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# Bionics Club: 3D Printing Workshop

Spotify Playlist



WPI Bionics Club • 9/20/23

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Join our Discord!



MyWPI



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# ANTI-HAZING FORM



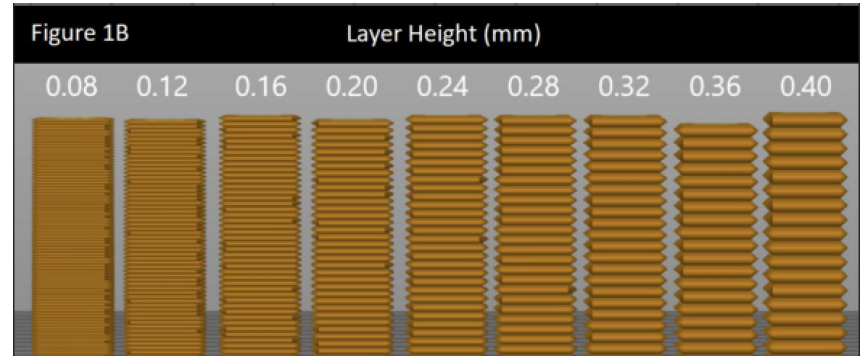
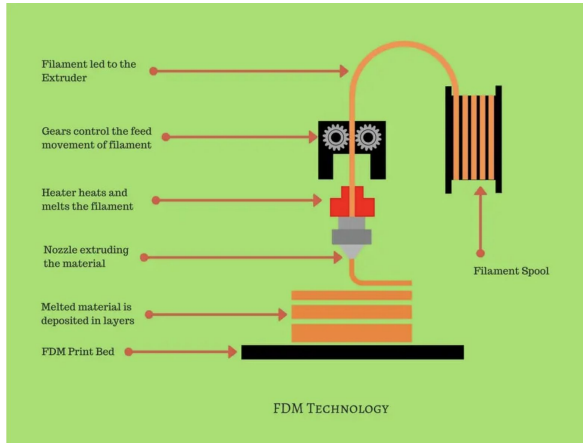
# Agenda

- What is 3D printing?
- Slice your thumb!
- Tour of Collablab 3D Printers

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# What is FDM 3D Printing?

- Fused Deposition Modeling
- The most accessible type of printing on campus/generally
- Uses layers of materials to create parts
  - Melts and deposits plastic through a nozzle layer by layer with an x-y-z axis. Some 3D printers have an infinite y-axis to make large parts.



# Filament Types (Most Common 3)

## PLA

- Pros
  - Least Likely to warp during printing
  - Low cost + wide color variety
  - Environmentally friendly
  - Can print at higher speeds
- Cons
  - Deforms easily after printing when exposed to high temperatures
  - Weaker

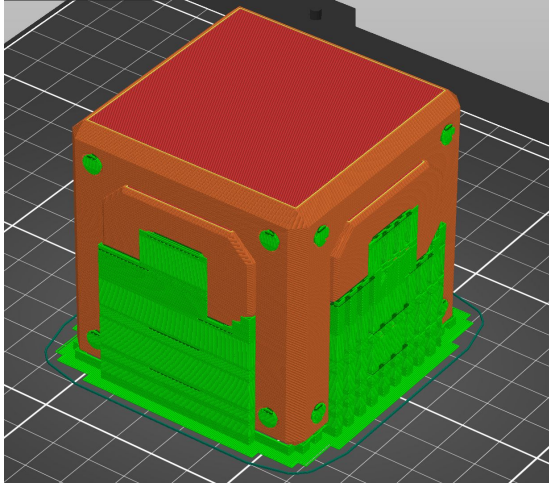
## PETG

- Pros
  - Strong
  - Compliant
  - Medium print speed
- Cons
  - Relatively high print temp
  - Needs a heated bed

## TPU

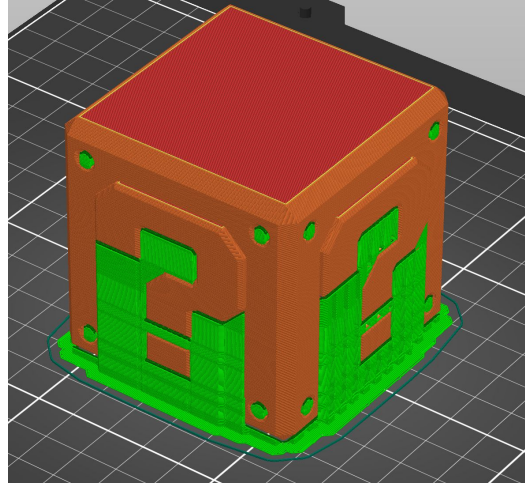
- Pros
  - Can get varying amounts of flexibility with different infill or specific TPU type
  - Strong
- Cons
  - Very slow print speed (can fail even at 100%)
  - Close to impossible to remove supports
  - Needs a textured bed to print

