



XUNTA DE GALICIA
CONSELLERÍA DE CULTURA, EDUCACIÓN
E ORDENACIÓN UNIVERSITARIA



centro autonómico
de formación e innovación

educación infantil e primaria

IMPRESIÓN 3D do mundo dixital ao físico

Enrique Otero Neira (Brinka3D)







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FABRICACIÓN DIXITAL

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10101010010100101000000111101010101010000111101010100010111101010100010100001011110 000010101010
010001111000010101010101000001010111101001010101001010010100000001111010101010100001111010101

CAD - Computer-Aided Design
(Software de debuxo, creación dos obxectos que van ser fabricados)



CAM - Computer-Aided Manufacturing
(Fabricación asistida por ordenador, debuxo e planificación do proceso)



CNC - Computer Numerical Control
(Creación e lectura das coordenadas gcode transformándoas en movemento)



Substracción 2D

Substracción 3D

IMPRESIÓN 3D

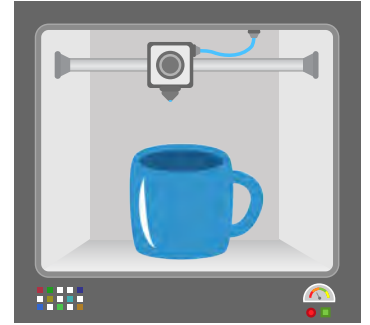
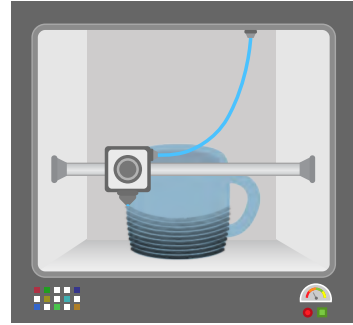
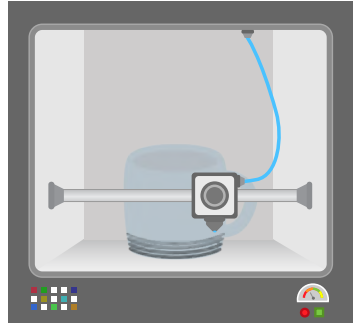
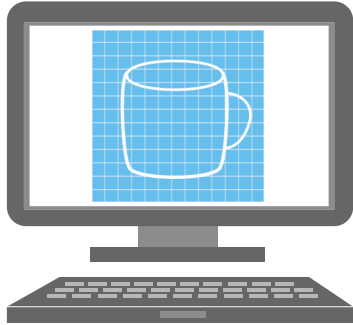
Substracción 2D - Cortadoras computerizadas



Substracción 3D - Tornos e fresadoras computerizadas



IMPRESIÓN 3D



FABRICACIÓN ADITIVA

IMPRESIÓN 3D

Procesos de base líquida

- Resinas foto curables
- Cera fundida
- Tintas empastadas
- Auga

SLA - Stereolithography
DPL - Direct Light Processing
Multijet Wax Deposition
Inkjet / Polyjet Modelling
Rapid Freeze Prototyping

Procesos de base po

- Materiais semi-cristalinos
- Plásticos
- Metais
- Cerámicos

SLS - Selective Laser Sintering
SMS - Selective Mask Sintering
SLM - Selective Laser Melting
EBM - Electron Beam Melting
Laser Cusing
Accufusion - Laser Consolidation
Laser Power Forming

- LENS - Optomec
- POM - Group DMD
- DLF - Direct Laser Forming

Sprayed Metal

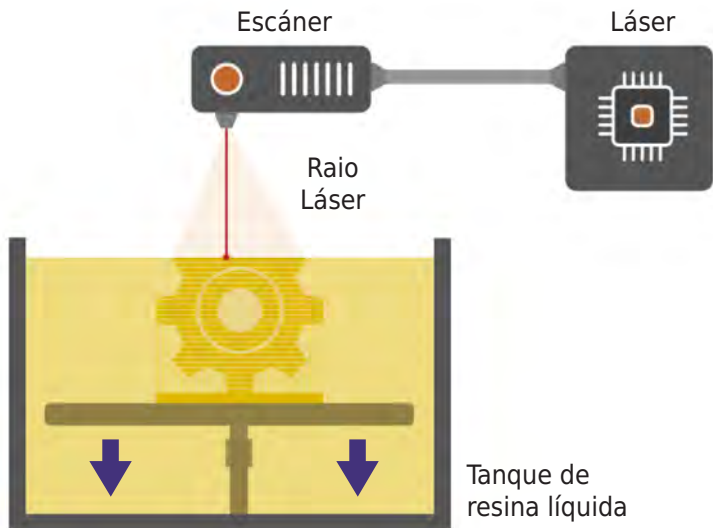
Procesos deposición (sólida ou fundida)

- Follas (metal, papel, etc.)
- Fío fundido (plástico, metal...)
- Mat. de consistencia plástica.

LOM - Laminated Object Manufacturing
Solidica - Ultrasonic Compaction
FDM - Fused Deposition Modelling
Optiform Solid Imaging

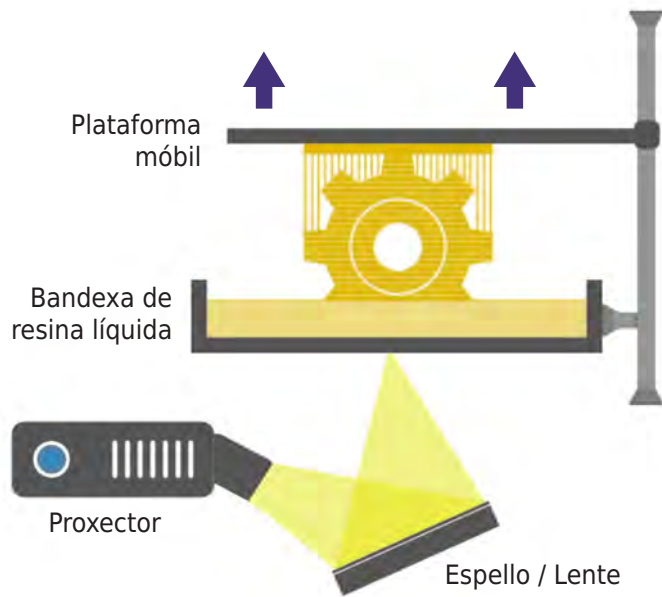
SLA

Stereolithography apparatus



DLP

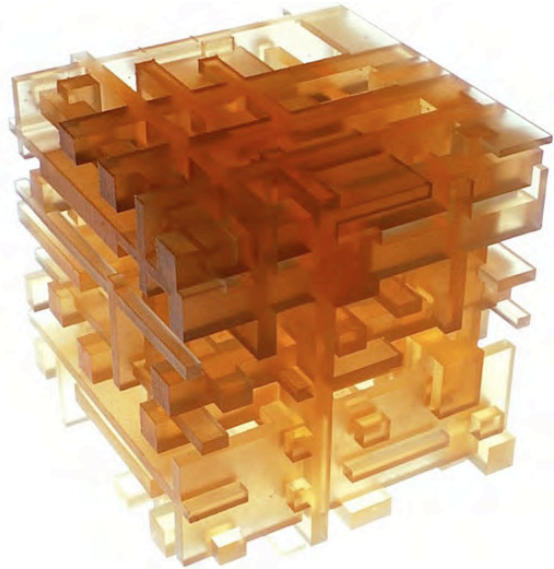
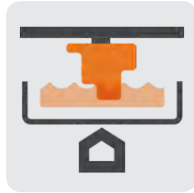
Direct Light Processing



SLA



DLP



FormLabs (DLP)

