Ready to Print in **3-D**?

Thanks to lower prices and increased availability for desktop 3-D printers—now might be the time to try 3-D printing at home. Here we look at some popular options. (For a look at the frontier of 3-D laser nanoprinting, see p. 28.)

3-D PRINT PROCESSES

Material jetting   Binder jetting   Directed energy deposition   Powder bed fusion

Sheet lamination   Vat photopolymerization   Material extrusion

Desktop models for hobbyists and enthusiasts

Professional-level desktop models

Affordable LCD-based versions now available

Vat Photopolymerization

3-D TECHNOLOGY: Stereolithography (SLA), digital light processing (DLP)

CREATING A 3-D OBJECT: A photo-polymer resin in a vat is selectively cured layer by layer, using a UV laser beam for SLA and a digital light projector for DLP

MATERIALS: Photosensitive thermoset polymers in a liquid form

PLUS/MINUS: Professional-quality smooth surface and fine details possible with high-end models, but generally more expensive than FDM

SLA, invented in 1986, was the first 3-D-printing technology

Material Extrusion

3-D TECHNOLOGY: Fused deposition modeling (FDM), also referred to as fused filament fabrication (FFF)

CREATING A 3-D OBJECT: Melted material is selectively deposited in a pre-determined path layer by layer

MATERIALS: Thermoplastic polymers in a filament form

PLUS/MINUS: Materials available in wide range of colors, easier to use and less expensive than other methods, but slower and results not as refined as SLA

FDM is the most widely used 3-D-printing technology

Powder Bed Fusion

3-D TECHNOLOGY: Selective laser sintering (SLS)

CREATING A 3-D OBJECT: A laser beam selectively melts and fuses tiny powder particles together layer by layer

MATERIALS: Thermoplastics, metal powders and ceramic powders

PLUS/MINUS: Professional-quality desktop options being created, but not yet available for home use due to powerful lasers and powders that require a controlled environment

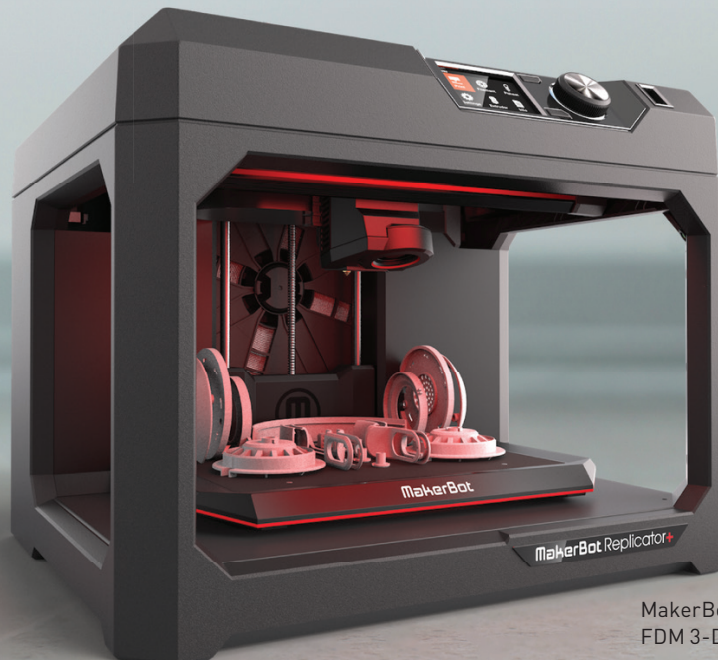**SLS is typically for professional and industrial uses**

3-D COMPARE PRINTERS

Compare 3-D printers by technology, cost and features

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www.tomsguide.com
https://all3dp.com

Ideas on what to print and downloadable designs

www.thingiverse.com
www.format.com

MakerBot Replicator+, FDM 3-D printer

Infographic by Alessia Kirkland / Sources: Wikipedia, www.aniwaa.com, www.tomsguide.com, https://all3dp.com