

3D PRINTING and PIXELS

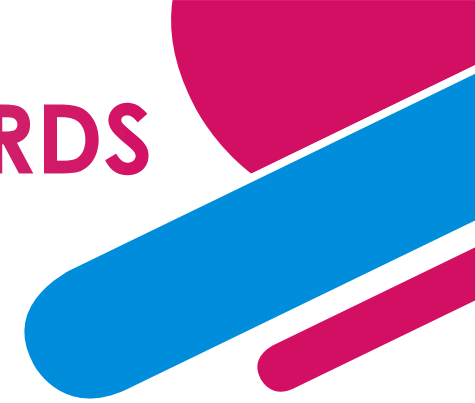
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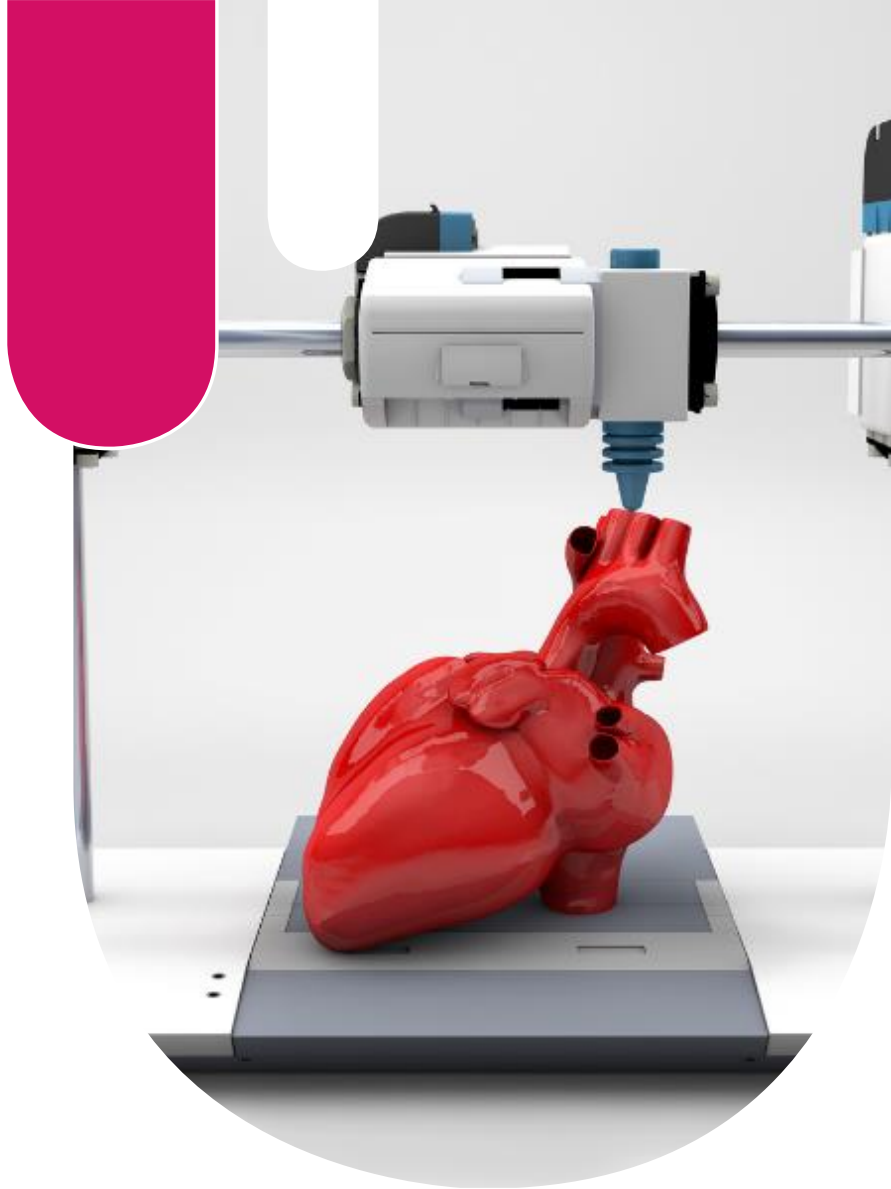


A PICTURE IS WORTH A THOUSAND WORDS



[itwinkle.org](https://www.itwinkle.org) > [Support](#) > [Christmas Lights Users Groups](#)





