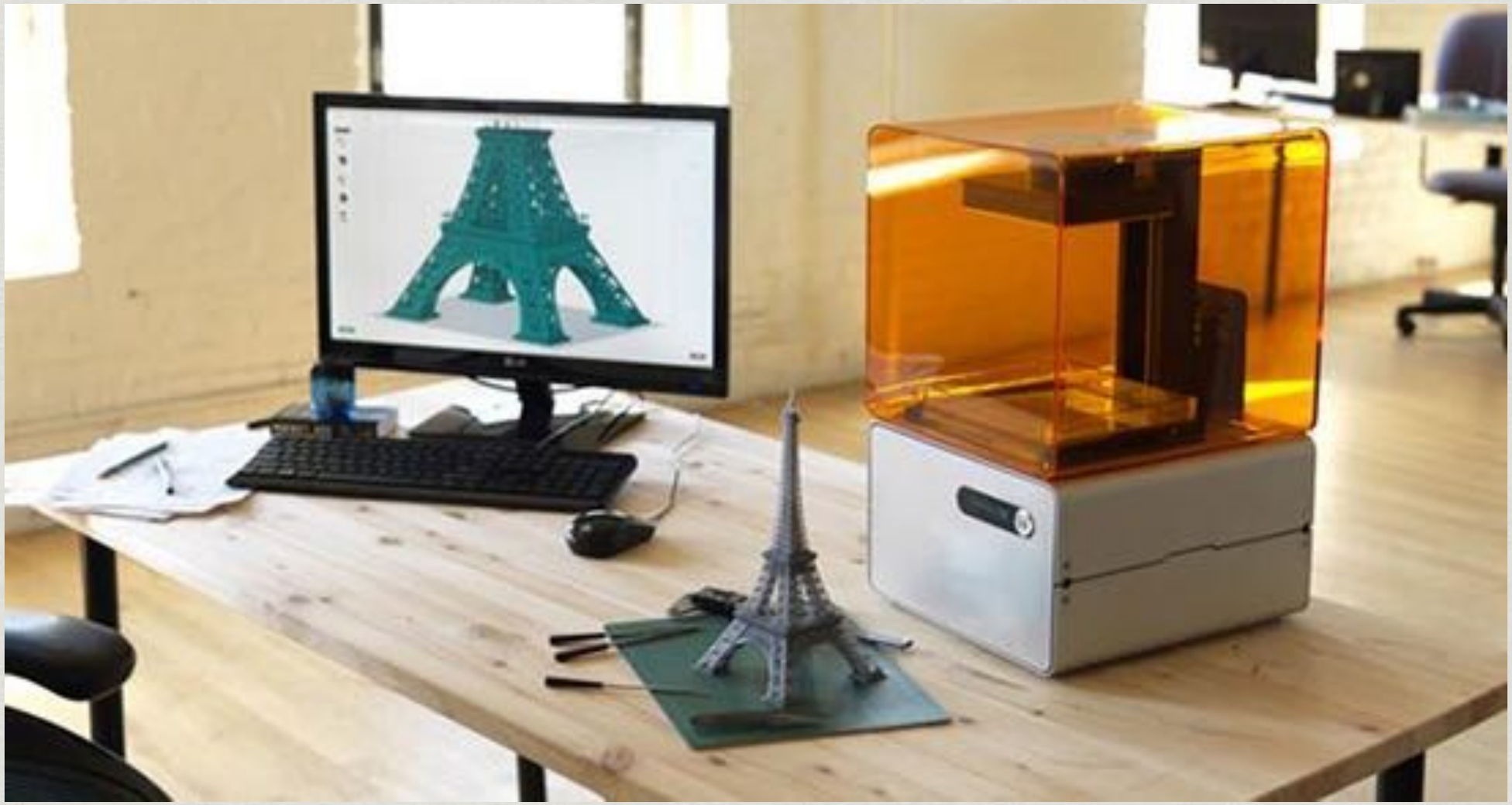
3D PRINTING

PRINTING IDEAS INTO 3D REALITY

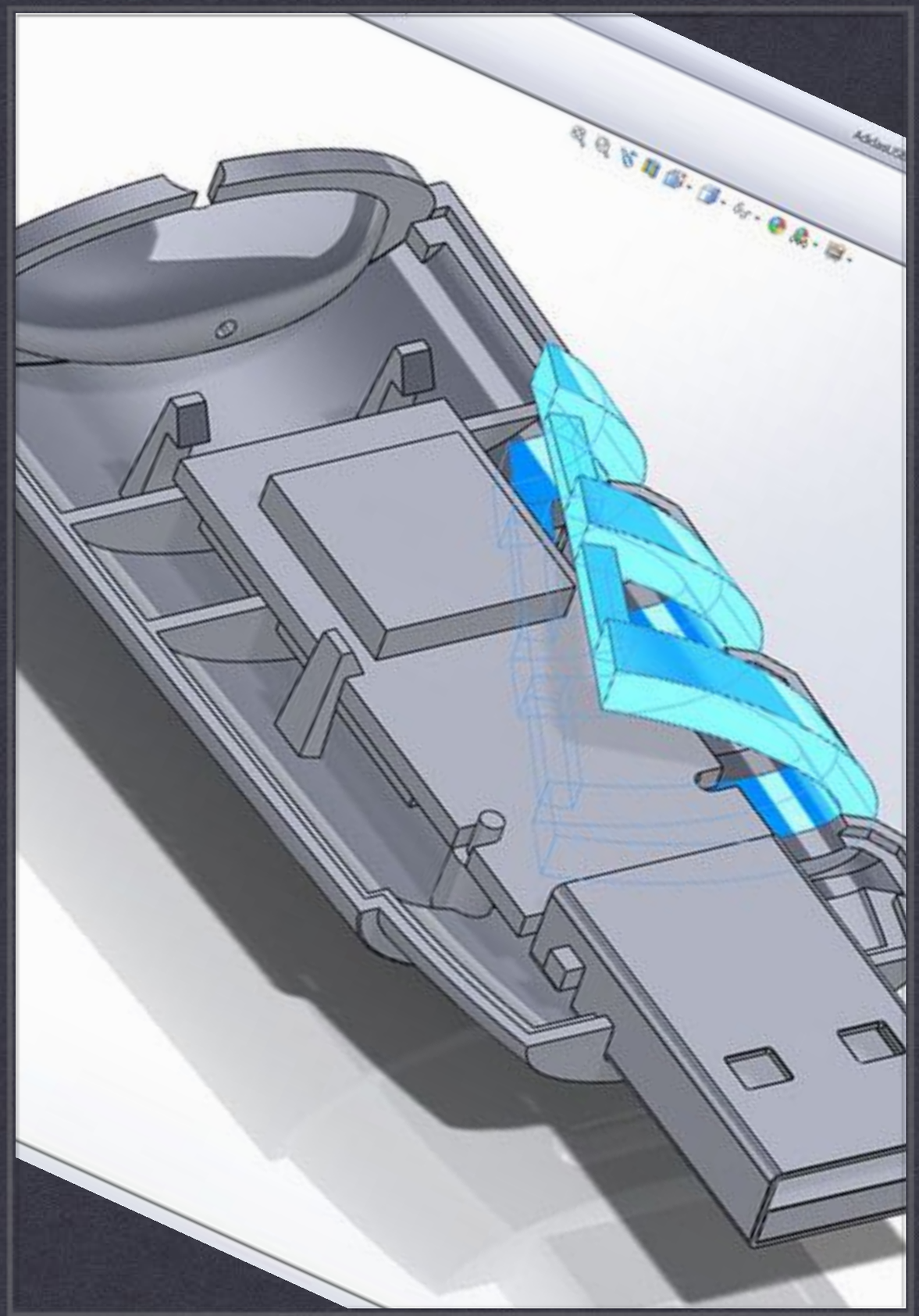
What is 3D printing?

