

# LA FABBRICAZIONE DIGITALE

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Un modo Nuovo di produrre le cose

# Enrico Bassi

Ricercatore, Designer e Consulente per l'innovazione



# Il tuo docente

- Industrial e product designer
- Docente di fabbricazione digitale
- Coordinatore del primo Fab Lab italiano (Fab Lab Italia)
- Coordinatore del Fab Lab OpenDot in Milano
- Instructor e global evaluator in FabAcademy

# LAB

# 05

FAB LAB

A CURA DI  
**ARDUINO.CC / M. BANZI**

Un fab lab è un laboratorio di produzione artigianale dove macchine digitali, software "open source", strumenti di lavoro e materiali. È ideale per realizzare prototipi in piccole quantità, ma personalizzati. L'aspetto della produzione di massa. In questo il mondo ce ne sono pochi. Di questi ce n'è solo uno.

da  
a è  
me  
a.



The logo for FABLAB TORINO is displayed on the wall. It features a green gear icon with a stylized human figure inside, positioned to the left of the text "FABLAB" and "TORINO" stacked vertically.

FABLAB  
TORINO





open  
dot

open STAGE

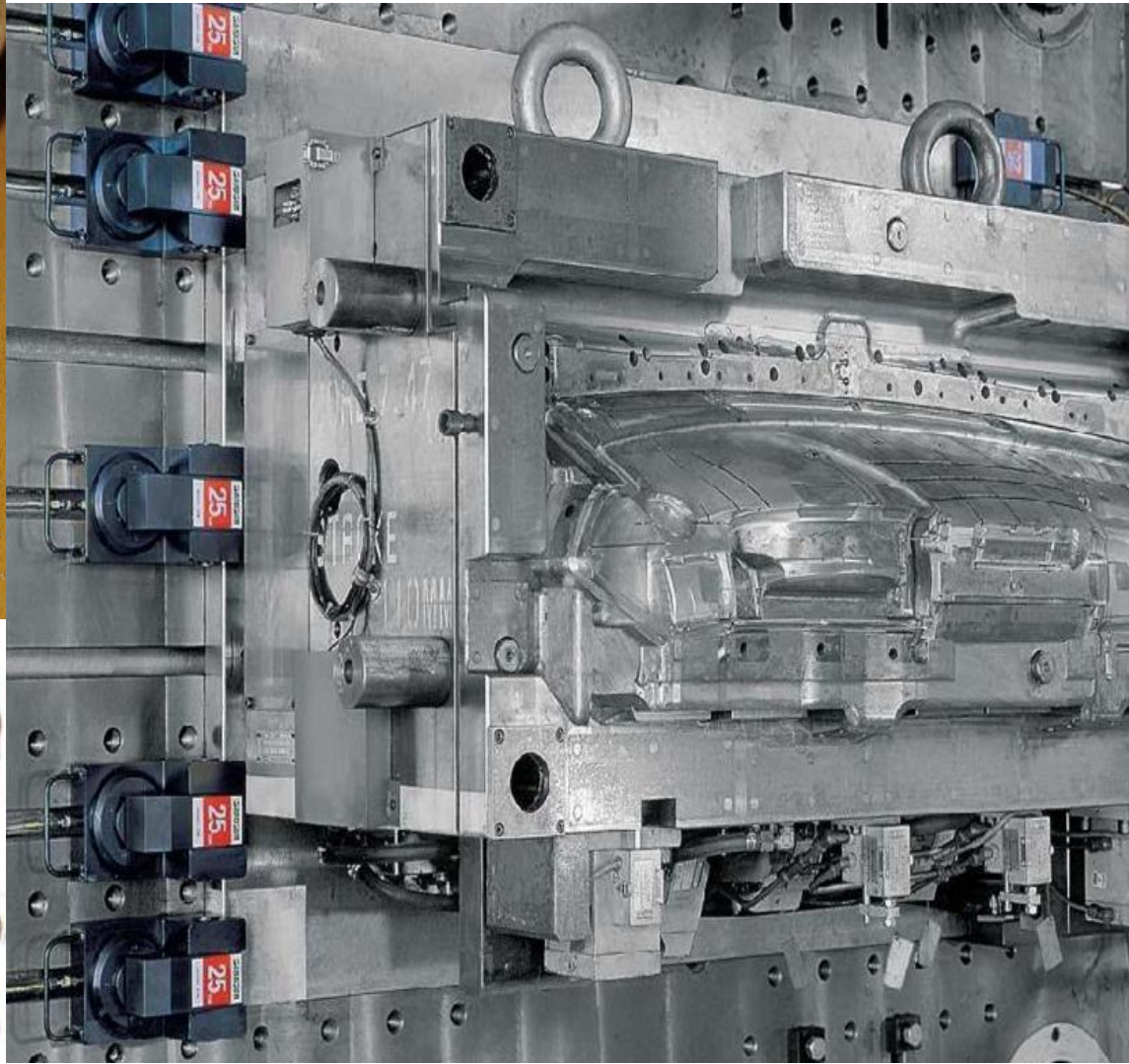
Fab Academy  
philosophy and applications of digital fabrication

**COS'È LA FABBRICAZIONE DIGITALE**

Partiamo dalla produzione tradizionale...



# Replicare uno Stampo



# Produzione industriale

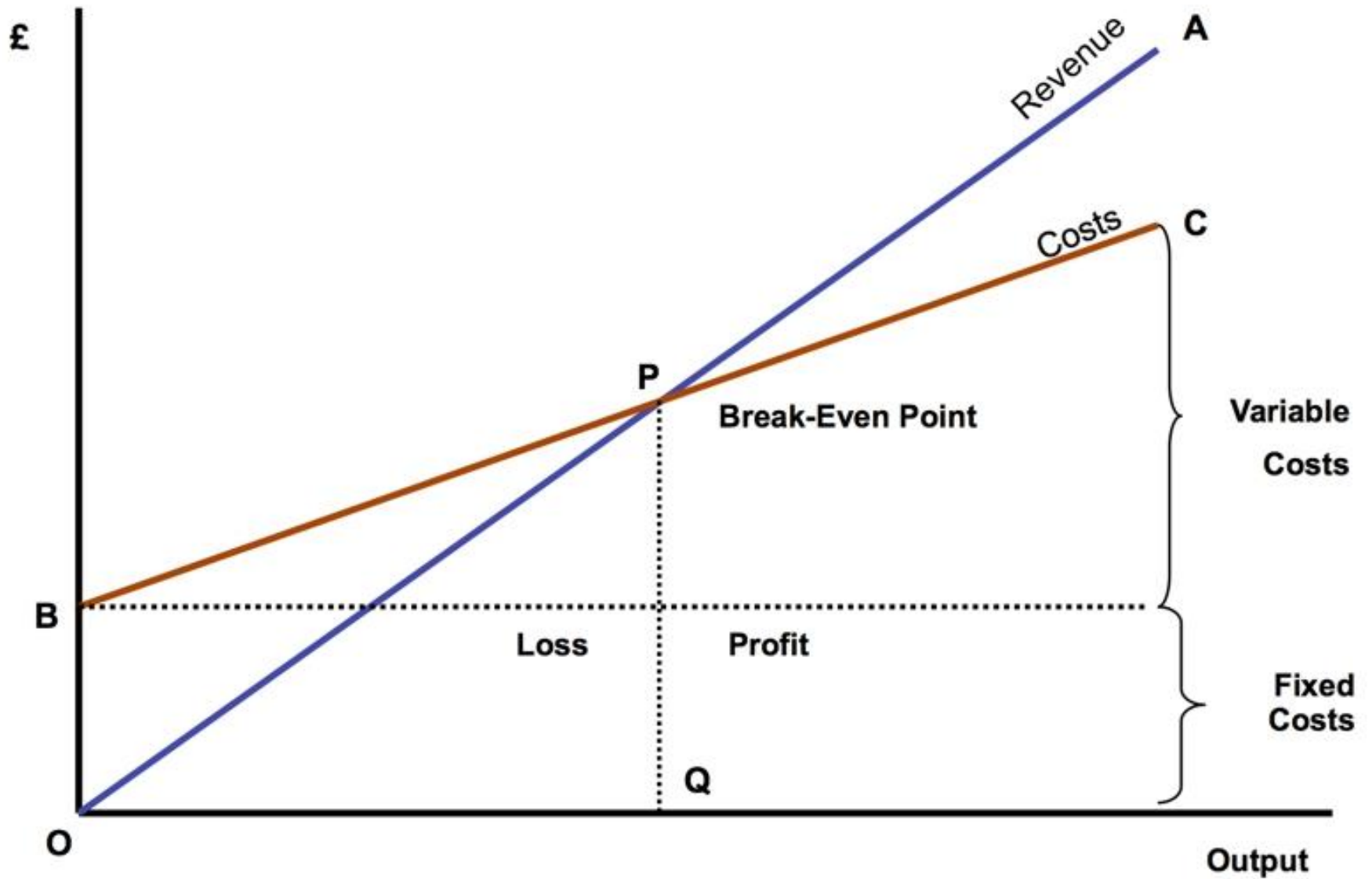
La produzione industriale è l'insieme delle attività relative alla trasformazione di materie prime, energie ed informazioni, in beni di consumo: ossia, la combinazione di fattori di produzione (input) per realizzare dei prodotti (output).

Ogni trasformazione per essere compiuta richiede una tecnologia, vale a dire una macchina in grado di implementare il tutto. La produzione di un prodotto complesso richiede un insieme correlato e finalizzato di processi (tecnologie, macchinari, ecc...) che costituisce un sistema di produzione.

