

3D PRINTING

Turkey Creek Division

November 28, 2023

Presented by:

John Fales

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Examples:

Prusa

Creality

Ultimaker

Many others.....



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 - FDM 3D printers work with a range of standard thermoplastics, such as ABS, PLA, and their various blends
 - Relatively low cost materials
 - Model is immediately ready to use after finishing
 - Print uses heat so distortion is possible

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Examples:

Formlabs

Moonray

Creality

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 - Resin materials can be expensive - \$150 - \$300 per liter

- Print comparison
 - FDM vs SLA



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 - FDM vs SLA



- SLA Precision



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 - Printing is achieved using heat and a thermoplastic material
 - A print head that heats and extrudes the material and moves around the print bed or the bed moves under the stationary print head depositing a bead of material in successive layers
 - The material cools and becomes solid and continuous with previous layers
 - Generally the item is built from the bottom up

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 - Layers are added sequentially to build model
 - "Wash, rinse, repeat"

- Where are SLA printers used?
 - Prototyping –
 - Industrial, manufacturing
 - Jewelry making –
 - Lost wax casting, ceramic
 - Dentistry –
 - Surgical guides for implants
 - Dentures
 - Orthodontics

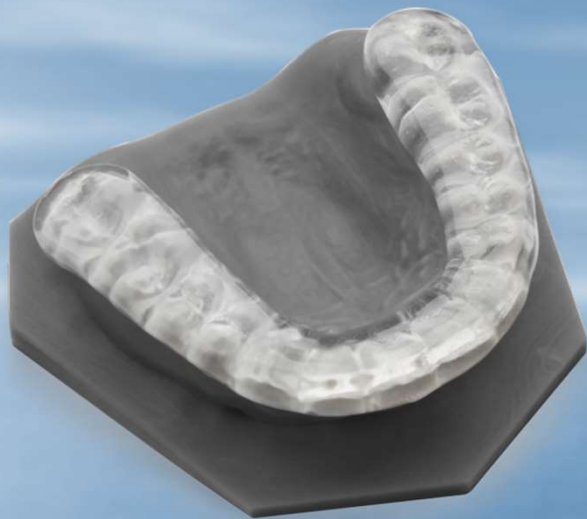
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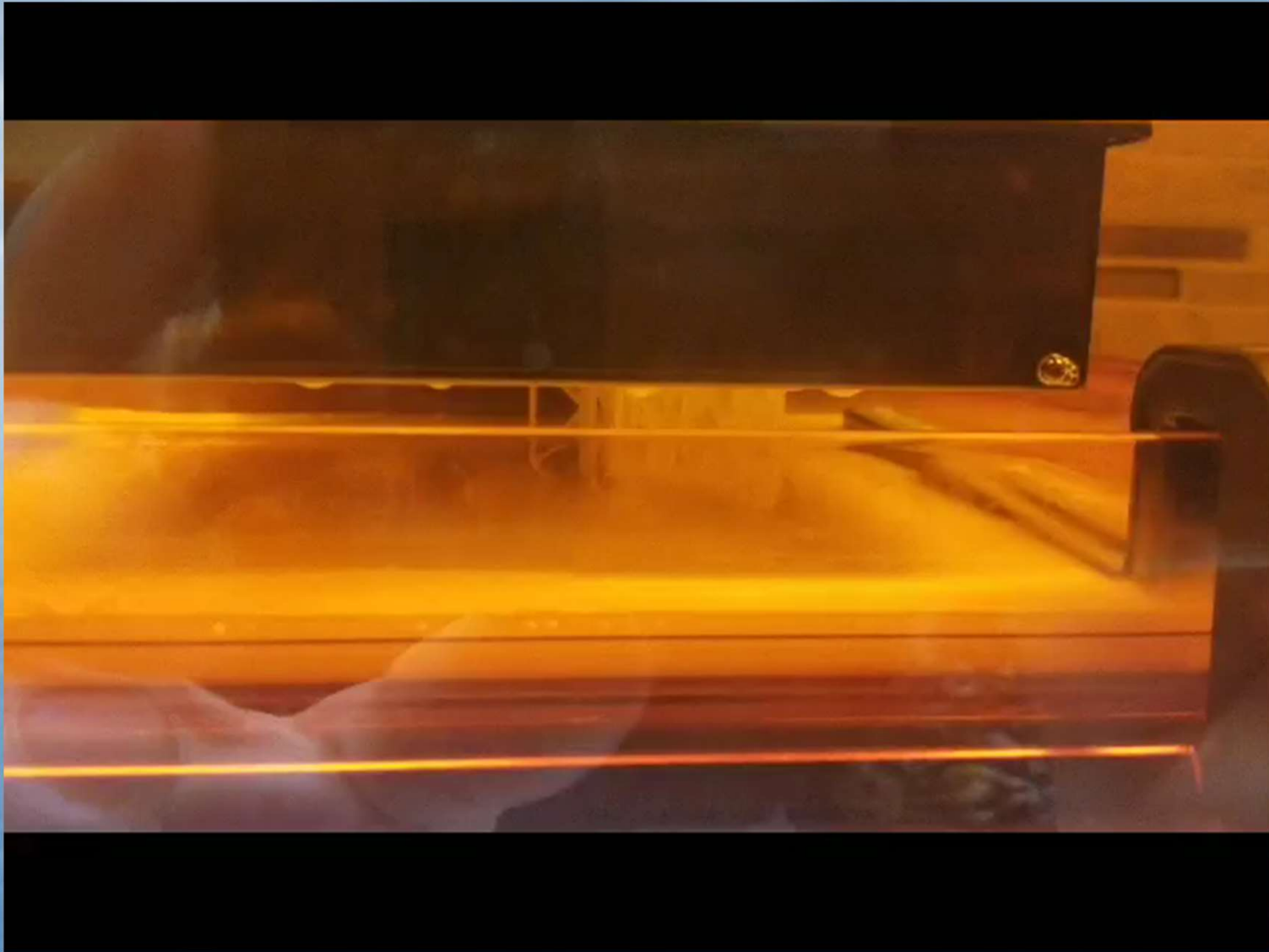