- A process of creating real 3-dimensional objects from their digital designs.



STAGE 1:

DESIGNING AN IDEA



Digital Modeling

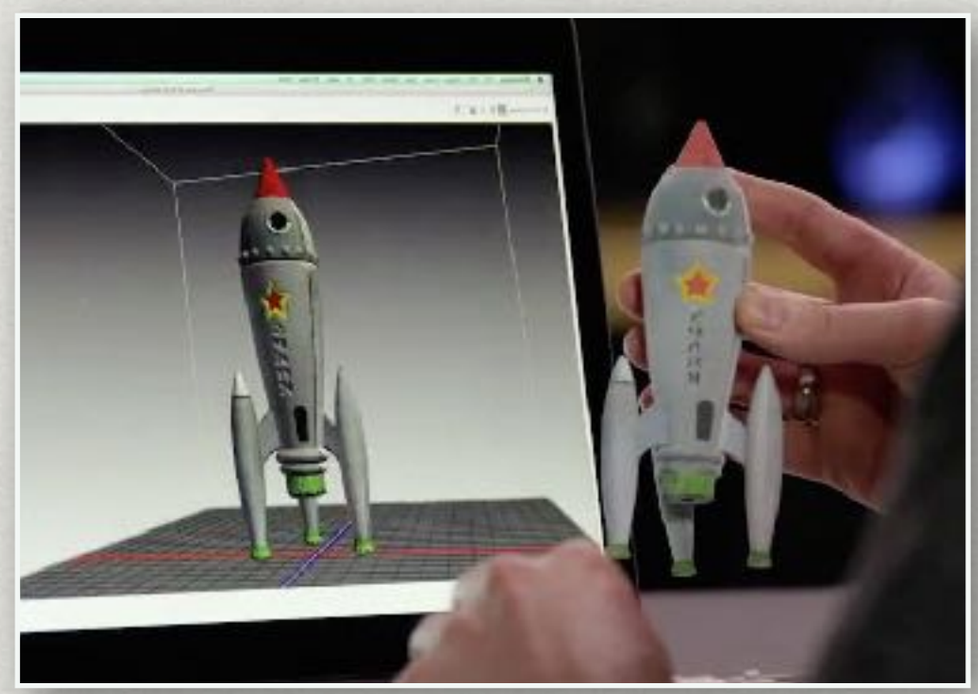
Computer Aided Design (CAD)