# Types of Supports



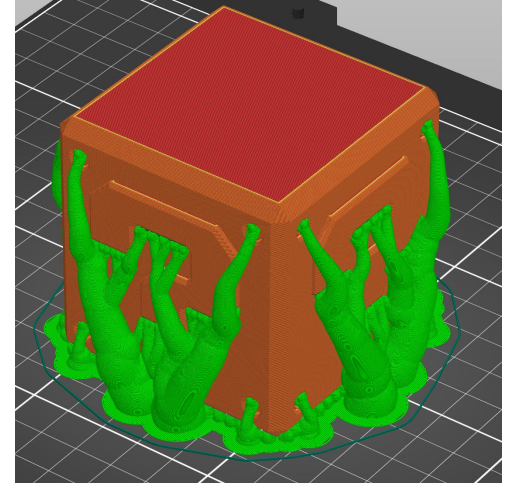
## Grid

- Speed: 9h13m
- Generation Time: Fast
- Medium removal
- Will leave marks on surfaces



## Snug

- Speed: 9h13m
- Generation Time: Fast
- Hard Removal
- Will leave marks on surfaces

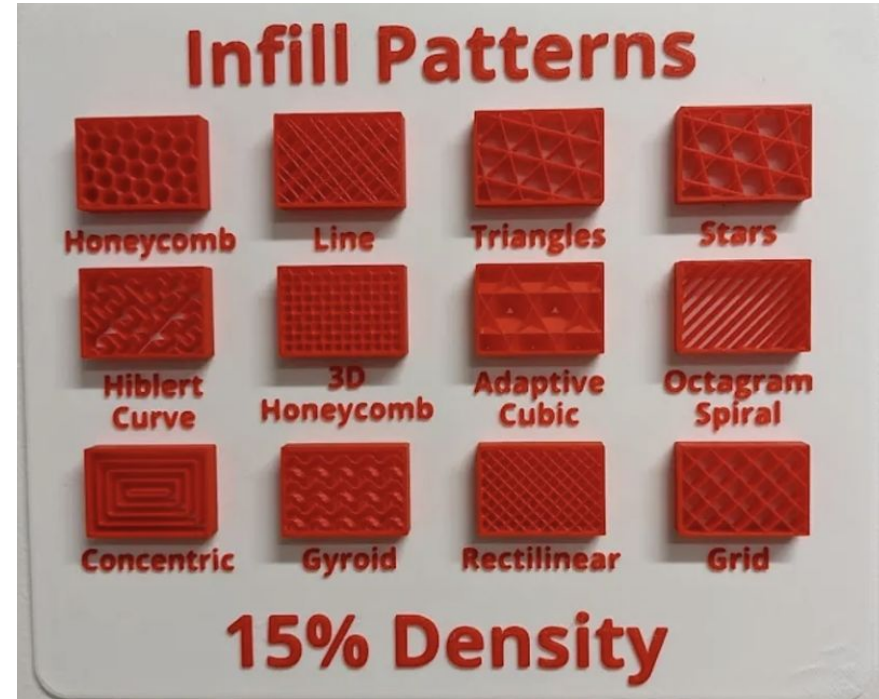
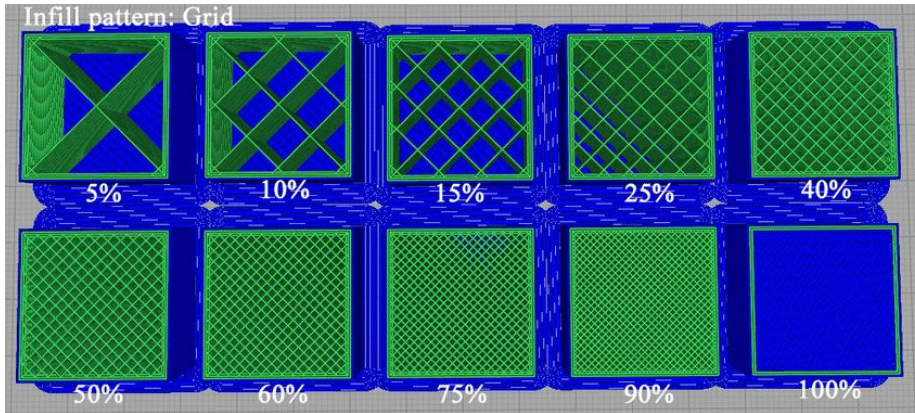


## Organic

- Speed: 10h36m
- Generation Time: Slow
- Easy Removal
- Minimal marks on surfaces

# Infill Types and Density

- Infill Density determines factors such as weight, strength, and printing time of the object.