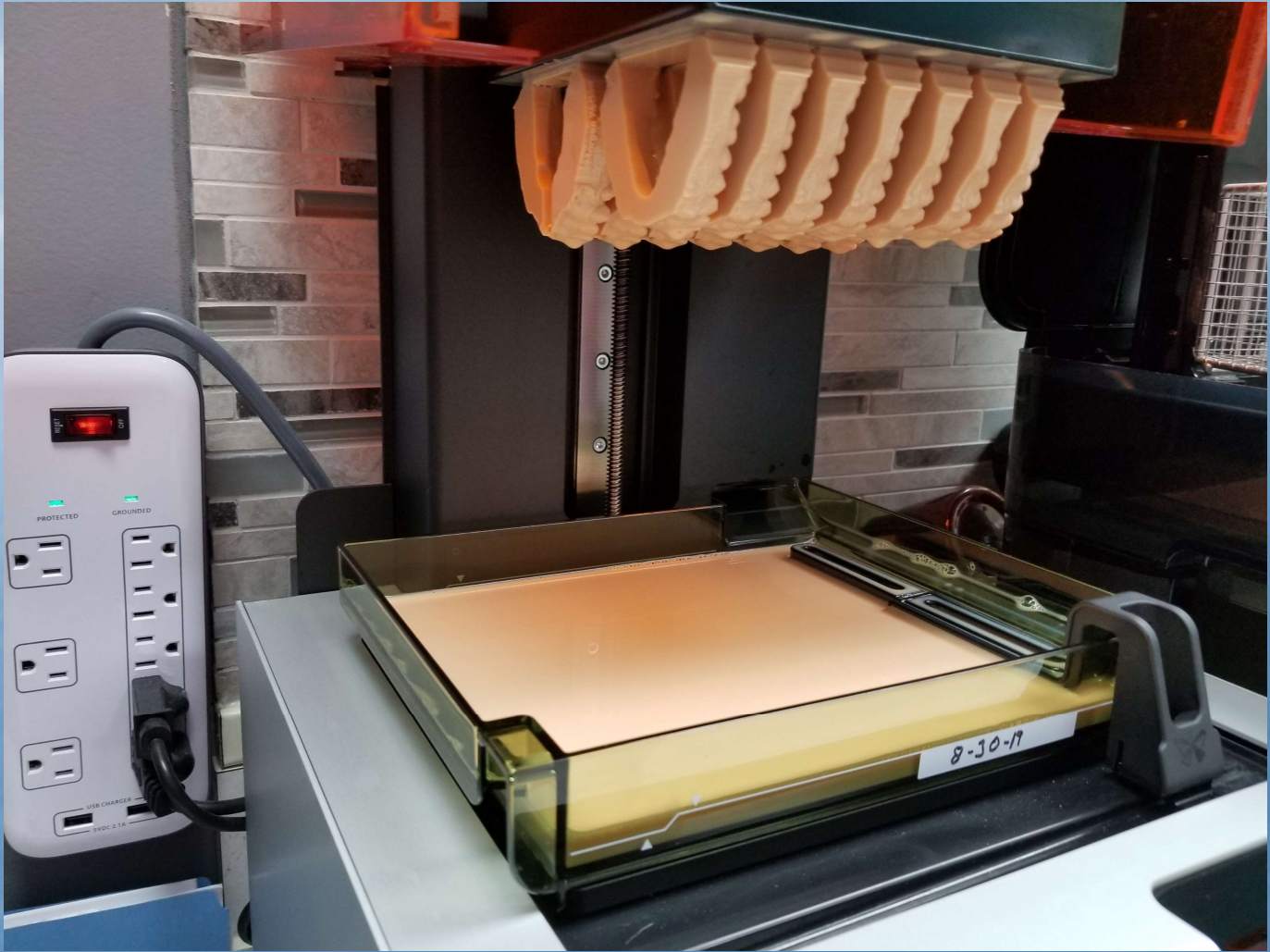
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 - Problem: Shortage of N95 level masks for health care workers and 1st responders
 - Solution: Turkey Creek members, Miles Hale and John Fales 3D print face shields and 'Montana' reusable masks



MontanaMask.stl, MontanaMaskFilter.stl [*] - PreForm

File Edit View Help



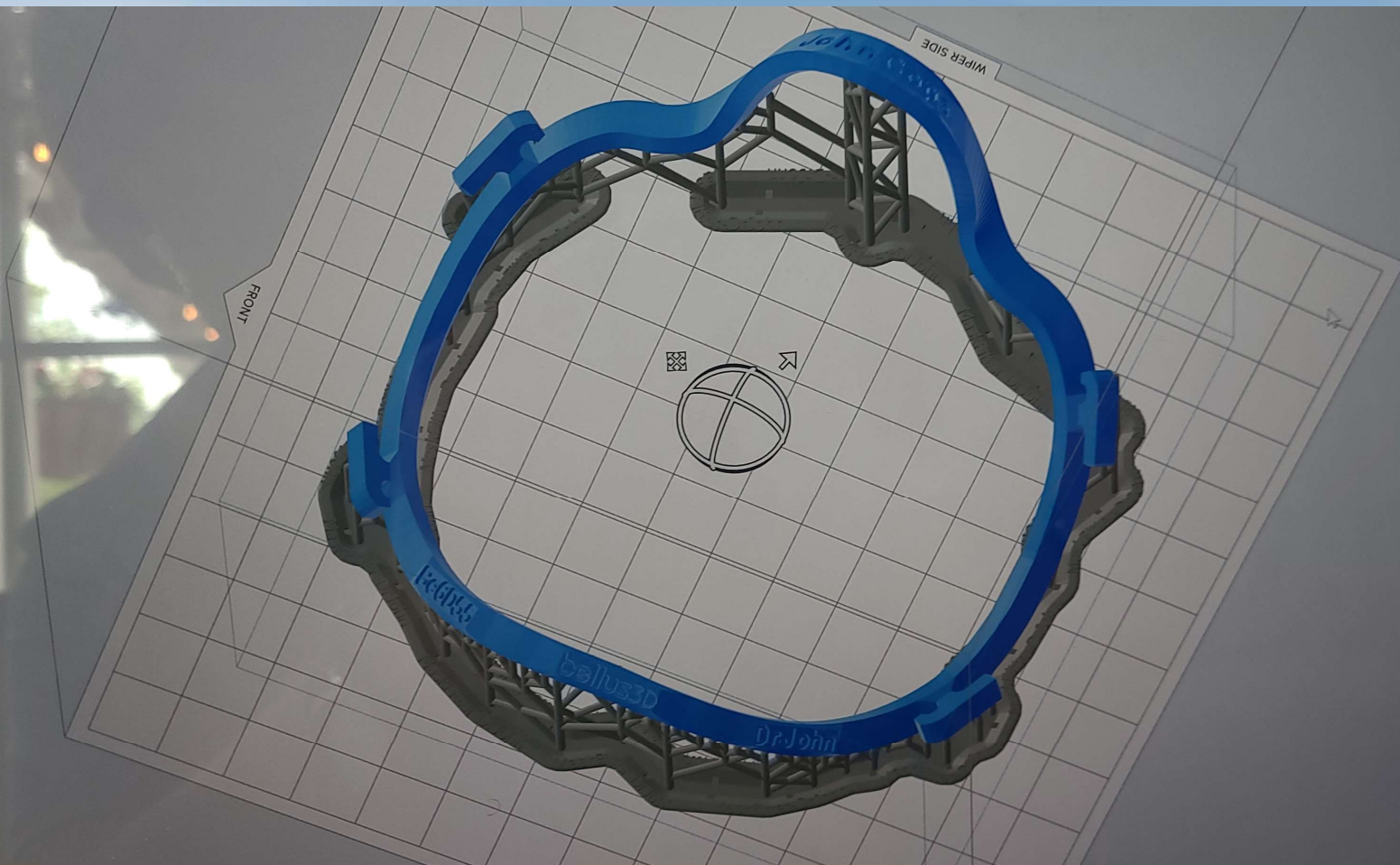
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Ready to Print

