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Plastic 3D Printing Submission Guide
STRATASYS F120

You can see the current section

Using this manual

Each page in this manual follows a general layout of two columns. Read left, to right to the bottom of each column, then move to the next.

Important keywords are highlighted in red.

On images, areas of interest are highlighted with red arrows or squares/circles.

Table of contents

The table of contents can be found on the next page. Chapter titles and sections are hyperlinked. You can click on a chapter title or a section to quickly navigate.

Chapter cards

Clicking on chapter titles will take you to the chapter card of that chapter. The section titles are hyperlinked, and to the right, corresponding timestamps are hyperlinked also for the accompanying video for that chapter.

You can click on the video ↗ button to watch the video for that chapter.

About this manual

This manual was revise on October 13, 2023.

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Click on a chapter to quickly go to its title cards.
The current chapter title is in darker.

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Stratasys F120 Printer

The Stratasys F120 3D printers incorporate the latest in innovative technology to provide you with precise pro- totypes from a CAD design.

Stratasys' Fused Deposition Modeling (FDM) technology provides prototype parts, including internal features, that can be used to field-test form, fit, and function.

Direct Digital Manufacturing (DDM) allows for the cre- ation of customized end-use parts straight from 3D CAD data.

The F120 printers feature a servo/belt driven XY gantry with multiple modeling material capability.
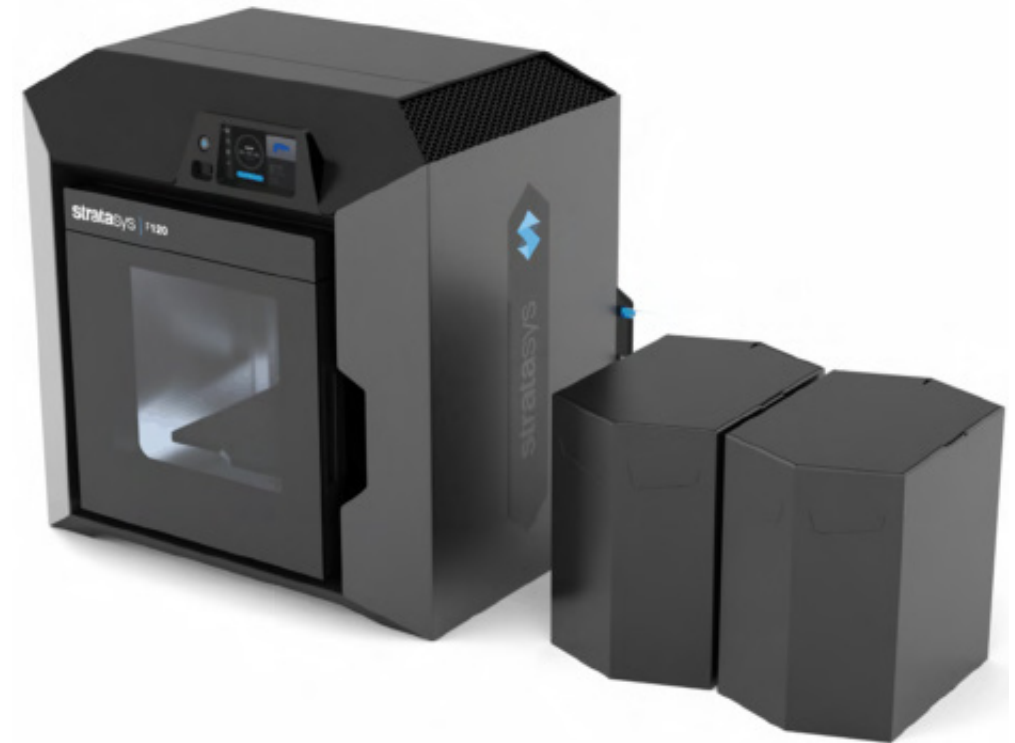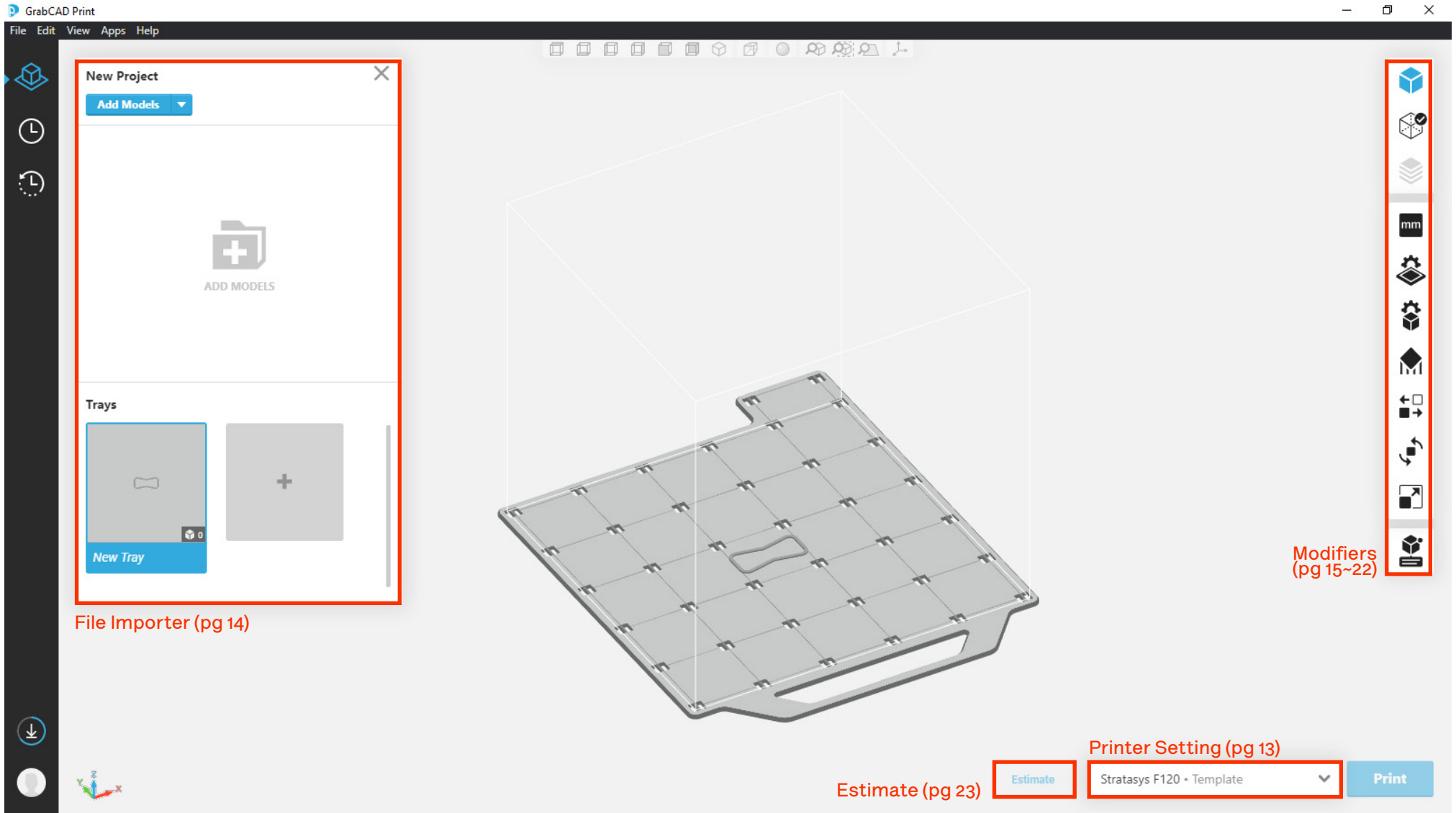
Software:
GrabCAD Print (download)

System Requirements:
Windows 7, 8, 8.1 and 10 (64bit only)
with a minimum of 4GB RAM (8GB or more recommended)

Maximum Build Size (XYZ):
254 x 254 x 254 mm (10 x 10 x 10 in.)

Model Materials:
ABS-M30™, ASA, SR-30 Support material

Layer Thickness:
ABS, ASA
0.013 in. (0.330 mm)
0.010 in. (0.254 mm)
0.007 in. (0.178 mm)

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GrabCAD User Interface

New Project

Add Models ▼

ADD MODELS

Trays

New Tray

🔲 0

File Importer (pg 14)

Modifiers (pg 15~22)

Printer Setting (pg 13)

Stratasys F120 · Template

Print

Estimate (pg 23)   Estimate

Signing up for GrabCAD

The software for file checking and submitting a print to the Stratasys F120 Printer can be downloaded for free from the Grab-CAD Print Website.

Go to:

https://grabcad.com/print?locale=en

Click "Sign up for free."

Sign up

First name

First

Last name

Last

Email

Enter email

Email can't be blank

Password   Minimum 6 characters

Enter password

Password can't be blank

Location

Select your country

Phone number

Enter phone number

Role

Select response

What do you use your 3D printer for?