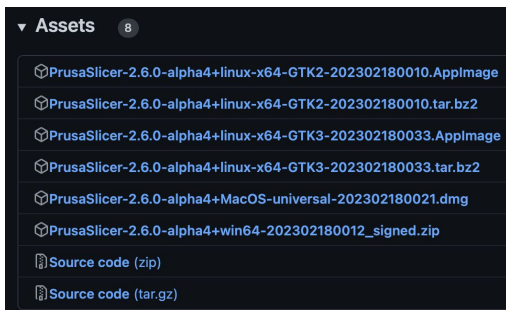
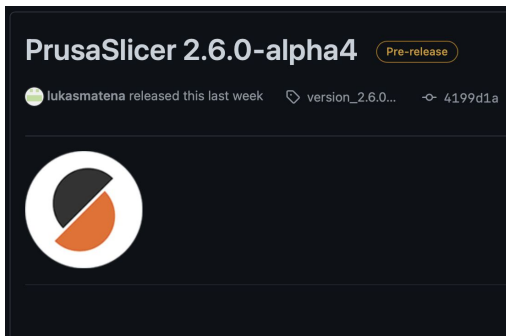
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# Guided Walkthrough: 3D Printing the Thumb

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# GitHub Prusa Slicer 2.6.0-alpha4



1. Search Prusa Slicer 2.6.0-alpha4 and click on the GitHub site. *(Note: The link to the download has also been posted in the Discord #general channel)*
  2. Scroll down to the bottom of the page to Assets and click on the one that matches your computer system.
  3. Go into your downloads and make sure that the correct version of Prusa Slicer is on your device. *(Note: The original Prusa Slicer will not be replaced by this one, instead it will be a separate slicer. For Mac devices, this slicer will need to be dragged onto the main desktop and will not show up in Launchpad)*
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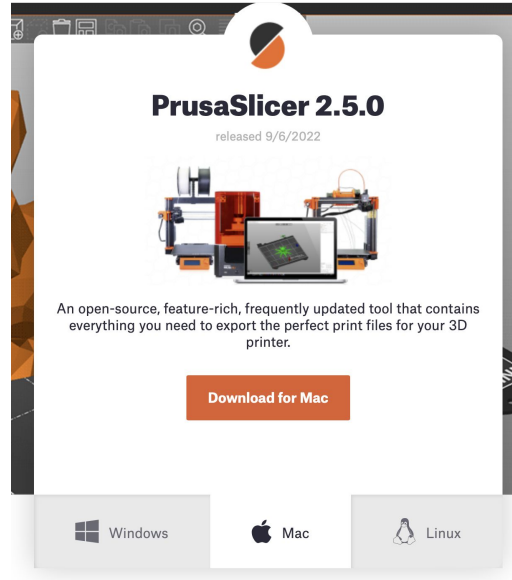
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# Downloading a Slicer (Prusa)

1. Look up Prusa Slicer and click on the link that leads to prusa3D.com.
2. Select the correct computer system, then press Download and follow any steps when prompted by the installer.