Resin Grey V4
Layer Thickness 0.16 mm

DETAILS

Print Time ~ 2 h 45 min
Layers 405
Volume 1791 mL

PRINTABILITY

Printability Pass
Show Minima
Show Cups

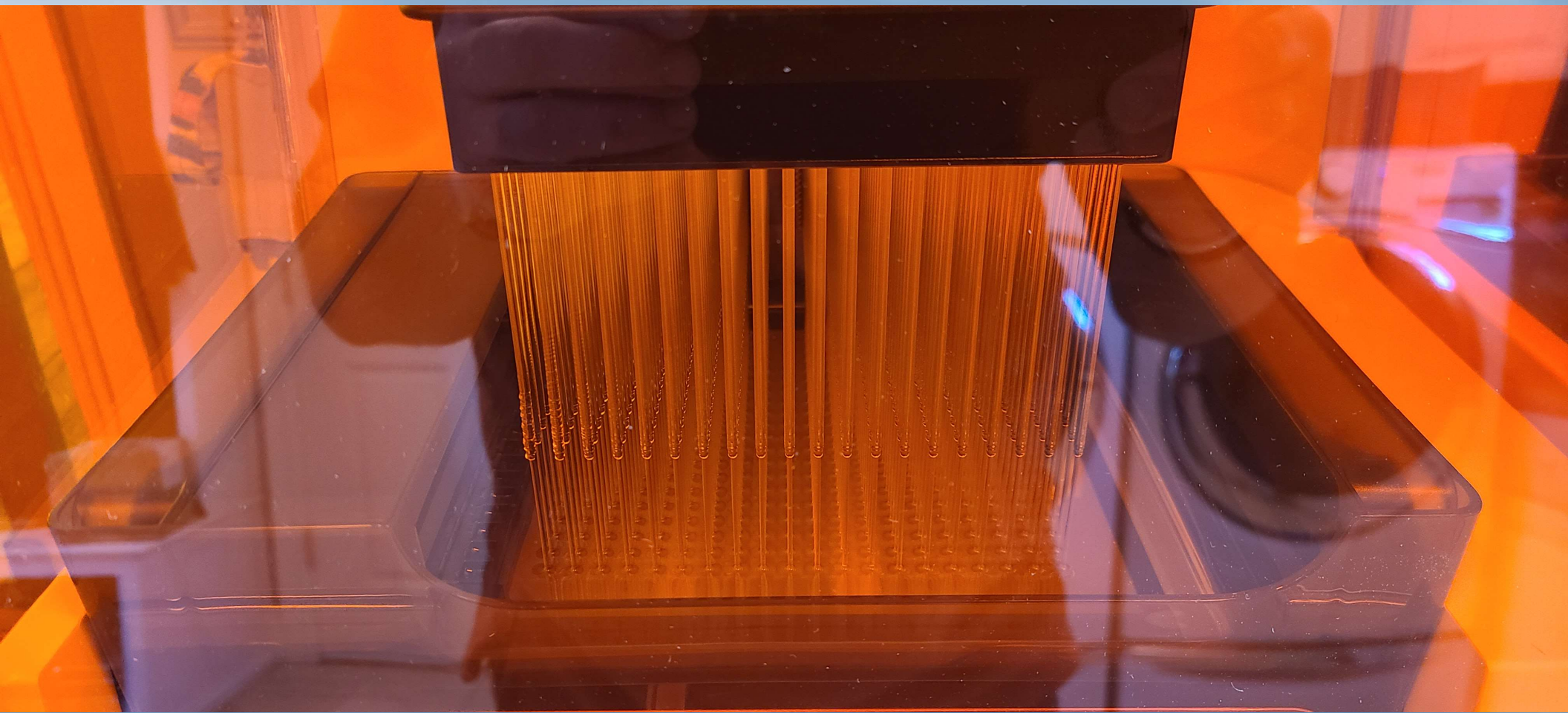
MODEL LIST (1)