Select response

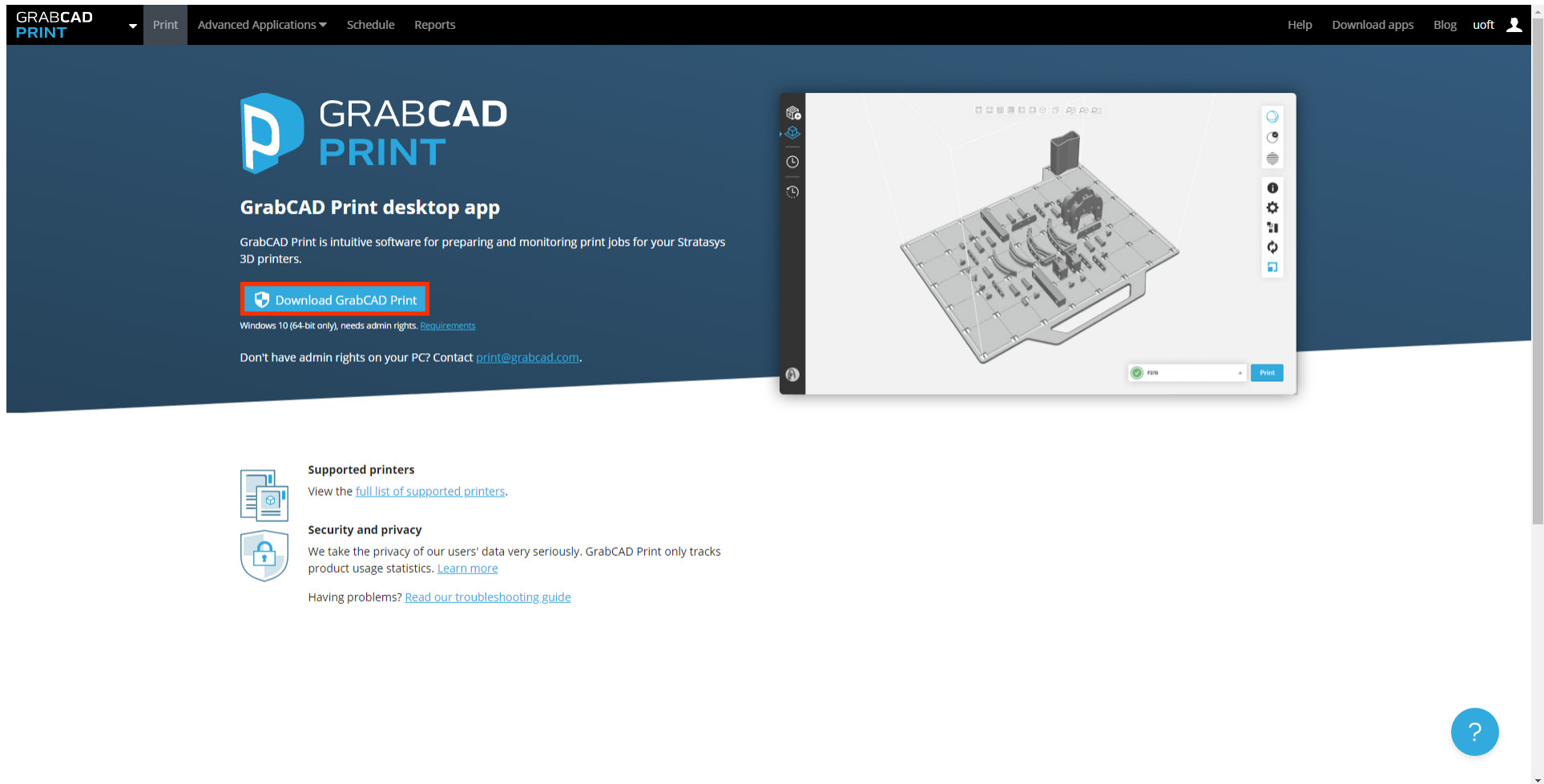By clicking on "Sign up", you confirm that you have read our Terms of Service, Software Terms and Privacy Policy and that you accept and agree to be bound by them.

Sign up

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Downloading GrabCAD

The confirmation email from GrabCAD directs you to the following webpage.

Click "Download GrabCAD Print"

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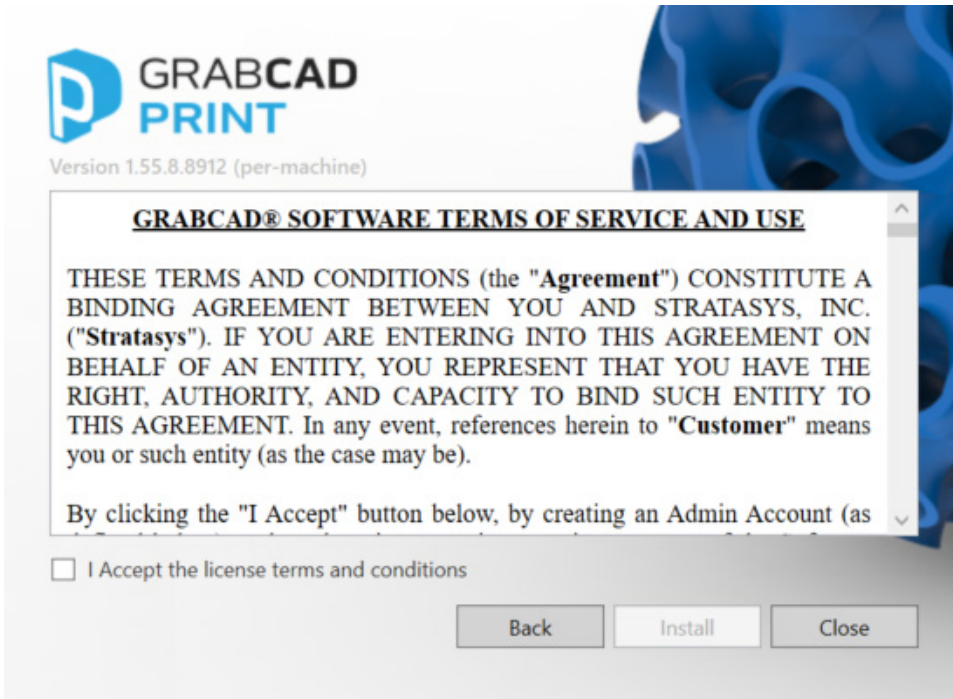
Installing GrabCAD

Run the downloaded installer.

Follow the installation wizard.

When the wizard is finished, Click "Launch"

When the program opens, sign in.

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Checking the Geometry
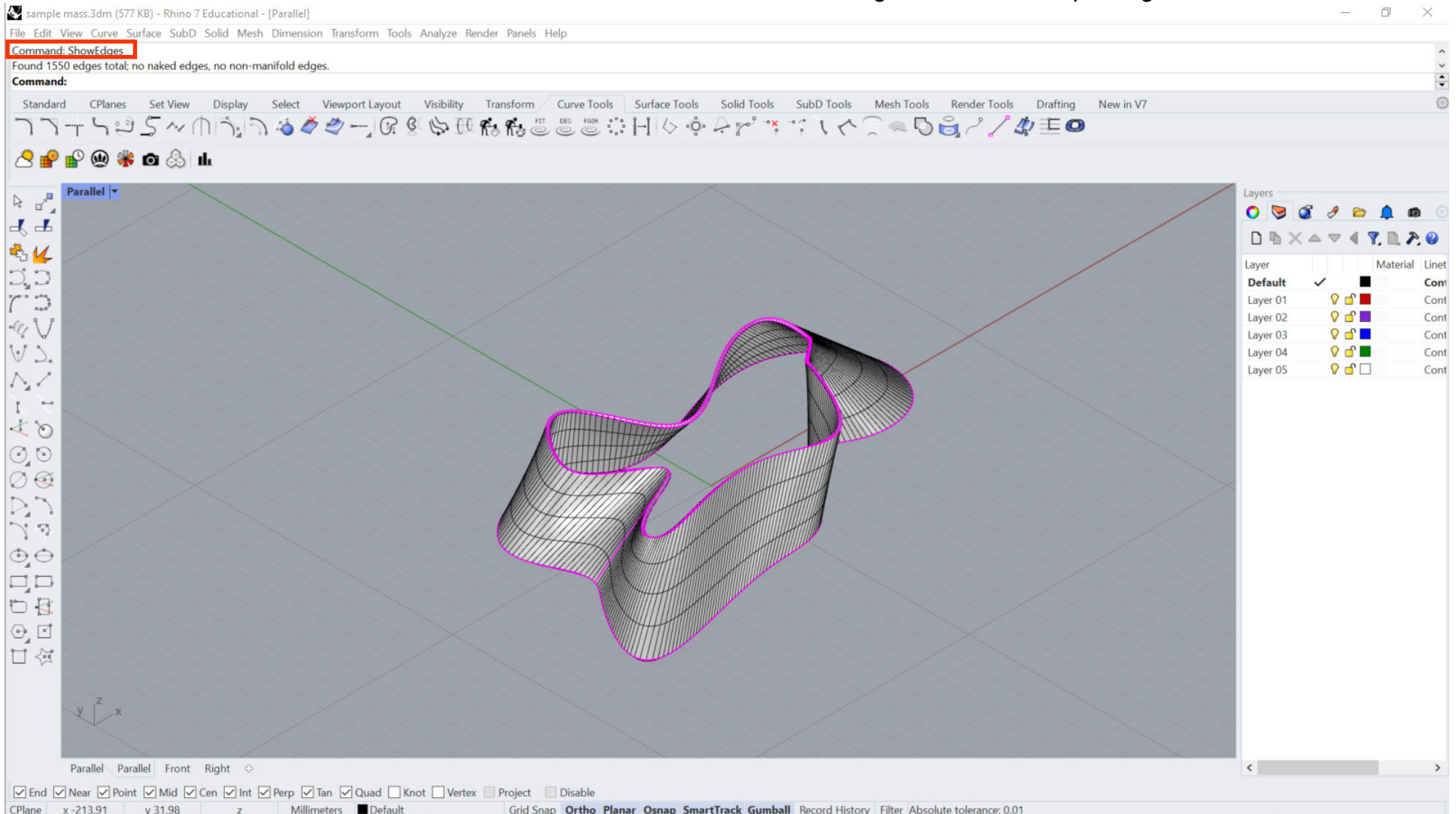
Select the geometry then type Show Edge command.
Edge Analysis prompt window pops up.

If your geometry has no unclosed-edges, the command tab will return following:
Found (#) of edges total; no naked edges, no non-manifold edges.