For a new object

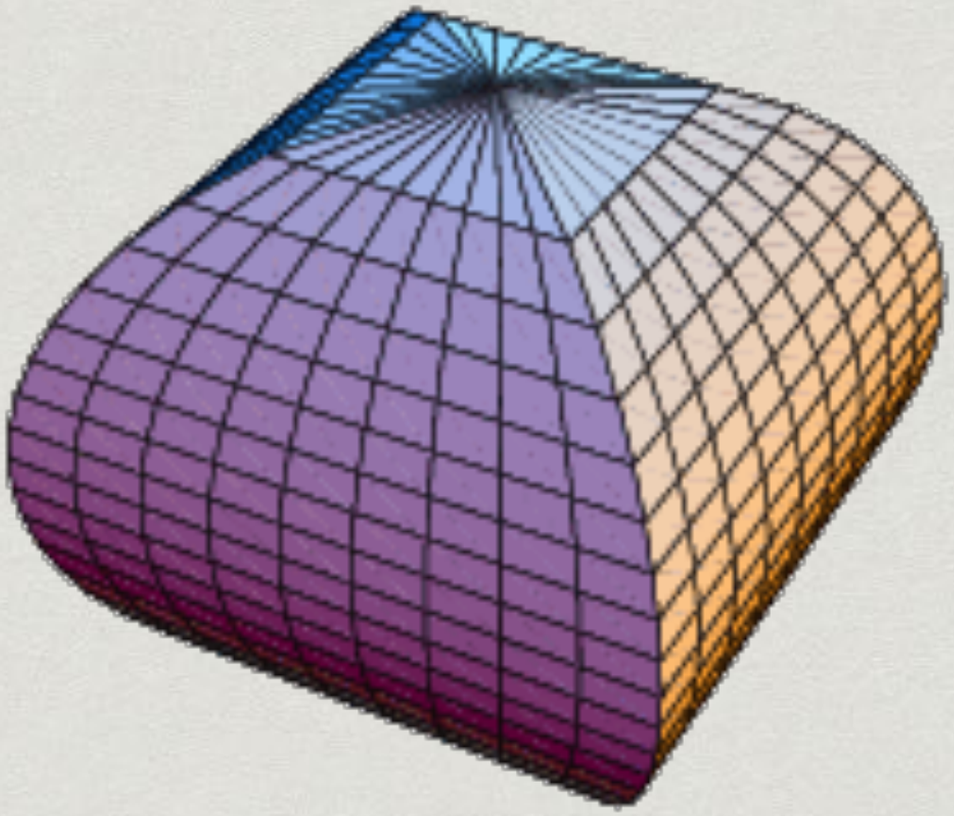
3D Scanning

For an existing object

A 3D Scanner



Creating the STL file