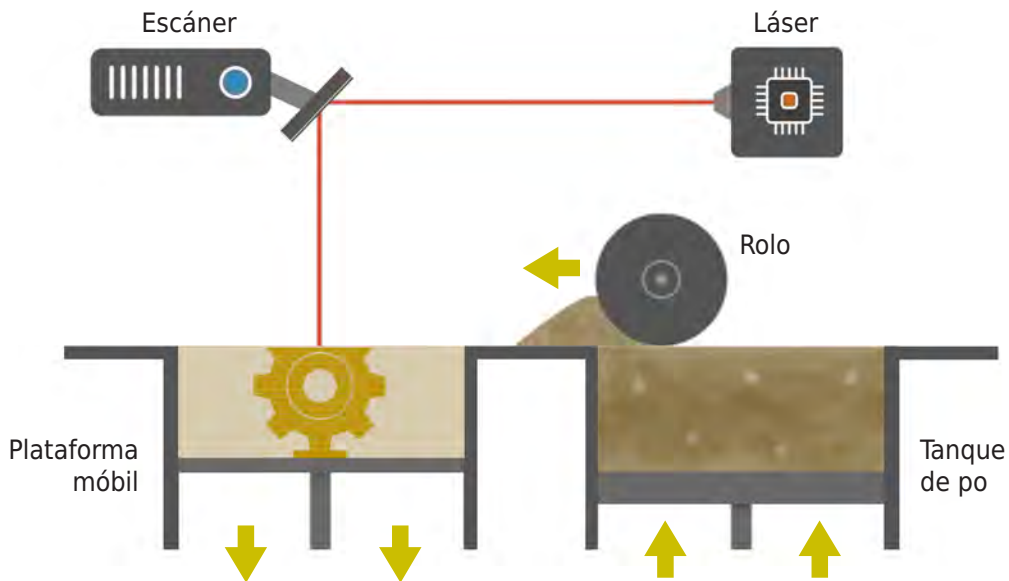


3D Systems (SLA)

SLS

SLM

Selective Laser Sintering / Melting



SLM



iMaterialise



own
phones
.com

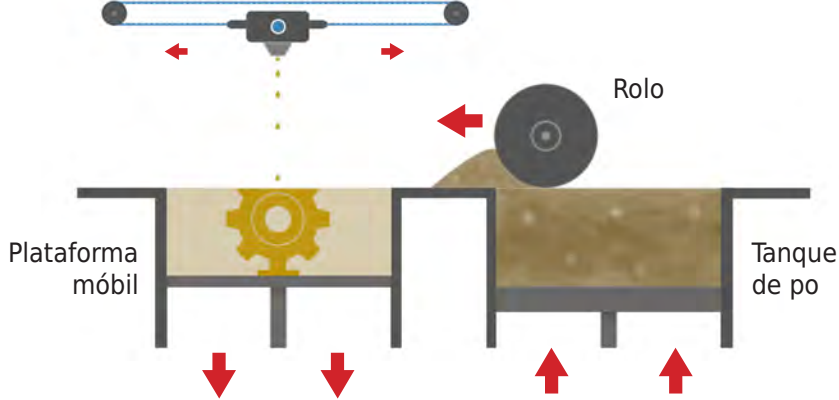
INKJET



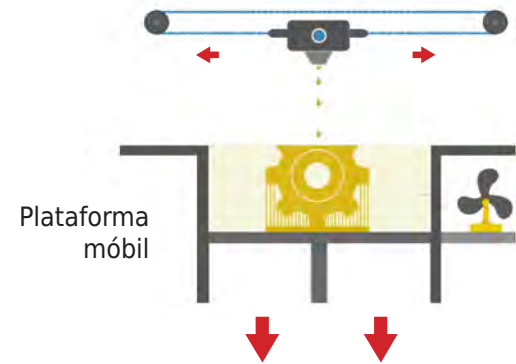
POLYJET



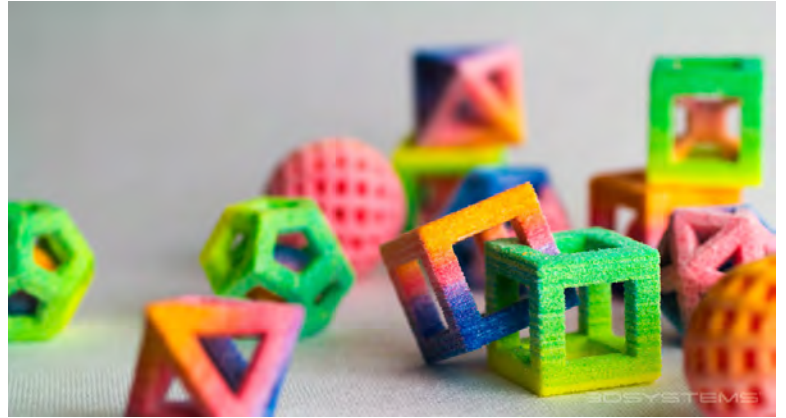
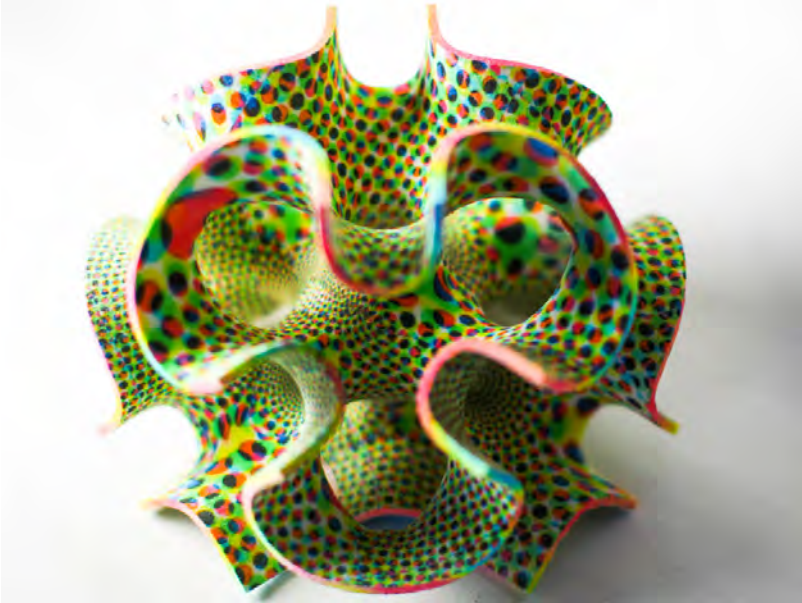
Inxector



Inxector



INKJET



POLYJET



Opaco ríxido



Transparente



Flexible



Dental



Biocompatible



Composite



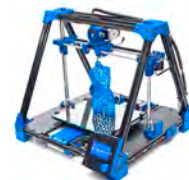
FDM



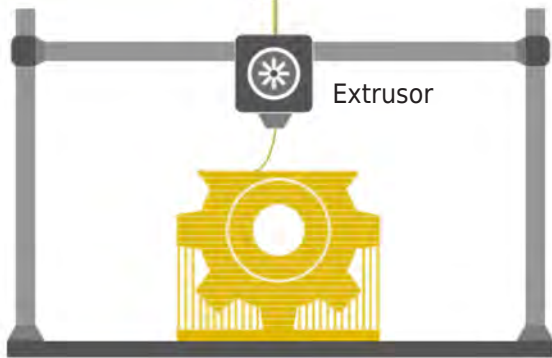
Impresoras FDM
industriais



Impresoras RepRap



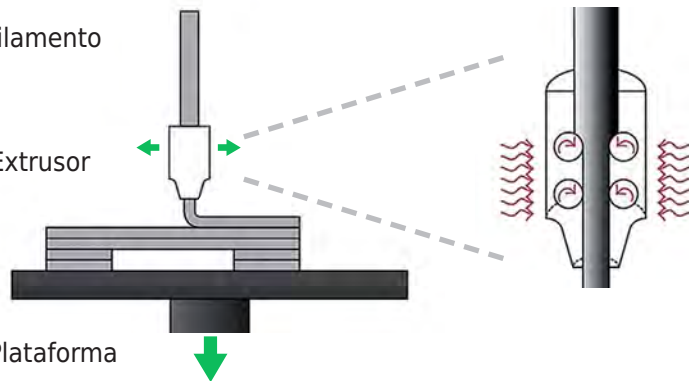
Filamento



Filamento

Extrusor

Plataforma



FDM



FDM - Fuse Deposition Modeling
FFF - Fuse Filament Fabrication
PJP - Plastic Jet Printing



