3D-Printing technologies

Photopolymerization

SLA

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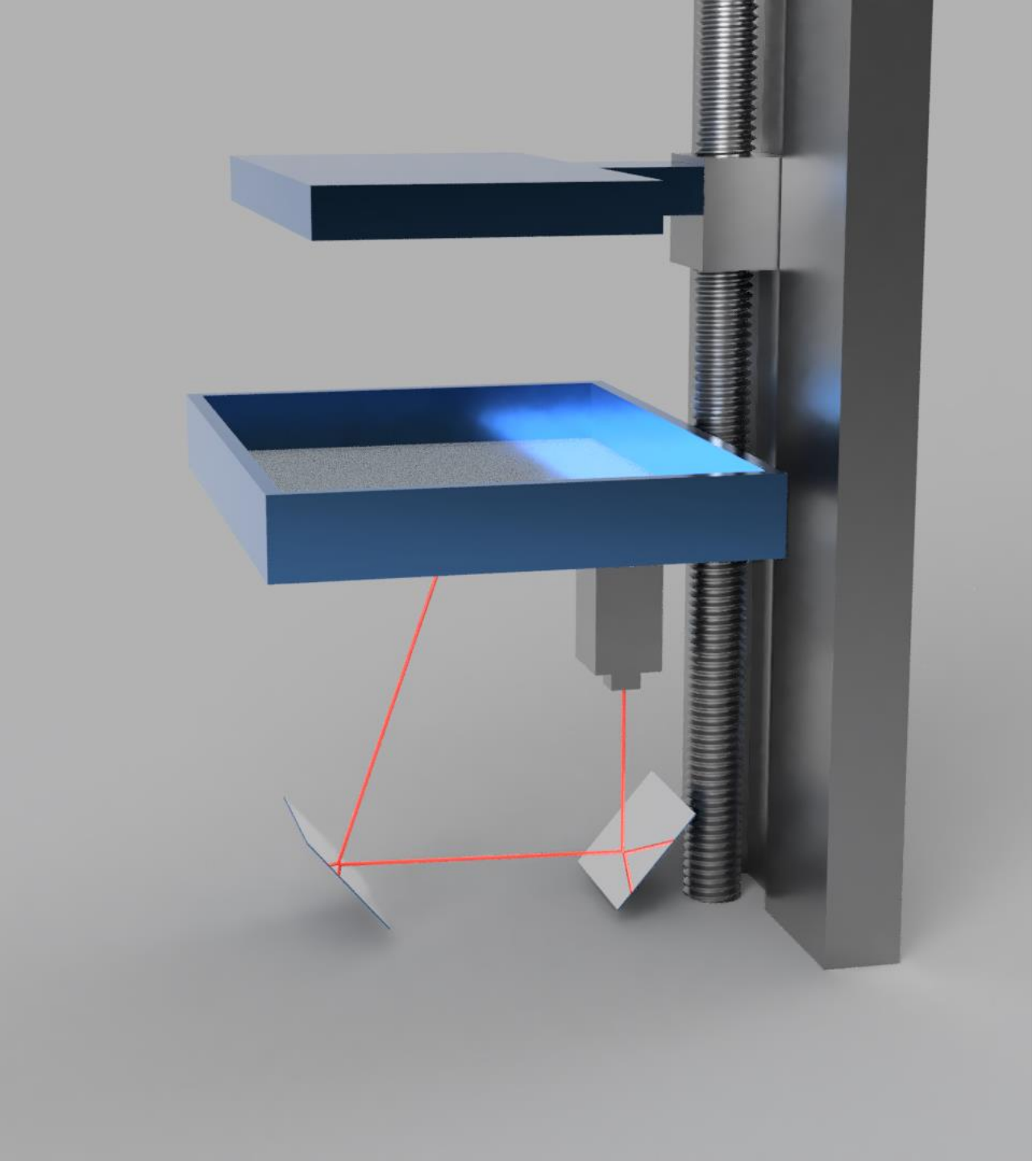