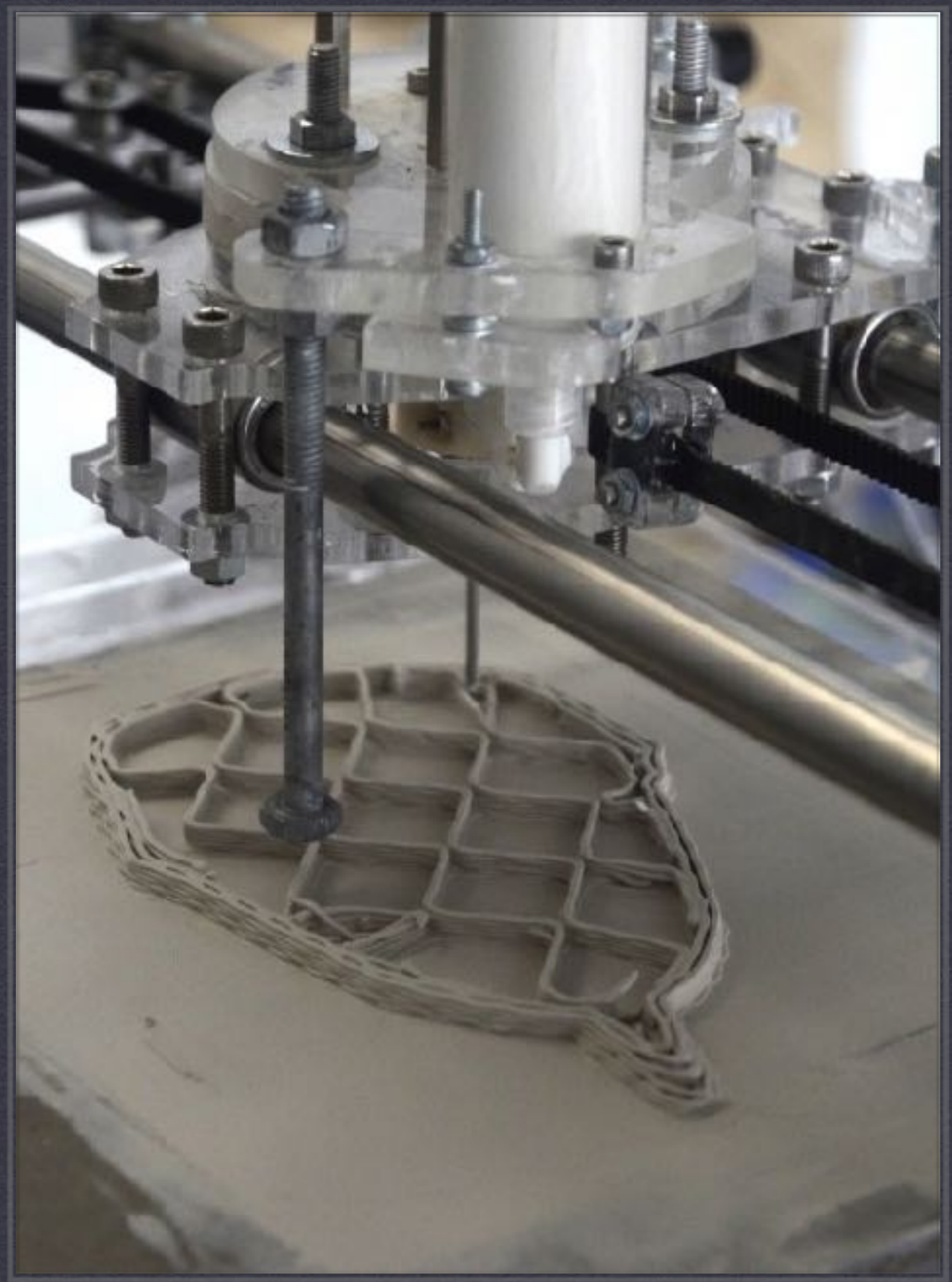


3D model

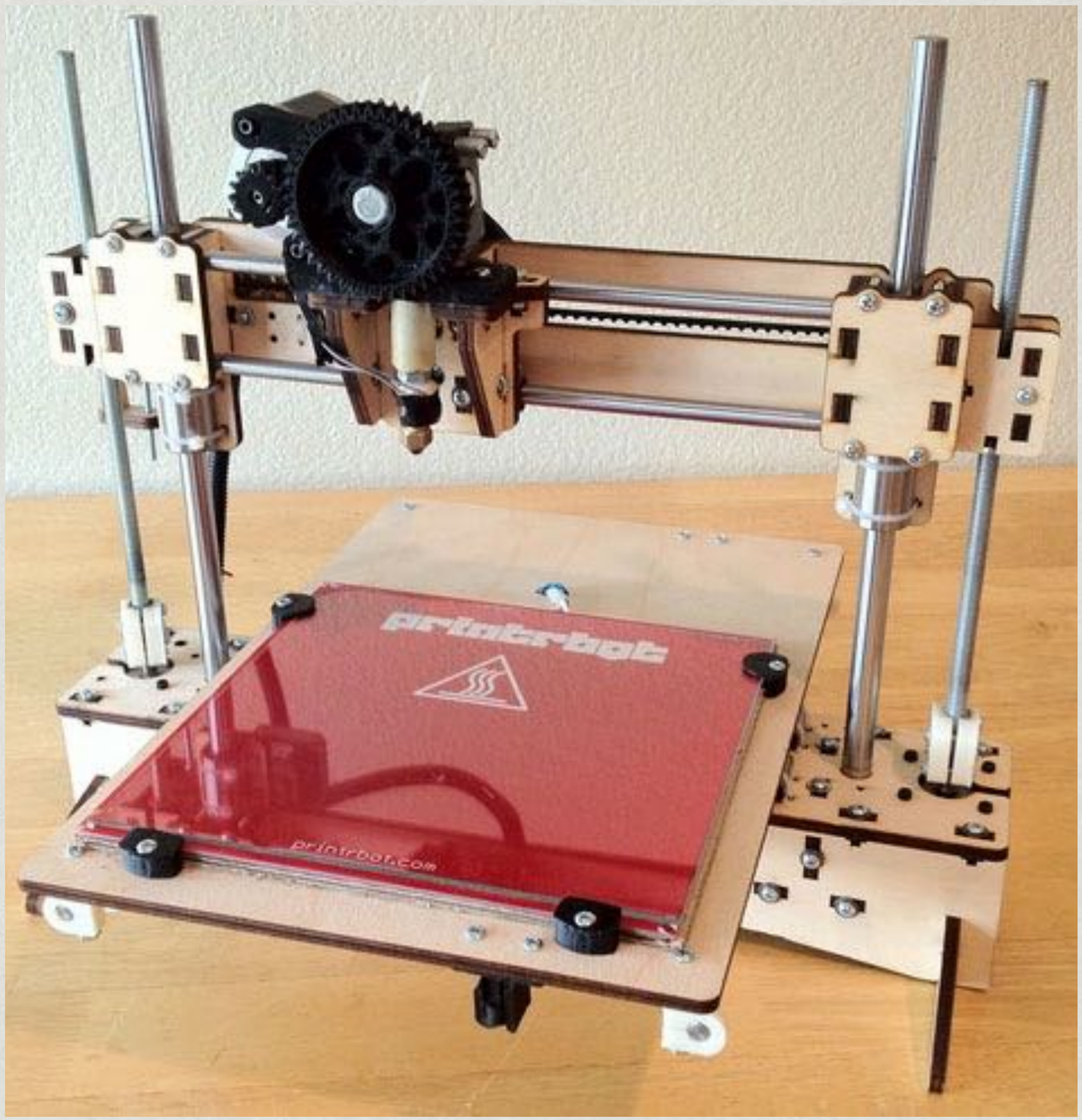
Generated STL (“stereolithography”) file with layers for input to printer