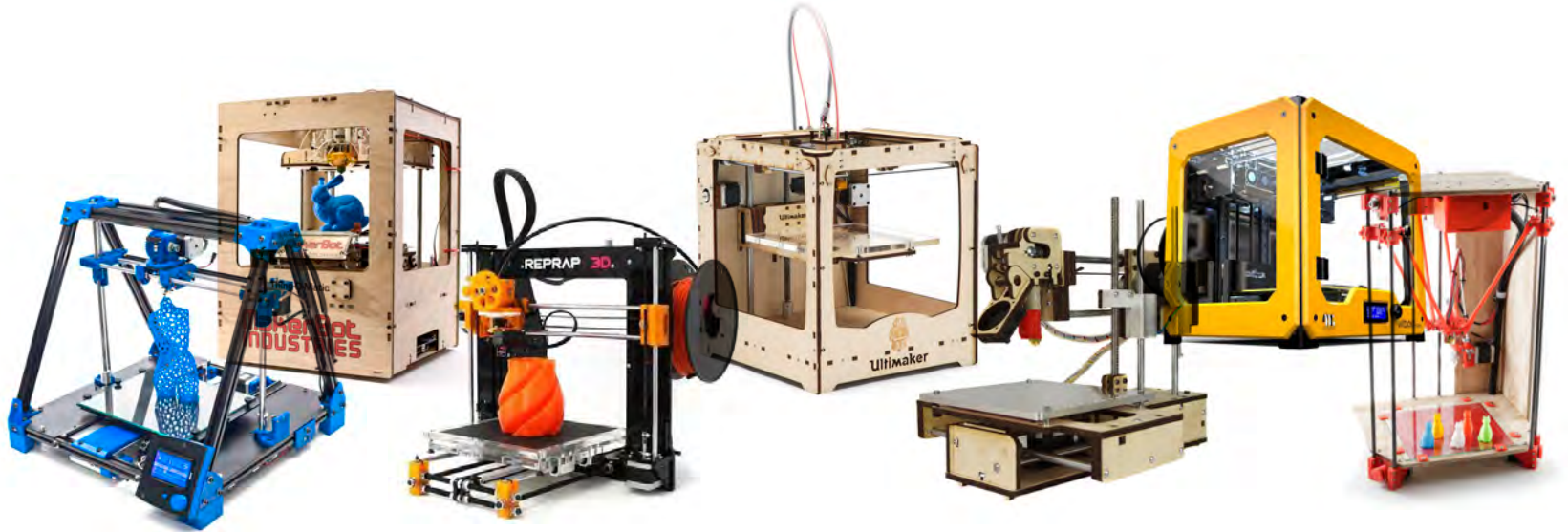
Ventaxas que a Impresión 3D engade a Fabricación Dixital:

- Facilita o desenvolvemento da **creatividade** en múltiples campos.
- A **complexidade xeométrica** xa non é un problema.
- Posibilidade de crear **réplicas exactas** a traves do escaneado.
- Infinidade de variantes e posibilidade de **persoalizar** calquer tipo de obxectos.
- Producción **por demanda** polo que hai unha redución de stock e custo de transporte.
- Técnica **aditiva** que ten menos desperdicio de materiais.