SLA

- SLA - Stereolithography
- Based on UV-laser which is moved with mirrors under the resin tank
- Build platform moves up and down

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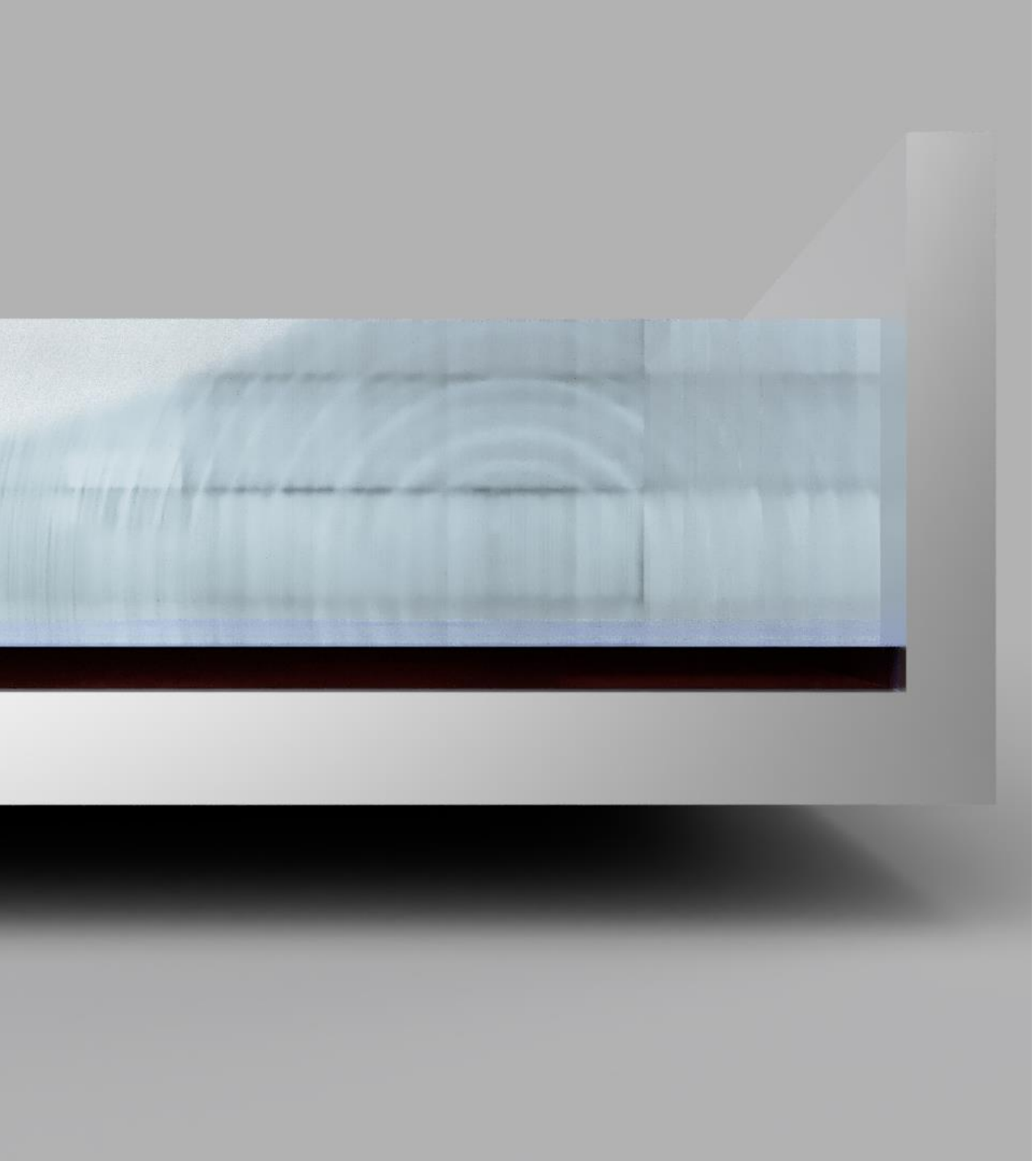

