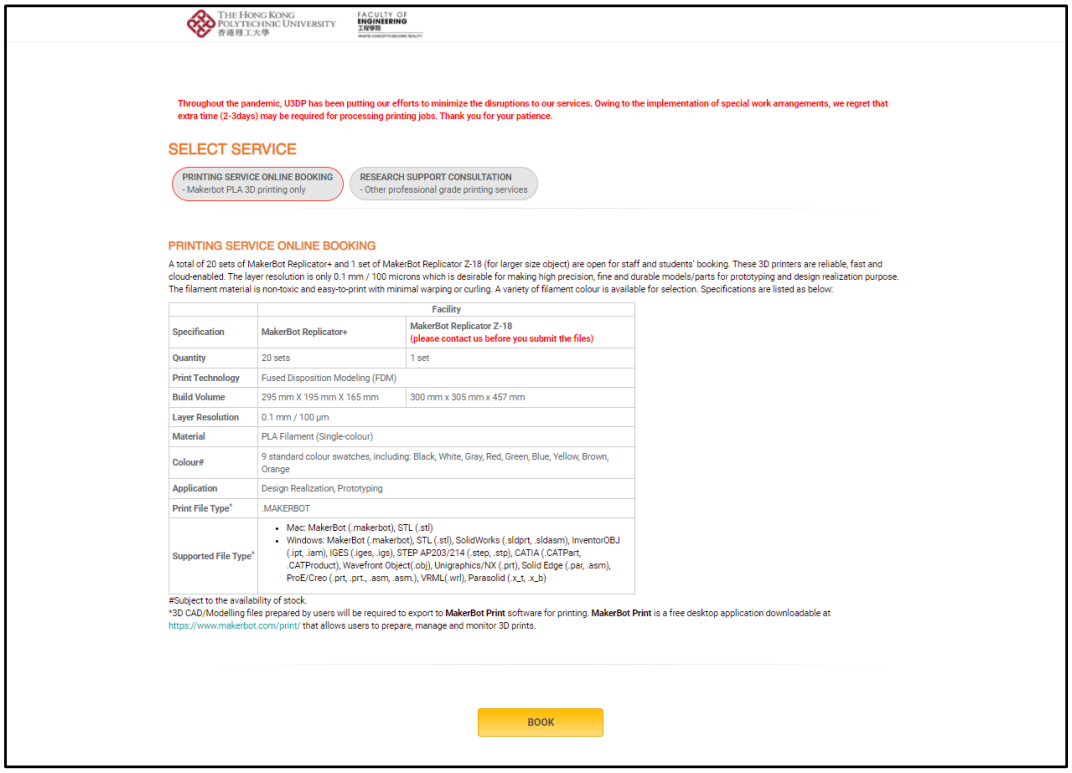



Selecting **Print Preview** will show you a visualization of how your model will print on your printer. This will show you where the raft and supports will print as well as provide you with a print time estimation. This is a good tool to use to check if there are any errors in your print model. **Please note that complex models will take longer to render a preview.*

Once you've prepared your file to print, please select the **Export a .MAKERBOT file** close to Print button to export a .MAKERBOT file.

# 3. Submit . MAKERBOT file

Next, you are required to log in at our printing service via below link and asked to import the .MAKERBOT file for printing preparation. You will be able to see the total weight and estimated printing time of your model. The printing cost will be calculated according to the total weight of your model.



THE HONG KONG POLYTECHNIC UNIVERSITY 香港理工大學 | FACULTY OF ENGINEERING 工程學院

Throughout the pandemic, U3DP has been putting our efforts to minimize the disruptions to our services. Owing to the implementation of special work arrangements, we regret that extra time (2-3days) may be required for processing printing jobs. Thank you for your patience.