If this is the case, proceed to:
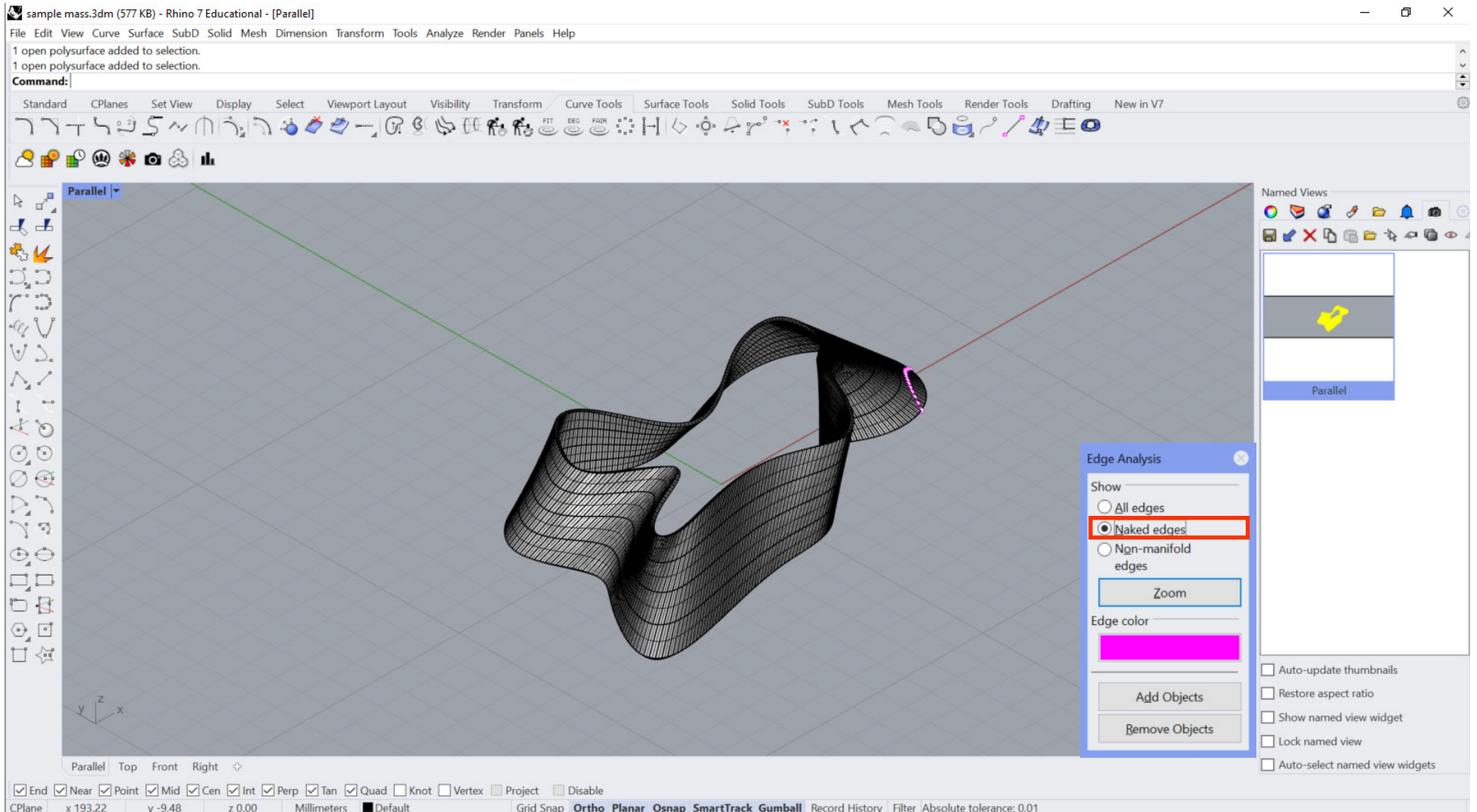Generating the Mesh and Exporting File

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Checking the Geometry cont.

If the command tab says the geometry has naked edges:

Recreate the surface so there are no naked edges.

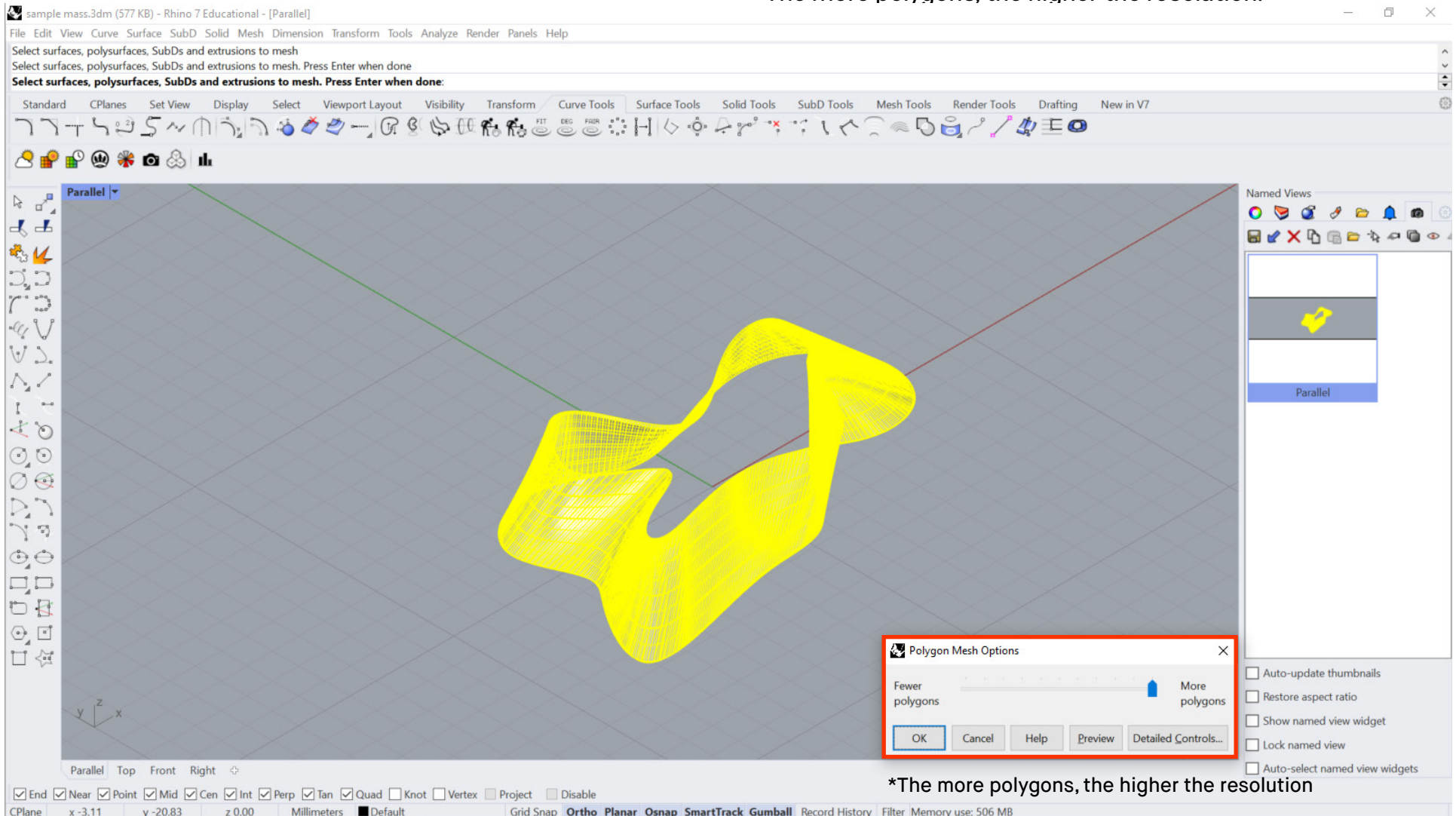Select Naked edge option in the prompt window to check for unclosed edges.

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Generating the Mesh

Select the geometry and type Mesh command.
The geometry then turns into a mesh with polygons.

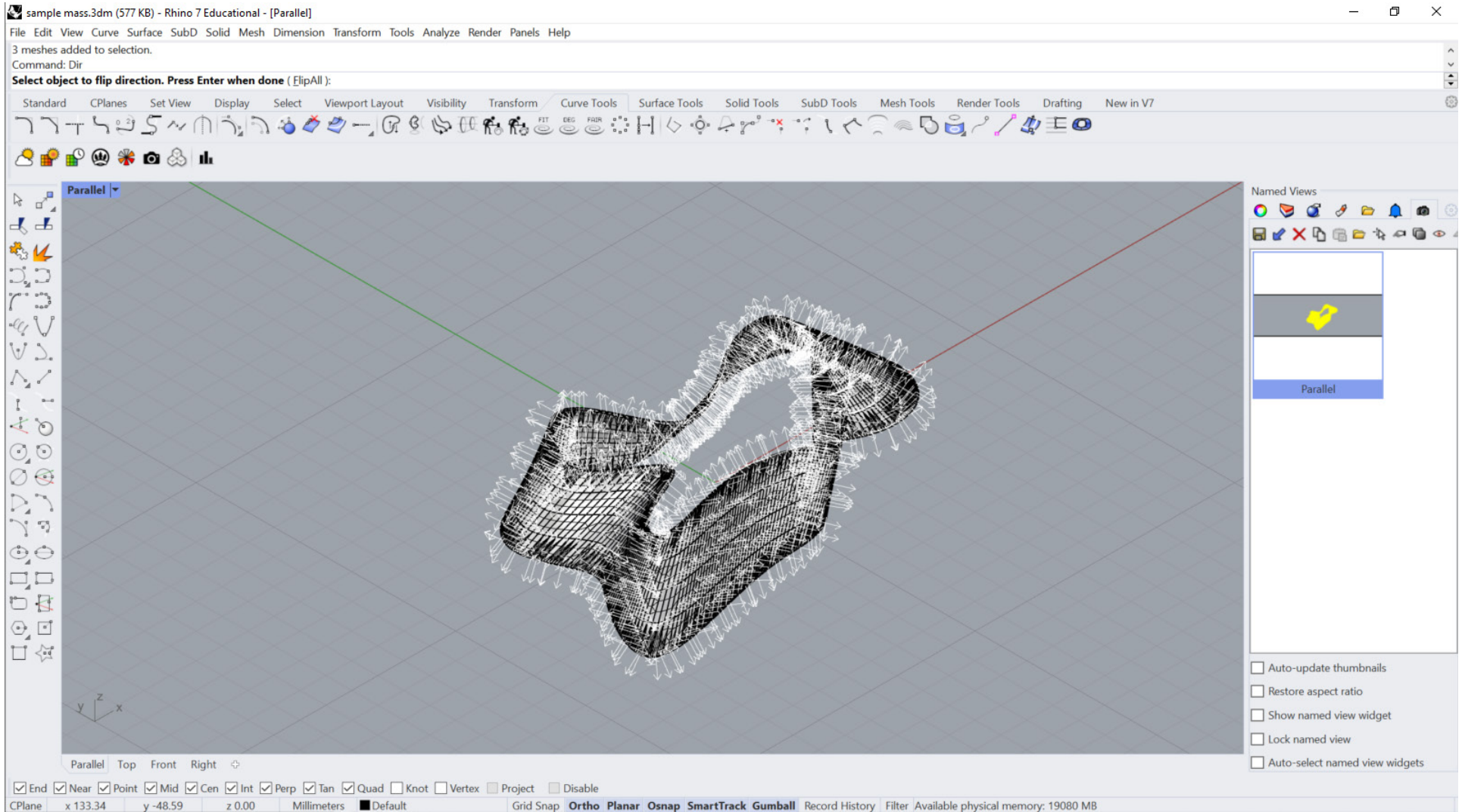You can control the number of polygon counts in the Polygon Mesh Options prompt.