STAGE 2:

THE ACTUAL PRINTING



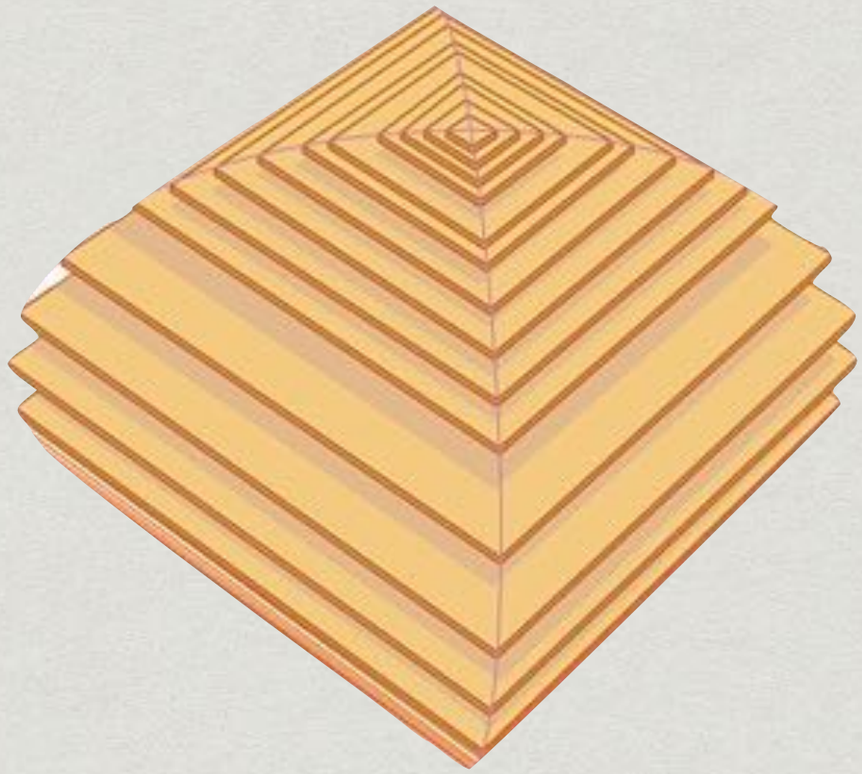
A 3D Printer Simply Constructed

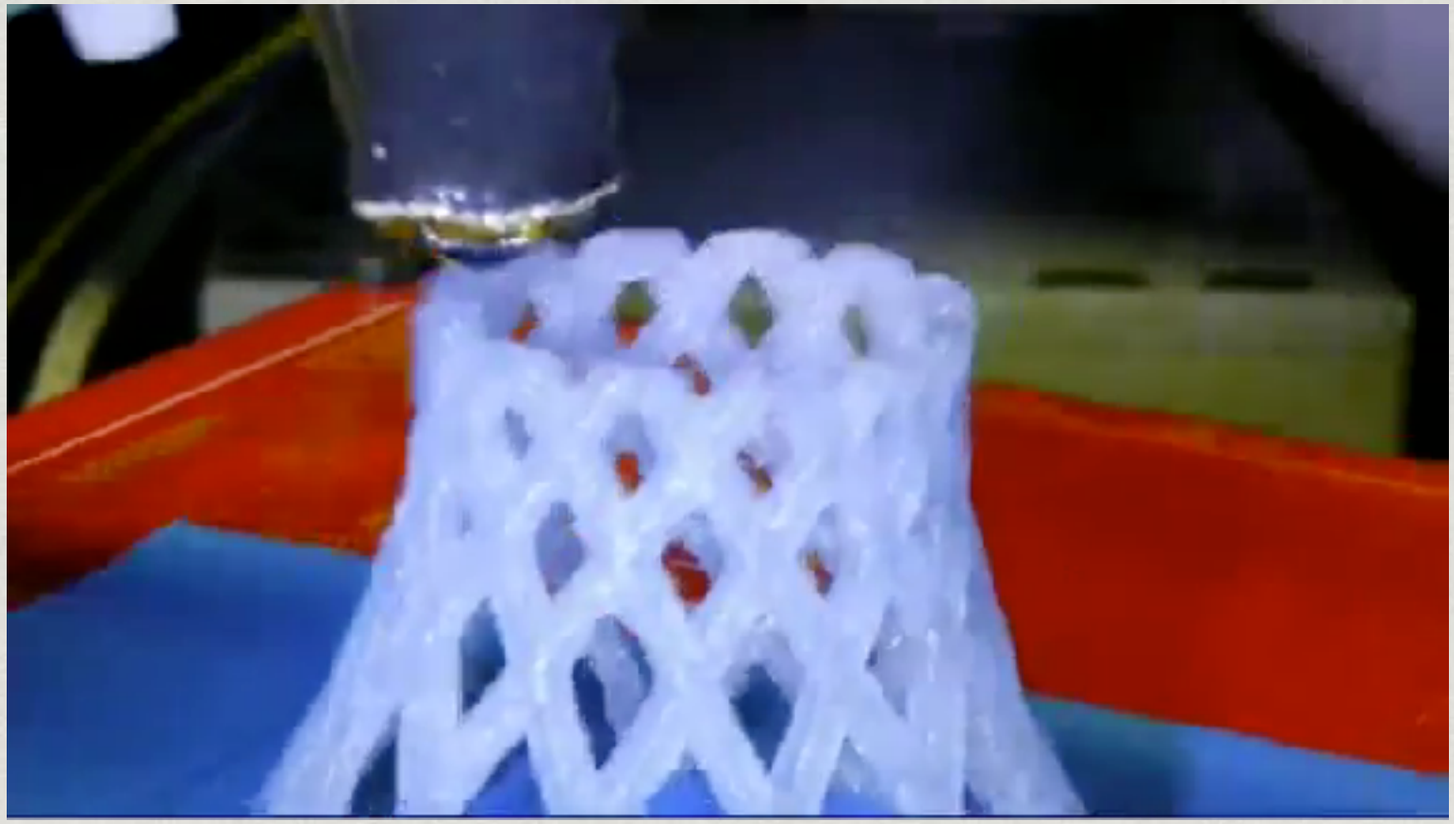


- A Platform
- A Printer-head with a supply of printing material for object
- A Mechanism to move the head in the X and Z, and platform in the Y direction

The Printing Mechanism

- Printer reads .stl file layer by layer