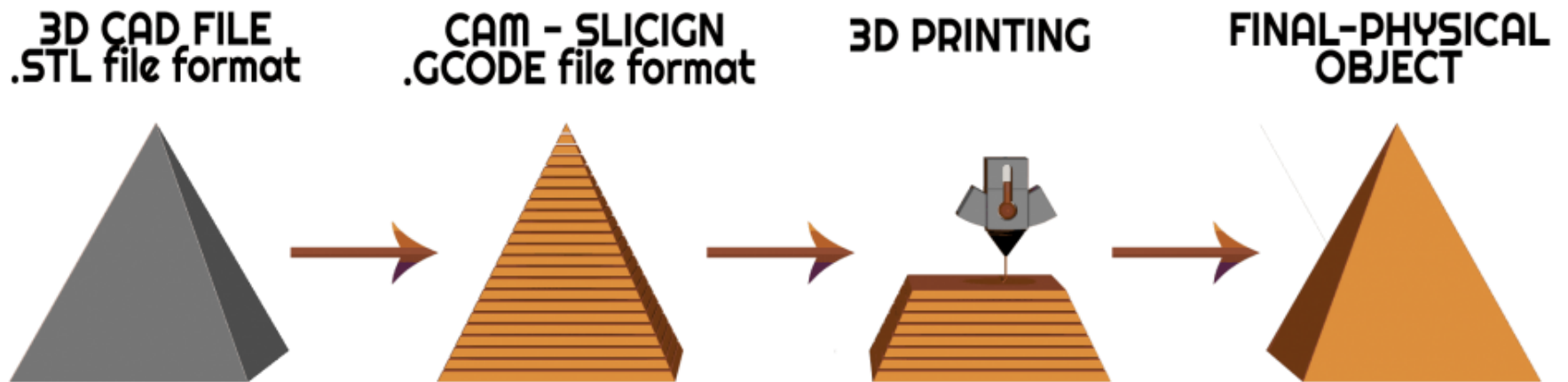
*(Wikipedia.it)*

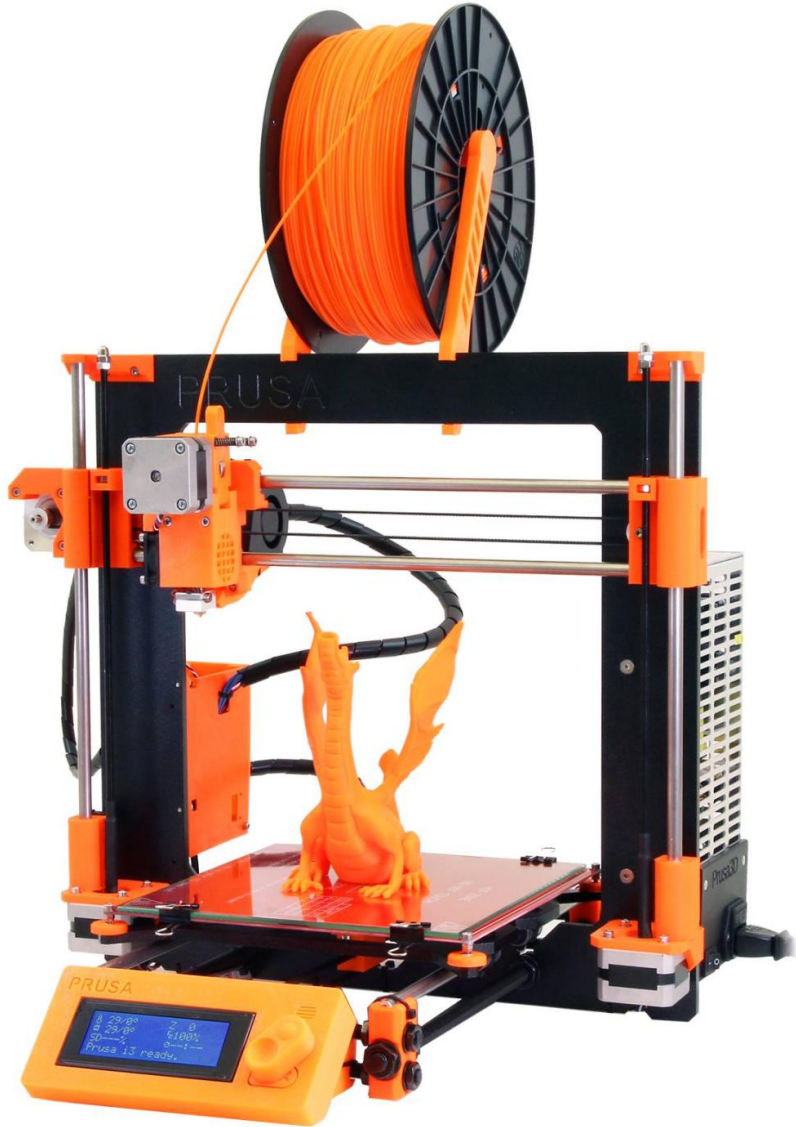
# La produzione industriale





# La fabbricazione digitale





# *PRINTING FARM UPDATE*

**PRUSA**  
**RESEARCH**  
by JOSEF PRUSA



# La fabbricazione digitale





# Gli Spazi della fabbricazione





<https://universoabierto.org/>

# Gli Spazi della fabbricazione



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<https://www.fablabs.io/map>