The more polygons, the higher the resolution.

*The more polygons, the higher the resolution

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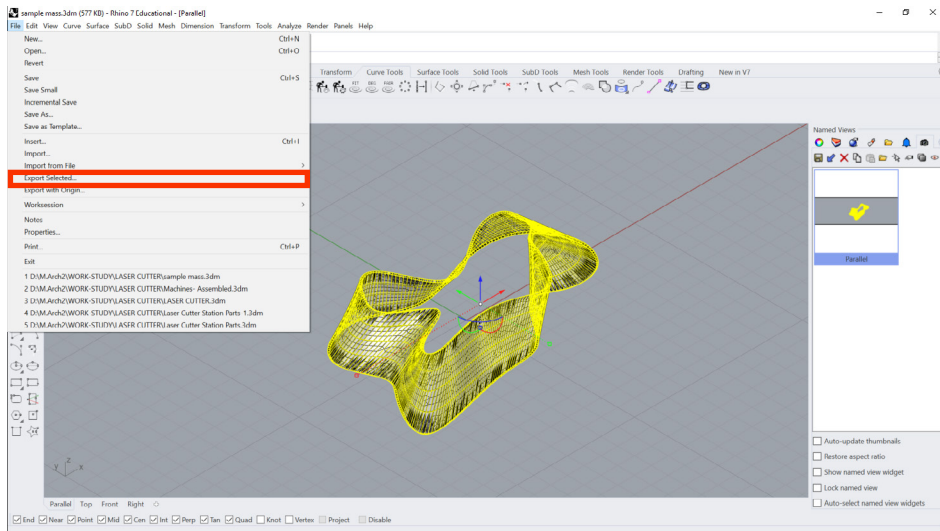FABRICATION**

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Generating the Mesh

Make sure the surface normal direction points away from the surface using DIR command.

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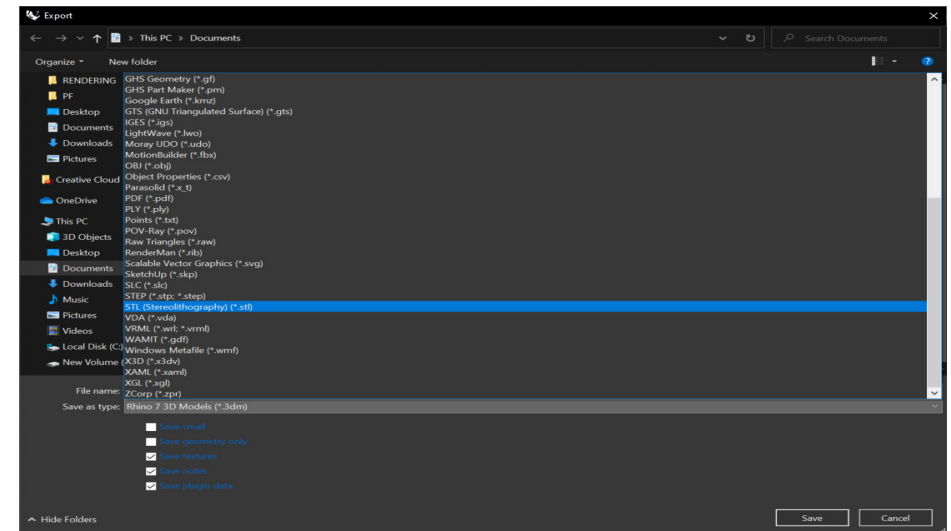
Exporting the File

Select the geometry.

Go to File then Export Selected.
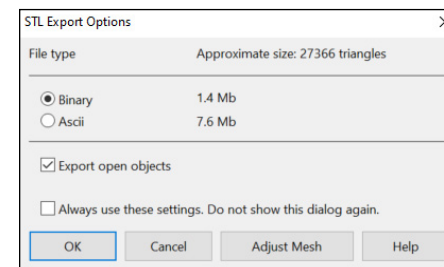

Export it as STL (stereolithography) file format.

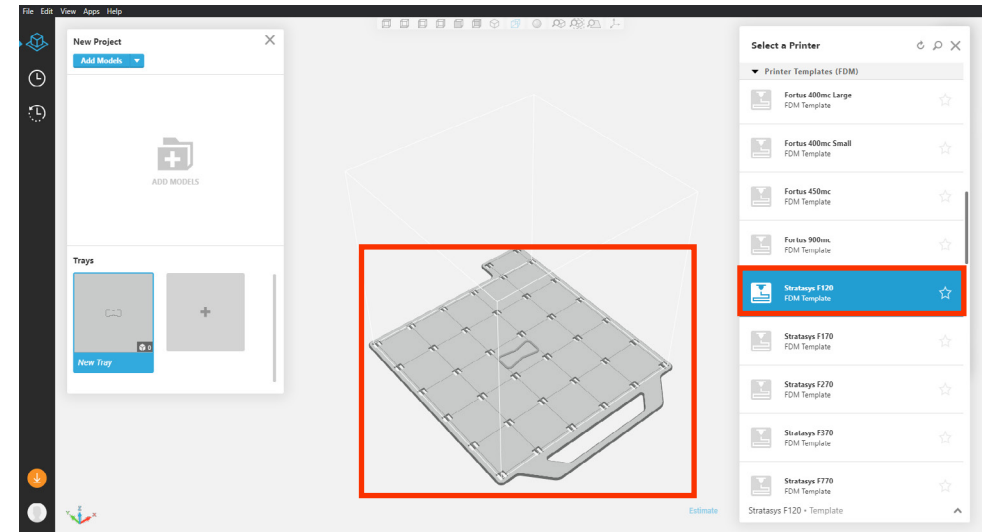In the STL Mesh Export Options prompt:

Set the file type to: Binary

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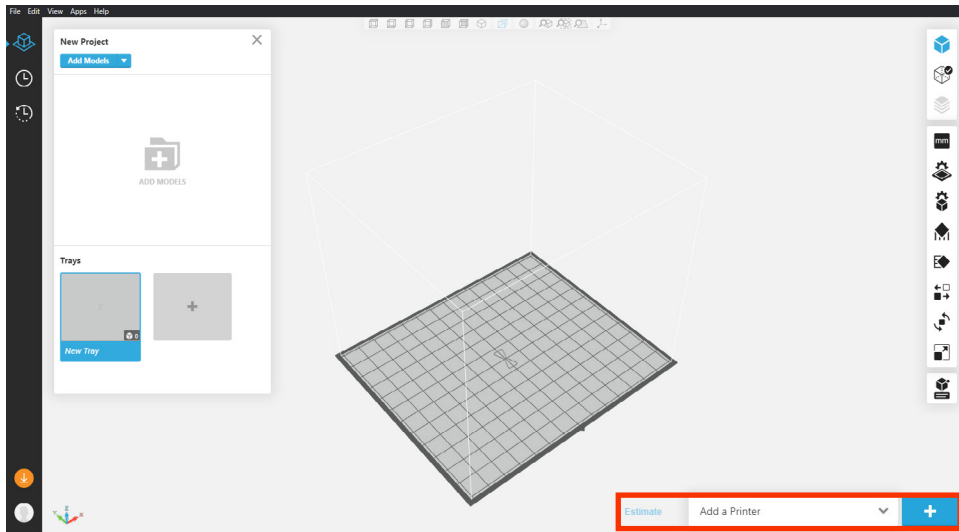
Setting the Printer

Step 1: Click the Add Printer button in the bottom right corner.

Step 2: Select Stratasys F120.

Print bed will change to Stratasys F120 default.

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Loading a File

Step1: Select Add Models.

"Models checked" prompt comes up:

Add Models ▼

| Models checked | ✕ |

Step2: Choose the STL File to load.

The loaded model shows up in the tray.