SLA - Resin tank

- Resin tank's shell is usually made from acrylic or metal
- Bottom of the resink tank is transparent and its coated with elastic coating
- Resin tank, build platform and the laser are consumable parts

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Printers

SLA

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Industrial printers (SLA)

3DSystems Prox 950

- XY-resolution 25 - 50 µm
- Z-resolution 25-100 µm
- Build volume1500 x 750 x 550 mm
- Price 500k €+

Stratasys Flex V650

- XY-resolution 127 µm
- Z-resolution min. 100 µm
- Build volume 508 x 584 x 508 mm
- Price200k+

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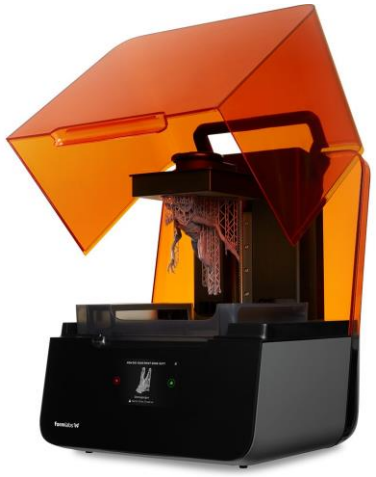
Consumer printers

Formlabs Form 3



- XY-resolution 25 µm
- Z-resolution 25 – 300 µm
- Build volume 145 x 145 x 185 mm
- Price 3500-4200 €

Peopoly Moai

- XY-resolution 70 µm
- Z-resolution 5 - 100 µm
- Build volume130 x 130 x 180 mm
- Price 1200 €

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Photopolymerization (M)SLA

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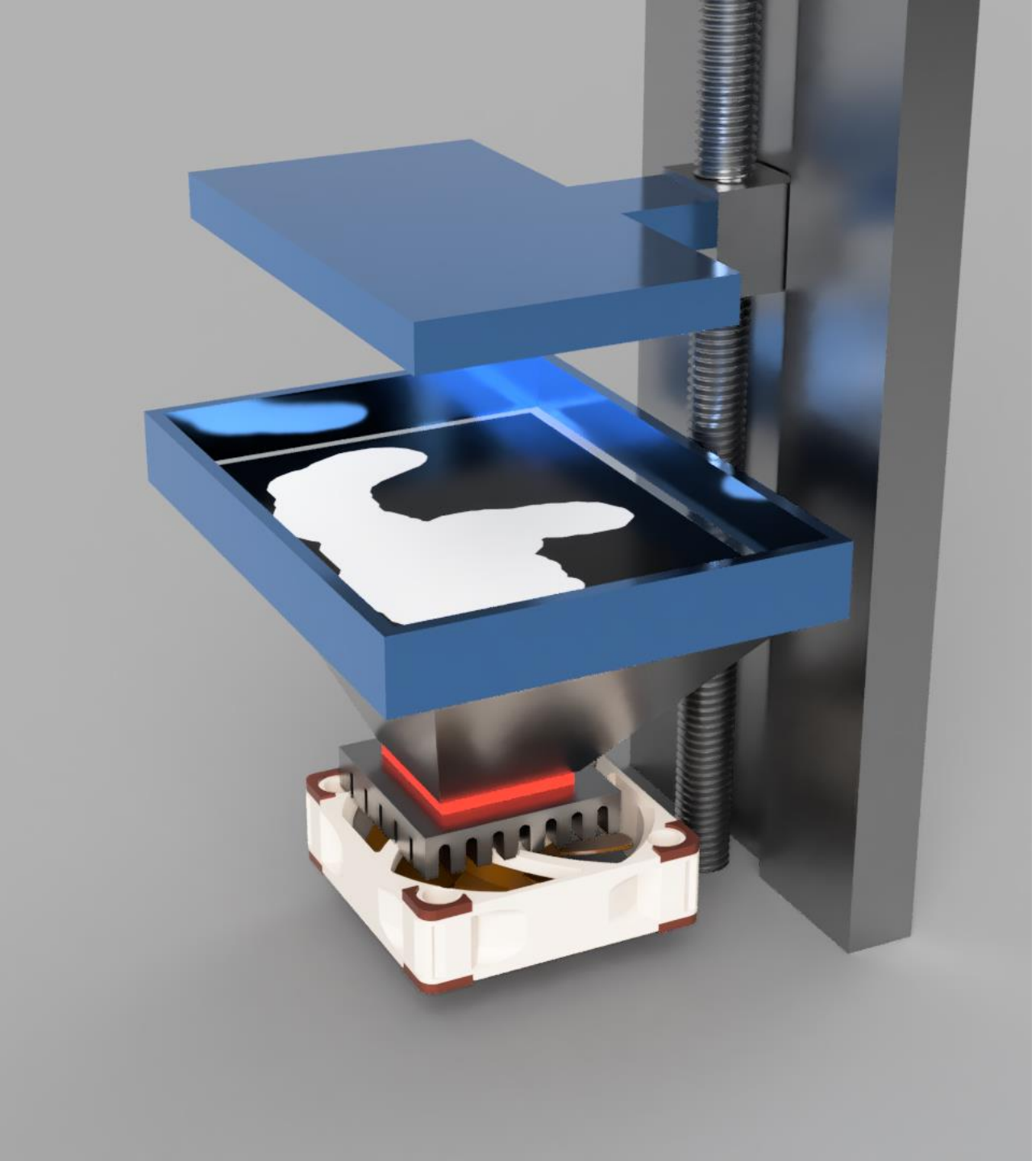