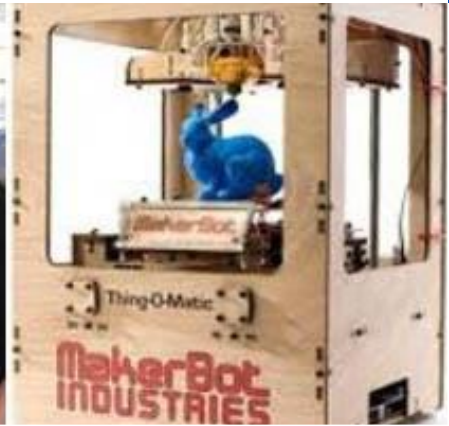
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- Christmas lights uses
- Design your own or buy
- Print your own or buy
- Where to find them
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HISTORY

It's been around longer than you think!



HISTORY

- **First idea in 1980**
photo-sensitive resin & UV light
- **First patent in 1986**
Charles “Chuck” Hall of 3D Systems
- **Patent expired in 2009**
anyone can sell a 3D printer

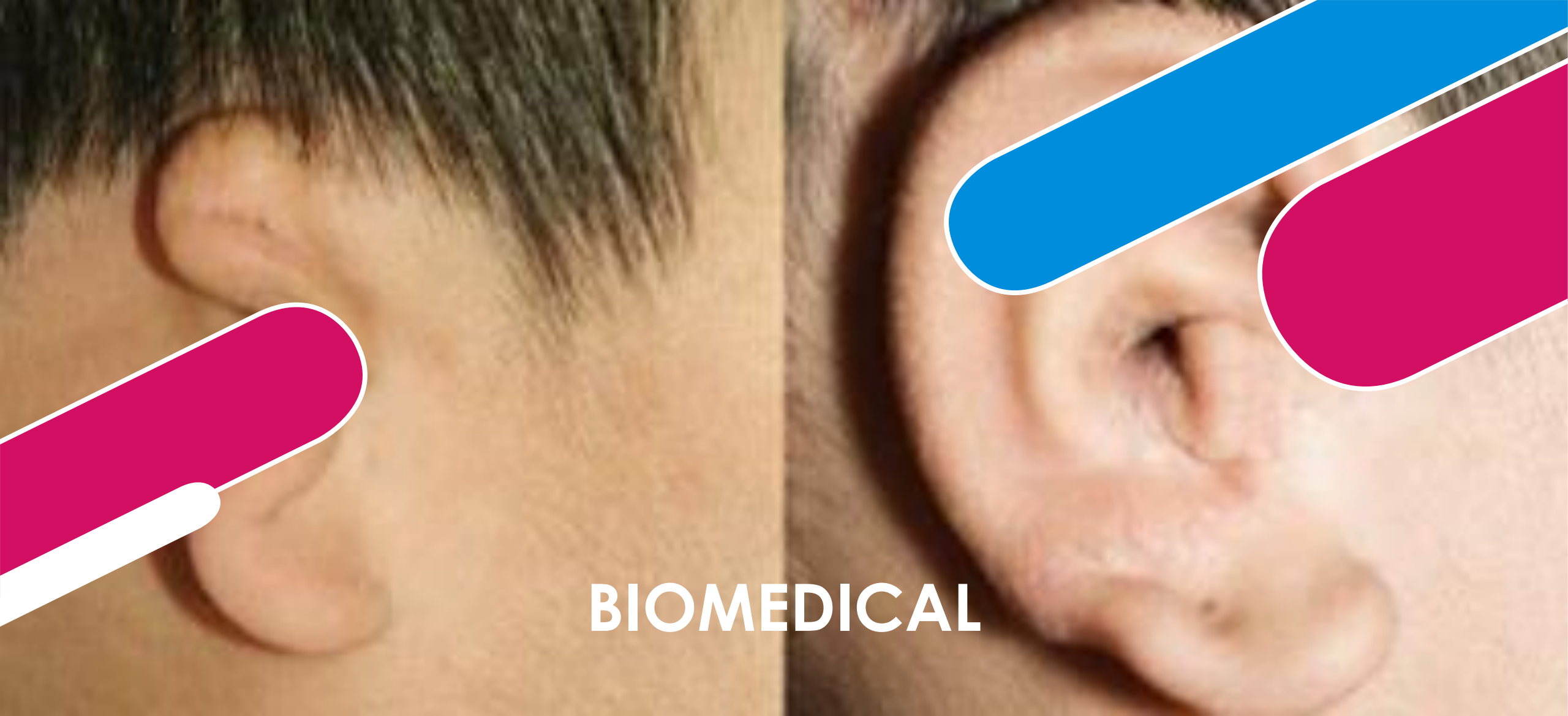




CONSTRUCTION

3D printed houses for less cost and faster time

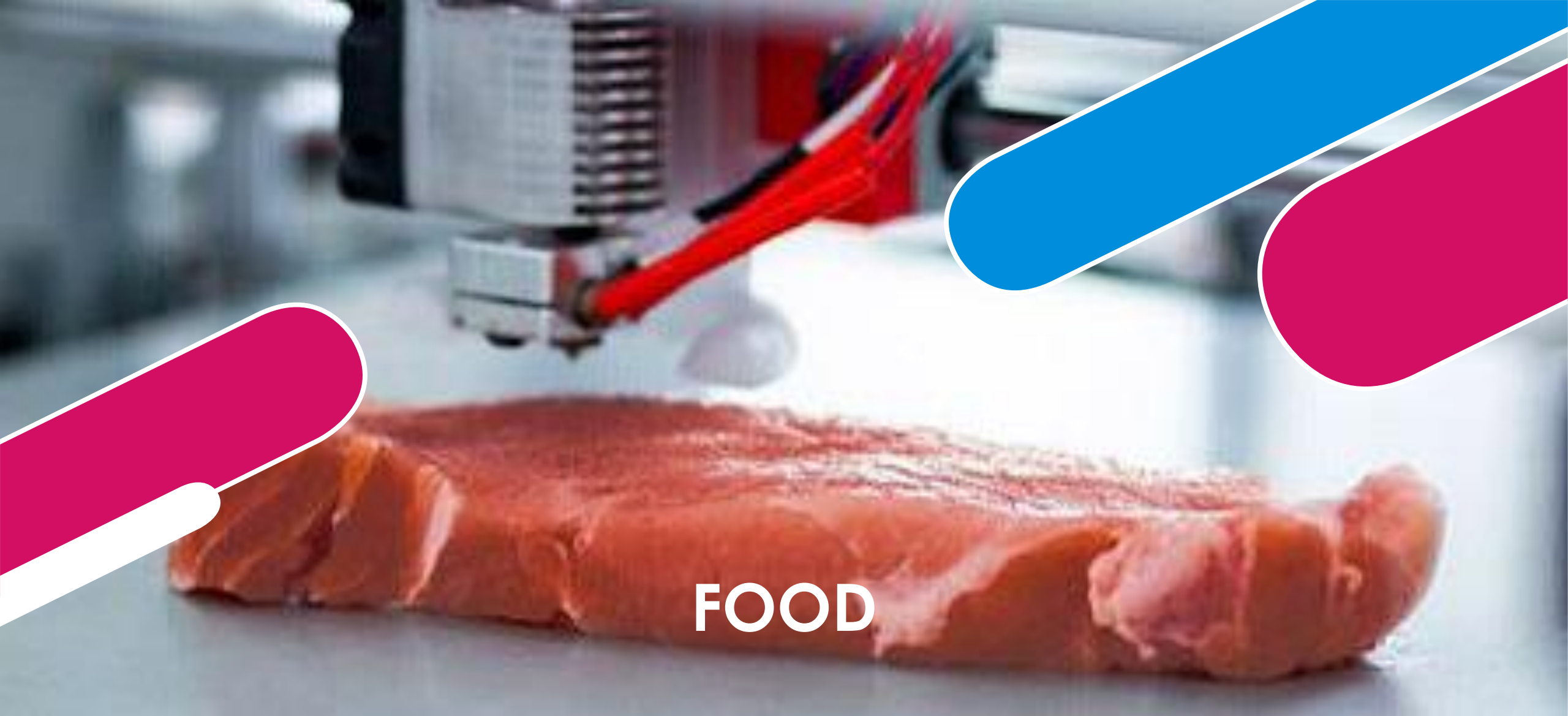




BIOMEDICAL

3D printed ear made from biomaterials





FOOD