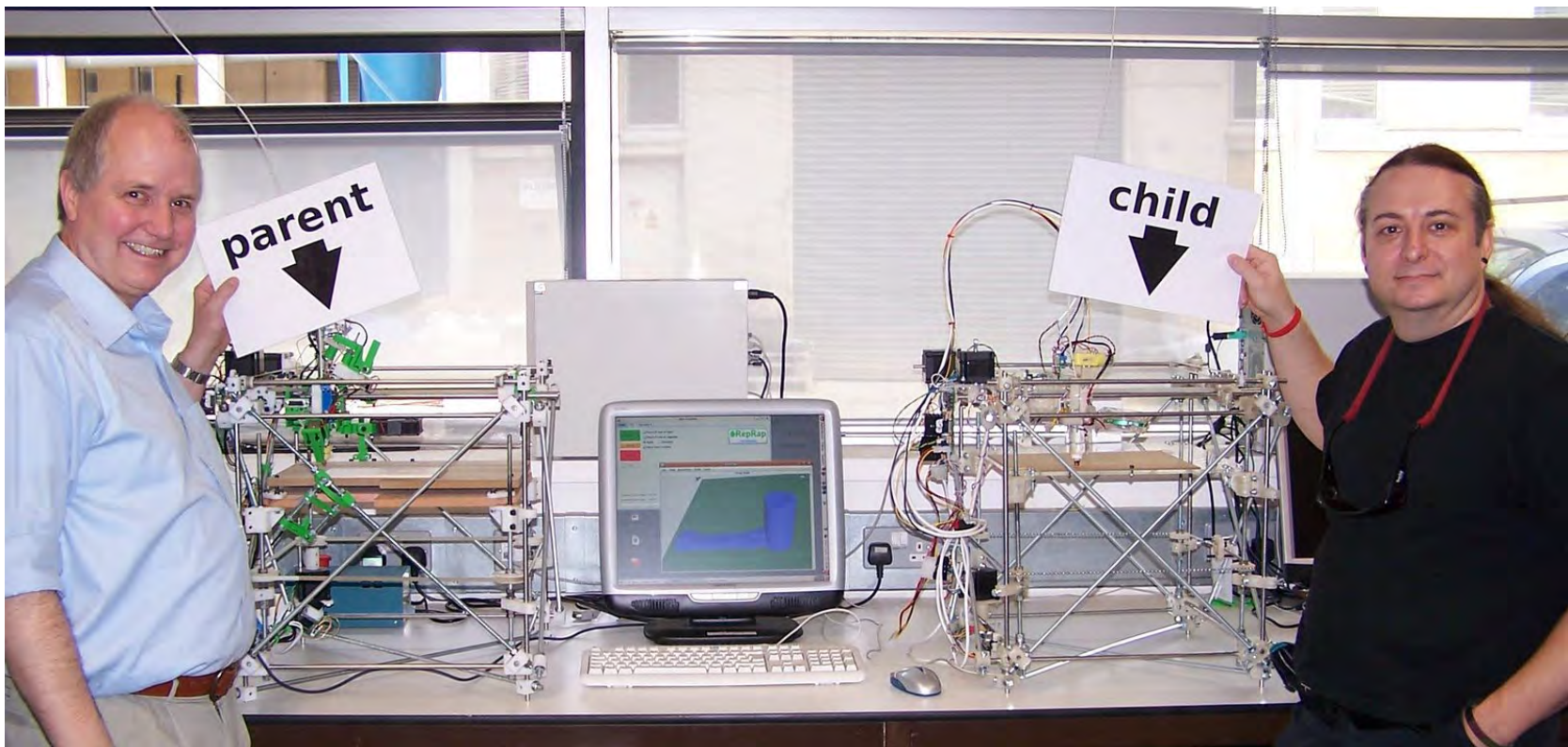


**ESTAS VENTAXAS EXISTÍAN XA DENDE HAI DÉCADAS...
CÁL É O MOTIVO POLO QUE SE EMPEZA A DESENVOLVER A TECNOLOXÍA AGORA?**

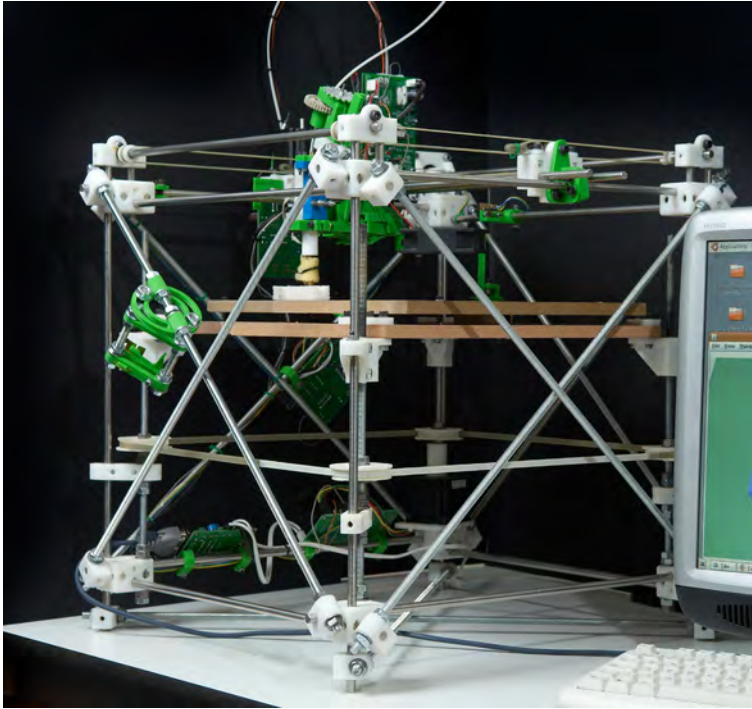
PROXECTO REPRAP



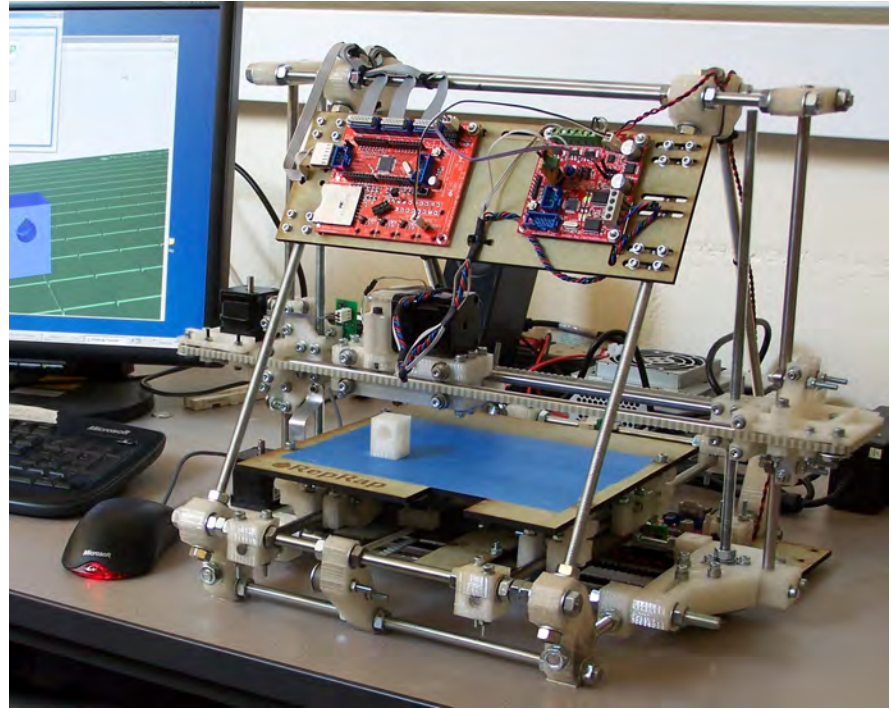
REplicating RAPid Prototyper - Dr. Adrian Brower 2005



GNU General Public License - Teoría Darwinista da Evolución

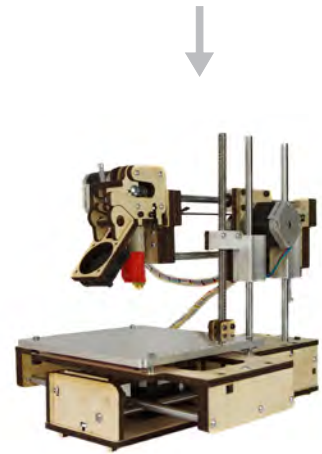
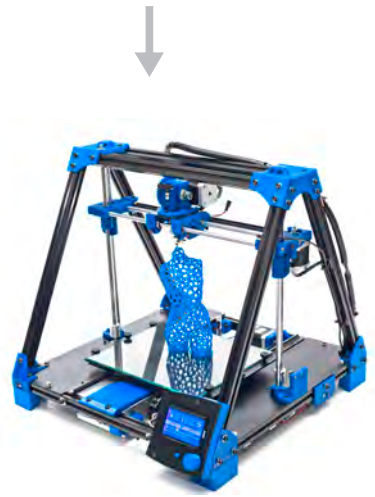
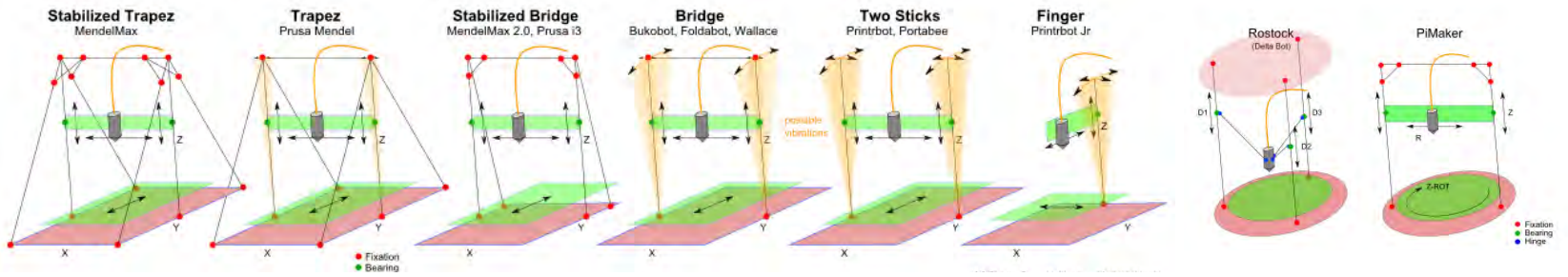


RepRap Darwin (2007)



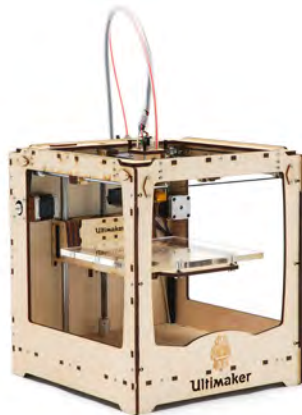
RepRap Mendel (2009)

Distintas variantes estruturais





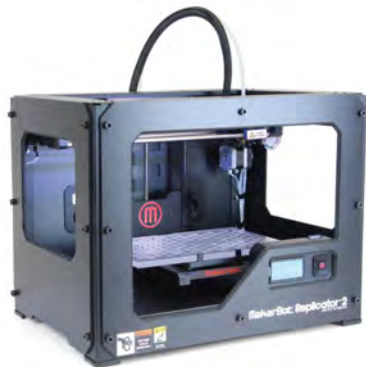
Makerbot



Ultimaker



bq Witbox



MATERIAIS DE IMPRESIÓN FDM



PLA - PolyLactic Acid (Ácido Poliláctico)



ABS - Acrilnitrilo Butadieno eStireno



POST-PRODUCCIÓN DE MATERIAIS DE IMPRESIÓN FDM

Baños de acetona (ABS)



0.35 mm Layer Height with
Vapor Bath Treatment

0.1 mm Layer Height

0.35 mm Layer Height

Uso de resinas Epoxi (PLA/ABS)