# RESCALING GLOBAL MANUFACTURING

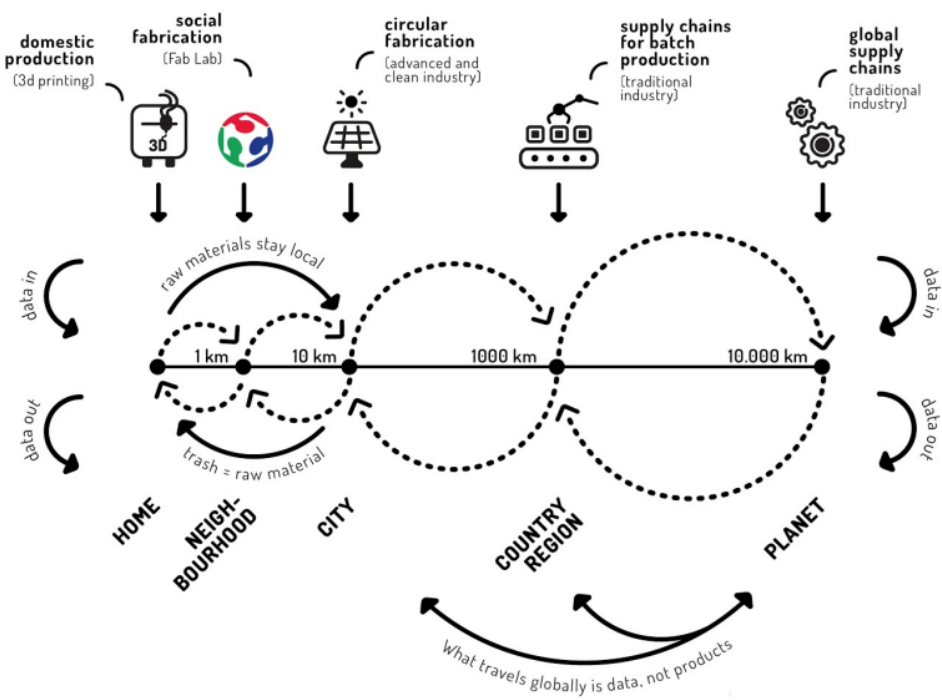



Image 3. A multiscalar and complementary fabrication ecosystem. Source: Fab City

## From linear to spiral production ecosystems:

↳ DIDO - Data in / Data out

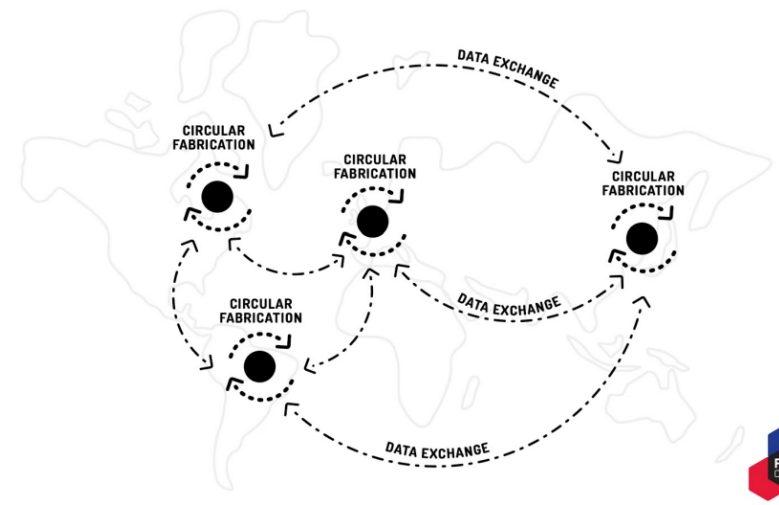


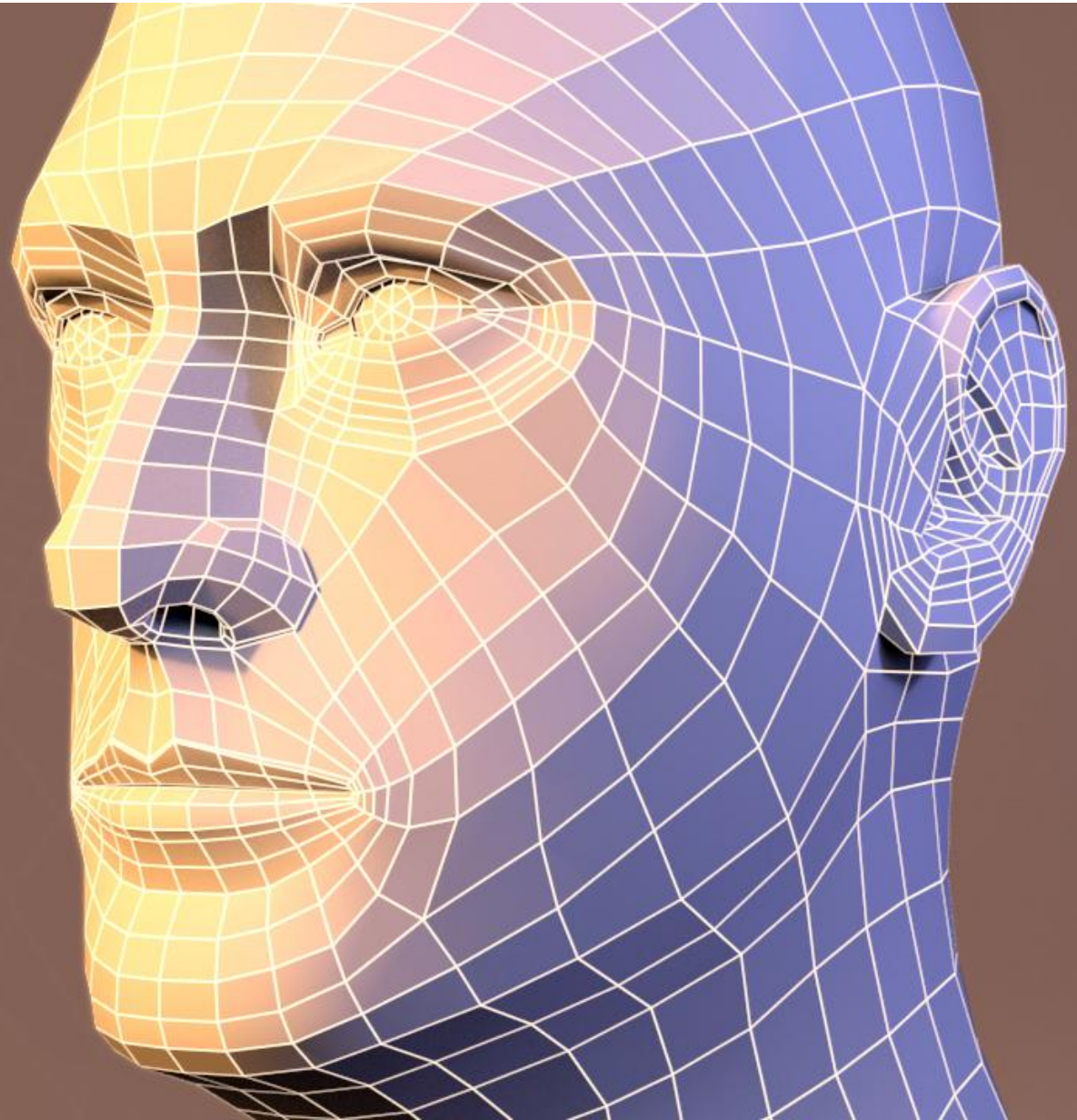
Image 4. Global connected production. Materials stay within accepted distances in cities and regions, information travels on how things are made. We share the recipes of how to construct our world. Source: Fab City

# LE TECNOLOGIE DI FABBRICAZIONE DIGITALE

—

CAD

# Mesh





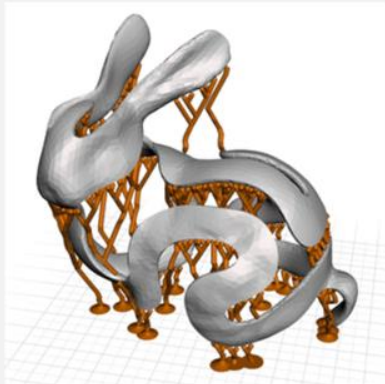
HOME

FAQ

MM MANUAL

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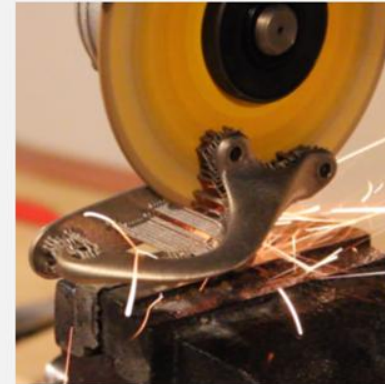
# Autodesk Meshmixer



DOWNLOAD



FORUM

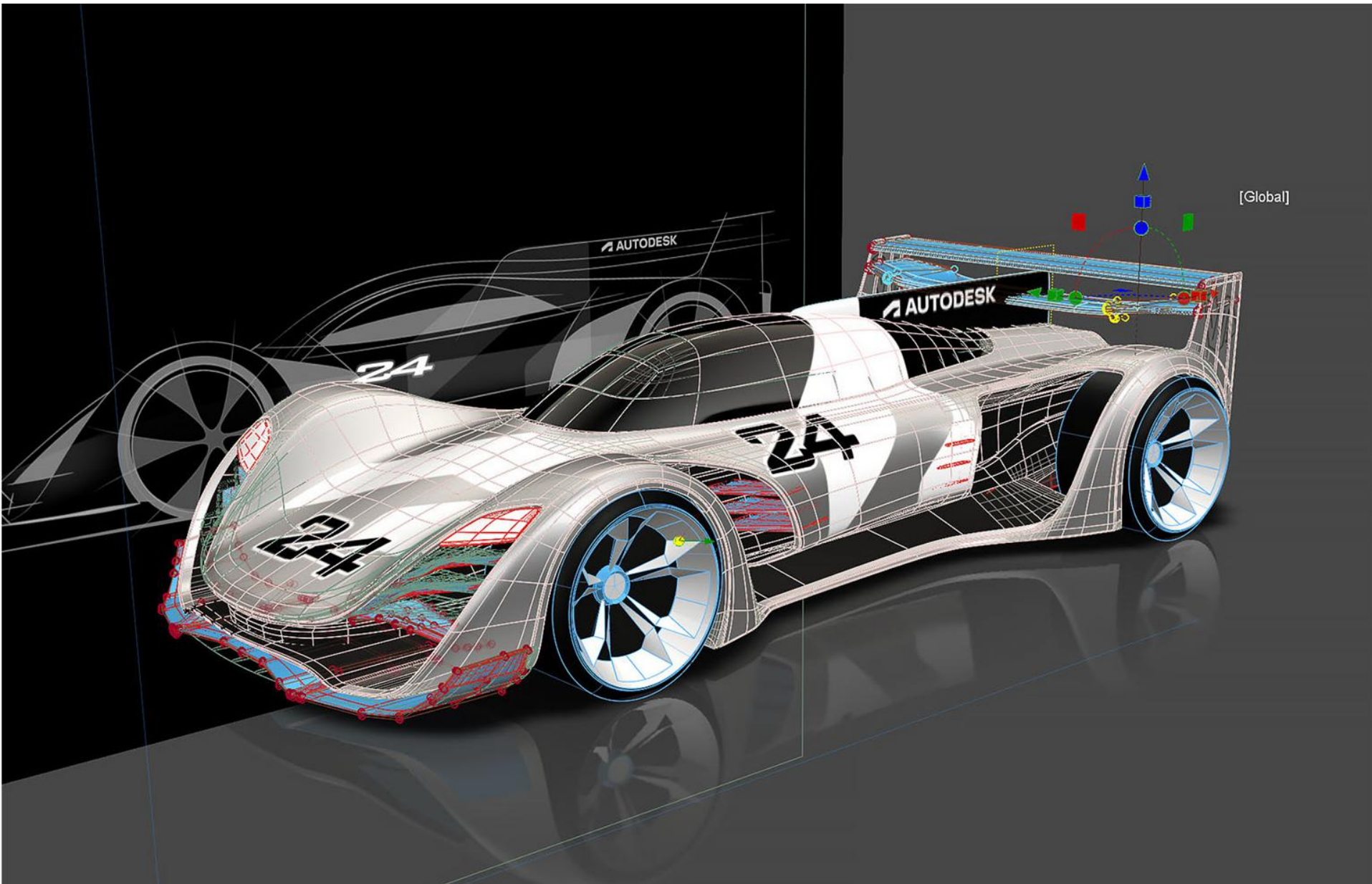


VIDEO

Meshmixer is state-of-the-art software for working with triangle meshes.



# Superfici





Alias

Contact Sales

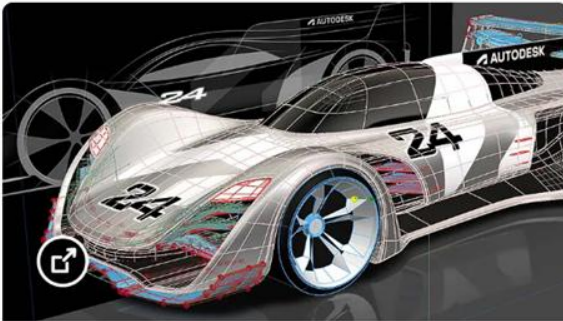
Download free trial

See pricing options

Overview Benefits Capabilities Customer stories FAQs

## What Autodesk Alias product is right for you?

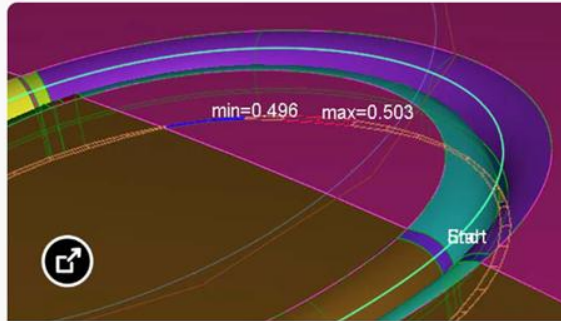
Compare products



### Alias Concept

Get sketching, fast concept modeling, and visualization tools.

See features



### Alias Surface

Refine concept models into Class-A surfaces for consumer and automotive designs.

See features



### Alias AutoStudio

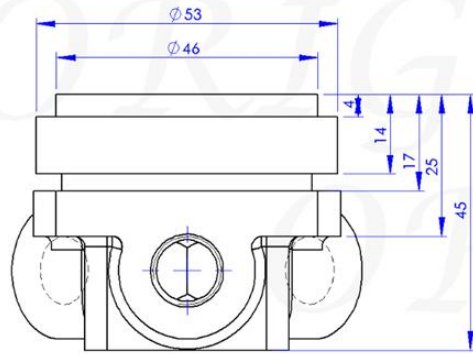
Perform concept modeling, analysis, technical surfacing, and visualization.