3D printed Japanese Wagyu beef



HOW THEY WORK

From idea on computer screen to printed reality



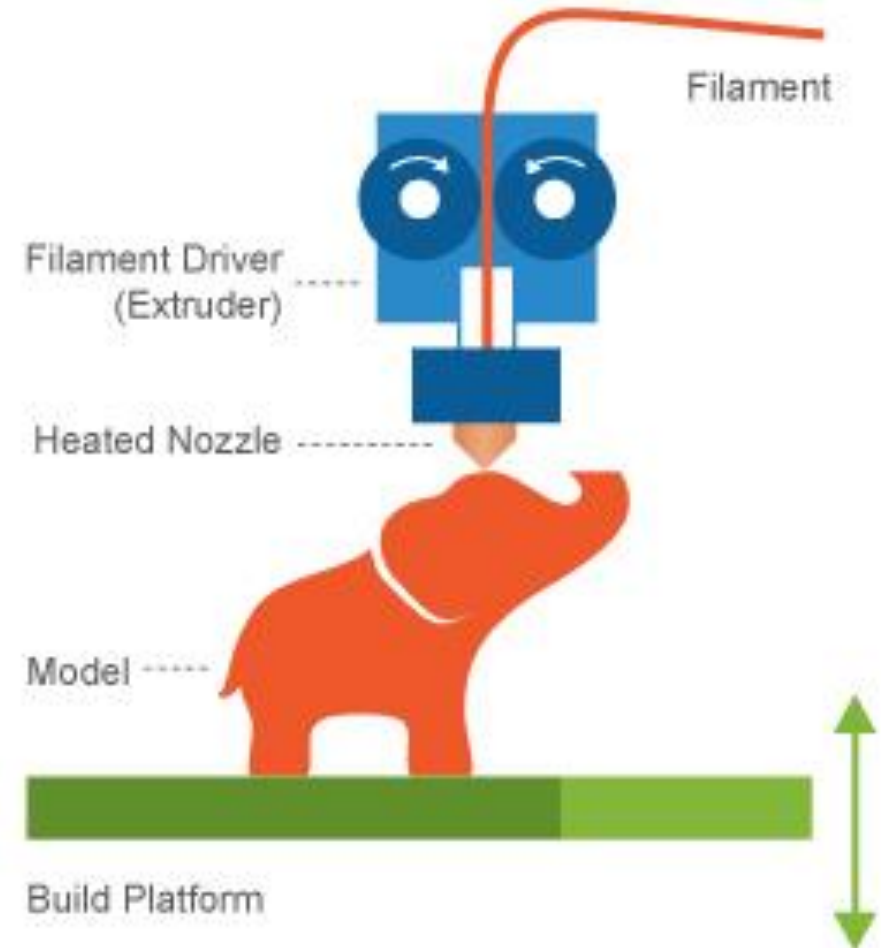
HOW THEY WORK

- **Similar ideas**
ice cream machine
glue gun
additive vs subtractive



HOW THEY WORK

- **Temperature**
nozzle up to 250°C
bed adhesion
- **Layers**
0.2mm common
thicker layers = faster