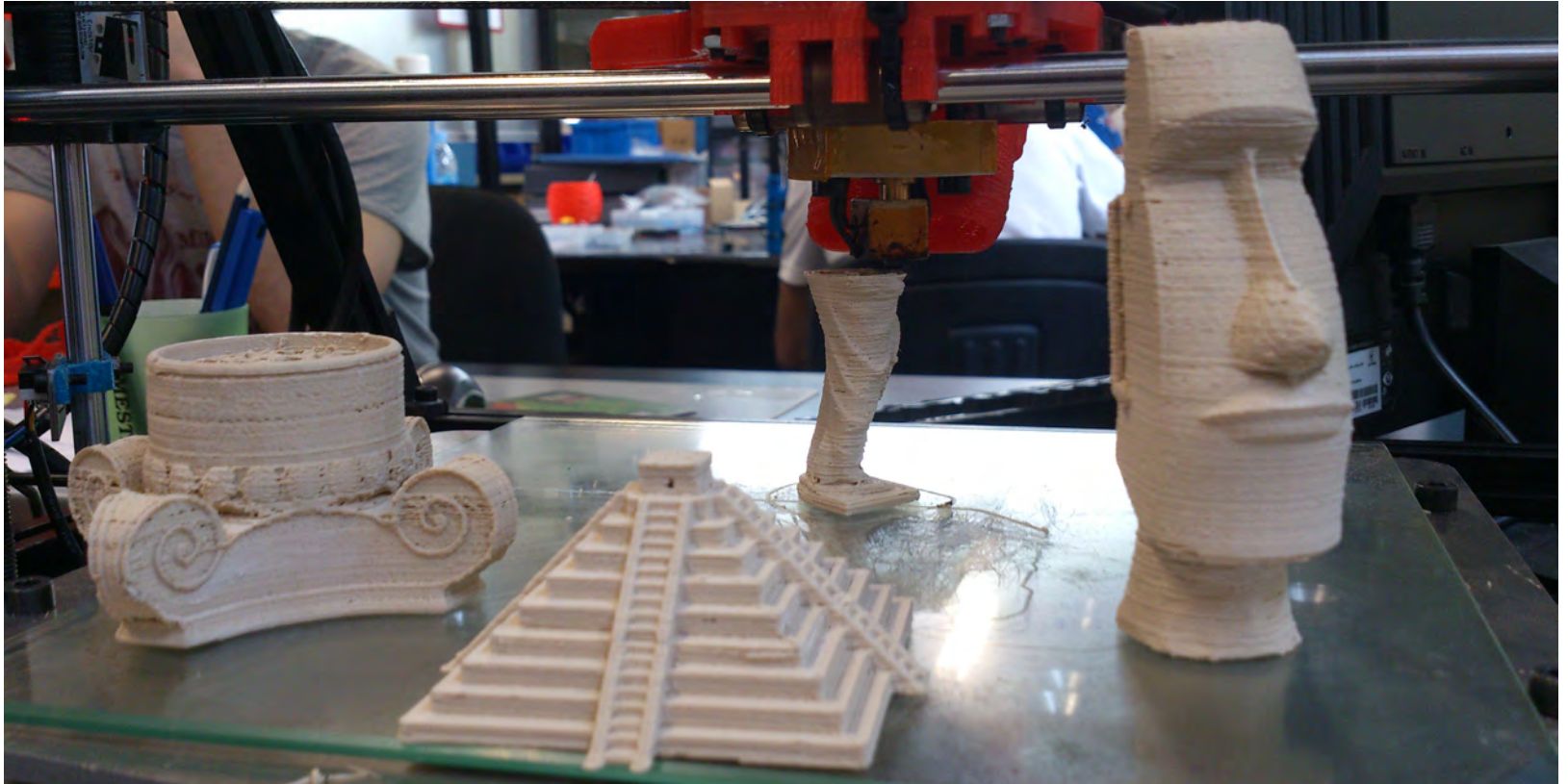


MATERIAIS NOVEDOSOS - EXPERIMENTAIS

Laywoo-D3 - Aspecto de madeira



Laybrick - Aspecto pedra arenisca



Nylon - Translúcido, alta resistencia e tinteable

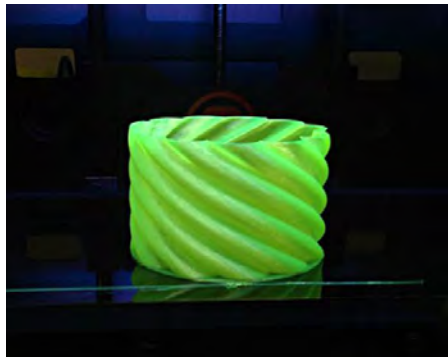


Nylon - Pre procesado (tintado)

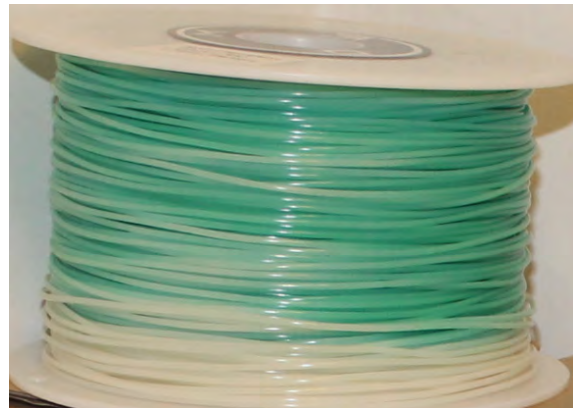




Materiais fluorescentes



Chamaleon



Aceiro inoxidable



Ferro magnético e oxidável

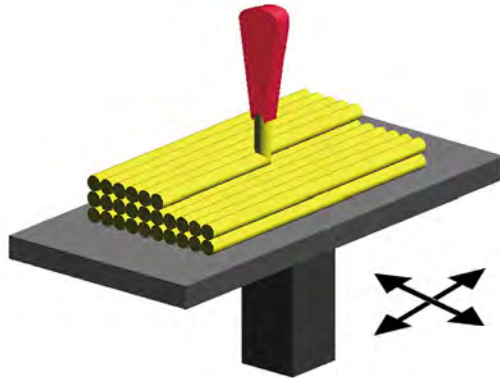




Plásticos
reciclados

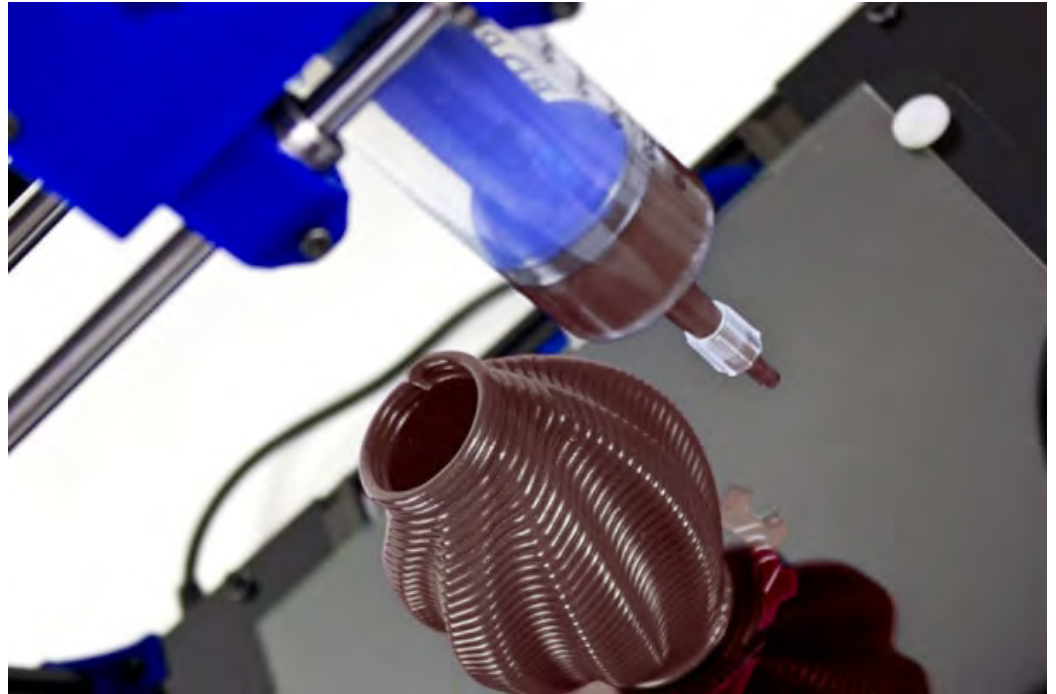


IMPRESORAS SINGULARES

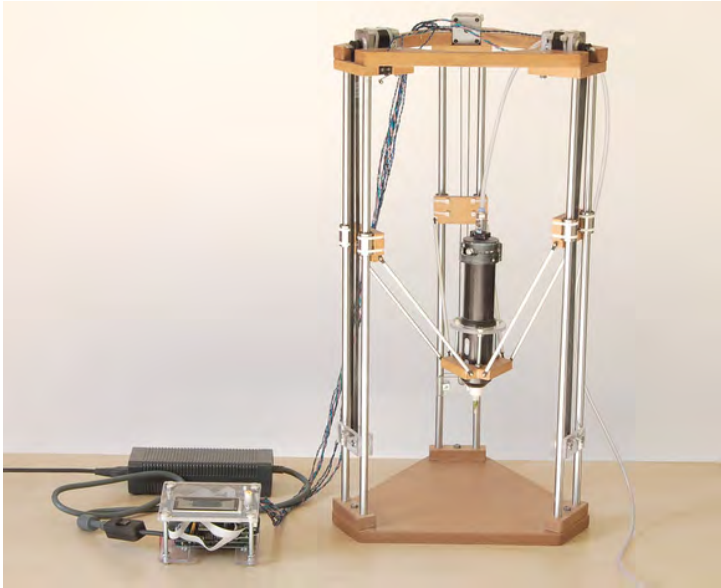


Baseadas no movement nas tres dimensións das impresoras FDM e aproveitando as comunidades de traballo RepRap e os desenvolvementos GNU

