

3D PRINTERS

FUTURE TECHNOLOGY



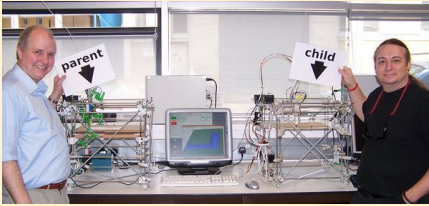
FRANCESCA LEONETTI

TABLE OF CONTENTS

1 ----- TABLE OF CONTENTS
2 ----- 3D PRINTERS
4 ----- FUNCTIONING
6 ----- USES IN THE MEDICAL FIELD
8 ----- USES IN THE AEROSPACE FIELD
10 ----- TIPS SECTION
11 ----- SOURCES



3D PRINTERS

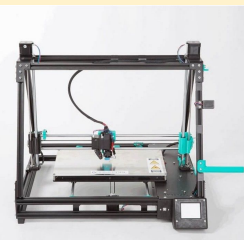
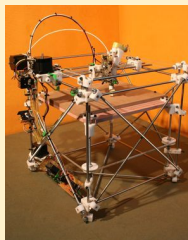


3D printers are the evolution of the two dimensional printers and they are based

on 3 axes (x, y and z). The idea of this tool was born from the RepRap project with the first draft in 2004, by Adrian Bowyer.

There are different types of 3D printers but the biggest difference is between the industrial ones and the home ones. The most famous types are:

- Darwin
- Mendel



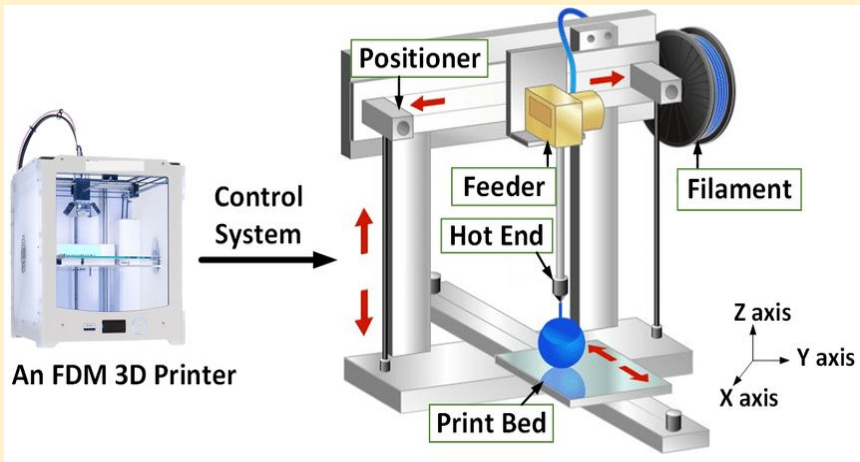
The main parts of 3D printers are the extruder from which the filament comes out and the bed on which the final model will be dropped.

3D printers differ also on the type of material they use. Focusing on the ones which focus on the use of filament, the most used ones are:

- ABS * (Acrylonitrile butadiene styrene)
- PLA * (Poly (Lactic Acid))



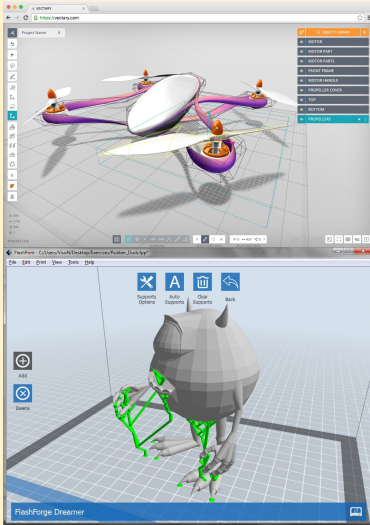
FUNCTIONING



When printing using a filament 3D printer:

- The extruder and the bed heat up
- The filament exits from the extruder and positions on the bed
- The object is printed in layers

To be able to print a model there are some steps to follow:



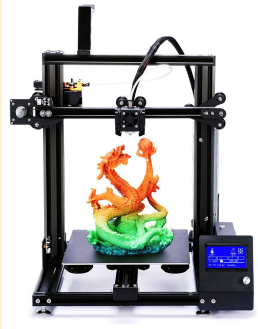
On the computer:

→ use a software to design the object in 3D (any software is fine, to start I suggest "TinkerCAD")

→ use a software to plan the printing and send the model to the tool (to start I suggest "Simplify 3D")

On the printer:

- set the temperatures
- check the calibrations
- position the extruder and bed
- print the object and...



