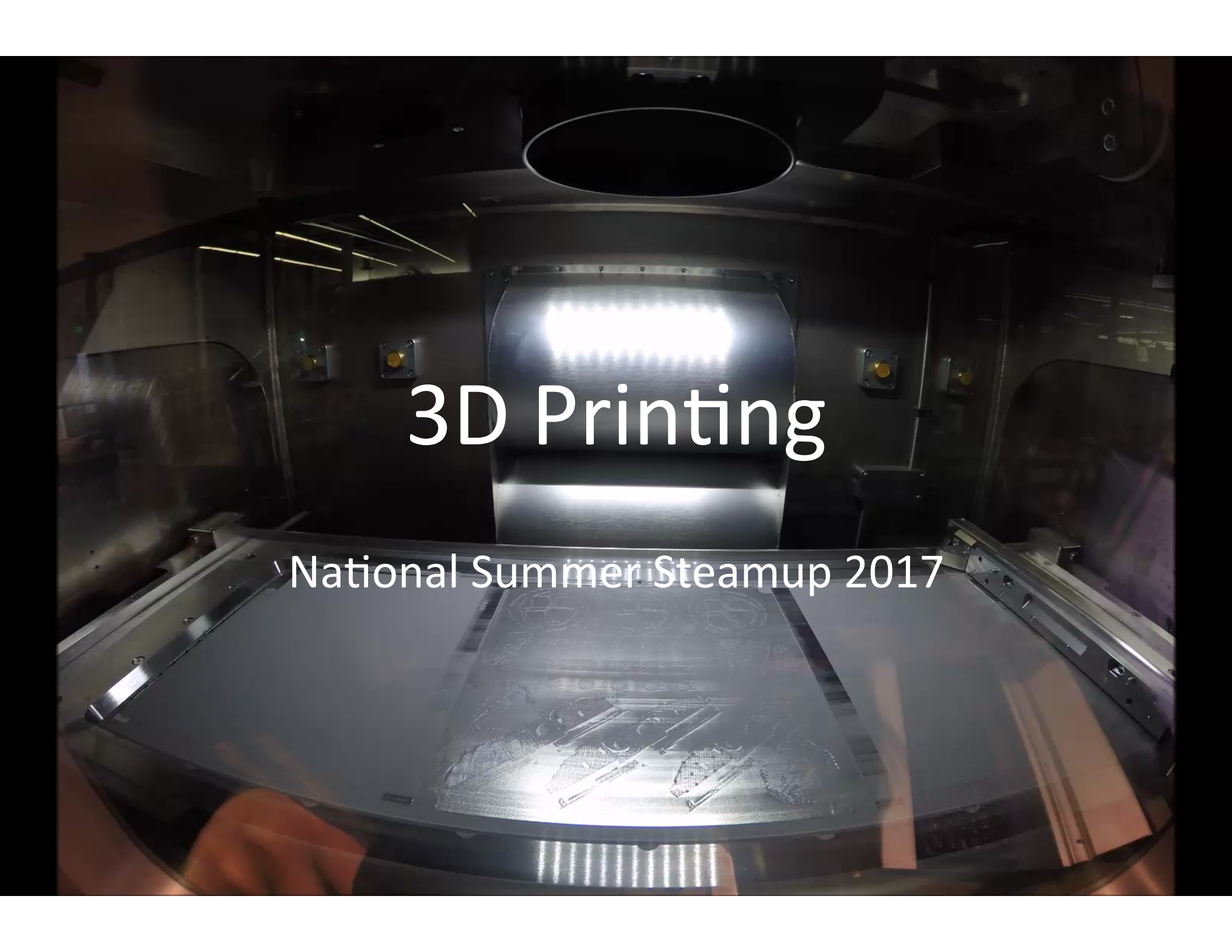


A large industrial 3D printer, likely a Selective Laser Melting (SLM) machine, is shown from a low angle. The machine's interior is dark, with a bright, glowing light source at the top center. The light source is a series of small, rectangular elements arranged in a horizontal row. Below the light source, a large, flat, metallic surface (the build platform) is visible. On this surface, a complex, metallic, 3D printed part is being built. The part has a complex, multi-layered structure with various geometric shapes and features. The machine's frame is made of dark metal, and there are several small, yellow, circular lights or sensors mounted on the sides. The overall scene is industrial and high-tech.