FILAMENT TYPES

- **PLA**

Low temp, brittle, outside maybe, easy to print

- **ABS**

High temp, strong, outside friendly not UV safe, warping & cracking

- **PETG**

High temp, strong, outside friendly, UV safe, somewhat easy to print



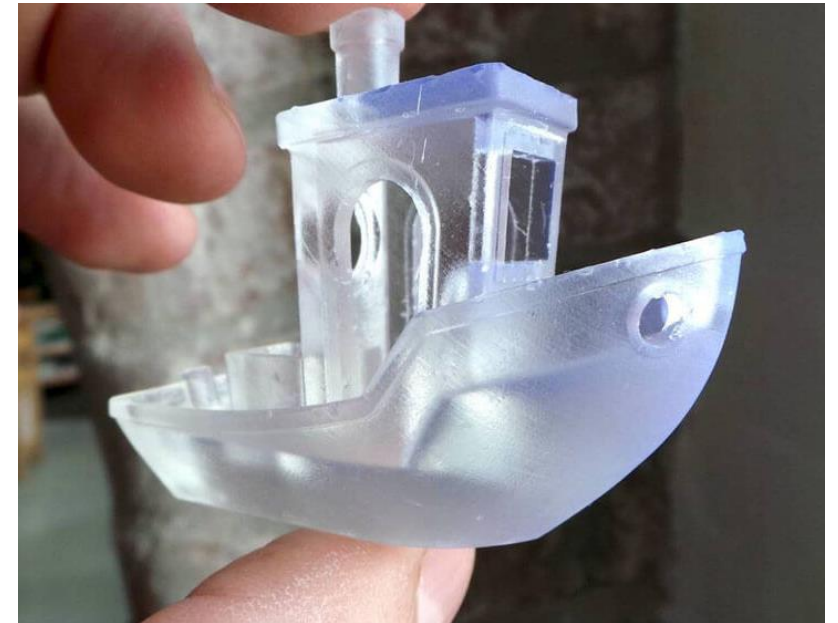
FILAMENT TYPES

- **TRANSPARENT**

Tricky to get “clear”, PLA/PETG, nozzle temp, fan cooling, thin layers, vase mode

- **TPU**

Rubber-like, shore hardness, very strong, NinjaFlex



3D PRINTING SOFTWARE

- “Slicer”

Converts shape (.STL file) into printer movements
(.gcode file)