See features

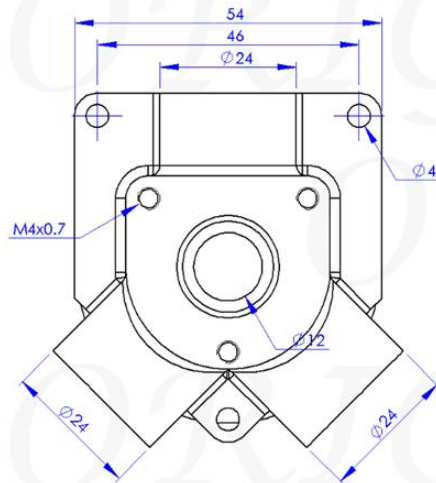
ALIAS: high quality aesthetics

<https://www.autodesk.com/products/alias-products/overview>

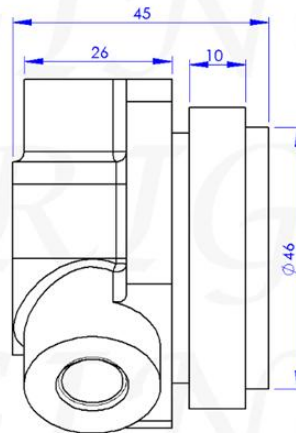
# Solidi



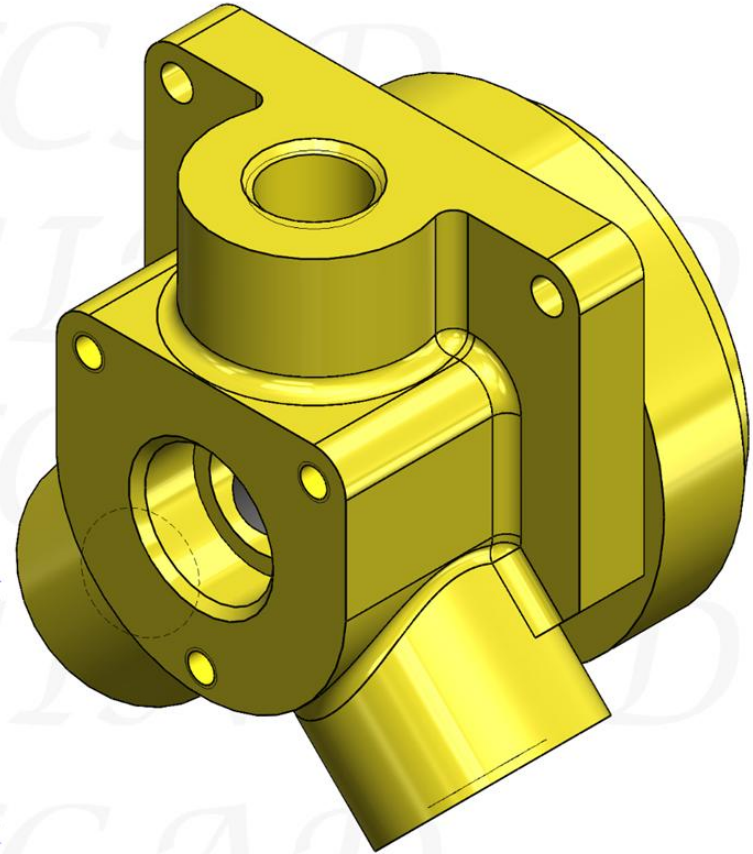
TOP VIEW



FRONT VIEW



SIDE VIEW

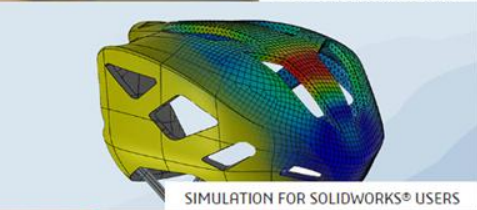


DESIGNED BY: CS	TITLE: 15	ALL DIMENSIONS ARE IN MM	
DATE: 11/20/2020	TOLERANCES.	PART NO: 31102020-02	SHEET SIZE: A4
CHECKED BY: CS	×××× ±0.01	DRAWING NO: DWG31102020-02	SCALE: 1:2
DATE: 11/20/2020	×××× ±0.005		REVISION: 00
	×××× ±0.001		





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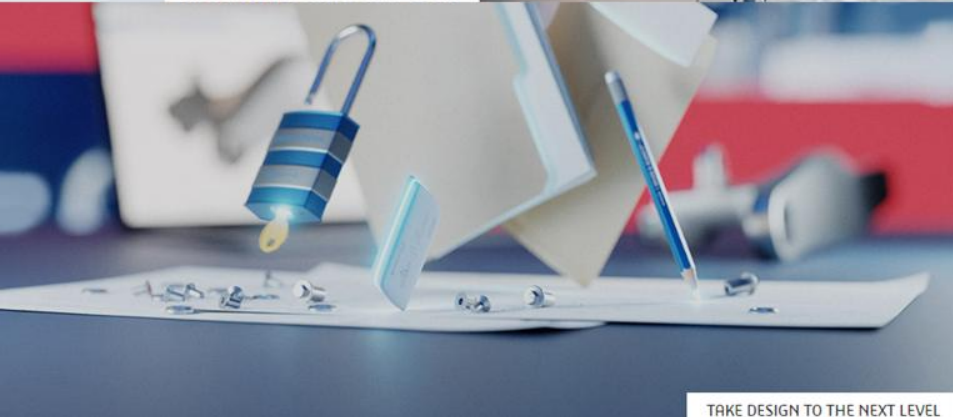
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2025 CALL FOR PRESENTATIONS



DraftSight

DRAFTSIGHT® 2D CAD



TAKE DESIGN TO THE NEXT LEVEL



SLURME 9

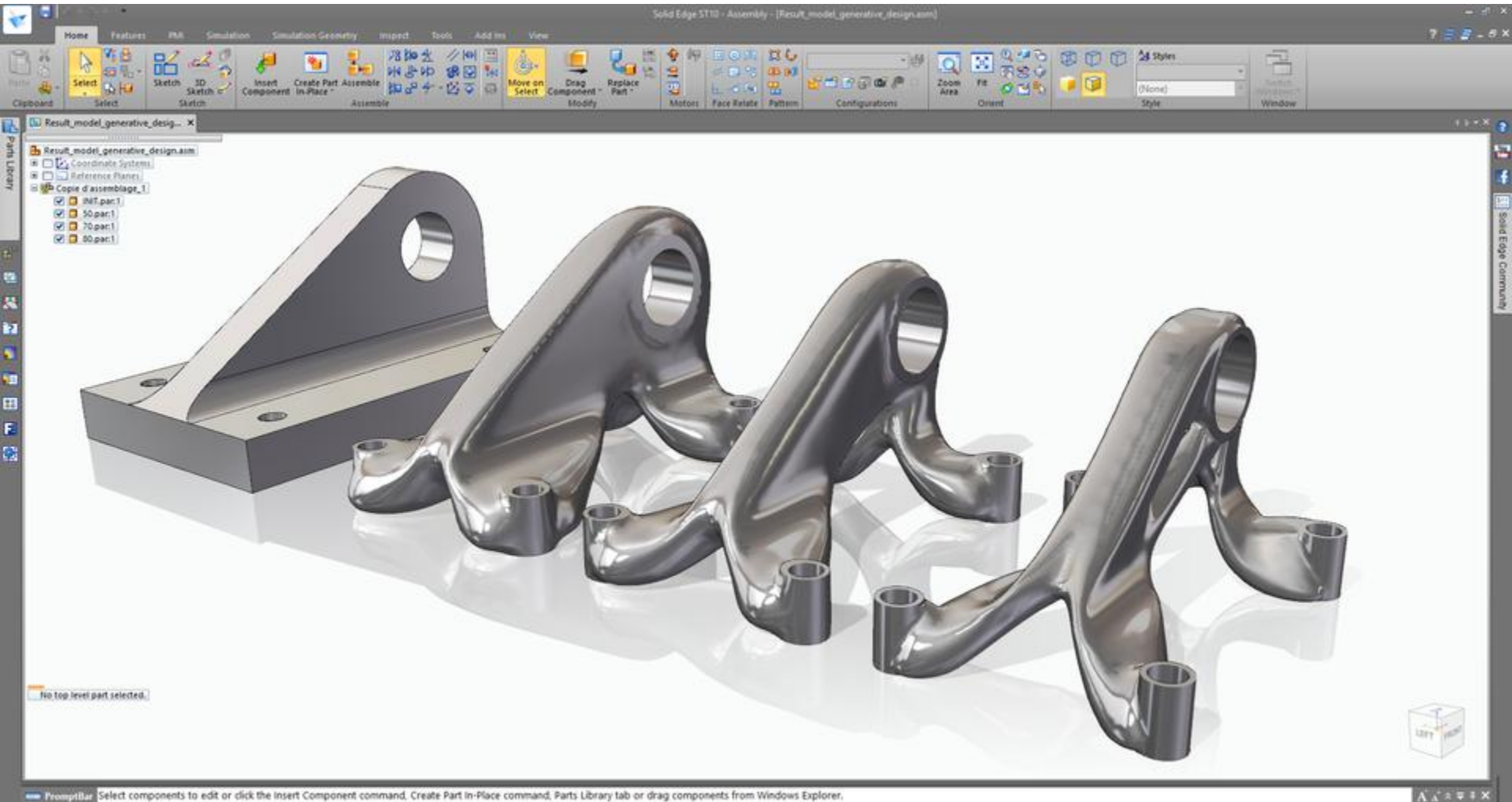
SOLIDWORKS LIVE

CUSTOMER STORIES



3DEXPERIENCE® WORKS VALUE OFFERS

# Generativo



PromptBar Select components to edit or click the insert Component command, Create Part In-Place command, Parts Library tab or drag components from Windows Explorer.