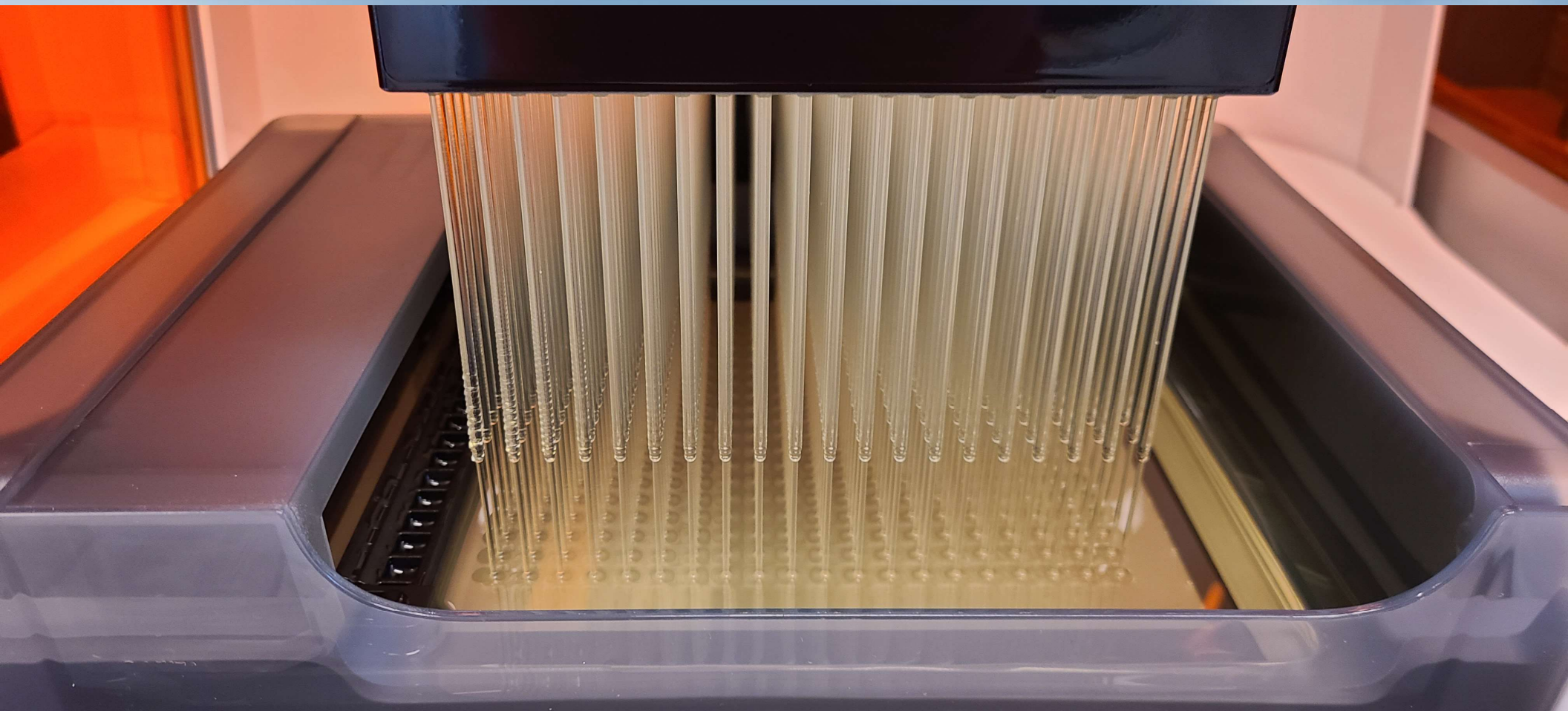
MaskFitter-DrJohn

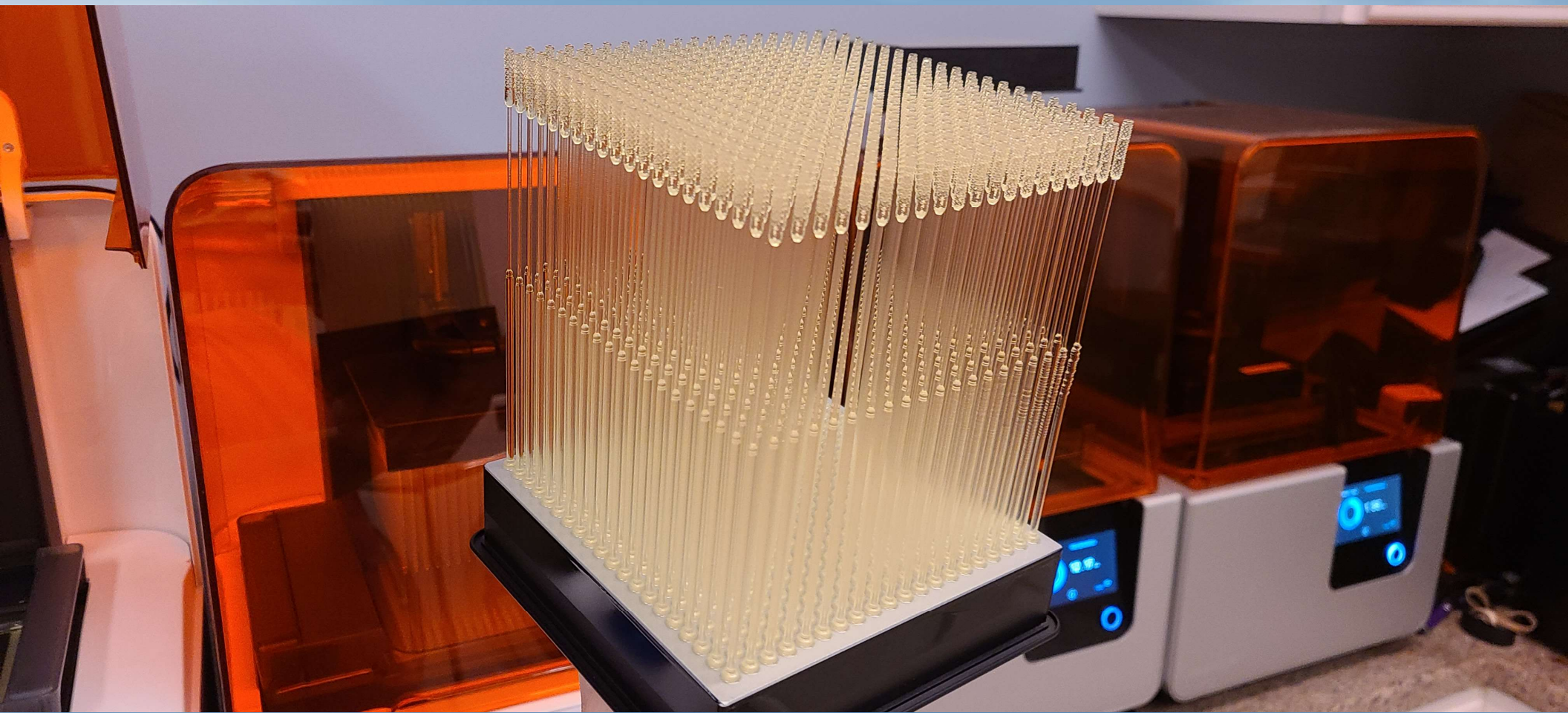


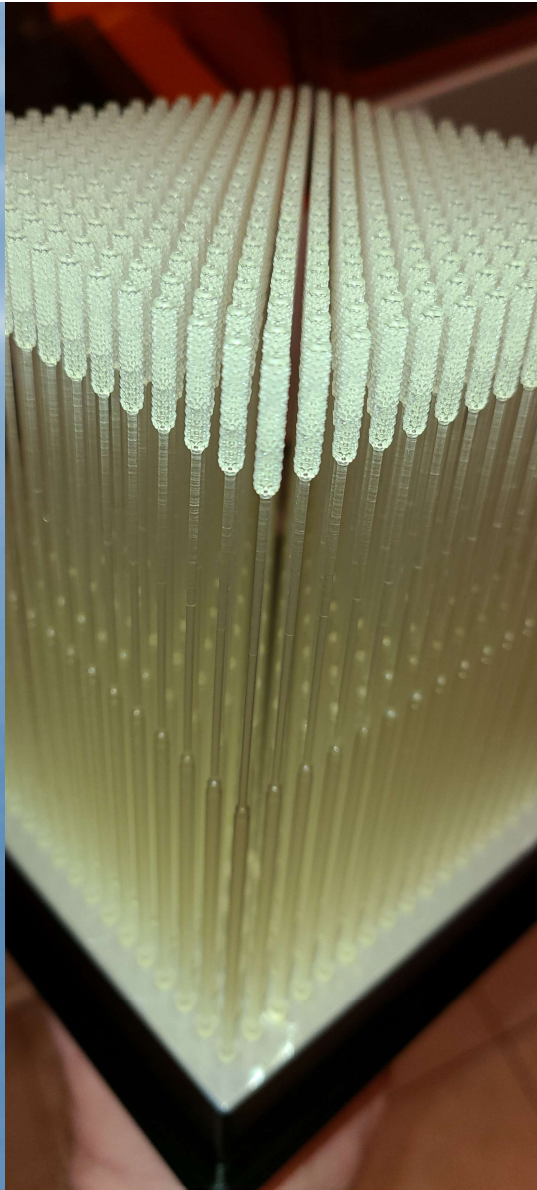
- COVID – 19 and 3D Printing
 - Problem: Shortage of Nasopharyngeal swabs for COVID – 19 testing in Kansas
 - Only 100 swabs available for CDC per week.