- It prints a layer by moving in X and Y, moves one step in Z and repeats for next





The Printing Material

- Polymers (like plastics and rubber), metals, fibers (like nylon) etc. are used to make the objects.
- These require extrusion and binding.
- Application → Material → Printing process

Fused Deposition Modeling (FDM)

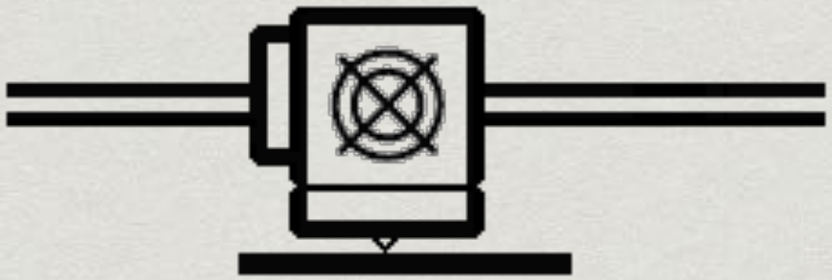
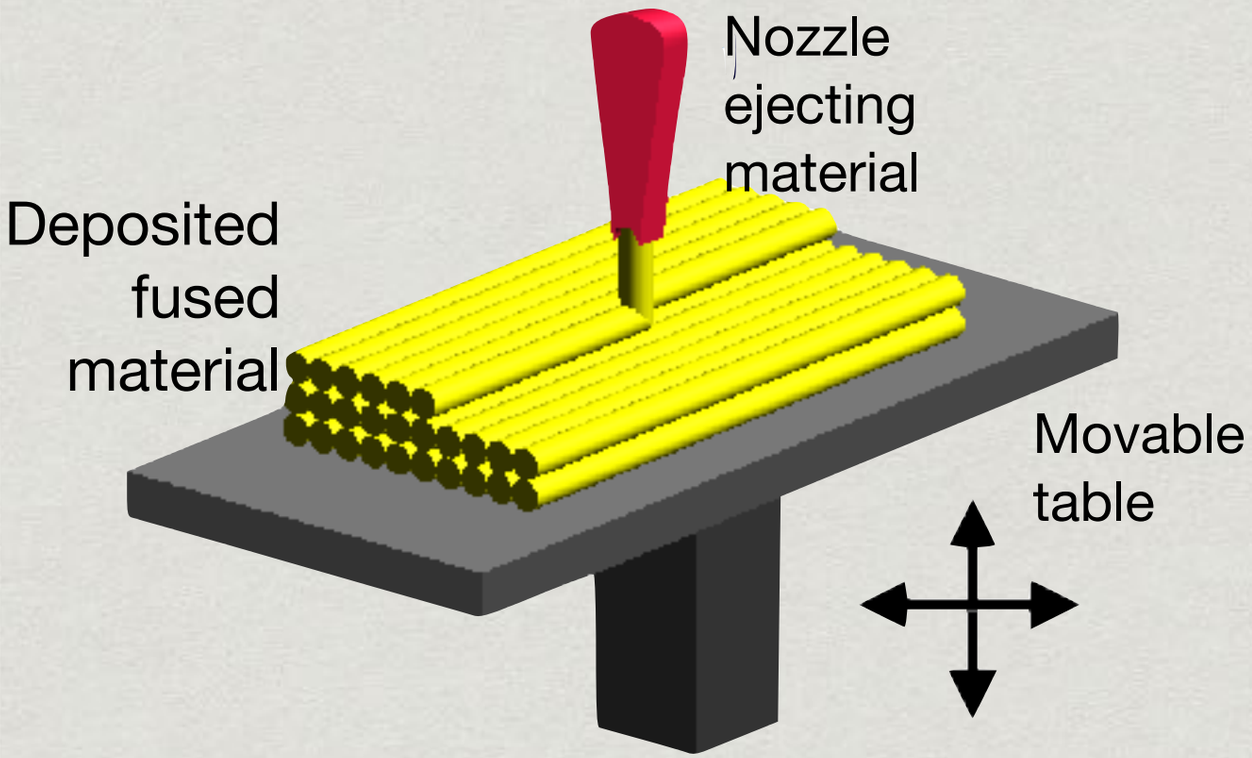