➔ NEW - Full access Fusion trial: For a limited time, design and make with all advanced features Fusion has to offer, free for 30 days. - **DOWNLOAD NOW**

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FUSION 360: very versatile, with generative

<https://www.autodesk.com/products/fusion-360>

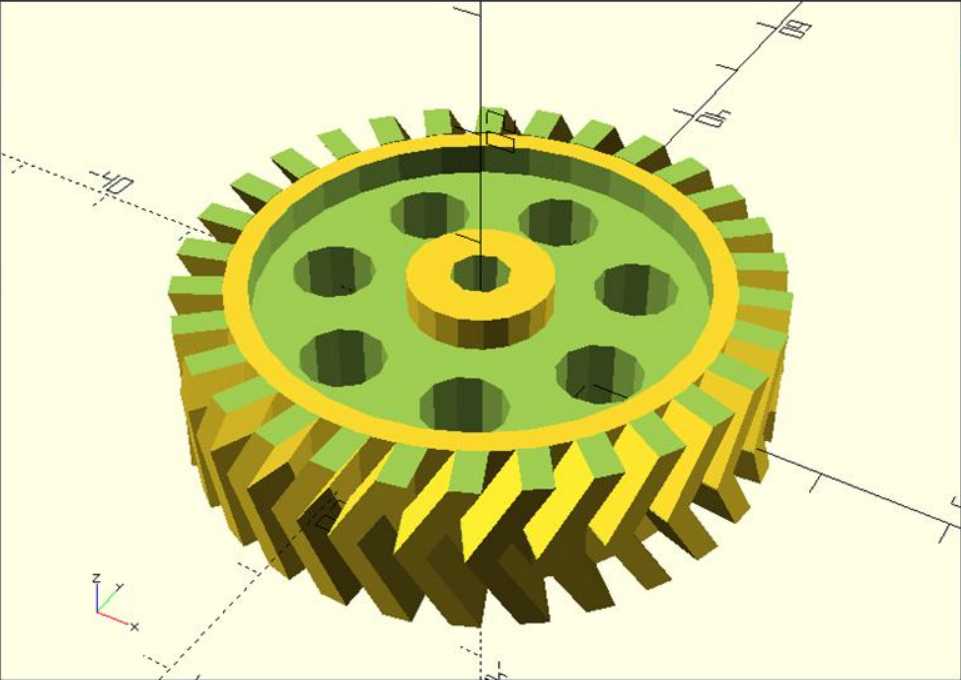
# Da Codice

gears\_helical.scad — OpenSCAD

File Edit Design View Help

Editor

```
1 // Helical Gears
2 // Catarina Mota
3 // catarinamfota@gmail.com
4 // 20091123
5
6
7 //GEAR PARAMETERS
8 doubleHelical=1; //int: 0=no, 1=yes (will make the gear 2x
9   taller)
10 gearHeight=7; //gear depth
11
12 pitchDiam=45; //pitch diameter
13
14 shaftDiam=5; //shaft diameter
15
16 //TEETH PARAMETERS
17 teethNum=30; //number of teeth (int)
18
19 addendum=2;
20 dedendum=2;
21 toothWidth=2;
22
23 angle=-30; //positive=right, negative=left
24
25 orientation=1; //int: 1=left, -1=right
26
27 //CENTER SHAPE PARAMETERS
28 centerShape=3; //int: solid=1, star=2, circle=3
29
30 starNum=6; //number of lines for star shape (int)
31 starWidth=2; //width of star lines
32
33 circleNum=7; //number of circles (int)
34 circleDiam=7; //diameter of circles
35
36
```



Customizer

Automatic Preview Show Details Reset

design default values + - save preset

Parameters

Console

```
Geometries in cache: 8
Geometry cache size in bytes: 22960
CGAL Polyhedrons in cache: 0
CGAL cache size in bytes: 0
Compiling design (CSG Products normalization)...
Normalized CSG tree has 287 elements
Compile and preview finished.
Total rendering time: 0 hours, 0 minutes, 0 seconds
```

Viewport: translate = [ 0.00 0.00 0.00 ], rotate = [ 50.10 0.00 31.30 ], distance = 140.00 (781x551)

OpenSCAD 2019.05

# Grasshopper

ALGORITHMIC MODELING FOR RHINO

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## About Grasshopper...

For designers who are exploring new shapes using generative algorithms, **Grasshopper@** is a graphical algorithm editor tightly integrated with Rhino's 3-D modeling tools. Unlike RhinoScript, Grasshopper requires no knowledge of programming or scripting, but still allows designers to build form generators from the simple to the awe-inspiring.

Grasshopper is included in **Rhino 7 for Mac and Windows.**

[... download now](#)

## News

[More...](#)

## Events

October 2024

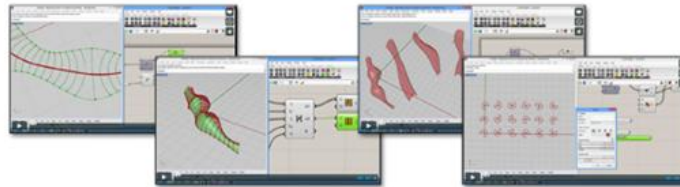
S	M	T	W	T	F	S
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<a href="#">6</a>	<a href="#">7</a>	<a href="#">8</a>	<a href="#">9</a>	<a href="#">10</a>	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

**Attention!** This site will be discontinued soon.

For all things Grasshopper, please visit the [Grasshopper Discourse Forum](#).

## Get Started Here:

There are many resources available to learn more about Grasshopper.



[Introduction to Grasshopper Videos](#) by David Rutten.

Wondering how to get started with Grasshopper? Look no further. Spend some time with the creator of Grasshopper, David Rutten, to learn the fundamentals of Grasshopper. No experience is necessary. This video series and many other tutorials are available on our [Tutorials page...](#)

Also, check out these [tutorial videos...](#)

## Grasshopper Support Forum

[Distance based random cull in GH](#)

[Grasshopper Fabric/Textile App Should Exist](#)

## About



[Scott Davidson](#)  
created this [Ning Network](#).

Welcome to  
Grasshopper

[Sign In](#)

## Translate

## Search

Grasshopper3d Only

## Photos



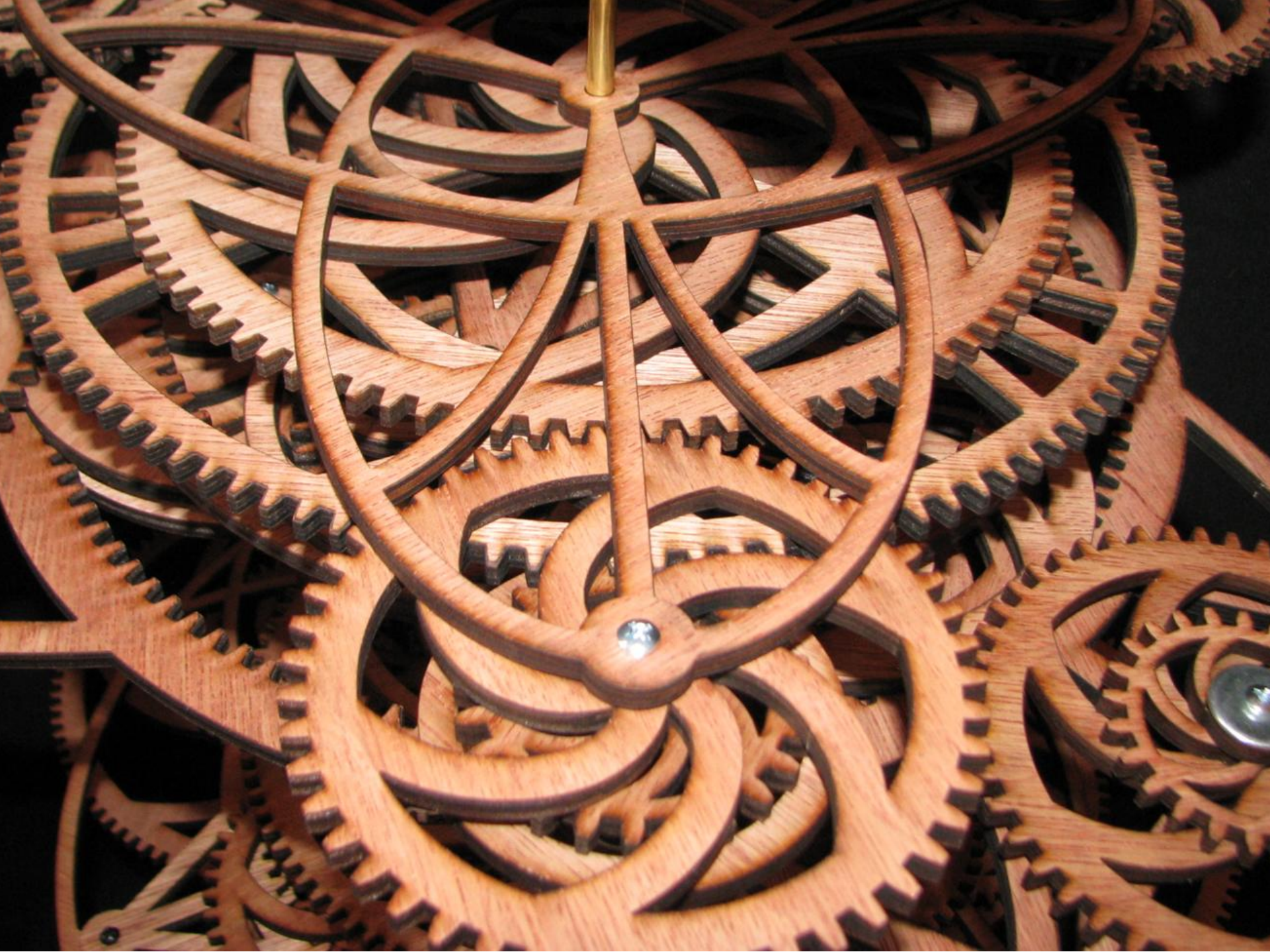
by [Parametric House](#)