Extrusor de materiais plásticos



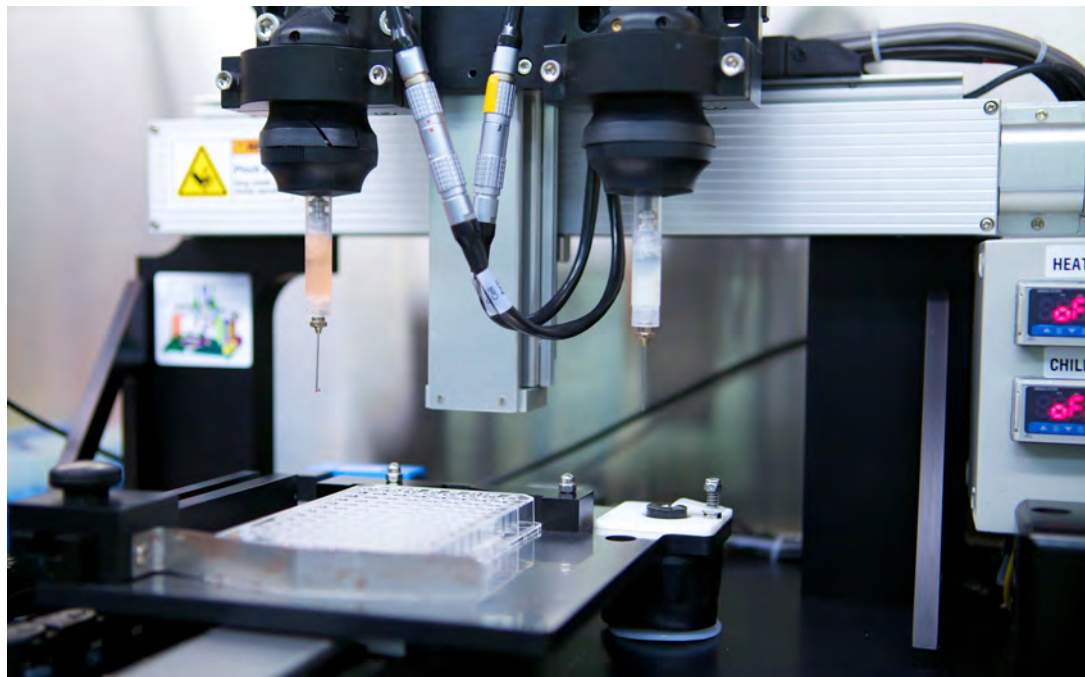
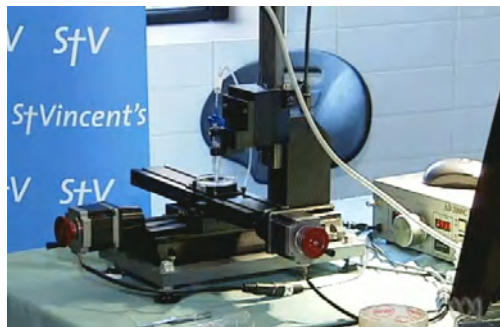
Ceramic delta printer



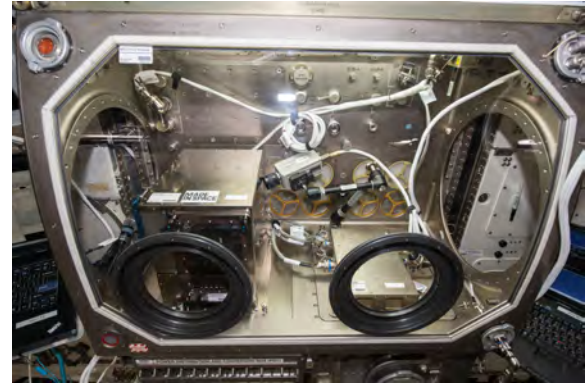
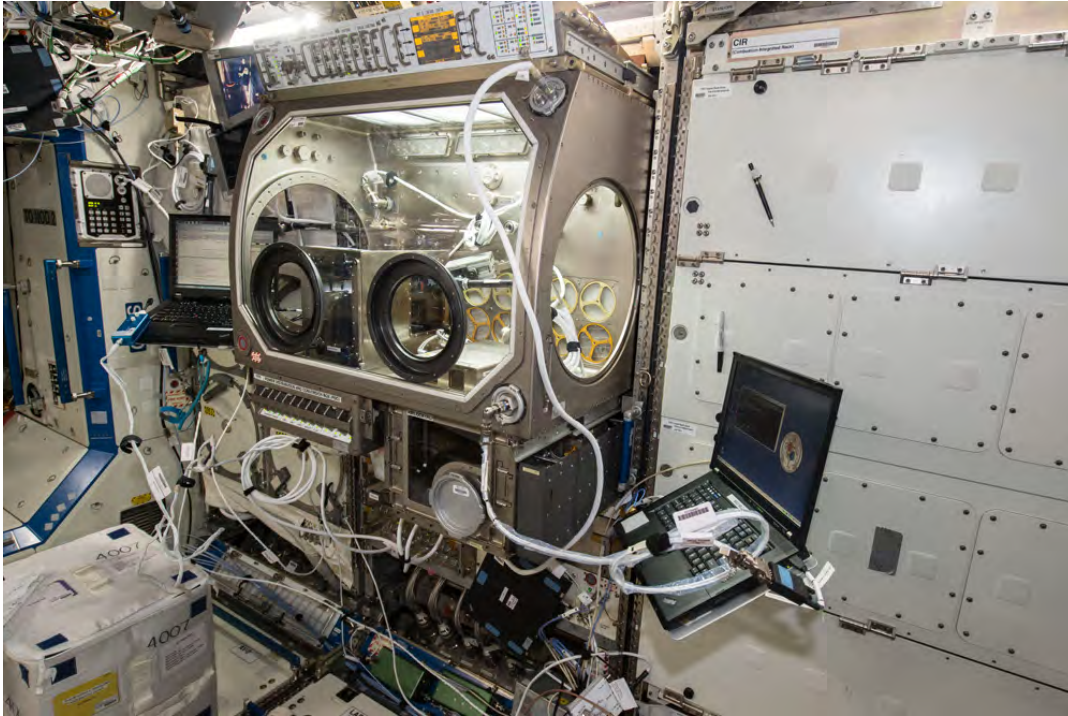
Siguiendo a misma línea tecnológica e aumentando a escala - Impresión de formigón



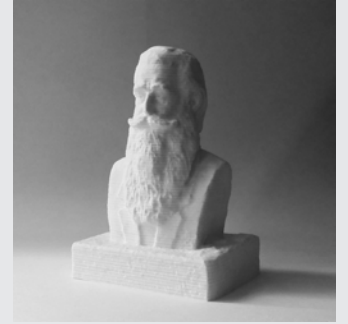
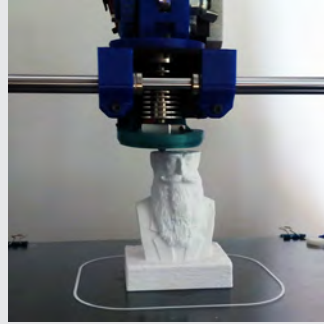
Siguiendo a mesma liña tecnolóxica e reduciendo a escala - Cells printing