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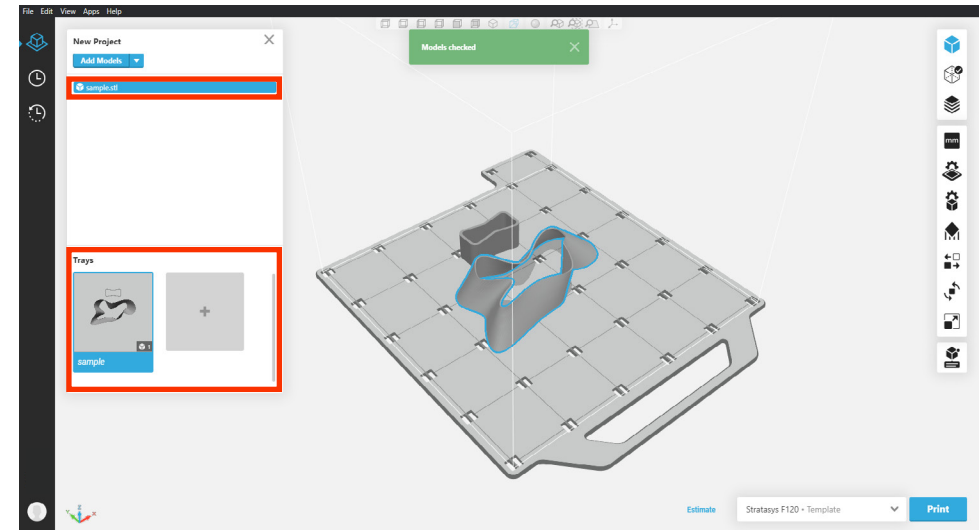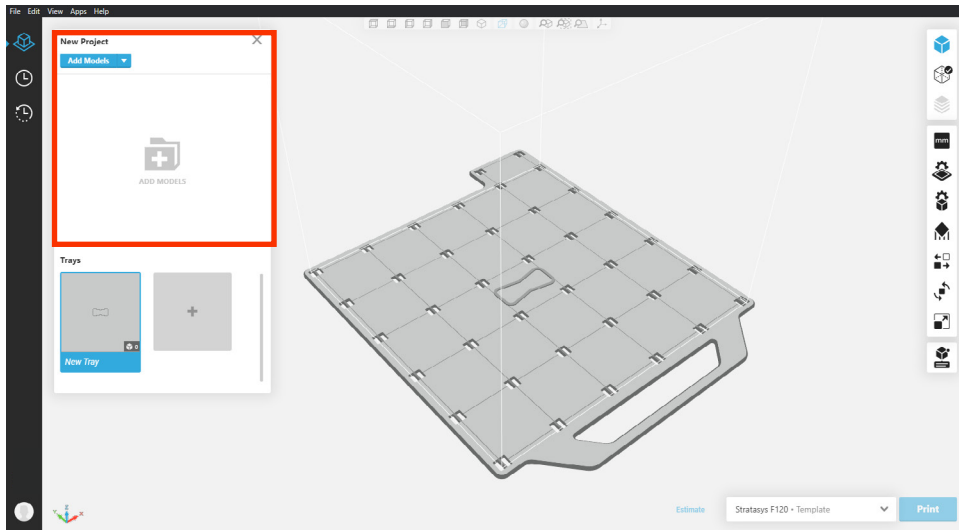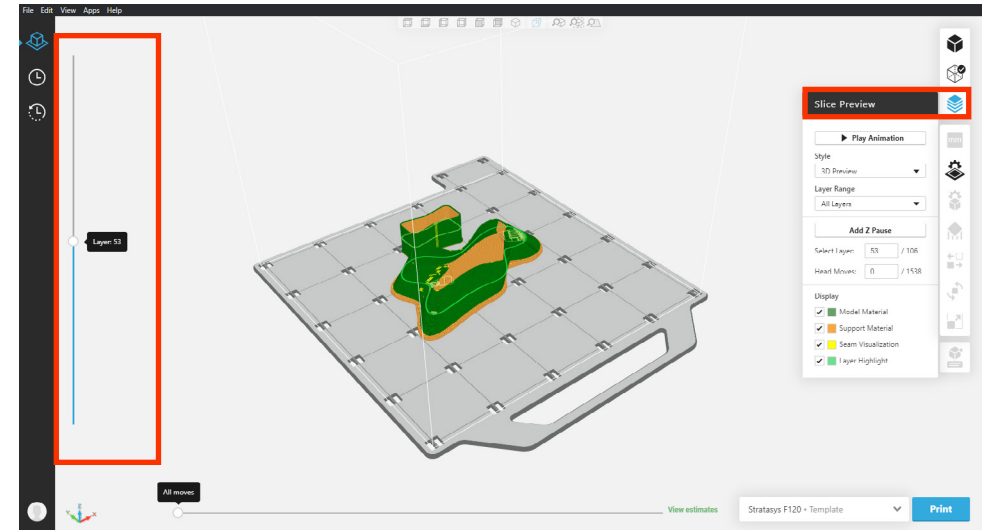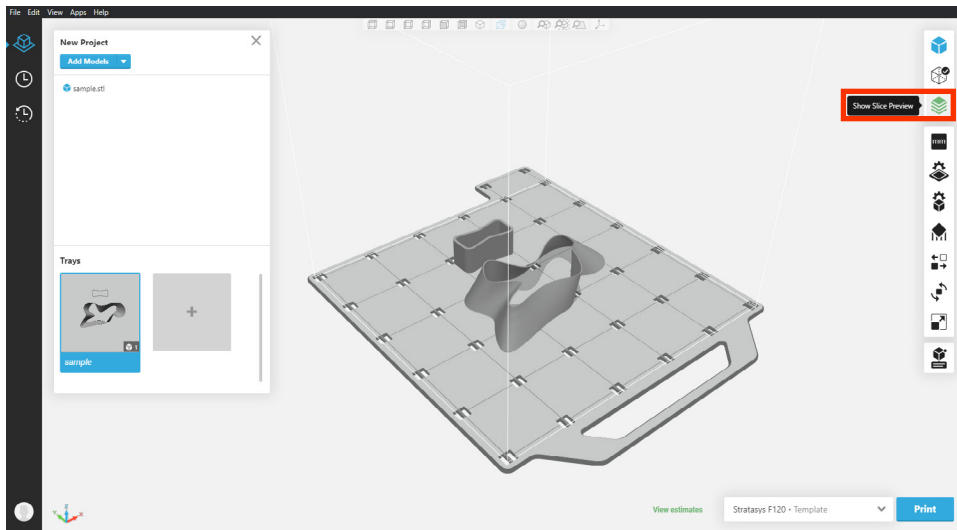
Slice Preview

Click the Show Slice Preview button on the right side bar.
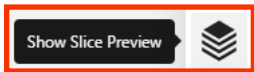
When the icon turns green the sliced model may be viewed.

This model displays colour coded tool paths, including supports.
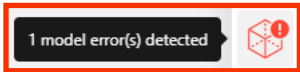
Layers can be viewed individually using the slider on the left.

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Model Errors

When the icon displays red, it indicates an error in the model.

Analysis Mode: the second icon from the top right displays the error status of the model.

Get Error Details: Model errors may include self intersections, open faces and inverted normals. These will be displayed in this view.
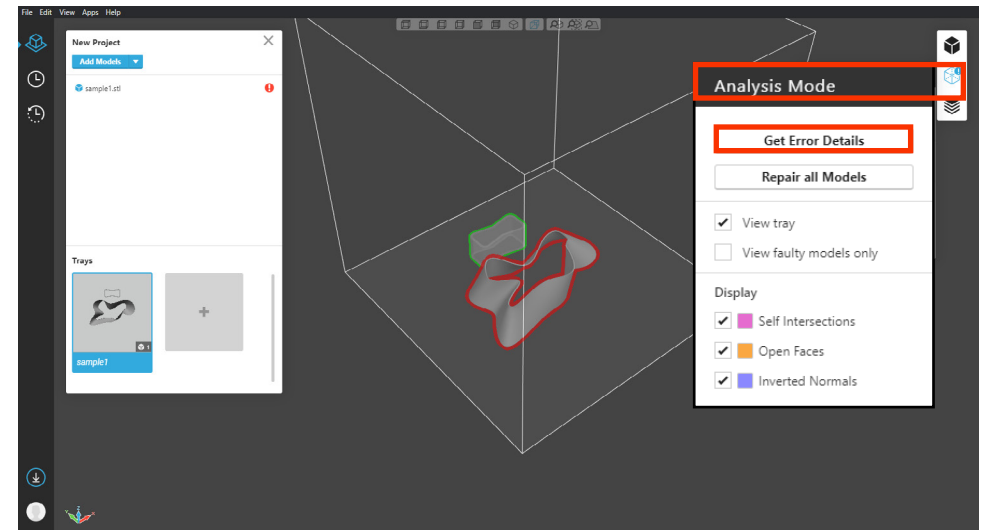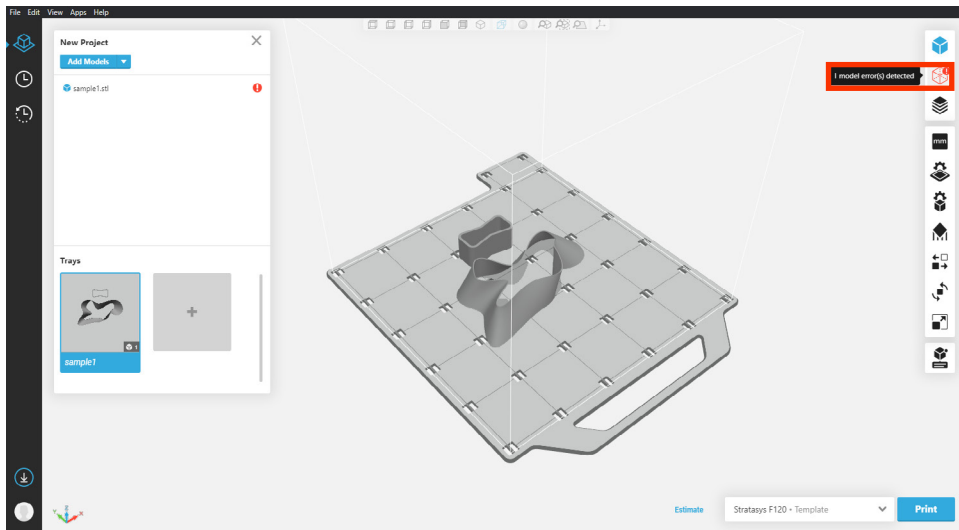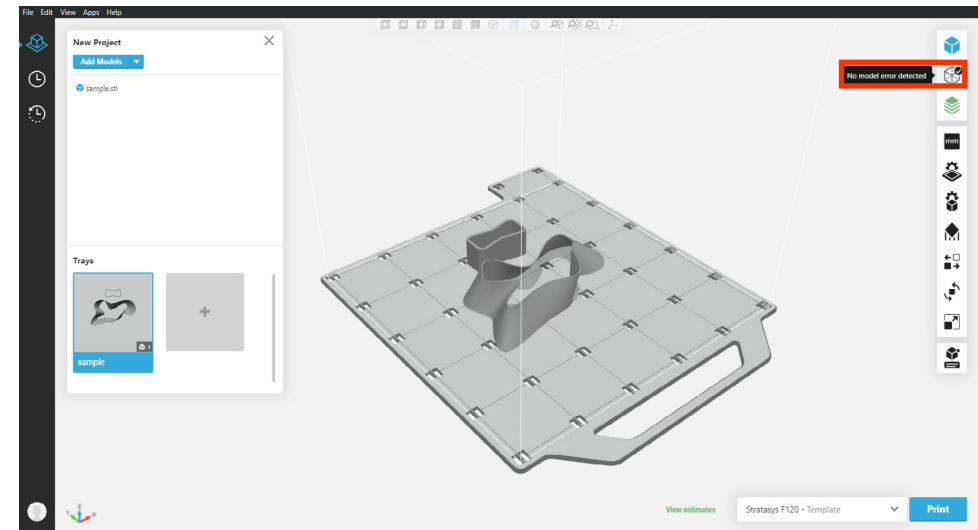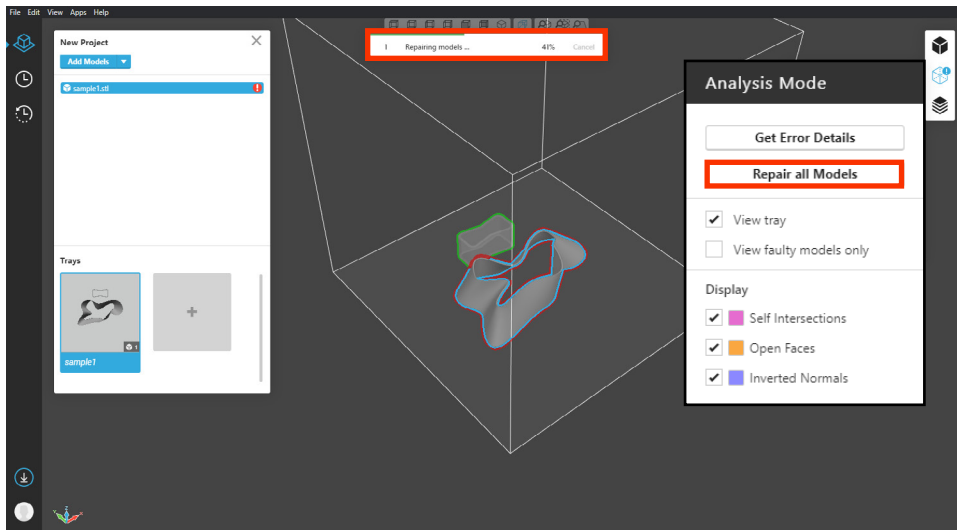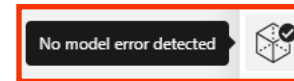
Model Errors: Repair