MSLA

- MSLA – Masked Stereolithography
- MSLA is based on UV-led which is directed to the bottom of the resin tank. Underneath the resin tank is an LCD-display
- Build platform moves up and down

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MSLA – Resin tank

- Resin tank's chassis is usually made out of metal, but there are some acrylic options
- Bottom is empty, there is a replacable FEP-film
- FEP-film, LCD-display, UV-led and build platform are consumable parts

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Printers

(M)SLA

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Industrial printers

- **3DSystems Figure 4**

- XY-resolution 25 - 50 µm
- Z-resolution 25-100 µm
- Build volume 125 x 70 x 346 mm
- Price 25k €+

Photocentric Magna

- XY-resolution 137 µm
- Z-resolution 25 – 200 µm
- Build volume 510 x 280 x 350 mm
- Price 22000€

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Consumer printers

Peopoly Phenom

- XY-resolution 72 µm
- Z-resolution 50 - 100 µm
- Build volume 276 x 155 x 400 mm
- Price 2300 €

Elegoo Mars

- XY-resolution 47 µm
- Z-resolution 12.5 µm
- Build volume 120 x 68 x 155 mm
- Price 260 €

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Photopolymerization DLP

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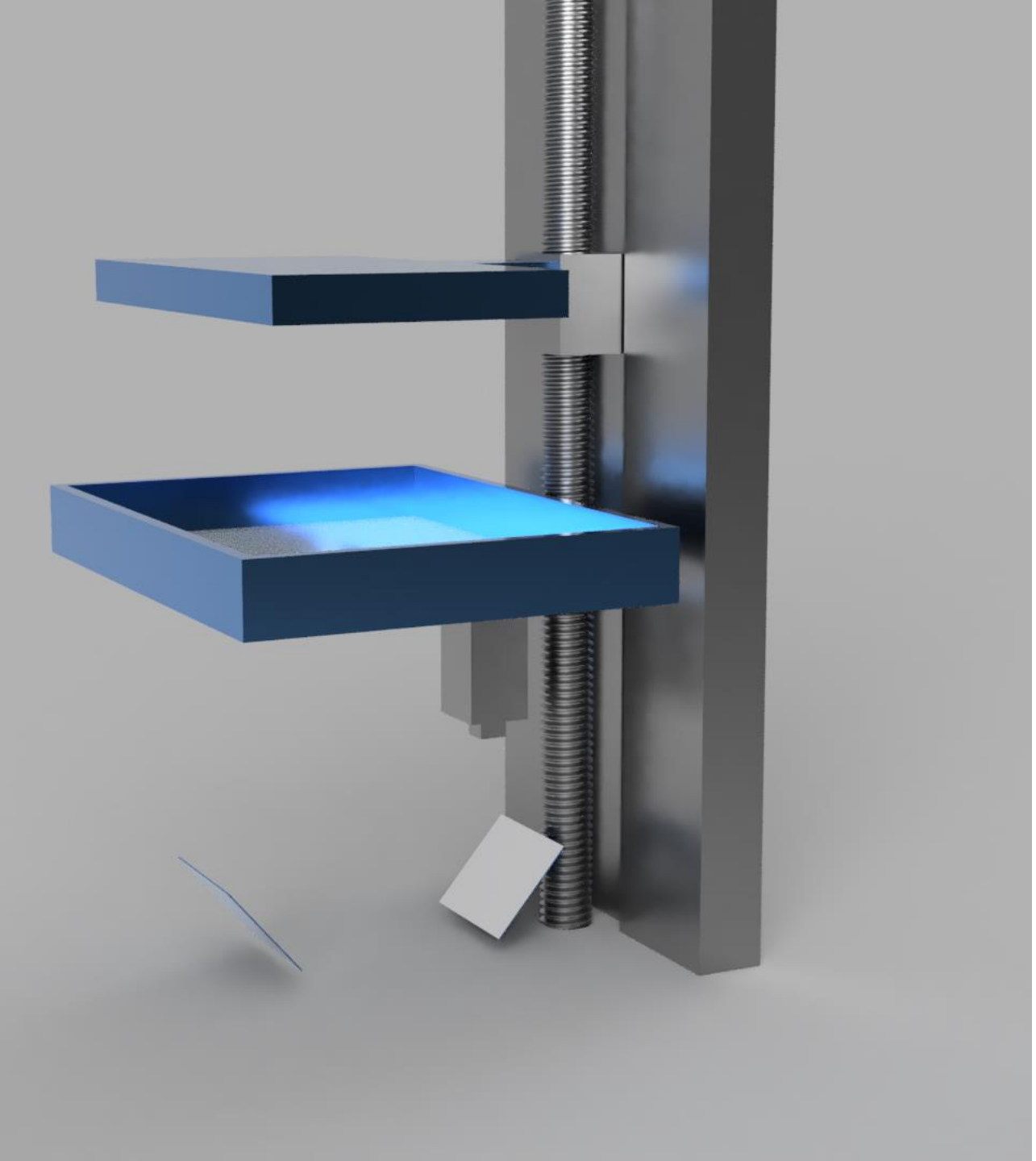

DLP

- DLP – Digital Light Processing
- Basically the same than the others, but there’s a projector which lights the resin
- The resin is a bit different than in the other printers
- Rarer method nowadays because of development of MSLA
- Build platform moves up and down

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DLP – Resin tank

- Resin tank is either acrylic or metal
- Projector’s lamp is consumable
- Build platform is consumable

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Applications

SLA / (M)SLA / DLP

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Small figures

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https://formlabs.com/blog/3d-printing-your-engagement-ring/

Jewelry

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Cast Urethane for the Film Industry
Challenge: Quickly create master tooling for Cast Urethane
Technology: SLA Accura® 55
Build time: 3 Days
Results: Speeding up of prop and costume manufacture in a highly time sensitive environment