SELECT SERVICE

PRINTING SERVICE ONLINE BOOKING - Makerbot PLA 3D printing only

RESEARCH SUPPORT CONSULTATION - Other professional grade printing services

PRINTING SERVICE ONLINE BOOKING

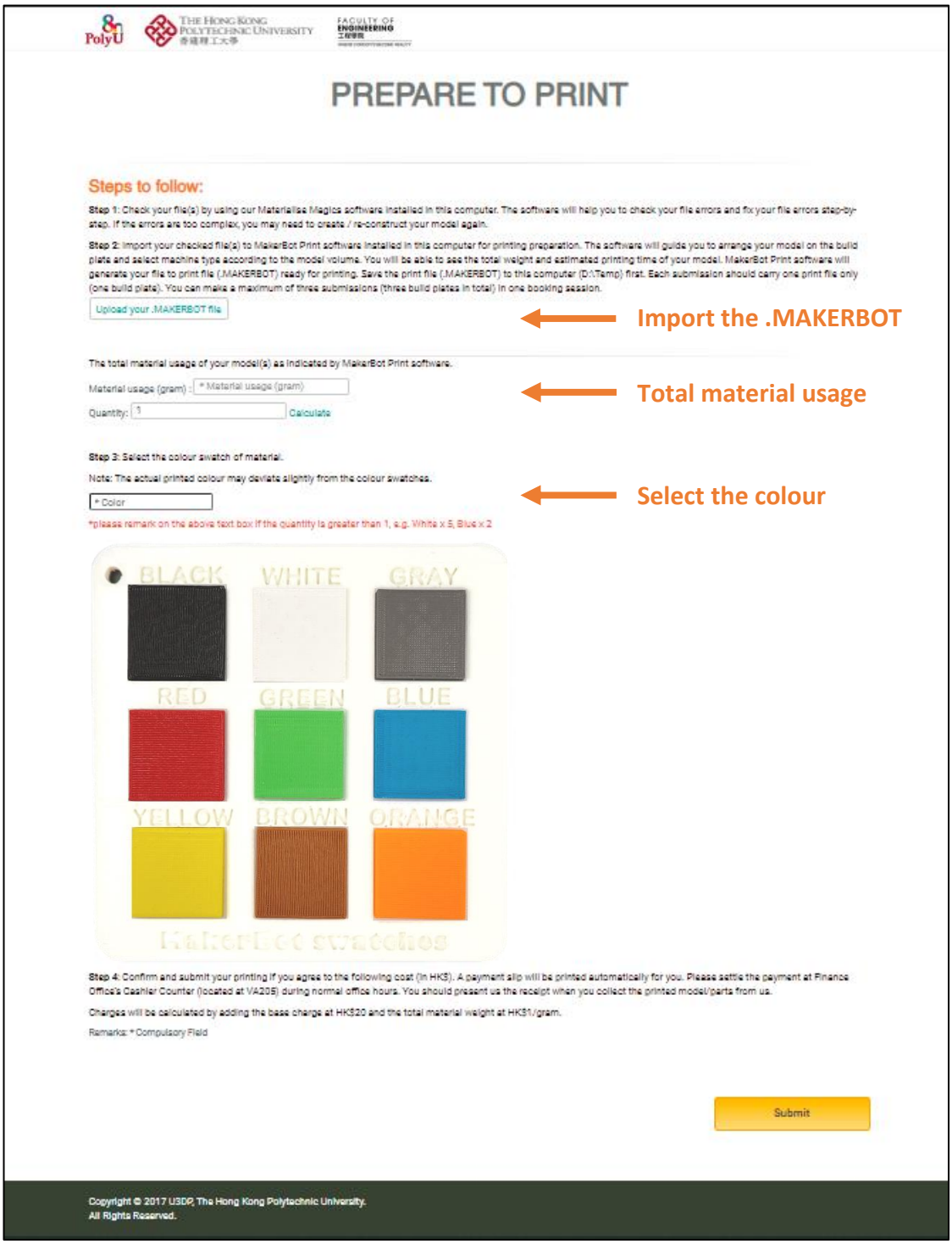
A total of 20 sets of MakerBot Replicator+ and 1 set of MakerBot Replicator Z-18 (for larger size object) are open for staff and students' booking. These 3D printers are reliable, fast and cloud-enabled. The layer resolution is only 0.1 mm / 100 microns which is desirable for making high precision, fine and durable models/parts for prototyping and design realization purpose. The filament material is non-toxic and easy-to-print with minimal warping or curling. A variety of filament colour is available for selection. Specifications are listed as below:

| | Facility | |
|---|---|---|
| Specification | MakerBot Replicator+ | MakerBot Replicator Z-18 (please contact us before you submit the files) |
| Quantity | 20 sets | 1 set |
| Print Technology | Fused Disposition Modeling (FDM) | |
| Build Volume | 295 mm X 195 mm X 165 mm | 300 mm x 305 mm x 457 mm |
| Layer Resolution | 0.1 mm / 100 µm | |
| Material | PLA Filament (Single-colour) | |
| Colour# | 9 standard colour swatches, including: Black, White, Gray, Red, Green, Blue, Yellow, Brown, Orange | |
| Application | Design Realization, Prototyping | |
| Print File Type* | .MAKERBOT | |
| Supported File Type* | • Mac: MakerBot (.makerbot), STL (.stl)<br>• Windows: MakerBot (.makerbot), STL (.stl), SolidWorks (.sldprt, .sldasm), InventorOBJ (.ipt, .iam), IGES (.iges, .igs), STEP AP203/214 (.step, .stp), CATIA (.CATPart, .CATProduct), Wavefront Object(.obj), Unigraphics/NX (.prt), Solid Edge (.par, .asm), ProE/Creo (.prt, .prt., .asm, .asm.), VRML(.wrl), Parasolid (.x_t, .x_b) | |

#Subject to the availability of stock.
*3D CAD/Modelling files prepared by users will be required to export to **MakerBot Print** software for printing. **MakerBot Print** is a free desktop application downloadable at https://www.makerbot.com/print/ that allows users to prepare, manage and monitor 3D prints.

BOOK

***https://www.polyu.edu.hk/u3dp/booking/***


PREPARE TO PRINT
Steps to follow:
Step 1: Check your file(s) by using our Materialise Magics software installed in this computer. The software will help you to check your file errors and fix your file errors step-by-step. If the errors are too complex, you may need to create / re-construct your model again.
Step 2: Import your checked file(s) to MakerBot Print software installed in this computer for printing preparation. The software will guide you to arrange your model on the build plate and select machine type according to the model volume. You will be able to see the total weight and estimated printing time of your model. MakerBot Print software will generate your file to print file (.MAKERBOT) ready for printing. Save the print file (.MAKERBOT) to this computer (D:\Temp) first. Each submission should carry one print file only (one build plate). You can make a maximum of three submissions (three build plates in total) in one booking session.
Upload your .MAKERBOT file
Import the .MAKERBOT
The total material usage of your model(s) as indicated by MakerBot Print software.
Material usage (gram) : * Material usage (gram)
Quantity: 1
Calculate
Total material usage
Step 3: Select the colour swatch of material.
Note: The actual printed colour may deviate slightly from the colour swatches.
* Color
Select the colour
*please remark on the above text box if the quantity is greater than 1, e.g. White x 5, Blue x 2
BLACK
WHITE
GRAY
RED
GREEN
BLUE
YELLOW
BROWN
ORANGE
Step 4: Confirm and submit your printing if you agree to the following cost (in HK$). A payment slip will be printed automatically for you. Please settle the payment at Finance Office's Cashier Counter (located at VA205) during normal office hours. You should present us the receipt when you collect the printed model/parts from us.
Charges will be calculated by adding the base charge at HK$20 and the total material weight at HK$1/gram.
Remarks: * Compulsory Field
Submit
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All Rights Reserved.

Confirm your order if you agree to the cost. After submit the MAKERBOT file, you will receive a mail for confirmation. We'll start the printing request on the next working day.

**3D Printing Request**

Dear staff/student,

Thank you for using our 3D Printing service on the following timeslot(s):

| Index | Date | Time |
|---|---|---|
| 1 | 2022-Mar-30 | 14:30-15:00 |

You have just placed the following printing request to us with details as follows:

Staff ID:

Staff Name:
Material Color: White ; QTY = 1
Makerbot File:
Total Material Usage of Your Model(s): 11 (gram)
Cost (HK$): 31

Your 3D printing request will be scheduled on the next working day. Once your printing completed, we will send another email with a payment notification, please settle the payment with PolyU ' s Finance Office. If have any queries on your printing request, please contact our U3DP Hotline at 3400-3131.