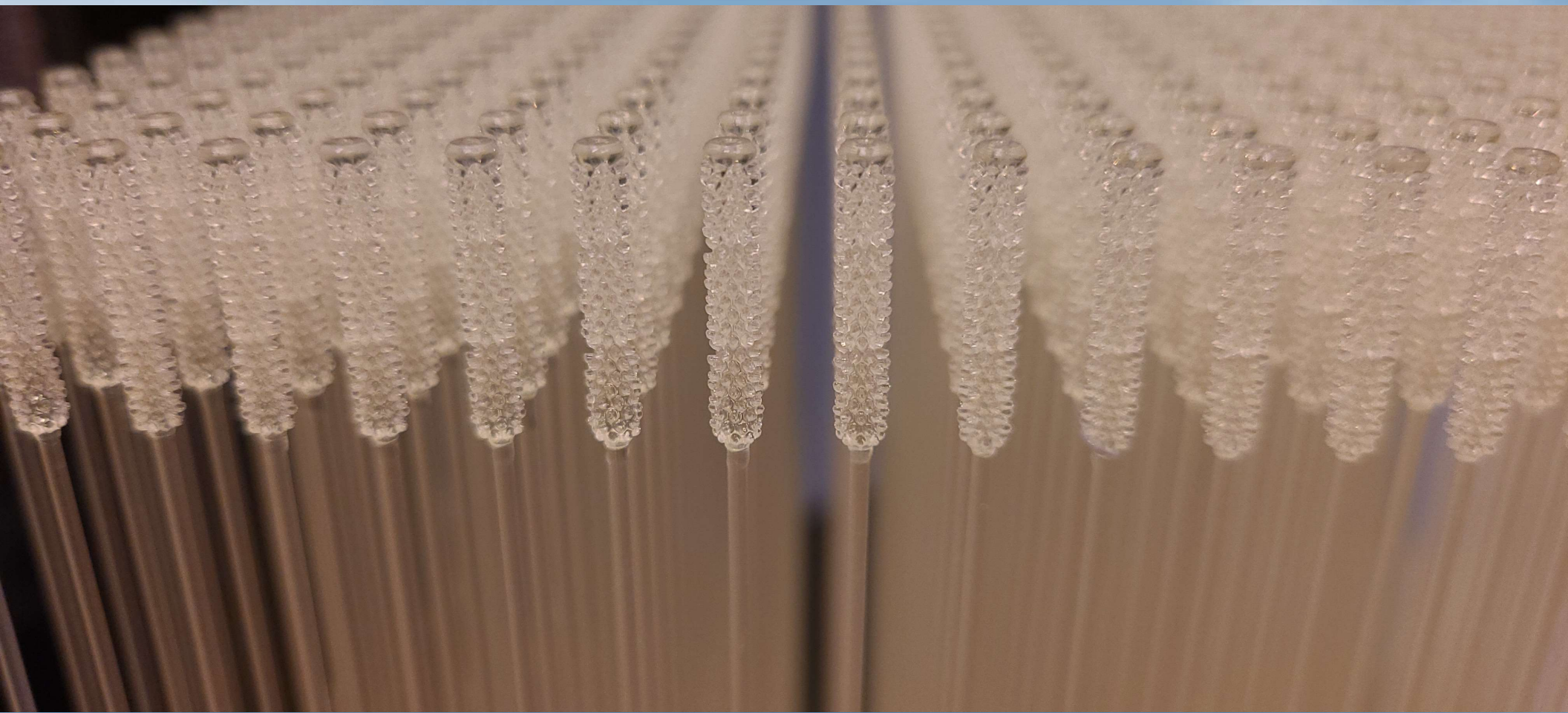
- COVID-19 and 3D Printing
 - Problem: Shortage of nasopharyngeal swabs for COVID-19 testing in Kansas
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 - Solution: 3D print 5,000 swabs per week nasopharyngeal swabs for use by County Health Departments in Kansas until supply shortage was resolved









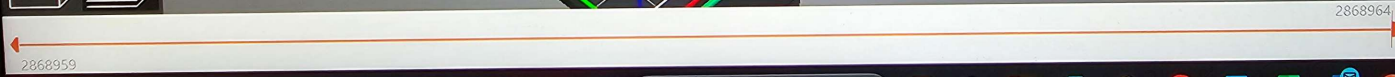
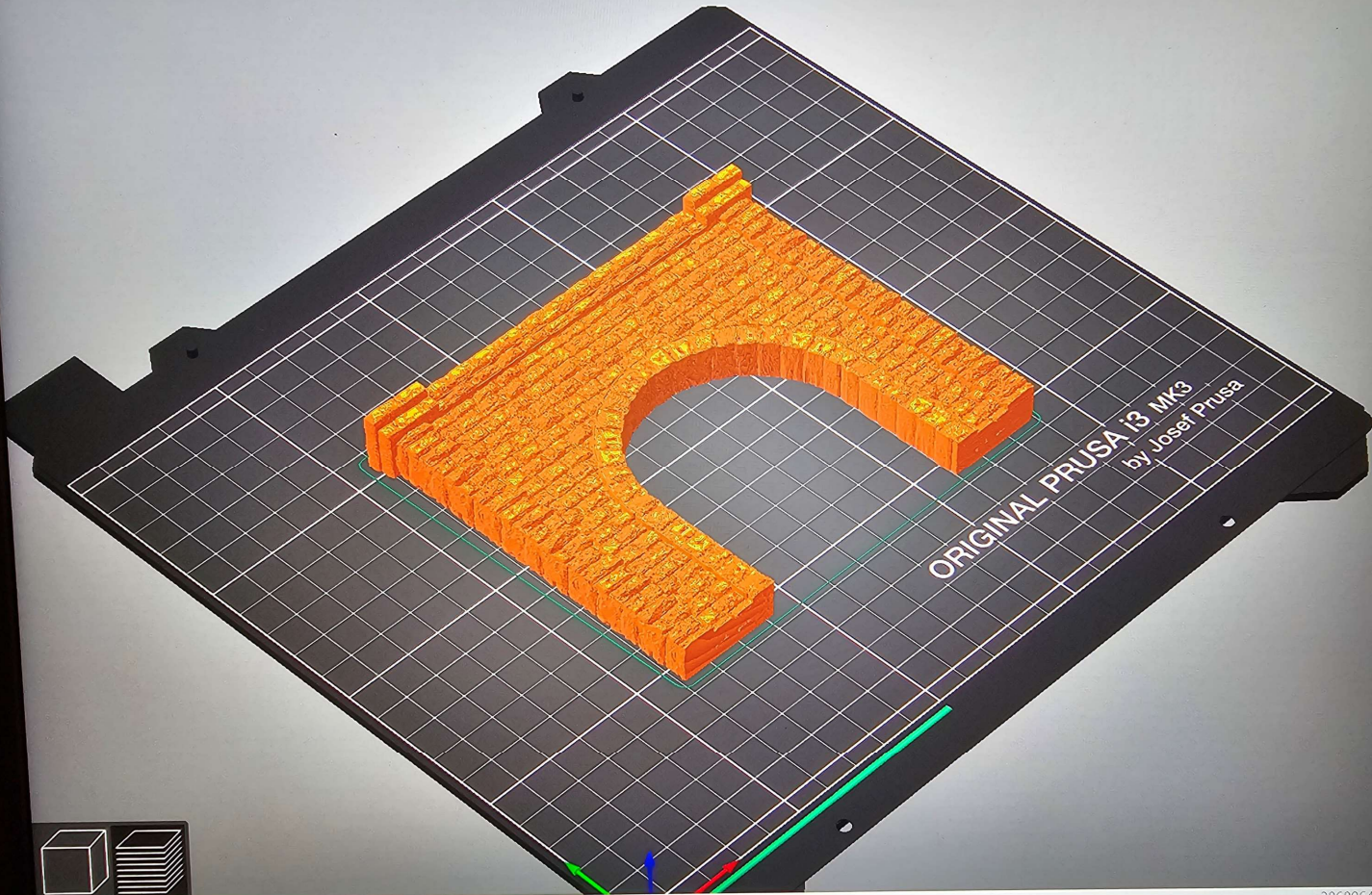