If your model has errors, GrabCAD Print will attempt to fix them when you click Repair all Models.

If this fails you will have to fix them manually in Rhino and re-export the STL file.

When there is no error in the model or model is repaired,

the icon displays no model error detected.

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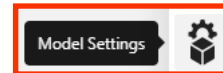
Tray and Model Settings

The Tray Settings Menu is where you select your material, either ABS or ASA.
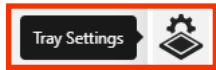
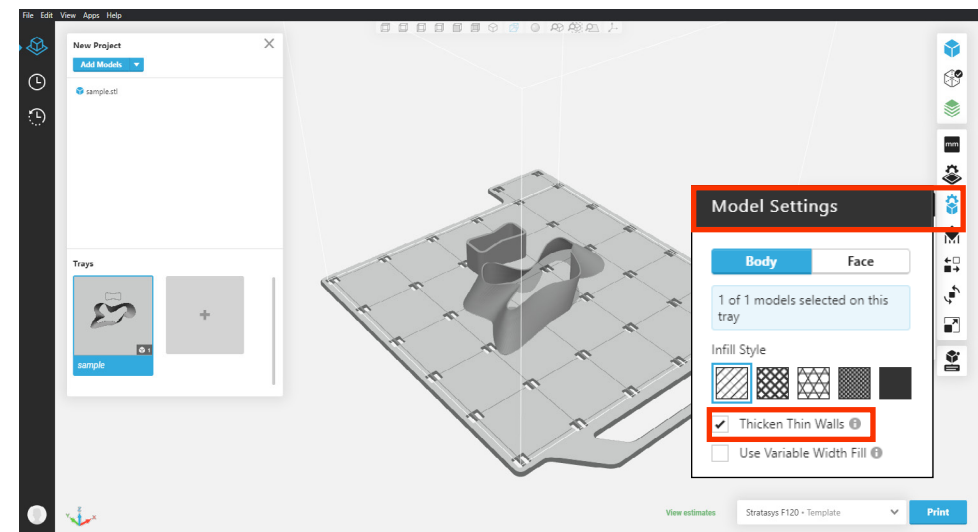This is also where you set your slice height, either 0.007mm, 0.010mm, or 0.013mm.

This will affect the build time, as well as detail of your print.

The Model Settings menu allows you to choose your infill pattern and density.

Hover over each pattern for more details.

Select Thicken Thin Walls to make sure all walls are above the minimum required thickness.

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Model Settings: Infill Style

The Infill Style options allow you to select density of your material for optimal material use and structural integrity depending on the purpose of your project.
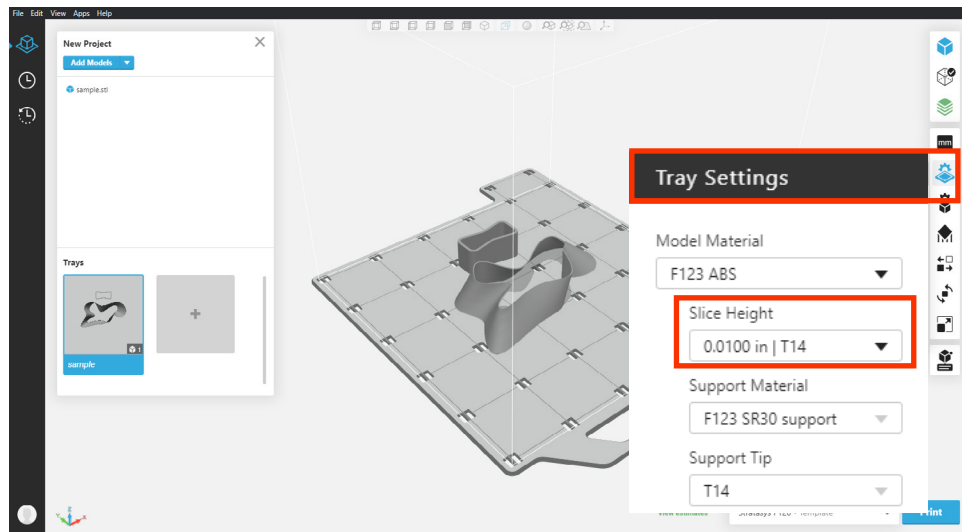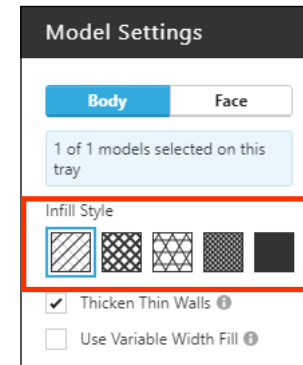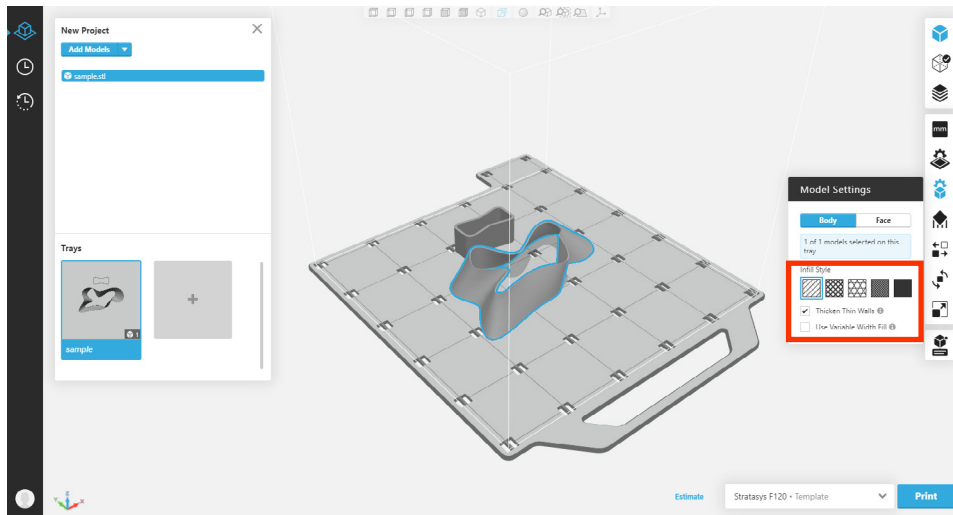
This will affect the build time, as well as detail of your print.

The Infill Style menu allows you to choose your infill pattern and density.

Hover over each pattern for more details.

Sparse: For reducing density when structural integrity is not a primary concern.

Sparse Double Dense: For reducing overall density while maintaing structural integrity.

**Hexagram:** For balance between material usage and structural integrity.

Sparse High Density: For high structural integrity when solid infil may cause build issues.

Solid: For maximum structural integrity.

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Support Settings

The Support Settings menu allows you to set your support structure's pattern and density.
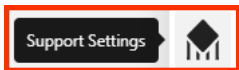
Supports create a structure underneath overhangs on your model. Hover over the i icon above the drop-down menu to learn about each support pattern.