**This is a system-automated message, please do not reply to this email.**

Best Regards,
University Research Facility in 3D Printing
The Hong Kong Polytechnic University

**A confirmation email after *SUCCESS SUBMIT MAKERBOT* file**

# 4. Complete printing & Receive email with payment notifications

## Receive email with payment notifications for settle the payment


You will receive 3D Printing Complete email with Payment notification once the printing is complete. Please show this email to the staff at Finance Officer's cashier counter at VA205 and settle the payment. And you can collect your printed parts at W501. You will be asked to present the receipt to us during collection.

**3D Printing Complete**

Dear staff/student,

Your request has been successfully completed. Please show this email to the staff at Finance Office's cashier counter at VA205 and settle the payment. Please bring along the FO payment slip and come to the U3DP W501 Help Desk counter to pick up your part(s), thanks for using our service.

**PAYMENT NOTIFICATION**

| | Tab Cheng |
|---|---|
| Name of client: | |
| Payment Method: | |
| Payment Amount (HKD): | 31 |
| Payment Details: | Departmental material |
| Payment Due Date: | 06/04/2022 |
| Charge Accoun t: | 1.2D.0M.973L |
| U3DP Ref#.: | U3DP_OP_20220330_03 |
| FO Ref#: | |

If you have any queries, please call our hotline at 3400-3131.

**This is a system-automated message, please do not reply to this email.**

Best Regards,
University Research Facility in 3D Printing
The Hong Kong Polytechnic University

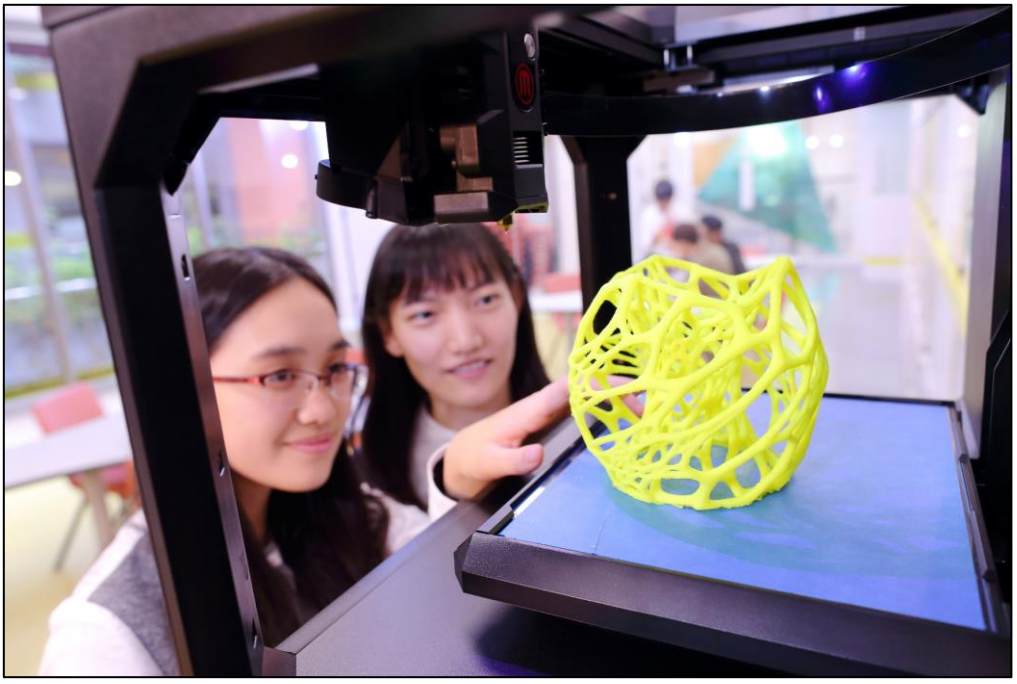
**Receive an email with Payment notification after *3D Printing Complete***

# 5. Settle payment

Show email with payment notifications to settle the payment at Finance Office's Cashier Counter (located at VA205)


# 6. Present or upload receipt to Collect printing parts

Collect the printing parts at W501, U3DP & and Removal the support if necessary



# THE END