**\* This is instead of the GitHub version, it may be slightly different**

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## General Steps

1. Export your Onshape part as an STL file.
  2. Open the STL file in your Slicer.
  3. Orient your part and add appropriate supports.
  4. Select the printing material and appropriate infill.
  5. Slice your part and check the time estimate.
  6. Export the G-Code.
  7. Upload the G-Code to the 3D printer and print!
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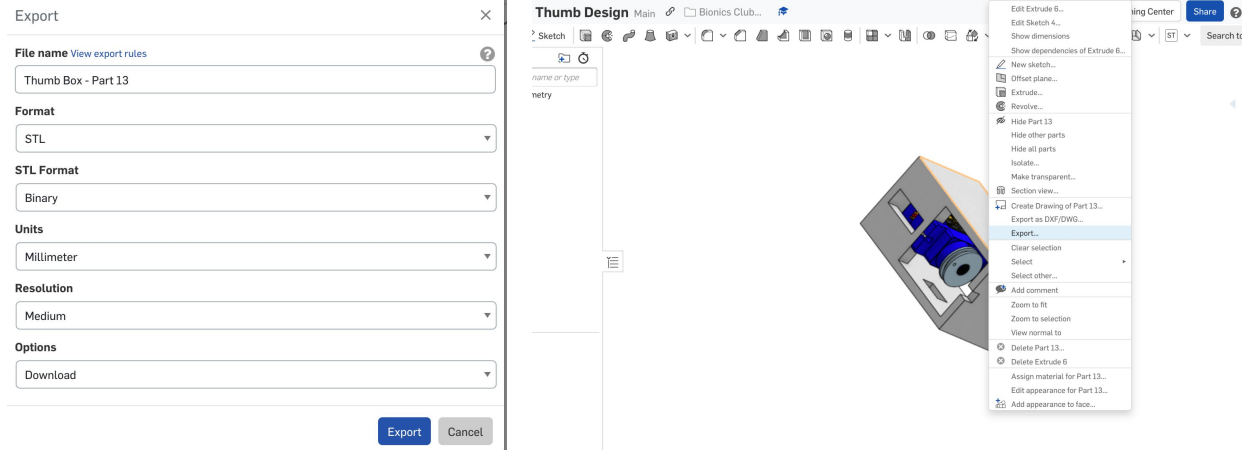
# Exporting Thumb CAD from Onshape

Thumb CAD

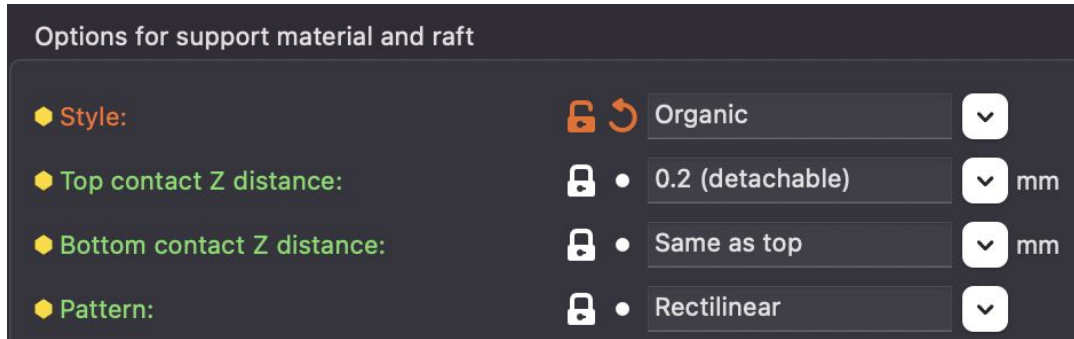
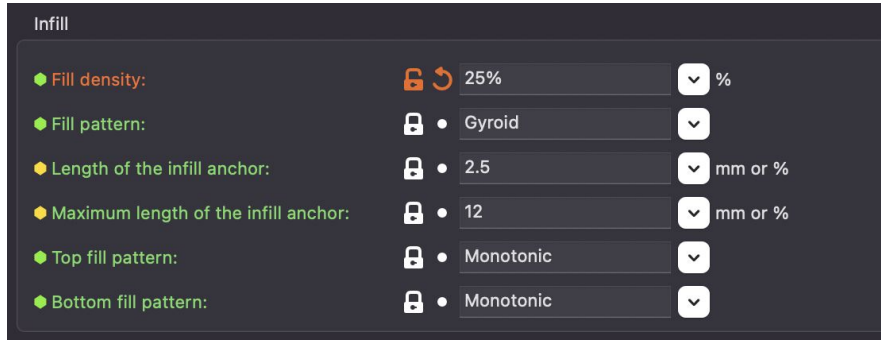


## STEPS

1. Open the part you want to export
2. Right click on the physical part
3. Select Export
4. Export as an SVG file



# Slicing the Thumb On Prusa Slicer



- Print Settings
  - a. 0.15mm quality
  - b. Generic PLA
  - c. Printer: Whatever printer you are on
  - d. Supports: Everywhere
  - e. Infil: 25%
- Style:
  - a. Grid for Base
  - b. Organic for fingers
- Fill Pattern: Gyroid

# Upcoming

SEPTEMBER						
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
					1	2
3	4	5	6 Welcome Meeting!	7	8	9
10	11	12	13 Onshape CAD Workshop	14	15	16
17	18	19	20 3D Printing Workshop	21	22	23
24	25	26	27 Actuation Workshop	28	29	30
NOTES						

BES

- Bionic's Club Potluck!
  - 9/24 : 11am-2pm by the institute park stage
  - Sign up to bring something! (if you want)



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# QR Codes



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Our Discord



Our Email Alias

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