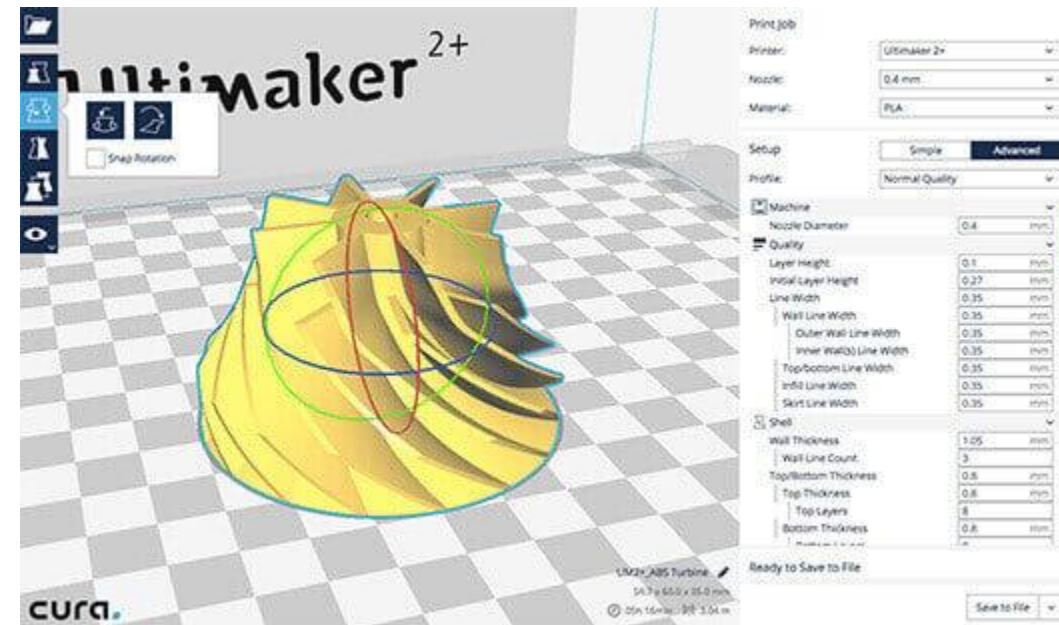
Come with printer

- **Types**

Proprietary

Universal

Cura, PrusaSlicer, others



3D PRINTING SOFTWARE

- **Common software settings**

Infill

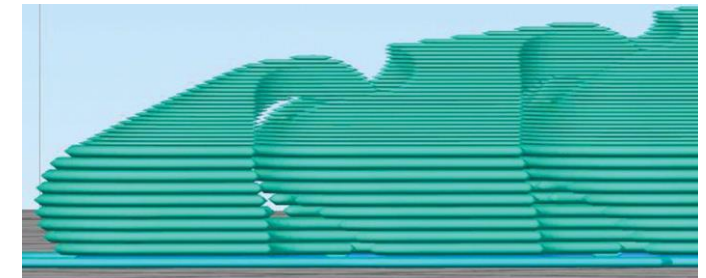
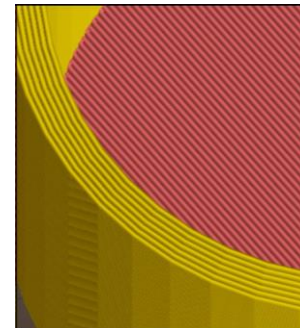
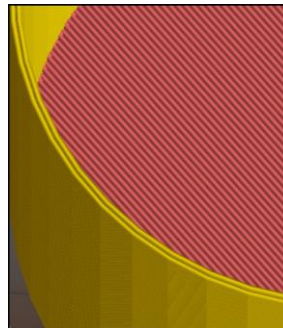
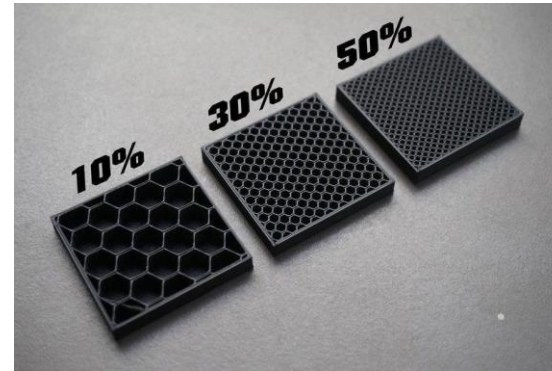
Supports

Perimeters, vertical shells

Layer height

Filament type

Your favorites?



CHRISTMAS LIGHTS USES

How 3D printing can simplify and improve what you do



WHAT CAN YOU MAKE?

- **House clips**

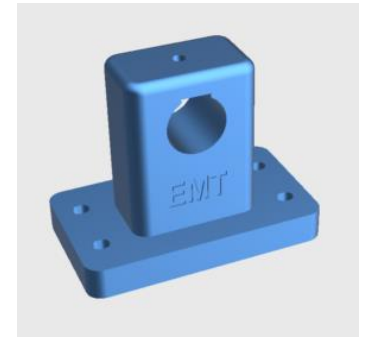
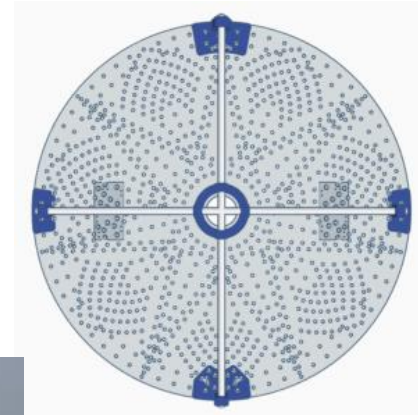
Gutter, shingle, eaves, siding

- **Conduit attachments**

House mounts, pixel clips

- **Prop mounts**

House/yard mounts, coro braces



WHAT CAN YOU MAKE?

- **Tools**
Pixel pushers/jigs
- **New props**
Stars, spinners, candy canes
- **Modify traditional props**
Spiral trees, RBLs
- **Controller/power supply mounts**



3D PRINTING VS. TRADITIONAL

- **3D printing**

Small

Repetitive

Complicated

Custom



- **Traditional**

Large, strong parts



DESIGN YOUR OWN OR BUY

Making custom parts yourself or buying premade ones



WHERE TO FIND DESIGNS

- **Facebook**

[Official xLights Sharing Group](#)

[Official xLights Support Group](#)

[3D Printing For True Holiday Light Enthusiasts](#)

[3D Printing For Holiday Lighting Enthusiasts Group.](#)

- **3D printing repositories**

thingiverse.com

printables.com



Printables
by JOSEF PRUSA

WHERE TO FIND DESIGNS

- Christmas lighting vendors

[Flash The Neighbors](#)

[Inspire Light Shows](#)

[JustinZDesign](#)

[SFL Designs](#)

[Your Pixel Store](#)