3D Printing

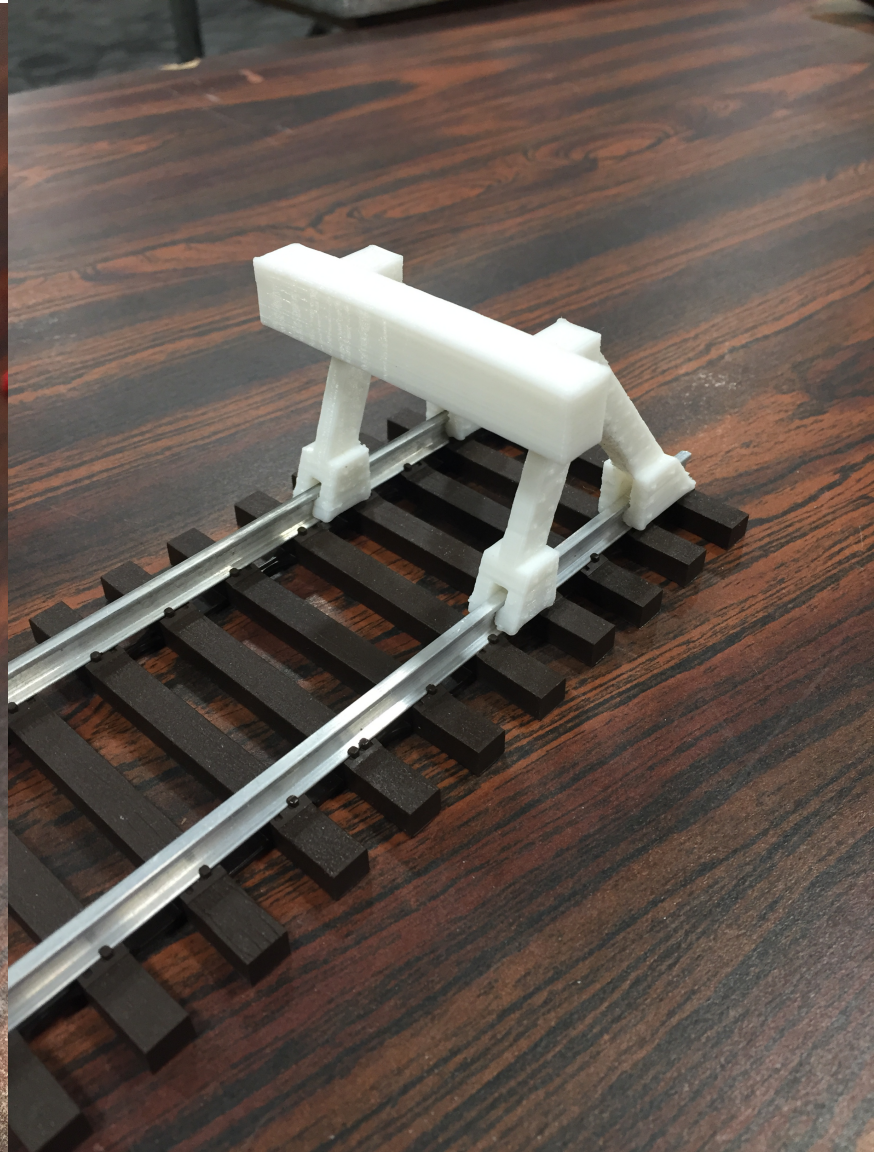
National Summer Steamup 2017

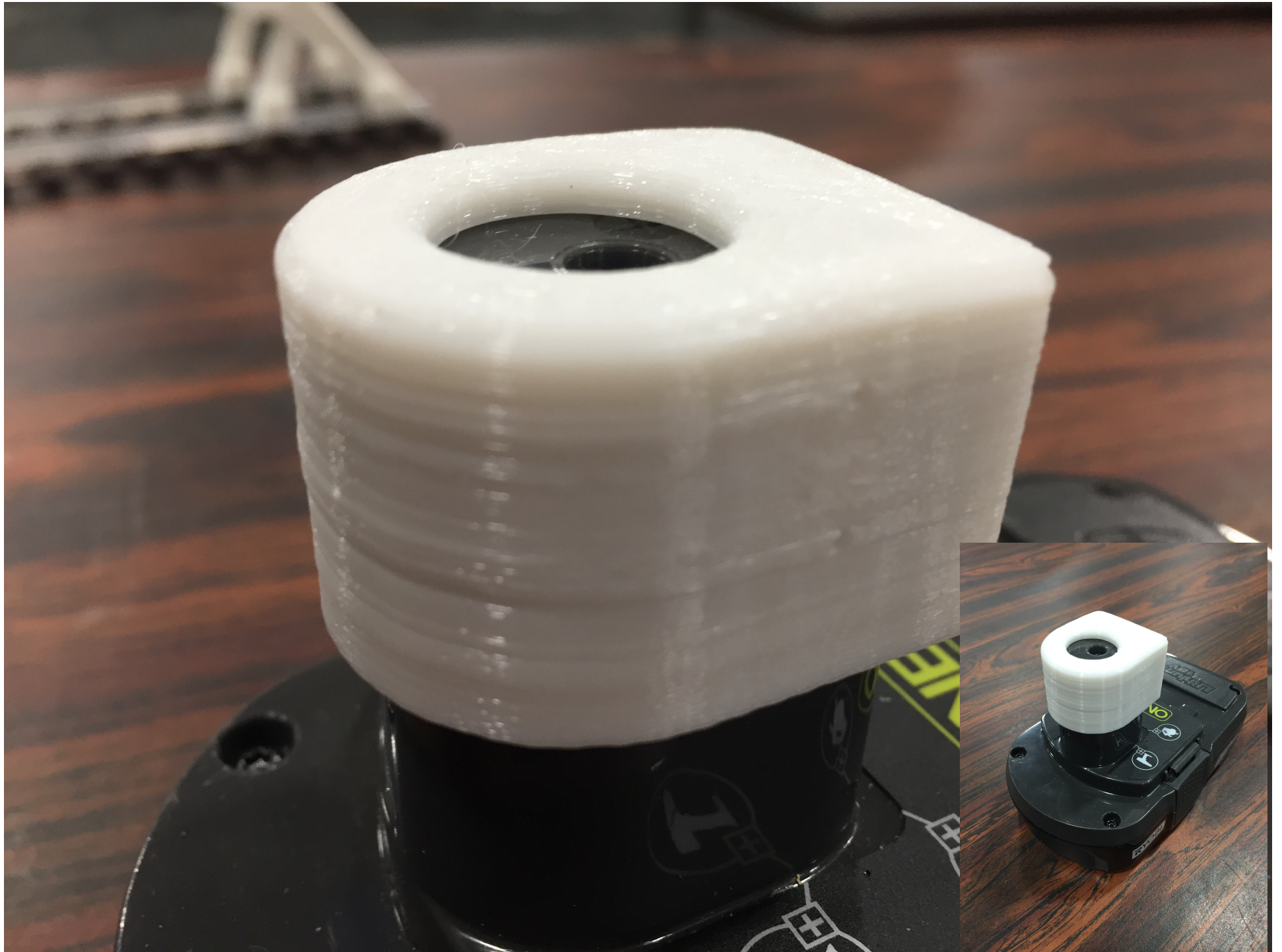
Types of 3D additive printer

- BJ – Binder Jetting (Powder/Resin)
- DLP – Digital light processing (Photoset Resin)
- EBM – Electron Beam Melting (Metal Powder)
- FDM – Fused Deposition Modeling (PLA, ABS...)
- LOM – Laminated Object Manufacturing (Paper)
- MJ – Material Jetting / Wax casting (Wax, Food)
- SLA – Stereo lithography (Photoset Resin)
- SLM – Selective Laser Melting (Plastic / Metal)
- SLS – Selective Laser Sintering (Metal)
- <https://all3dp.com/types-of-3d-printer-technology-explained/>

Most common FDM

- Most consumer 3D printers are Fused Deposition Modeling
- Extruded plastic.
 - ABS Acrylonitrile Butadiene Styrene (Like plastic models)
 - PLA Polylactic Acid (Biodegradable)
 - PVA Polyvinyl Alcohol (Water soluble) for support
 - PET PolyEthylene Terephthalate
 - Wood
 - Metal
 - Many more...
 - <https://www.allthat3d.com/3d-printer-filament/>





FDM Printers

Available to the hobbyist...

- Makerbot -- <https://www.makerbot.com>
- BoxZY (Also CNC & Laser) -- <https://boxzy.com>
– \$\$\$
- Dremel -- <https://3dprinter.dremel.com>
– \$\$
- Ultimaker -- <https://ultimaker.com>
– \$
- Many more...

SLA / DLP Photoset Resin

Professional but beginning to be available to the hobbyists.

- Formlabs -- <https://formlabs.com>
 - \$\$
- ONO -- <https://www.ono3d.net>
 - \$
 - Uses your cell phone and in the future tablet.
- Many more...

EBM / SLS Metal Printers



EBM / SLS Metal samples



Software

- Model creation
 - Solidworks (Professional Windows \$\$\$)
 - Autodesk Fusion 360 (Free version for hobbyists)
 - <http://OnShape.com> (Web based)
 - Shapr3D (iPad Pro)
- Slicing
 - Slic3r
 - <https://all3dp.com/1/best-3d-slicer-software-3d-printer/>

Downloading Models to Print

- Thingiverse
- GrabCAD
- <https://all3dp.com/1/free-stl-files-3d-printer-models-3d-print-files-stl-download/>