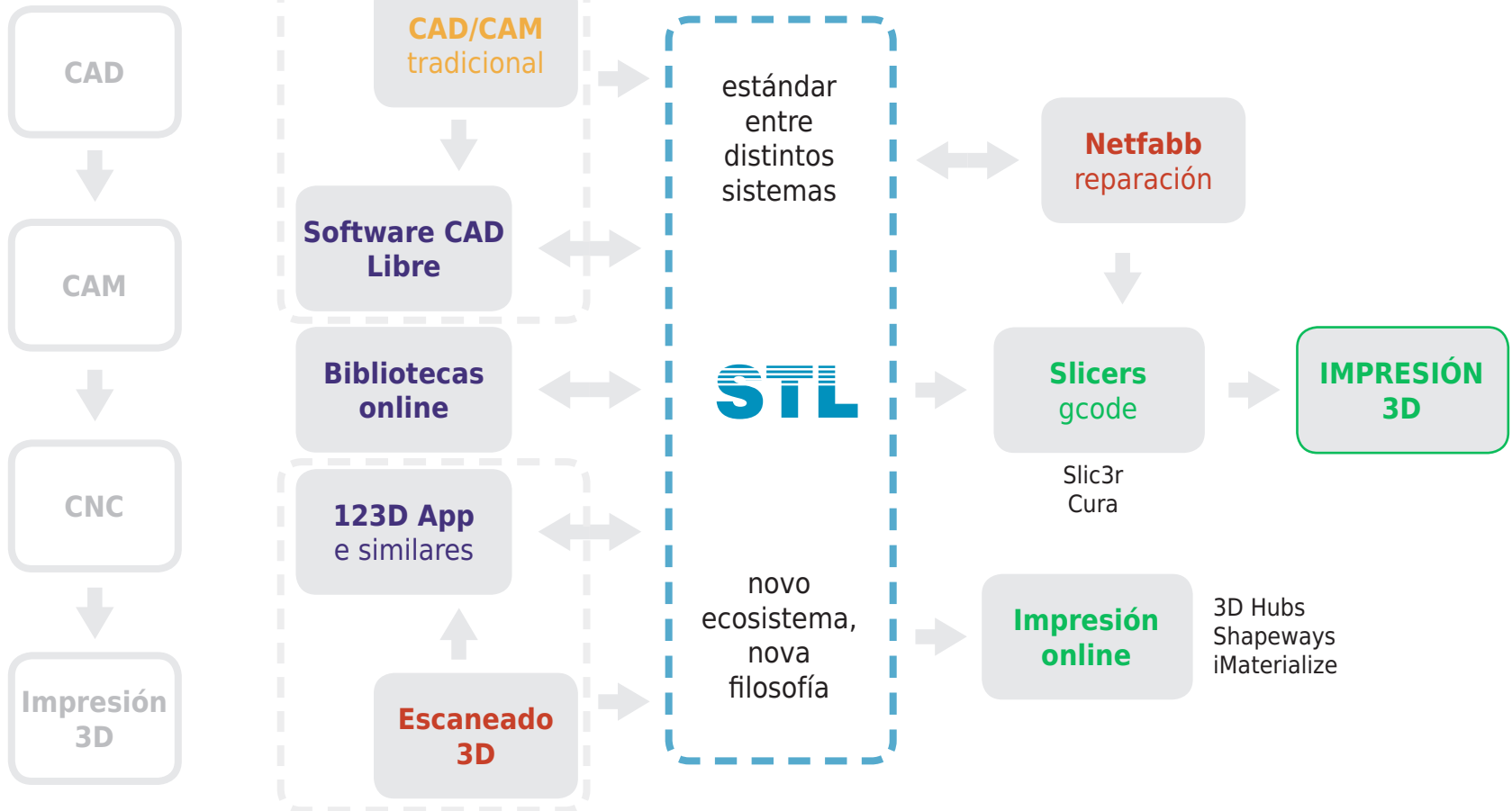
Primeira impressora no espazo - Estación Internacional ISS - 25/11/2014



SOFTWARE 3D



FLUXO DE TRABAJO



Bibliotecas online

MakerBot Thingiverse



yeggi

GRABCAD

RASCOMRAS

Impresión baixo demanda

shapeways*

i.materialise

123D Apps (Autodesk)



123D Catch

Generate 3D models from photos



123D Circuits

Design your next electronic project



123D Design

Easy 3D modeling for Web, Mac, and PC



123D Make

Unique 3D models from 2D slices



123D Sculpt+

Create 3D sculptures on iPad



Meshmixer

The ultimate tool for 3D mashups



Tinkercad

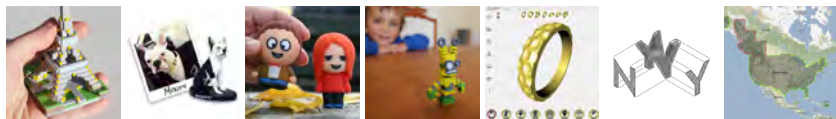
Get started with 3D modeling



Tinkerplay

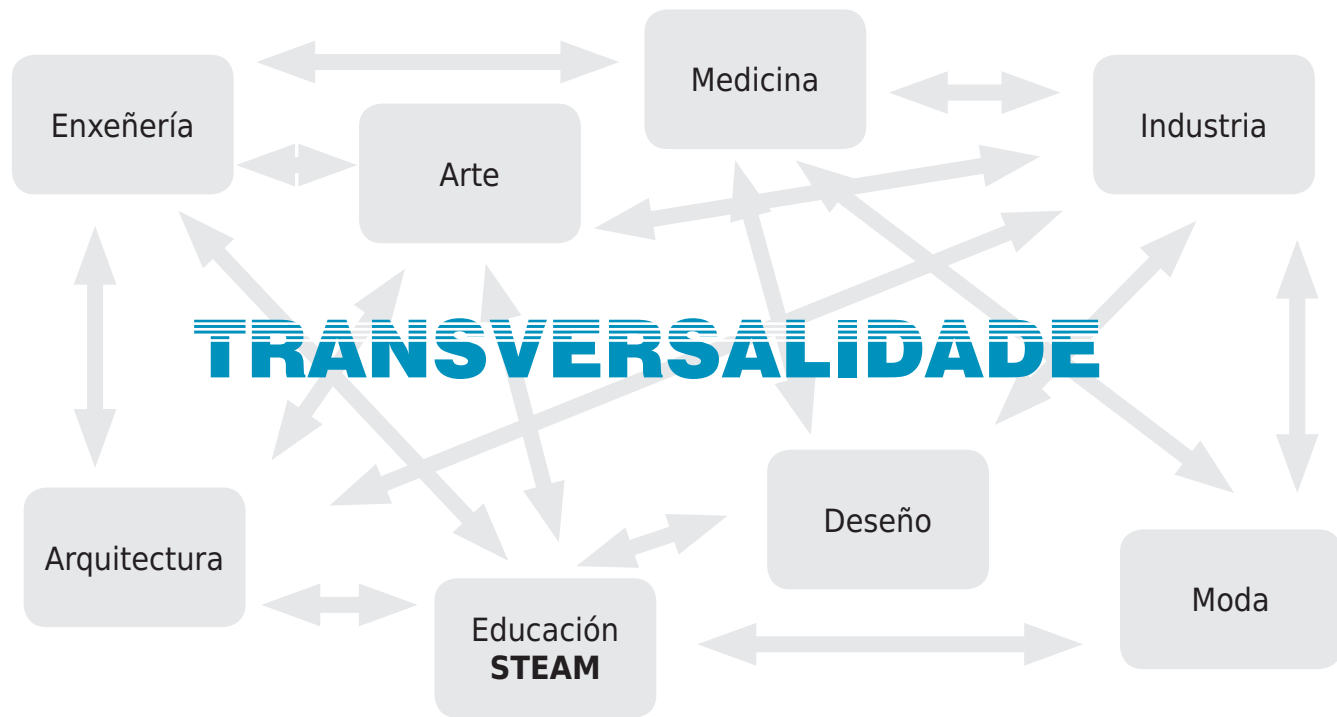
Design, customize and 3D print for play

shapeways.com/creator



APLICACIONES DA IMPRESIÓN 3D





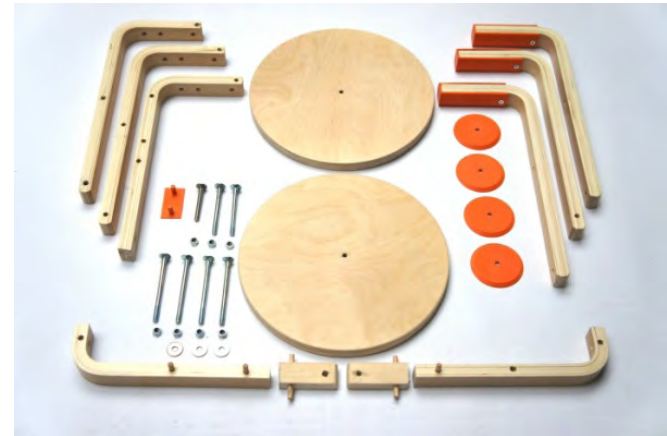
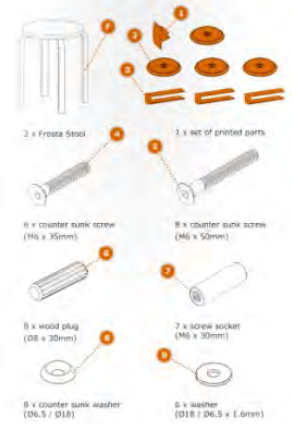
Colaboración entre distintos campos da enxeñaría e do deseño ou con novos campos: medicina, educación, etc.