Fig. 1

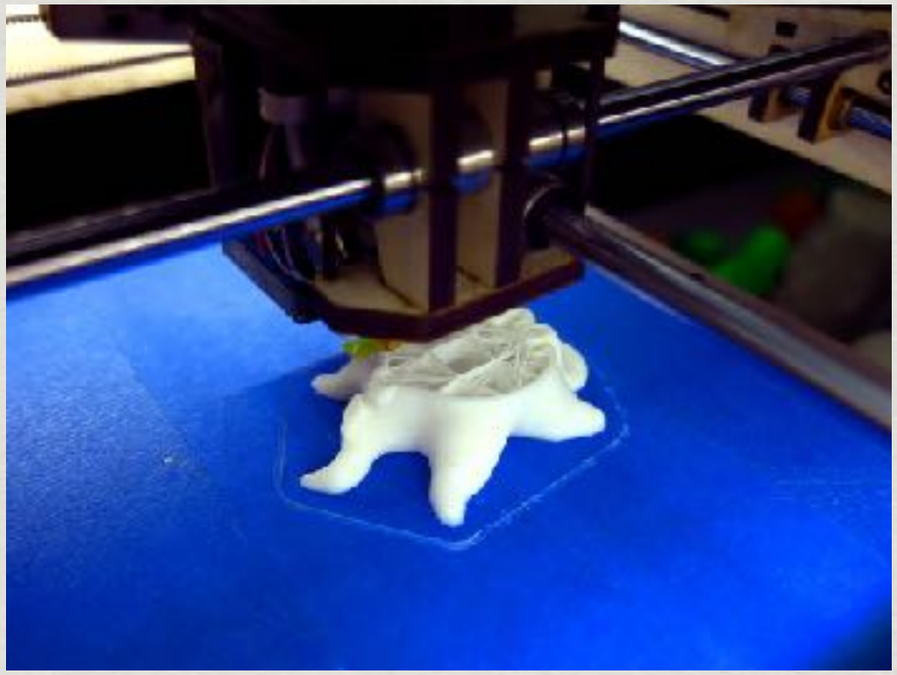


Granular Materials Binding

A Waste-less Approach

Subtractive Manufacturing

Machines out the object from an initial block of raw material

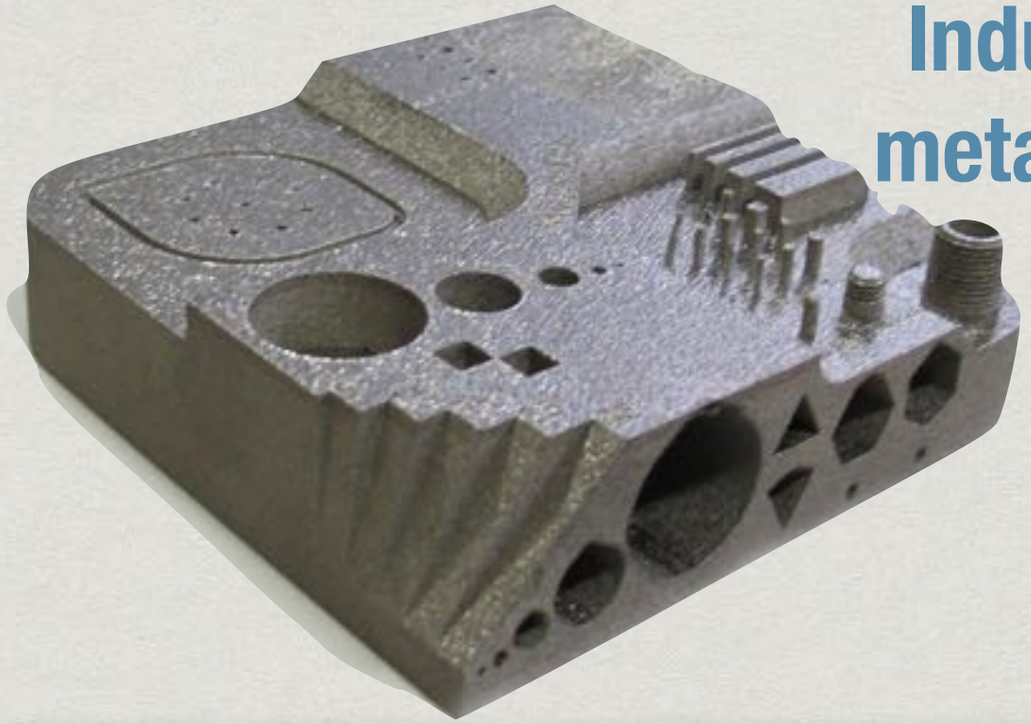


Additive Manufacturing

Keeps on adding material till the object is complete

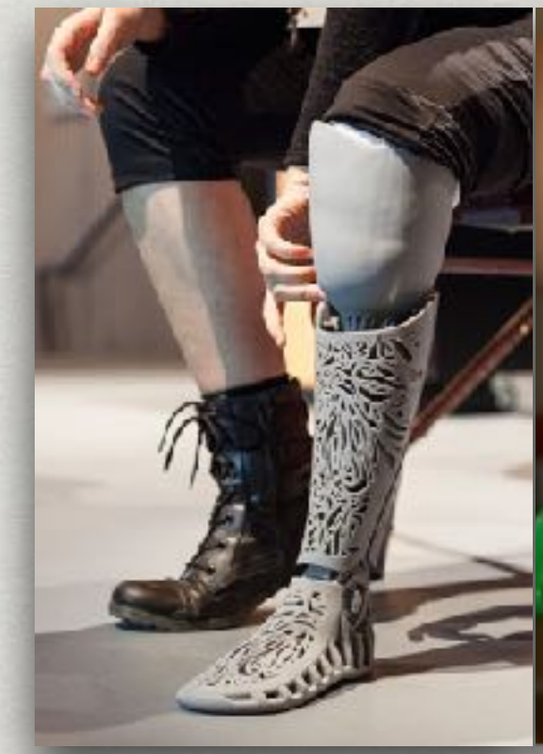
PUSHING INNOVATION