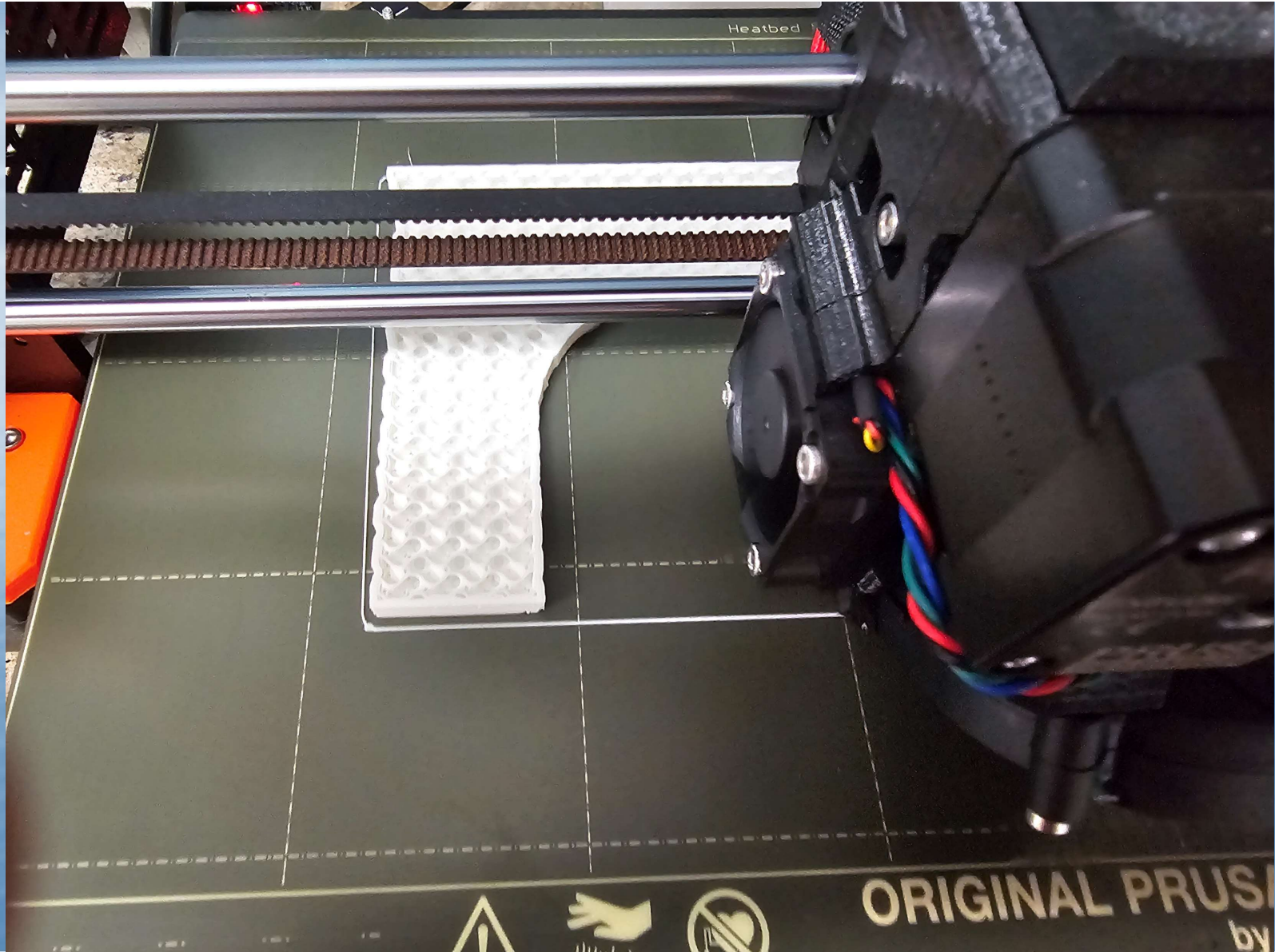


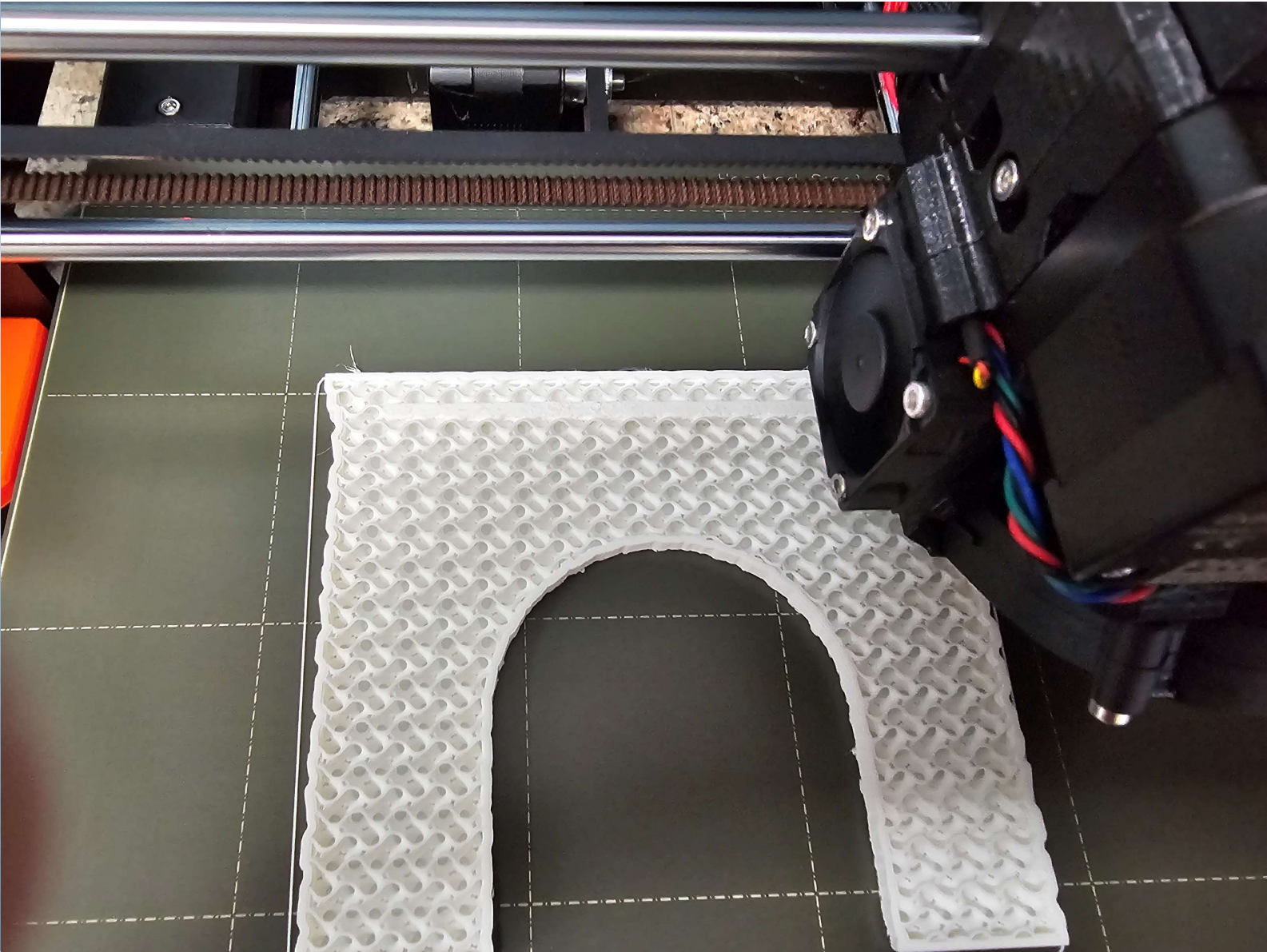
- Print set-up
 - Start with a *.STL file from a drawing program
 - Sketch-up