DESIGNING SHAPES



- **Beginner 3D design software**

tinkercad.com

- **Next-level software**

Fusion 360

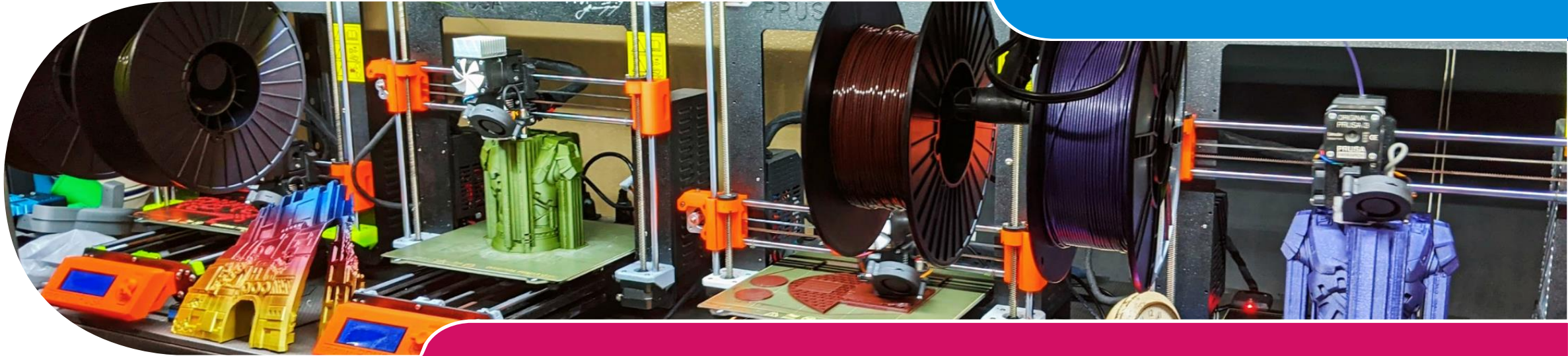
(free personal/hobbyist license)

YouTube is a great way to learn!



PRINT YOUR OWN OR BUY

Should you own a 3D printer or buy parts preprinted?



PRINT YOURSELF OR PREPRINTED?

- **Buy a printer**

Printer & filament cost, machine repair/maintenance, time to print

- **3D printing services**

wide variety of materials

shapeways.com

craftcloud.com

treatstock.com

shapeways[★]



Craftcloud[®]



TREATSTOCK

WHERE TO FIND THEM

Buy, borrow, or build one yourself



WHERE TO FIND THEM

- **Where to buy**
Amazon, Micro Center
- **Best ready-to-run**
Prusa, Bambu
- **Best budget**
Ender
- **Buyer's guide:** [All3DP.com](https://www.all3dp.com)



MAKERSPACE COMMUNITY

Be part of the maker movement!



MAKERSPACE COMMUNITY

- **Traditional and modern tools**
Wood/metalwork, 3D printers, laser cutters, electronics, sewing
- **Classes & workshops**
- **Make friends, build community**
People of different backgrounds helping each other



MAKERSPACE COMMUNITY



- **Area Makerspaces**

- Columbus Idea Foundry*

- *65,000 sqft facility*
 - *Space and tools for any project from electronics to blacksmithing*
 - *\$85/month membership*



ideafoundry.com



MAKERSPACE COMMUNITY

- **Area Makerspaces**

- Columbus Makerspace*

- *Wood tools, large CNC, 100W laser cutter, mini forge & kiln, 3D printer*
 - *\$55/month membership*



cloudha.us



MAKERSPACE COMMUNITY

- **Area Makerspaces**

- Libraries*

- *Marion Public Library
Makerspace*

- marionpubliclibrary.org/makerspace*

- *Mansfield/Richland County
Public Library*

- richlandlibrary.com/makerspace-workshop*



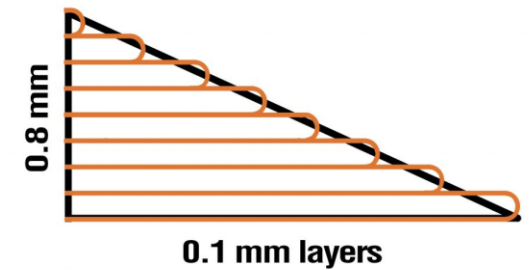
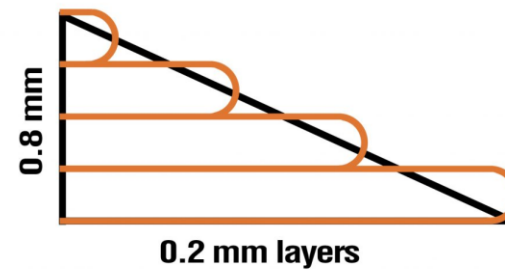
PRINTING TIPS

Advice for successful 3D printing



PRINTING LARGE OBJECTS

- **Nozzle size**
*fewer layers, less detail,
0.04-1.0+mm, strong heat bloc*
- **Filament type**
PLA ← PETG ← ABS
- **(Heated) enclosure**
*Reduced warping
& cracking*



FIRST LAYER IS IMPORTANT!