0 0



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# IL TAGLIO LASER





<https://youtu.be/3lLfXX9Xu-0?si=8ErWsW7h-173G8PB>







<https://www.stylepark.com/en/luceplan/titania-pendant-lamp>

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# IL TAGLIO VINILE

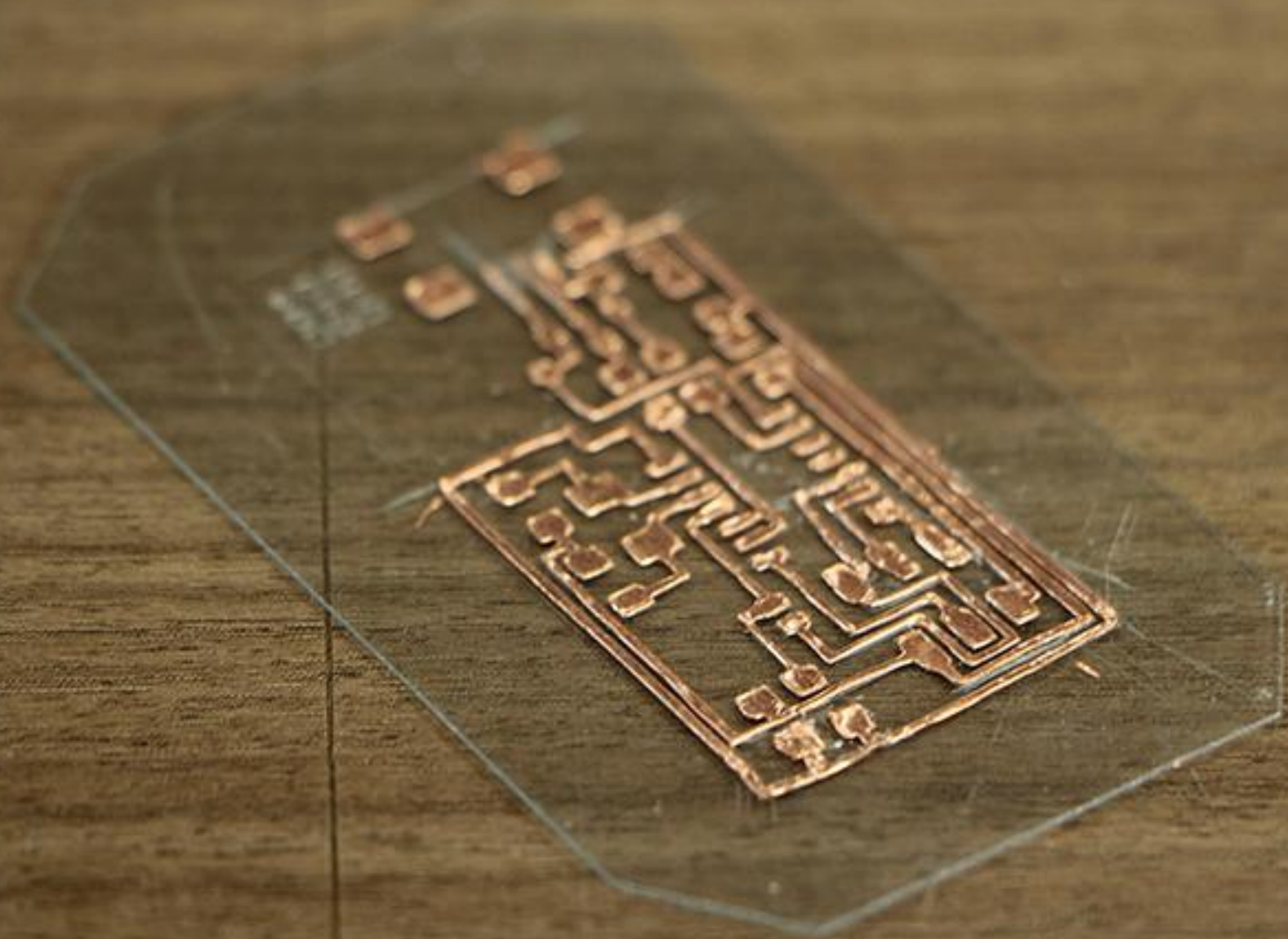






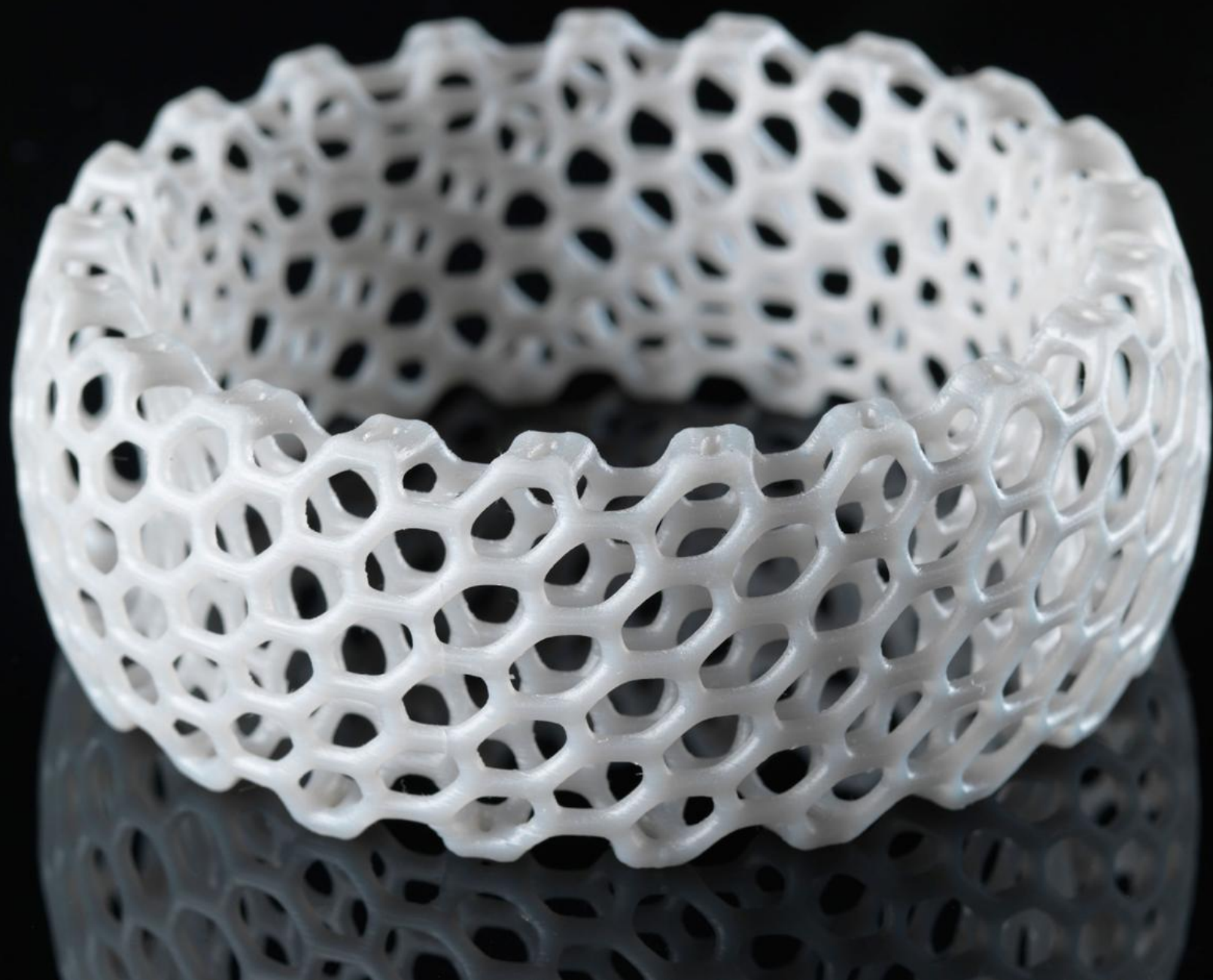


EST. 1986  
LOS ANGELES  
HIGH SPEED THRILLER



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# LA STAMPA 3D