ENJOY YOUR CREATION!!!

USES IN THE MEDICAL FIELD

Image: iStockphoto.com



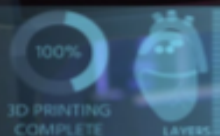
Image: iStockphoto.com

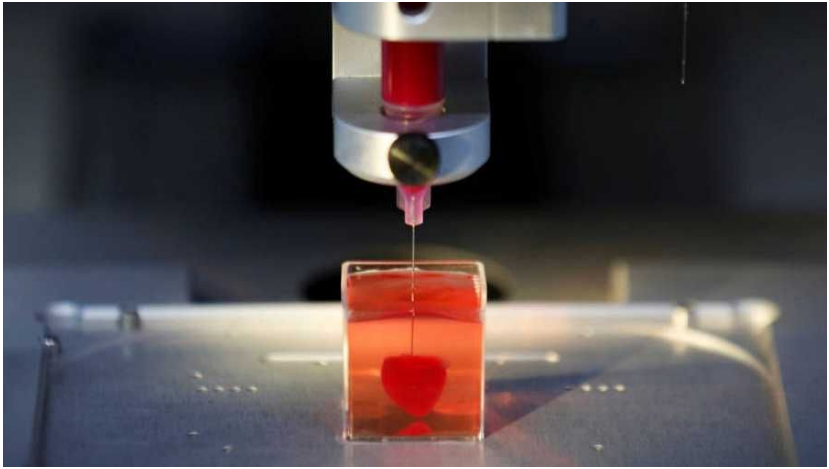


**PERSONALIZED
ORGANS!!!**



CREATION OF A LIVING HEART!!!





Since 2013, 3D printers have been used in the medical field. Prostheses are made using patients cells and are perfect for the use of patients. A bio-ink is used to create the organs and each of them is personalized.

In Spain, an aorta was created in 10 hours and the operation was a success. Kidneys and livers are already existing and used for medical research. A miniature heart was created and it pumped, in the future it will be used also for transplants.

USES IN THE AEROSPACE FIELD

LIVE IN SPACE
WITHOUT
NEED OF
EARTH!!!

3D PRINTERS WORKING AT 0 GRAVITY?!!

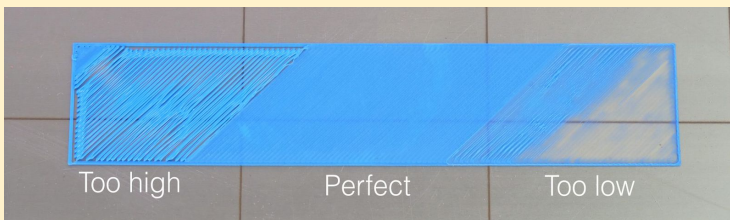


On the 21st to September 2014 the first 3D printer was sent to the International Space Station. It took three years for their constructors to make it ready for the space. Many trials were done to make it work efficiently at 0 gravity, to make it possible to manufacture products off the surface of the planet.

This permits to see everything different, people will be able to live in space without the necessity of contact with the Earth.