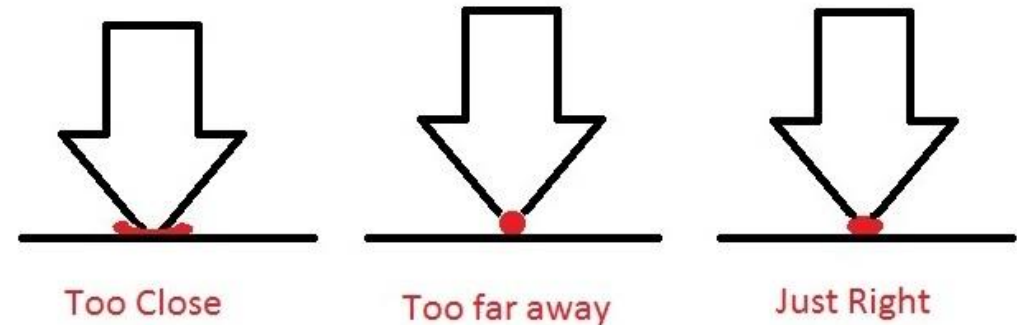
- **Why?**

- *Nozzle too high, part comes loose during printing*

- *Nozzle too low, elephant's foot, affects layer fusing*

- *Filament must slightly squish into bed*

- *Test height with two sheets of paper*



FIRST LAYER IS IMPORTANT!

- **Bed type**

Glass, PEI (powered coated vs. laminate)

Rigid vs. flexible

- **Adhesion**

Glue stick, Kapton tape, painter's tape, hairspray, ABS slurry, none



FIRST LAYER IS IMPORTANT!

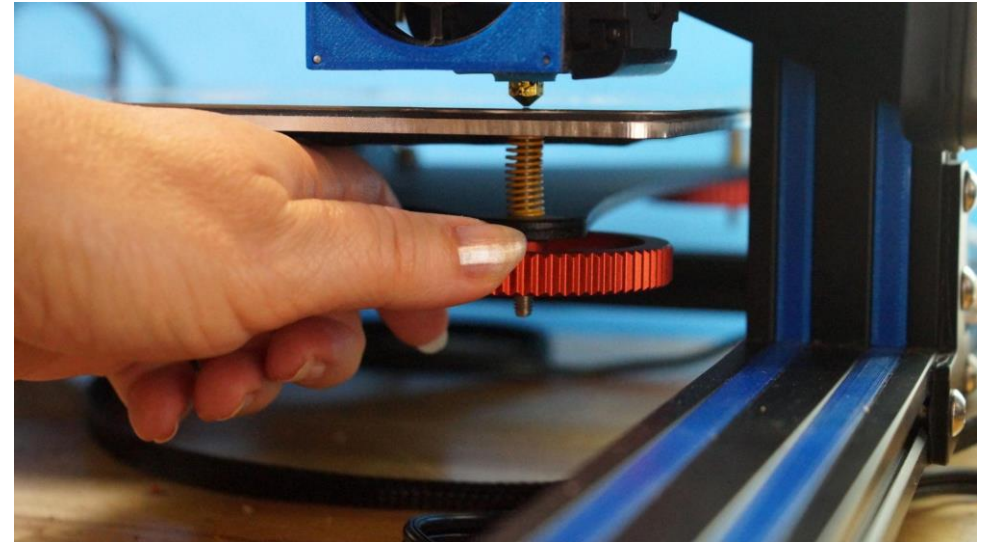
- **Prep**

*Level bed (manual/probe/
load cell)*

Skirt/brim/raft



*Clean surface
(hand oil, rubbing alcohol)*



WANT TO KNOW MORE?


Get more information about 3D printing




WANT TO KNOW MORE?



- **All3DP.com**
get on their mailing list
- **Facebook support groups**
- **Makerspaces**



ALL3DP
ALL ABOUT 3D PRINTING





QUESTIONS?



THANK YOU!

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