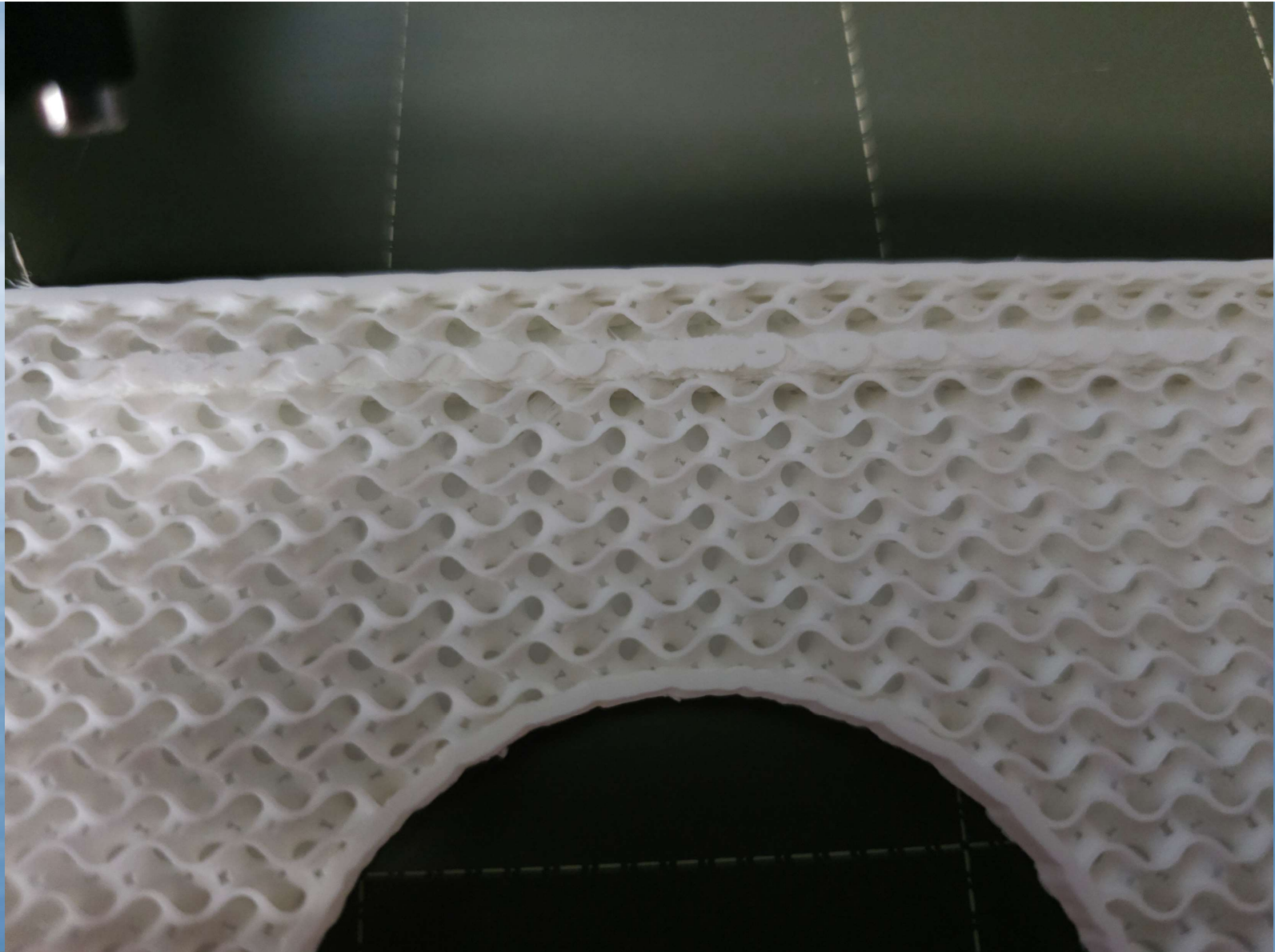
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 - Start with a *.STL file from a drawing program
 - Sketch-up
 - Format for printer with a 'slicing' program
 - Specific to printer
 - Formats file for printer
 - Supports
 - Internal fill
 - Orientation