An assortment of fields



Industrial metal parts

Food



Prosthetics

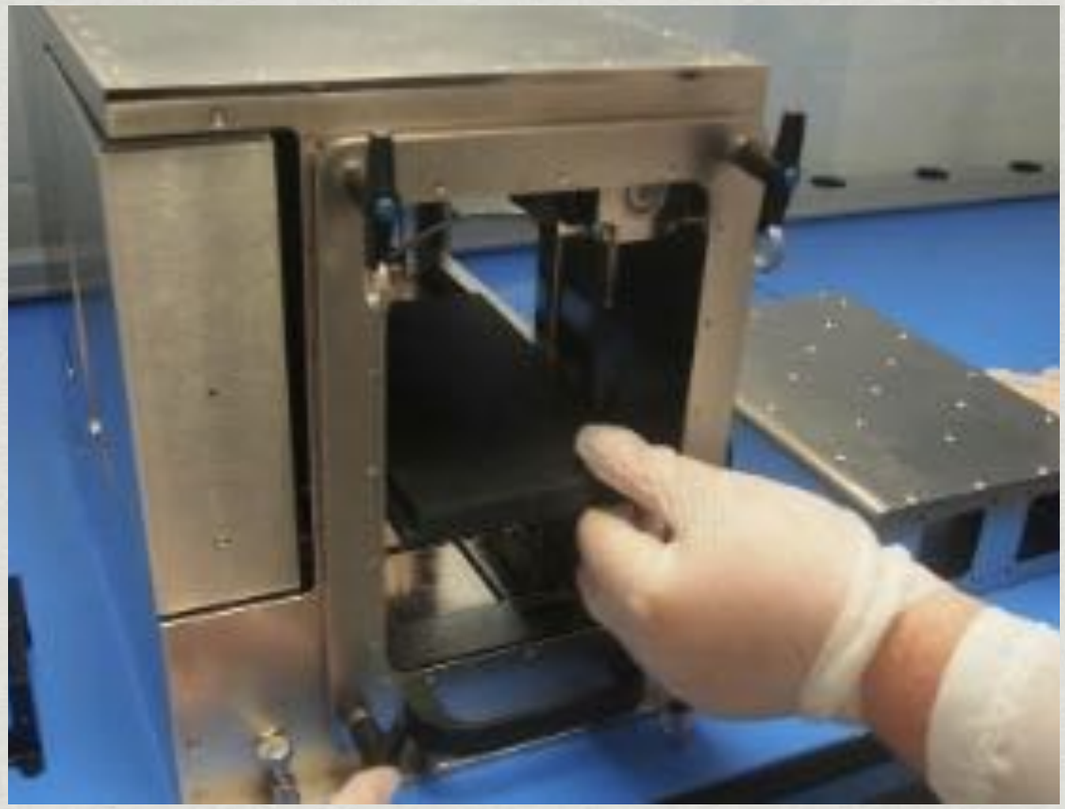
3D Bioprinting

10 Houses in a Day

A cheaper, faster and safer alternative to more traditional construction.

A Zero-Gravity Printer

NASA has tested 3D printers that will let Mars-bound astronauts print what they need as they travel.



A PROMISING TECHNOLOGY