Molds

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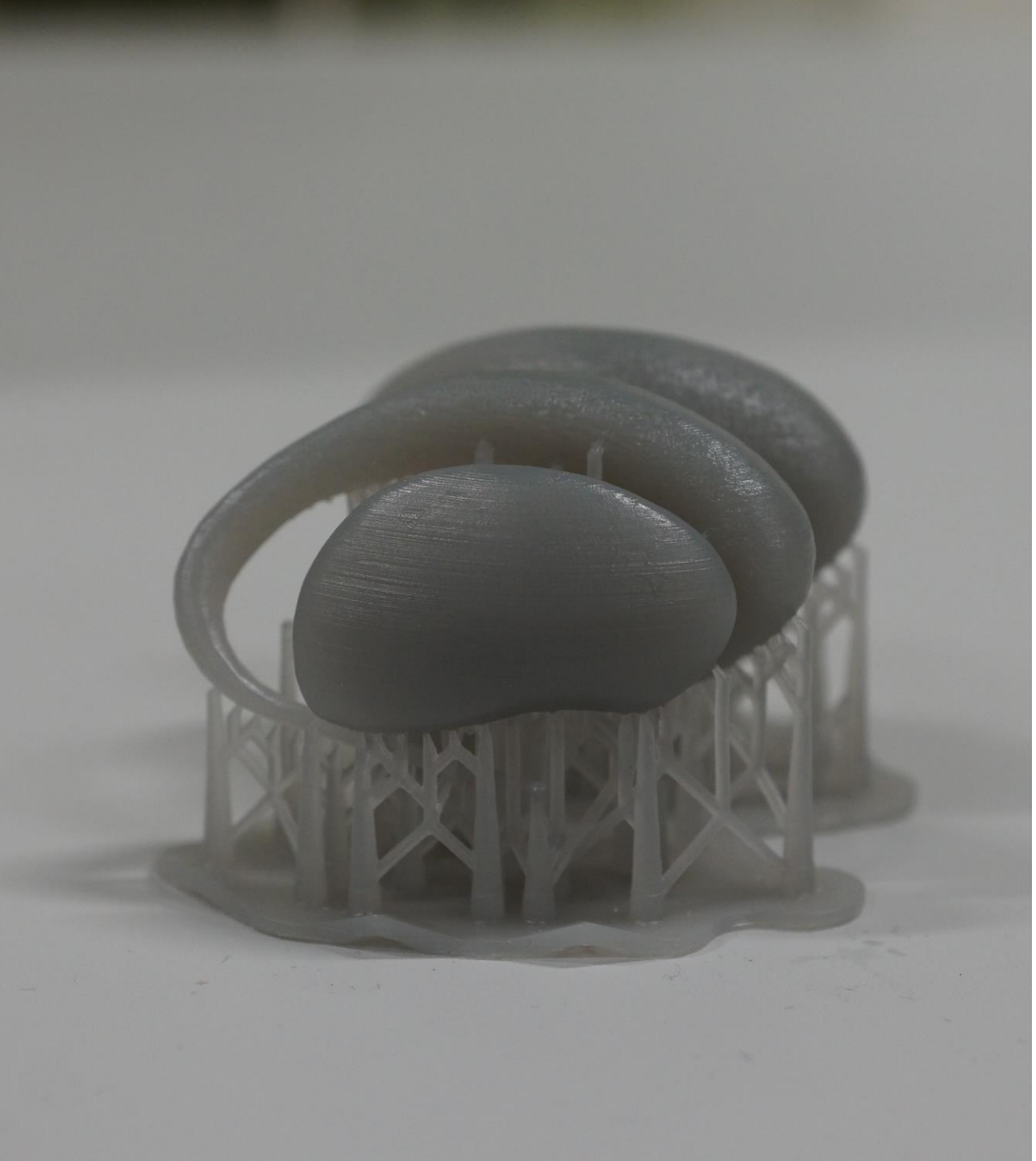