You can set the threshold past which overhang angles require supports, however the default value is already updated based on the material and slice height.
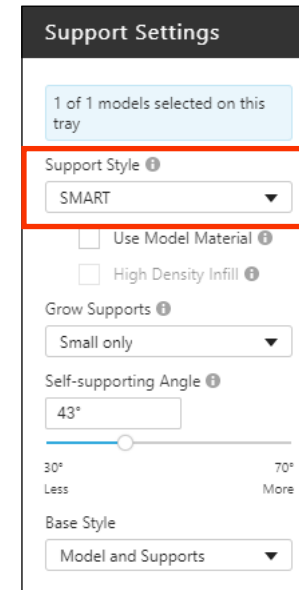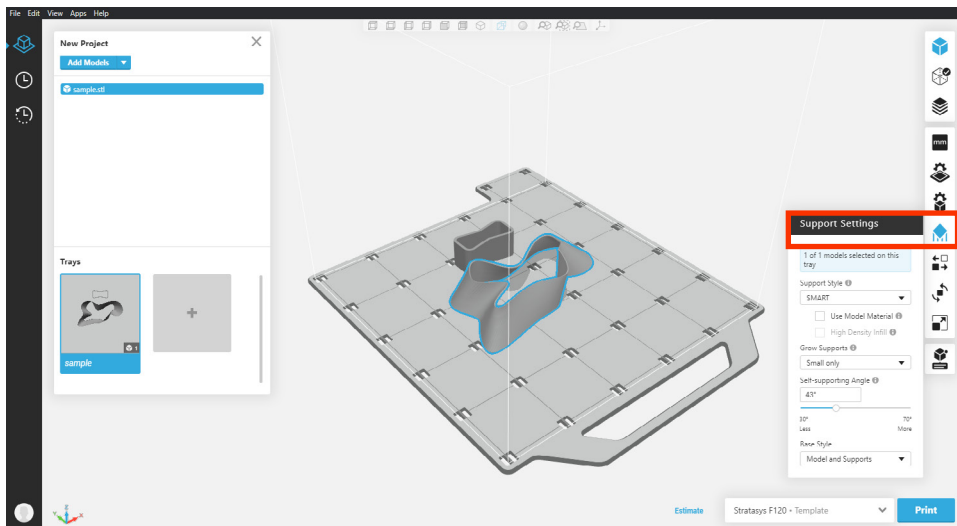
SMART:
Supports have sides that taper reducing the amount of material required, good for all models.

Sparse:
Supports have a wide raster pattern with no contour, good for tall models.

Basic:
Supports have a dense raster pattern with no contour, good for all models.

Surround:
Supports have a dense raster pattern and encase the model, good for tall, thin models.

Box:
Supports have a wide box raster pattern with no contour, good for tall models.

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Adding Multiple STL Files to the Bed

To add additional STL files to the bed, click the Add Models button in the top left.

The Arrange menu can be used to optimize model arangement on the bed.

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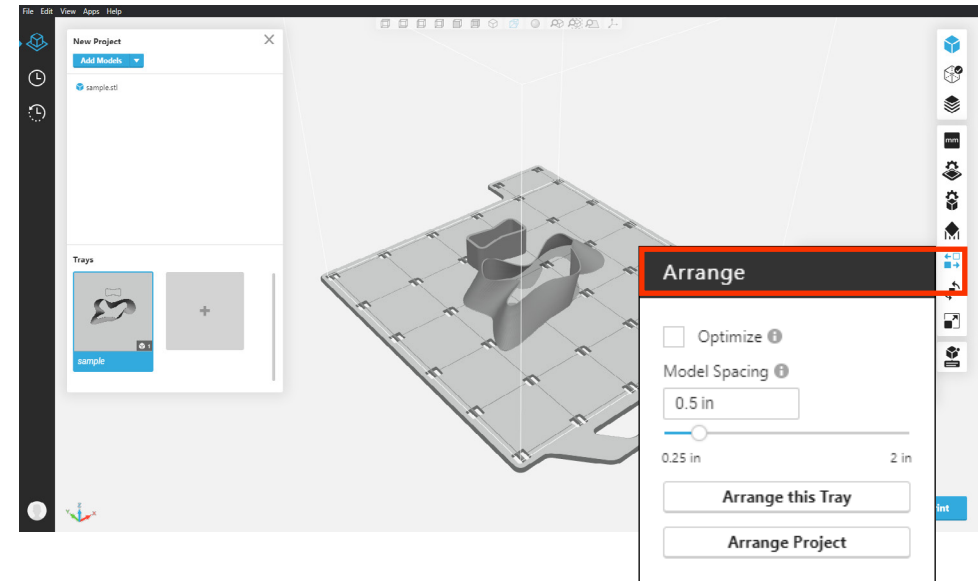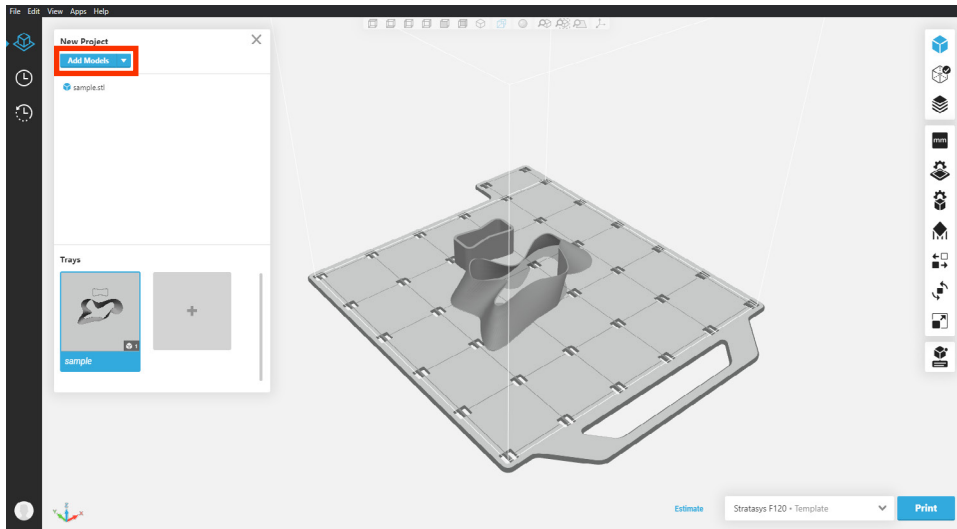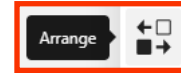
Orientaing Models on the Bed.

The Orient menu can be used to orient models to the bed more efficiently.

Try to find the orientation which uses the least support material.

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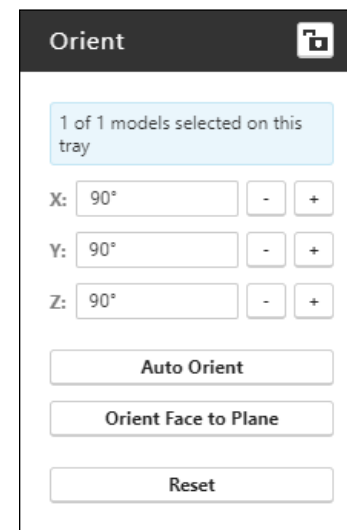Introduction / Getting Started / Rhino File Prep / GrabCAD / GrabCAD: Model Errors / **GrabCAD**: Model Settings / Print Estimate / Submission   **22**
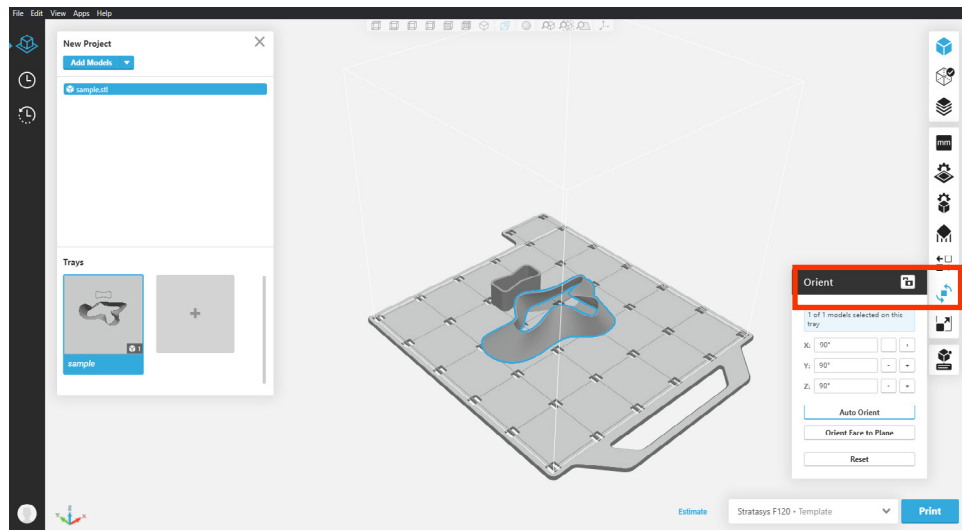
Estimating Build Time / Calculating Cost

To estimate build time and material used, click the
View Estimates button at the bottom.