# Open Flexure



<https://openflexure.org/projects/microscope/>



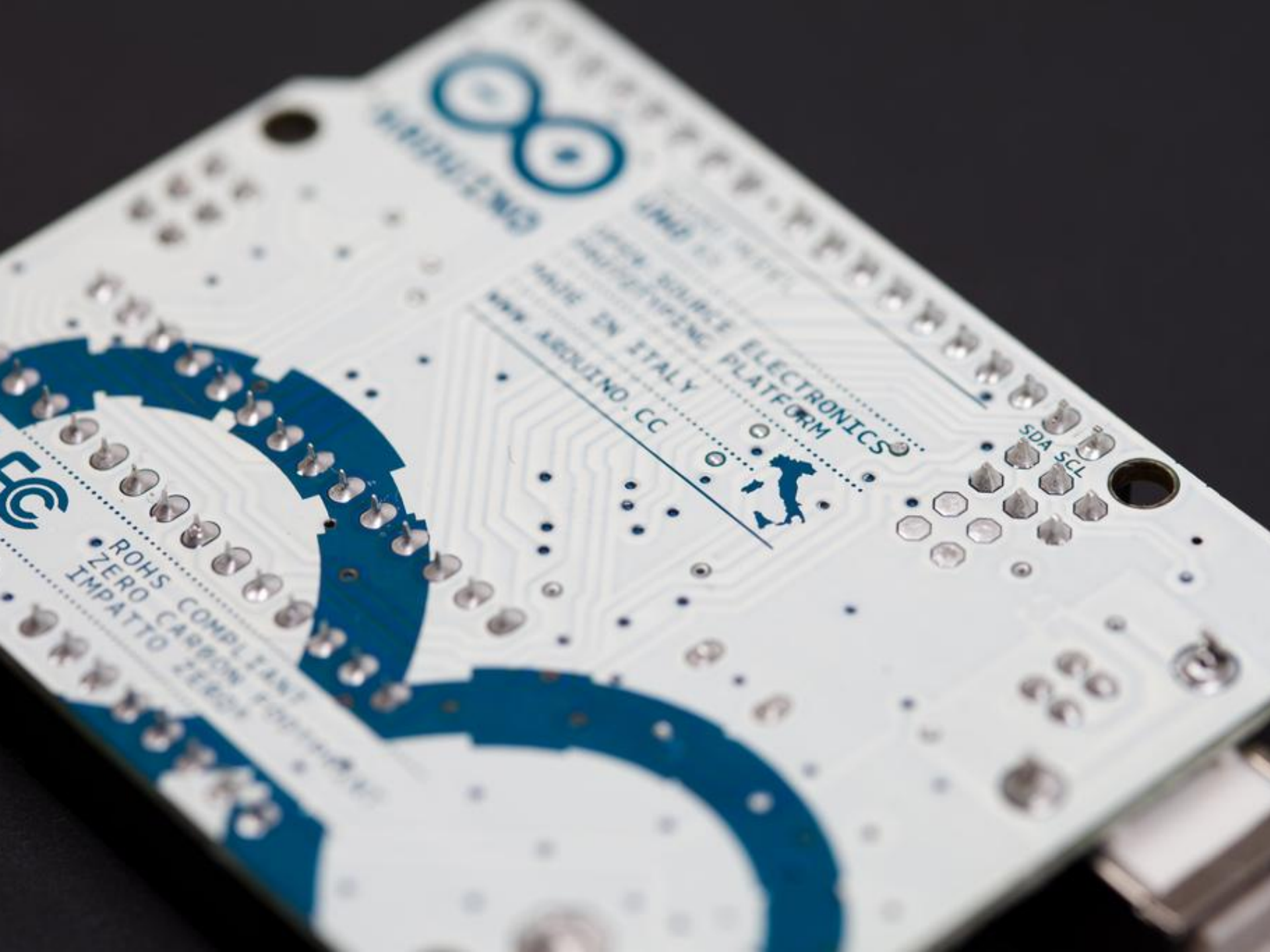


## E-nable

<https://assets.bwbx.io/images/users/iqjWHBFdfxIU/iJh1v34dycb0/v1/-1x-1.jpg>

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# ARDUINO



ARDUINO

ARDUINO ELECTRONICS

MADE IN ITALY

WWW.ARDUINO.CC

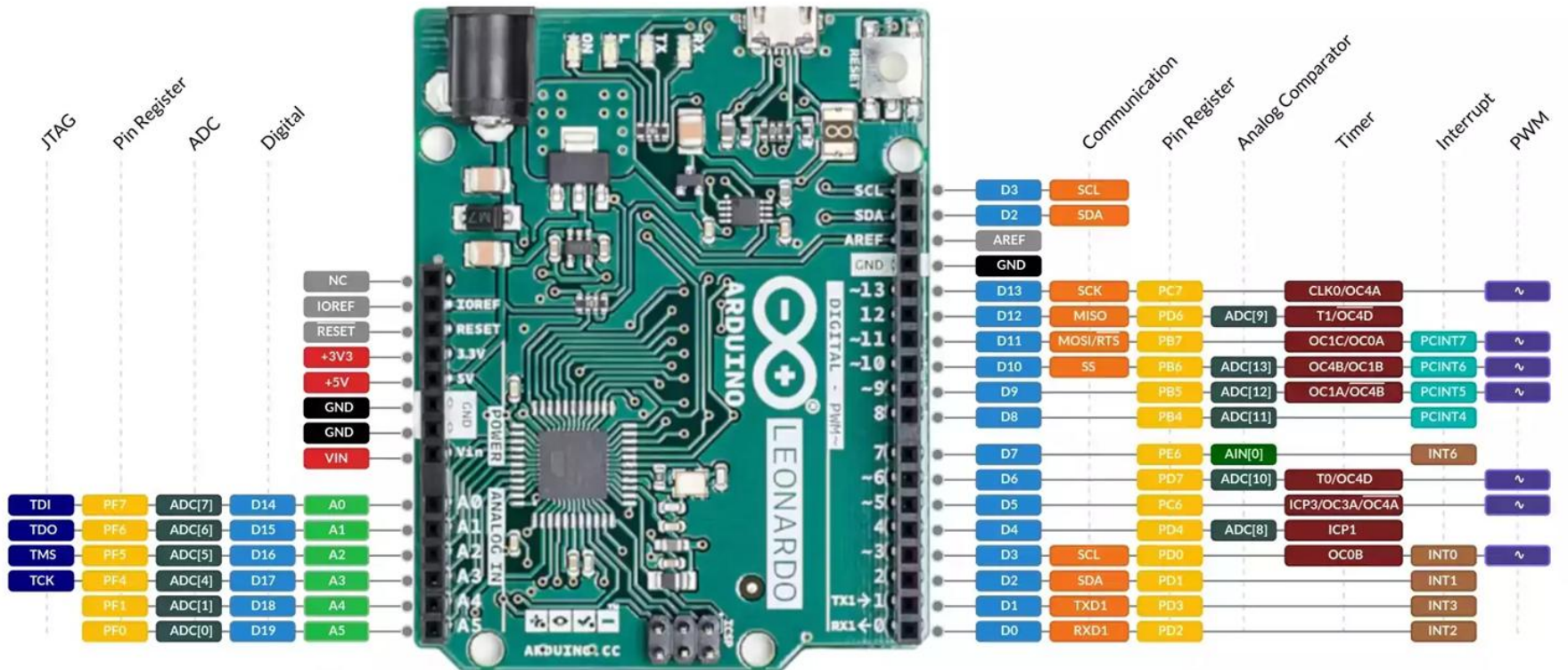
ARDUINO ELECTRONICS



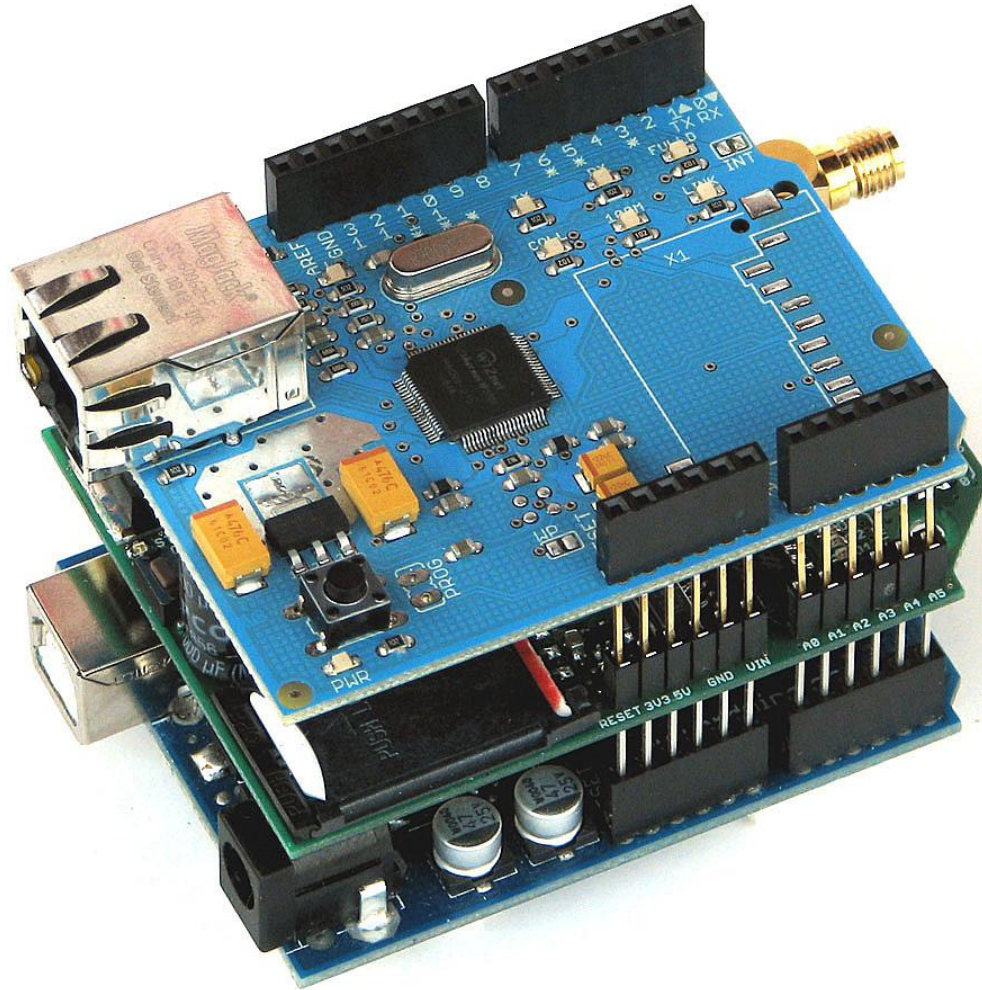
SDA SCL



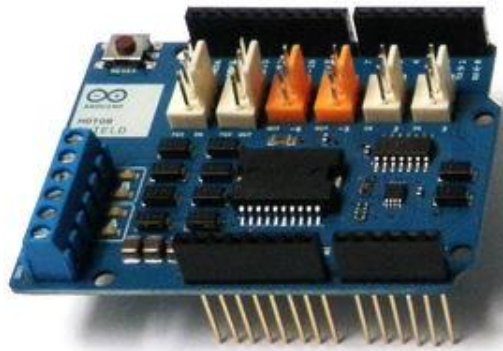
ROHS COMPLIANT  
ZERO CARBON FOOTPRINT  