EXEMPLOS NA EDUCACIÓN



Material didáctico creado/descargado/persoalizado polos profesores + Obxetos creados polo alumnado

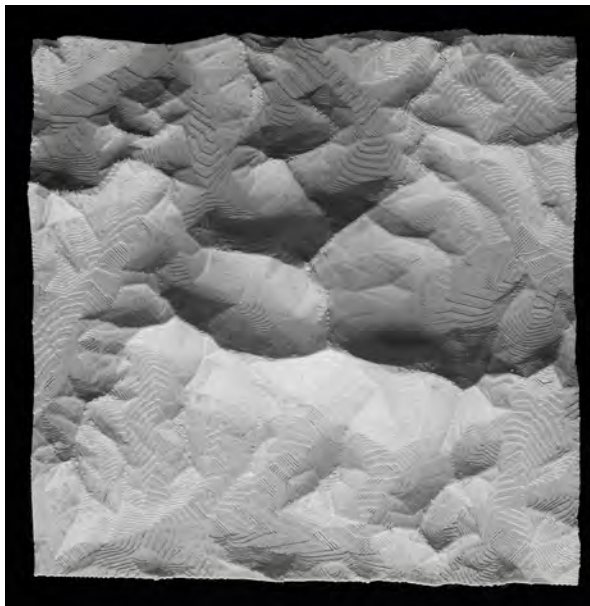
Hack Ikea
Imaginación e novos usos



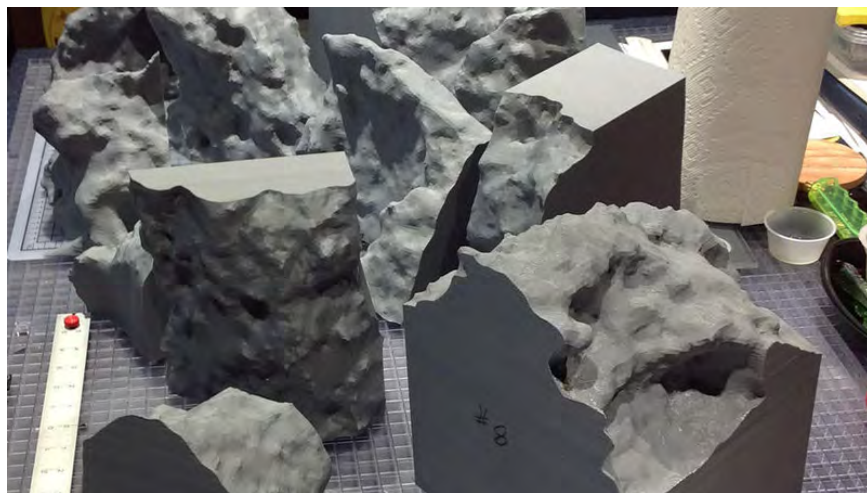
Matemáticas



Entendimento tridimensional
do território



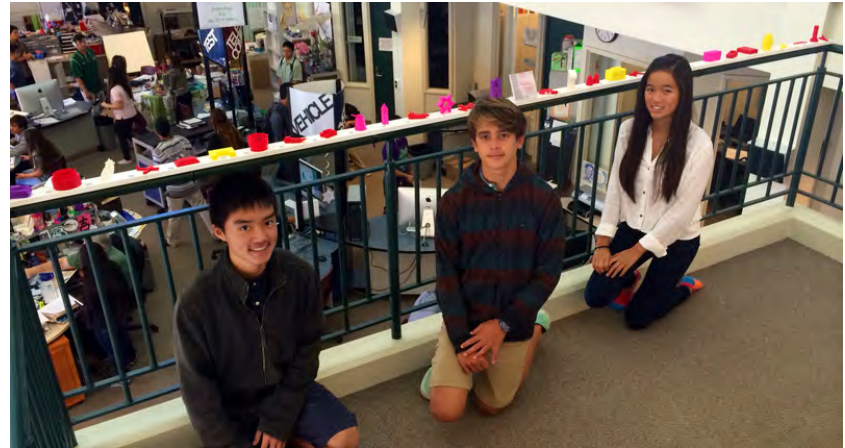
Descarga e impresión do
modelo de pedra marciana



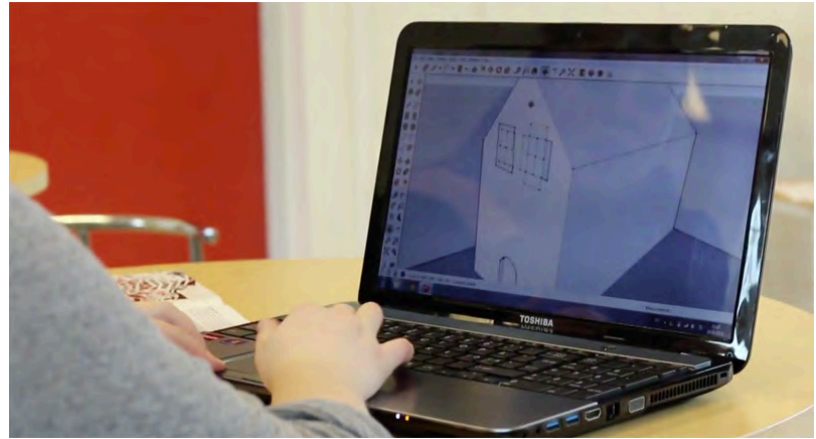
Biología



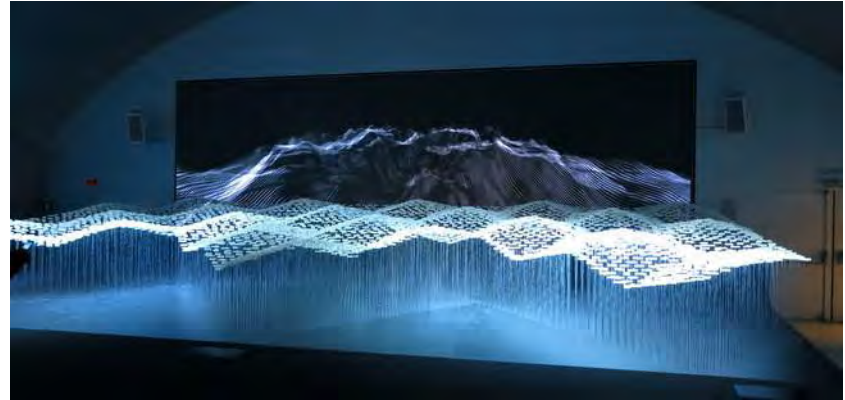
Estudio da Historia



Debuxo e impresión 3D
da localidade



Textos de Gabriel
García Márquez



RECICLAXE



seafood.org

CONCIENCIACIÓN



SOLIDARIDADE



e-NABLE: A Global Network Of Passionate Volunteers Using 3D Printing To Give The World A "Helping Hand."

enablingthefuture.org

” 3D printing has the potential to revolutionize the way we make almost everything ”



President Barack H. Obama
State of the Union Address
February 12th, 2013

STAY TUNED:

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- Búscanos en Facebook
- Email: info@brinka3d.com