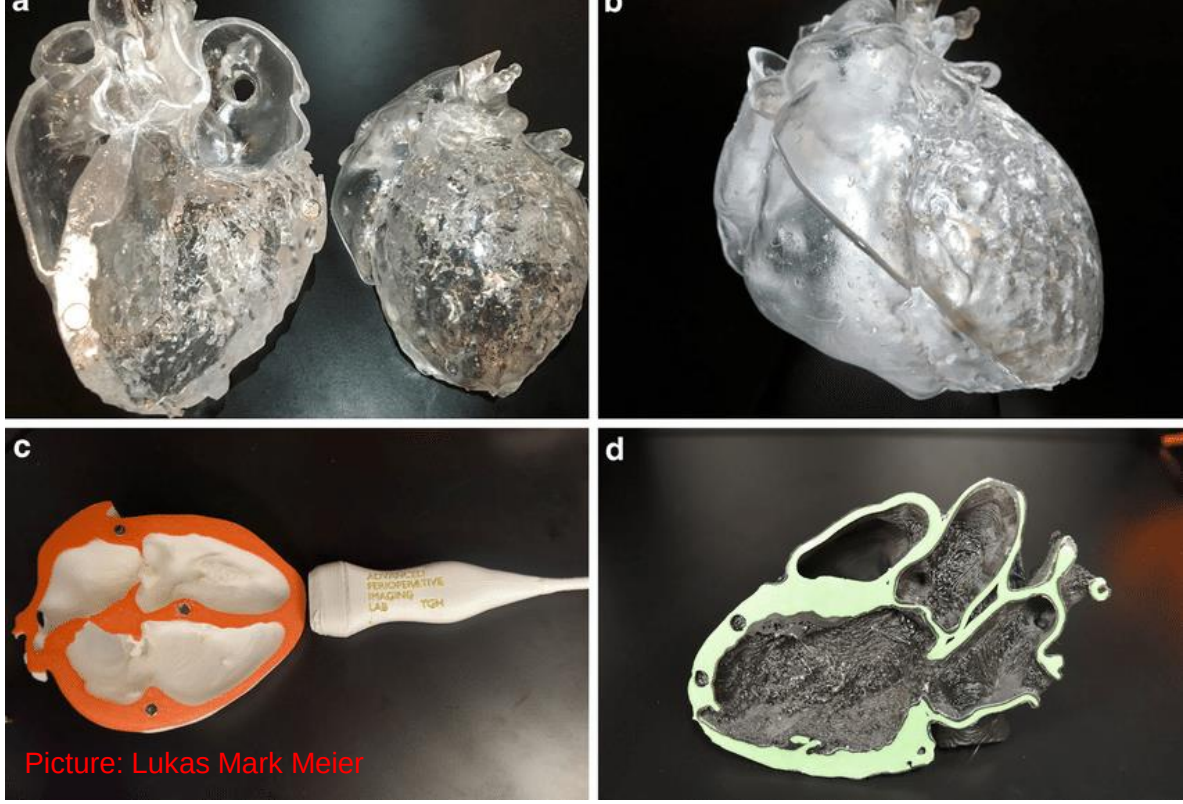

Education

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Picture : 3dogg.com

Picture: 3dogg.com

Dental

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SLA/MSLA/DLP

- Printing “always” requires supports
- Printing temperature should be +20ºC - +30ºC
- Correct orientation for the print
- Materials

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Pros vs cons

Pros

- Printing speed (MSLA and DLP)
- Accuracy and details
- Relatively cheap way to start printing
- Consumable parts are easy to change
- New materials being developed
- Easy to post process
- For mass production (?)

Cons

- Materials may not meet industry standards
- *Always* requires support
- Consumable parts cost money (Formlabs, Peopoly, Photocentric)
- Chemicals
- UV-light
- Buid volume
- Must-do-things after printing
- UV keeps hardening the print
  - -> Should be coated
- Most materials are hard (Common ones)
  - -> Break easily

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