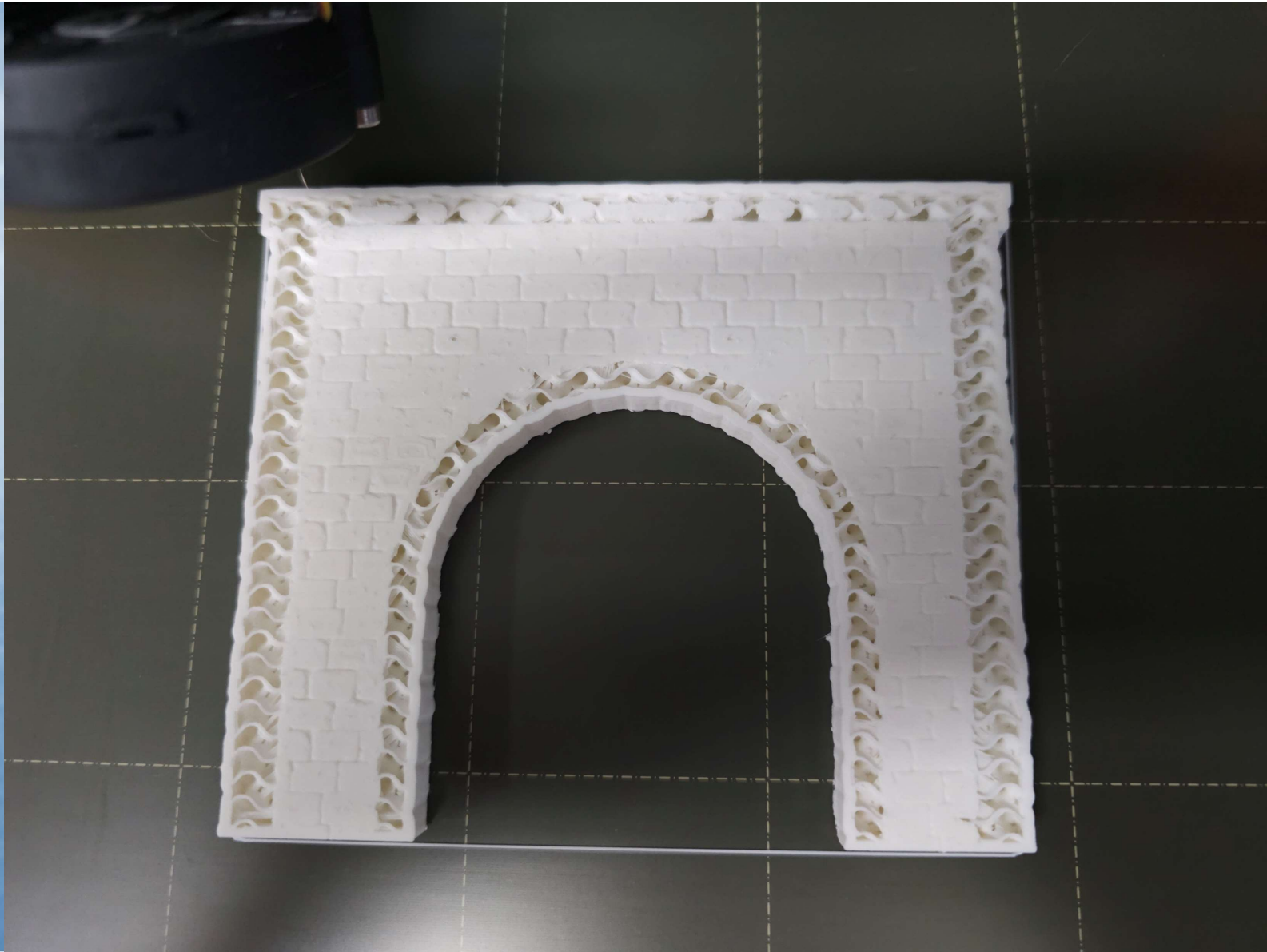


Feels colder
Now



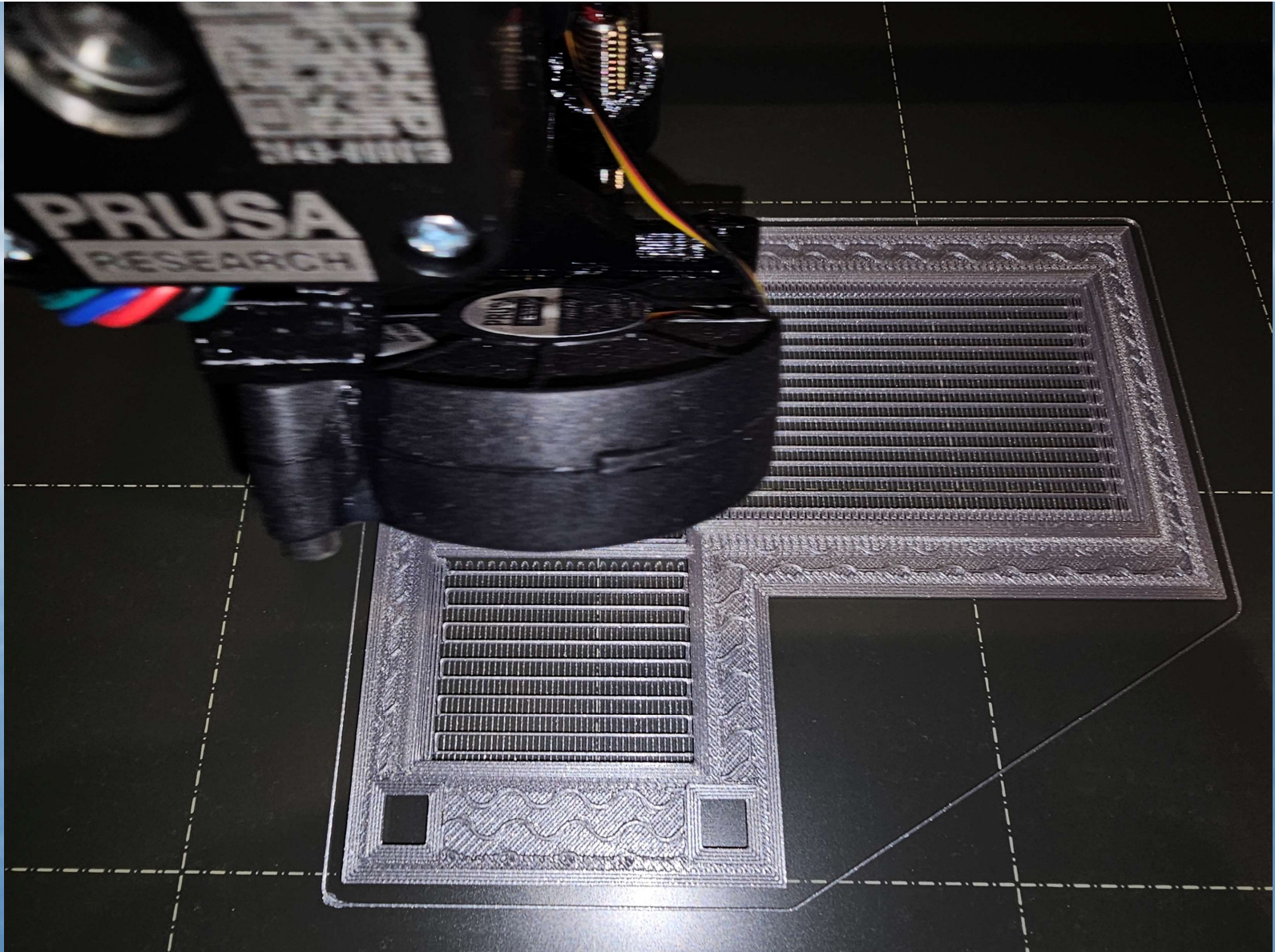


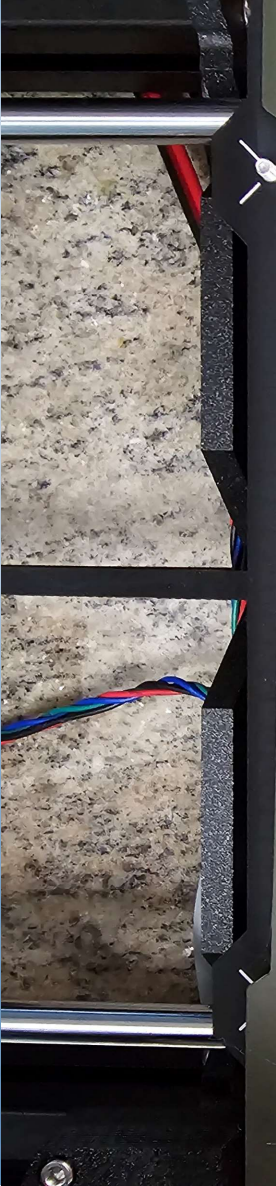












Heatbed Steel Sheet by