TIPS SECTION

- If the model you are printing is not remaining attached to the bed while printing → clean the bed with a soft cloth with alcohol
- Always insert and remove the filament with the heated extruder
- If the filament doesn't get out fluidly → heat the extruder to 200°C, then let it cool till around 100°C and pull the filament out (the ending part will be the residues of the printings) (if the problem persists bring it to someone to be checked)
- If the extruder is not coming out properly (not attached or very thin) or the printer is making a strange noise check the calibration
 - Use a paper and pass the extruder over it, there should be a very small friction (not more and not less)
- When not using it, place the filament in a dark place (it changes color)



SOURCES FOR FURTHER INFORMATION

- Engelhaupt, Erika. "Scientists Use 3-D Printers to Make Body Parts." *National Geographic*, 20 Feb. 2018, www.nationalgeographic.com/magazine/2018/03/explore-wellness-3d-printing-body-parts/.
- Thingiverse.com. (n.d.). Digital Designs for Physical Objects. Retrieved September 10, 2020, from <https://www.thingiverse.com/>
- Tinkercad login. (n.d.). Retrieved September 10, 2020, from <https://www.tinkercad.com/login>
- Calderan, P. (2015). *Stampa 3D: Il manuale per hobbisti e maker*. Milano: Apogeo.
- Made in Space: 3-D Printing Could Change the Way Astronauts Travel. (n.d.). Retrieved September 25, 2020, from <https://video.nationalgeographic.com/video/short-film-showcase/00000157-9fc5-da6d-a7ff-dff559230000>
- Witness History - The first 3D printer - BBC Sounds. (2020, May 20). Retrieved September 25, 2020, from <https://www.bbc.co.uk/sounds/play/w3cszmrn>
- Rtv.es. (2019, September 26). Fabrican una arteria aorta con una impresora 3D. Retrieved September 25, 2020, from <https://www.rtv.es/television/20190926/fabrican-arteria-aorta-impresora-3d/1979856.shtml>
- Reuters. (2019, April 16). Científicos israelíes crean con una impresora 3D el primer corazón que palpita. Retrieved September 25, 2020, from <https://www.rtv.es/noticias/20190416/cientificos-israelies-crean-gracias-impresora-3d-primer-corazon-palpita/1924400.shtml>
- https://www.researchgate.net/profile/Wenyao_Xu2/publication/328324778/figure/fig2/AS:682531510829056@1539739601237/The-mechatronic-structure-of-an-FDM-3D-printer-with-inevitable-variations-arising-from-pgm
- https://www.allthat3d.com/wp-content/uploads/2016/07/ec41b02089aebc2ad659852499e9a83b_original.png
- <https://manufactur3dmaq.com/wp-content/uploads/2018/02/Above-3D-Printed-parts-made-in-FDM-SLA-SLS-technology-from-left-to-right-Image-Credit-Fermlabs.jpg>
- <https://reppap.org/mediawiki/images/thumb/9/95/Pc-va.jpg/600px-Pc-va.jpg>
- <https://cdn.mos.cms.futurecdn.net/pNnQARjdJXDZSceJuAdhqi.jpg>
- https://miro.medium.com/max/3000/*IKnO61CNt5d9M6eD
- <https://idtxs3.imgix.net/si/40000/2F/D9.jpg?w=1200&h=627&fit=fill&bg=ffffff&border=0&q=50>
- <https://www.oemupdate.com/wp-content/uploads/2018/04/pg-no-24-1.jpg>
- <https://www.rtv.es/noticias/20190416/cientificos-israelies-crean-gracias-impresora-3d-primer-corazon-palpita/1924400.shtml>
- <https://www.rtv.es/noticias/20190416/cientificos-israelies-crean-gracias-impresora-3d-primer-corazon-palpita/1924400.shtml>
- <https://reppap.org/mediawiki/images/thumb/c/c6/RepRapOneDarwin-darwin.jpg/300px-RepRapOneDarwin-darwin.jpg>
- https://filament2print.com/3717-tm_thickbox_default/mendel-max-xl-impresora-3d.jpg
- <https://www.solidsmack.com/wp-content/uploads/2016/03/vectary-3d-modeling-ui-drone.jpg>
- <https://www.print3dd.com/wp-content/uploads/2015/06/Treelike.png>
- https://images-na.ssl-images-amazon.com/images/I/71-qKUJHj58L_SL1500.jpg
- https://blog.prusaprinters.org/wp-content/uploads/2018/04/first_layer.jpg
- https://i.cbsi.com/cnwk1d/i/tim/2012/01/11/LOW_05_final.png