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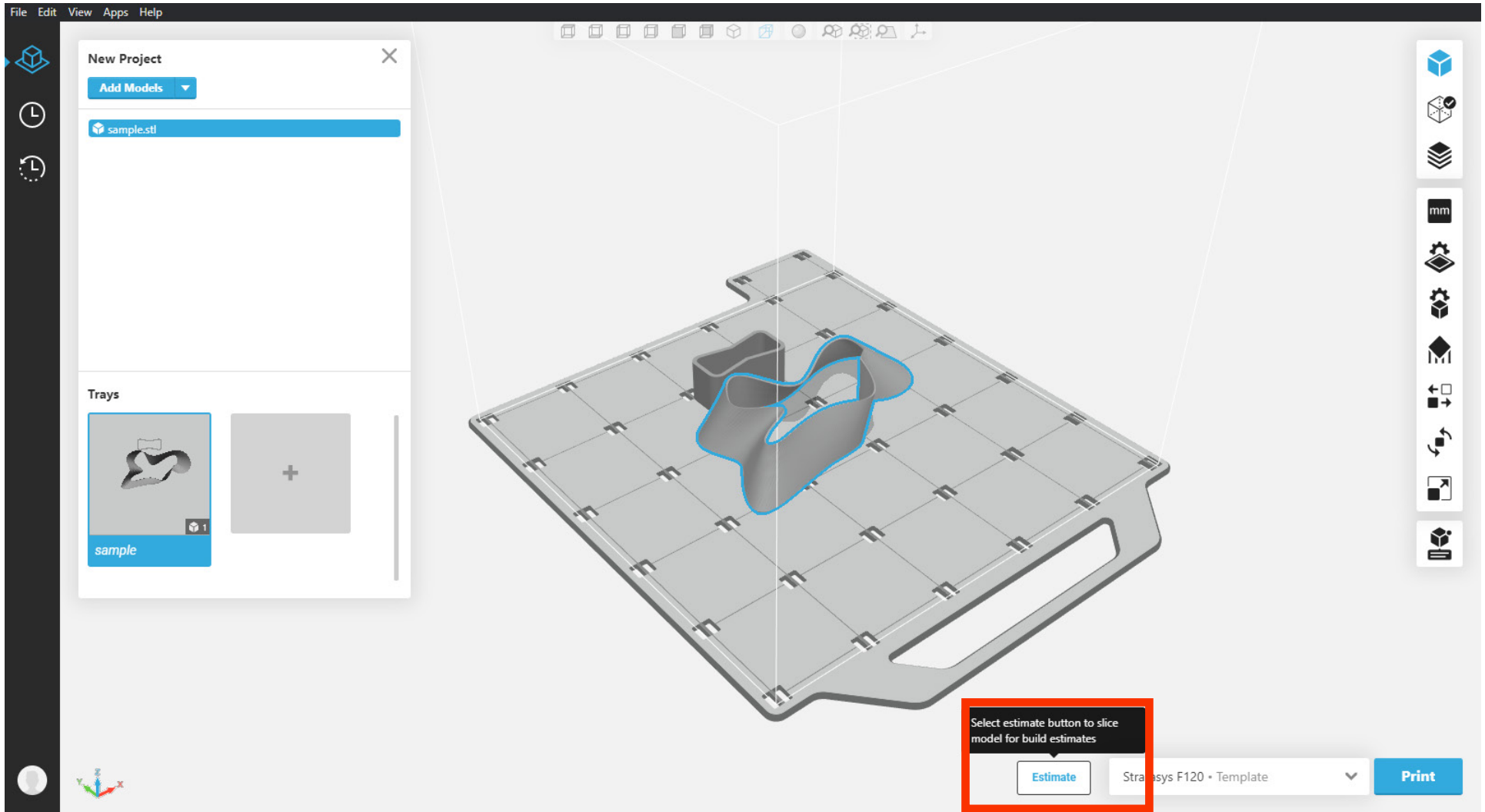
Estimating Build Time / Calculating Cost

For Plastic printing, both the model and support material must be added.

Cost: Multiply by $3.50 per cubic inch for ABS (black) model.
Multiply by $3.50 per cubic inch for ASA (white) model.
Multiply by $4.90 per cubic inch for SR-30 support.

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Submission: FTP folder access

Once you have reviewed your file and are ready for submission, upload to the 3D print submissions folder on the Daniels FTP:

Follow the FTP download instructions on the Daniels website.

Create a new folder with your lastname_firstname_date

*Before submitting your files, review the slice of the final arangement and make sure there are no mesh errors.
(Refer back to Model Errors chapter)

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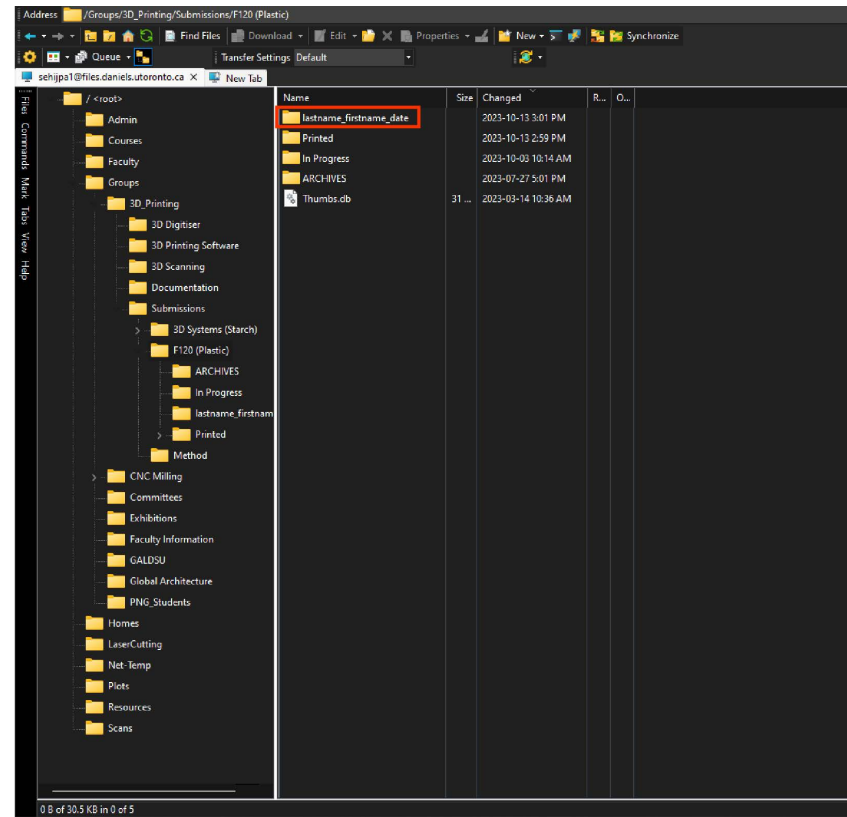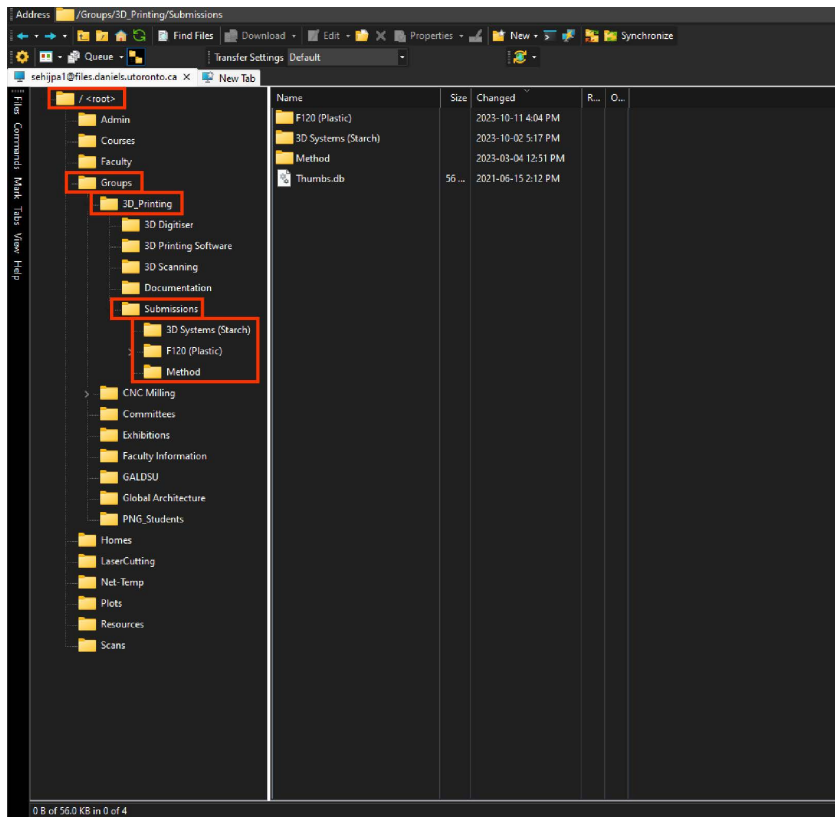
Submission: File Naming Convention

Copy and past your .stl AND .print files into the newly created folder, with following format:

lastname_firstname_date.stl
lastname_firstname_date.print

Always save the .print file for submission as well.
Both files must be present for file submission or the print will not be processed.

Once your file is uploaded email the 3D Printing to notify of file submission.
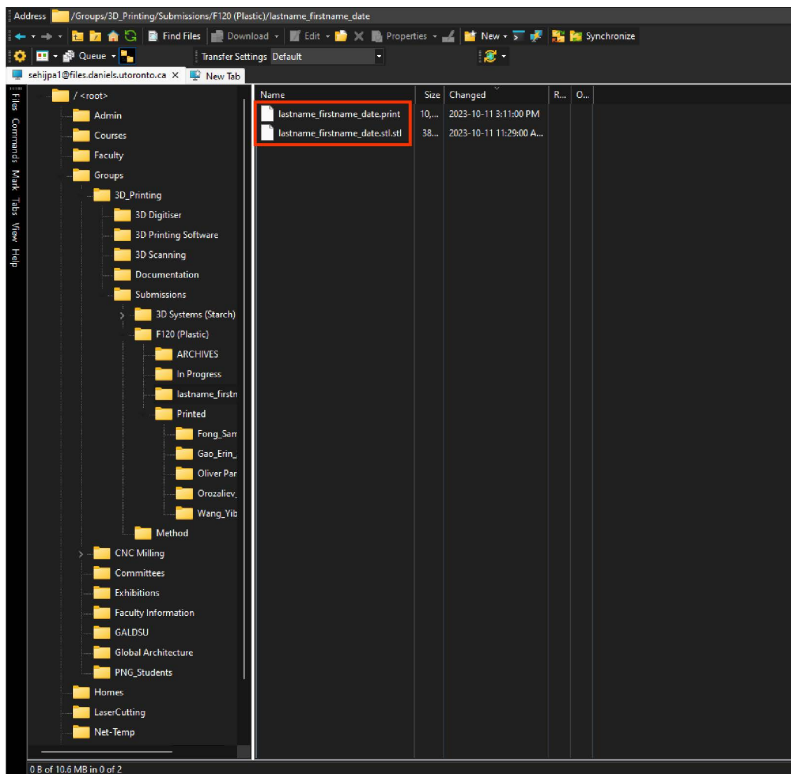3dprinting@daniels.utoronto.ca

Always include in the email Student First and Last Name:

Student Number:
File Name:

* FAILURE TO DO SO MAY RESULT IN YOUR PRINT NOT BEING PROCESSED

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Printing Solid Geometry

Click the Show Slice Preview button on the right side bar.

When the icon turns green the sliced model may be viewed.

This model displays colour coded tool paths, including supports.

Layers can be viewed individually using the slider on the left.

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