IMPATTO ZERO







Motor



Wireless

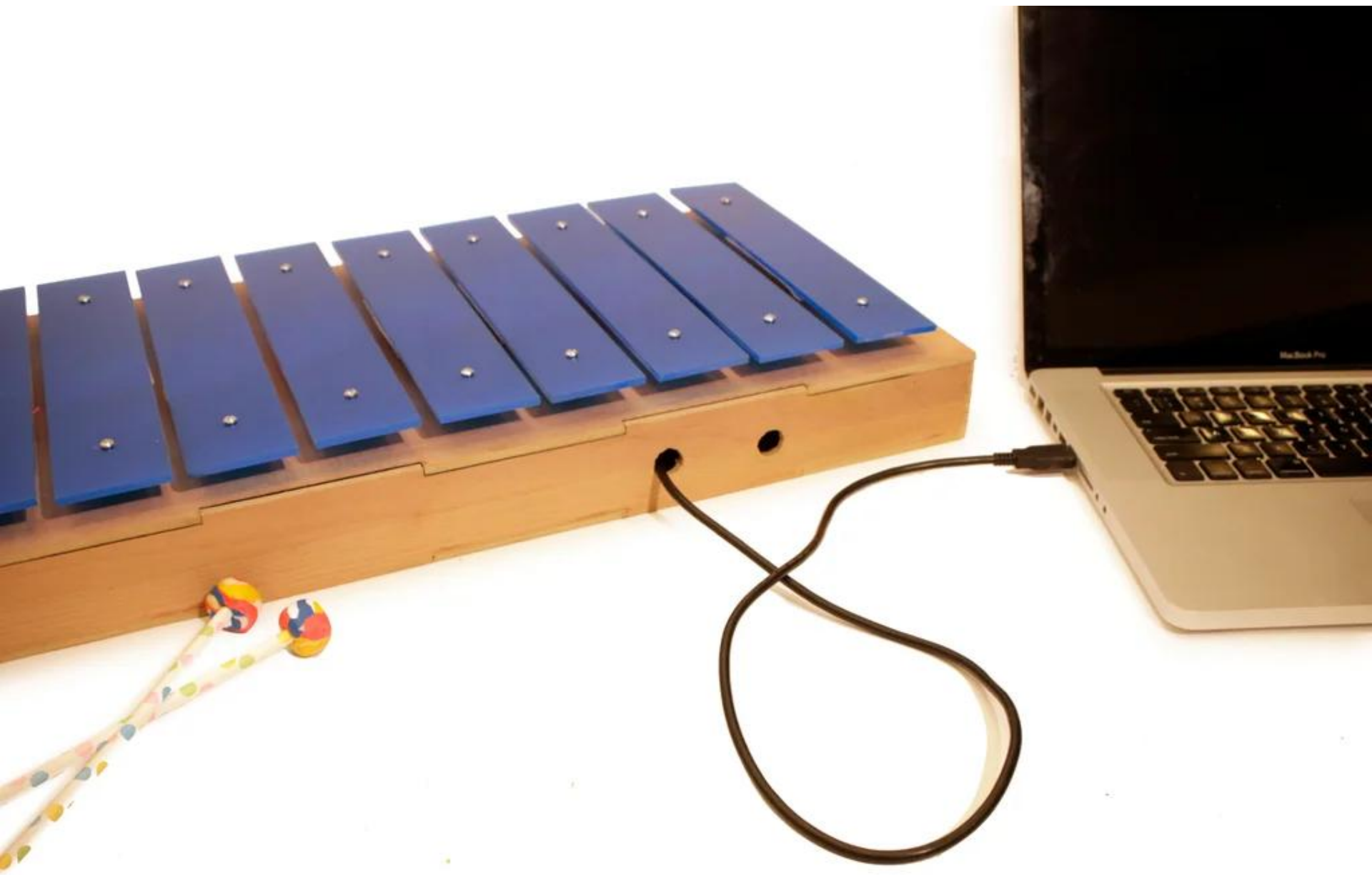


Ethernet





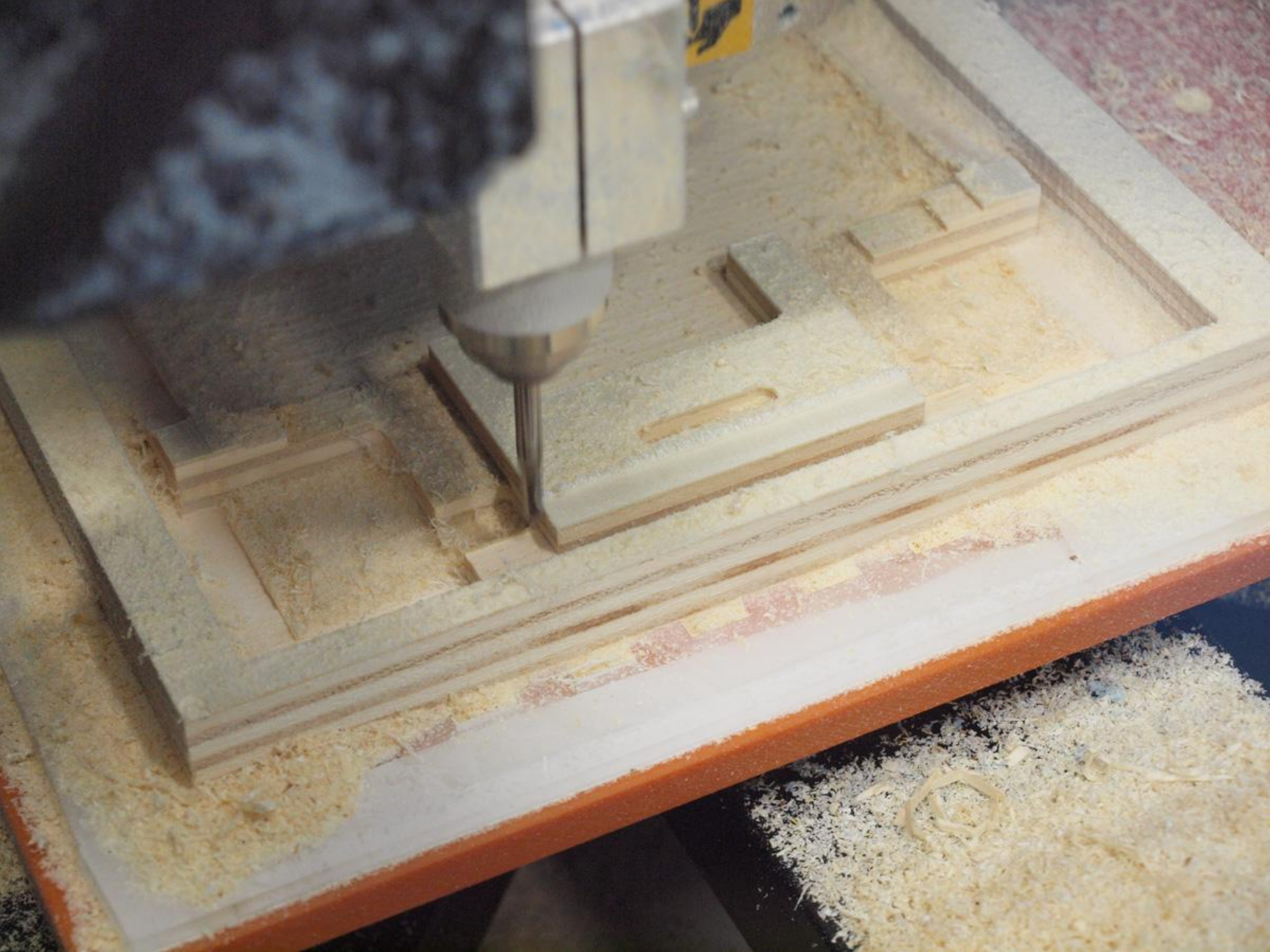






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# LA FRESATURA CNC



2-D (or 2.5D) Design

2-D V-Carve Design



Full 3-D Design/Model (surface and relief)



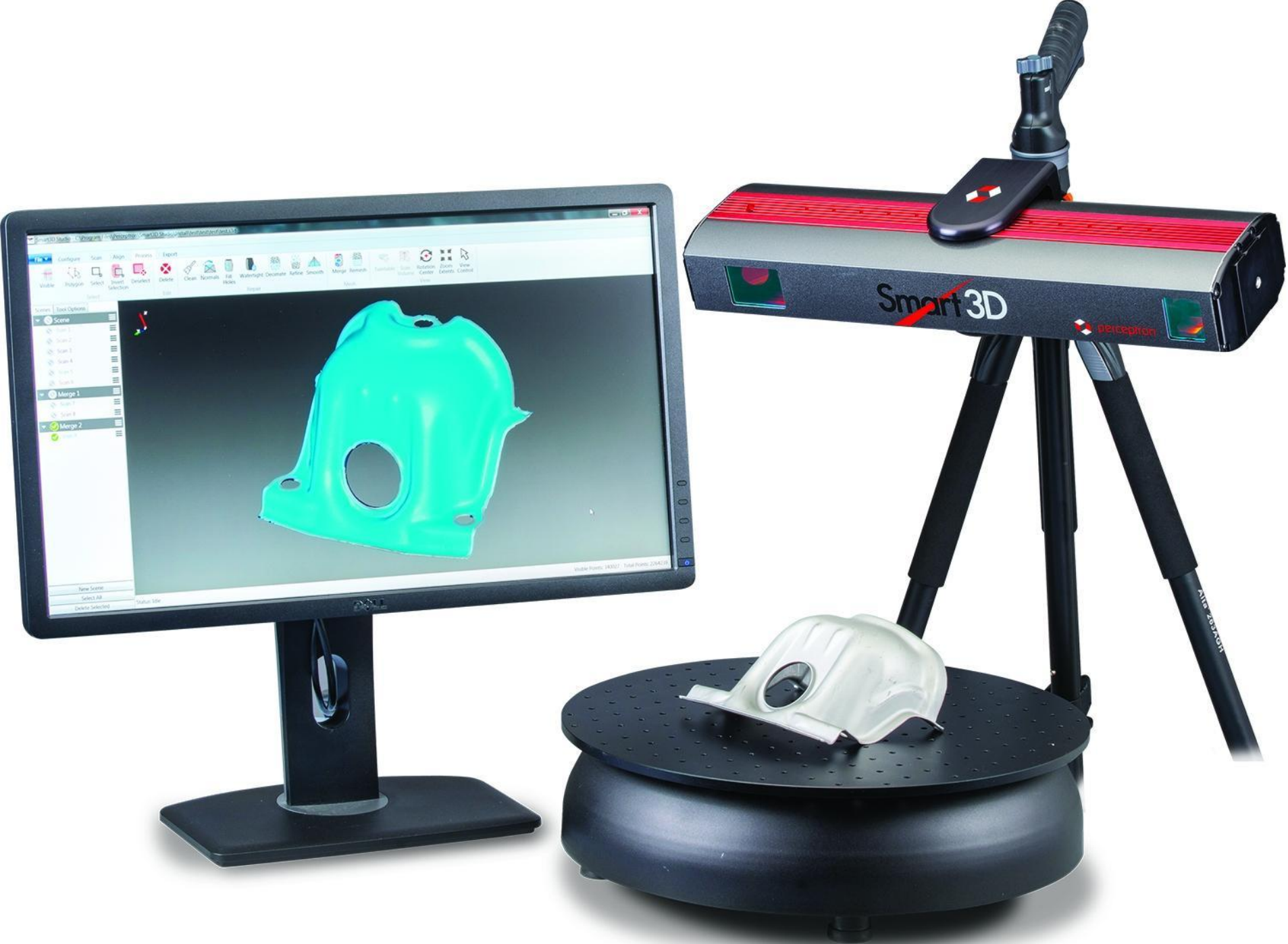
<https://www.behance.net/gallery/7649313/APTEK-Bar>



<https://bazar.preciousplastic.com/moulds/injection-moulds/premium-mould-6-sunglasses-mould/>

# LA SCANSIONE 3D

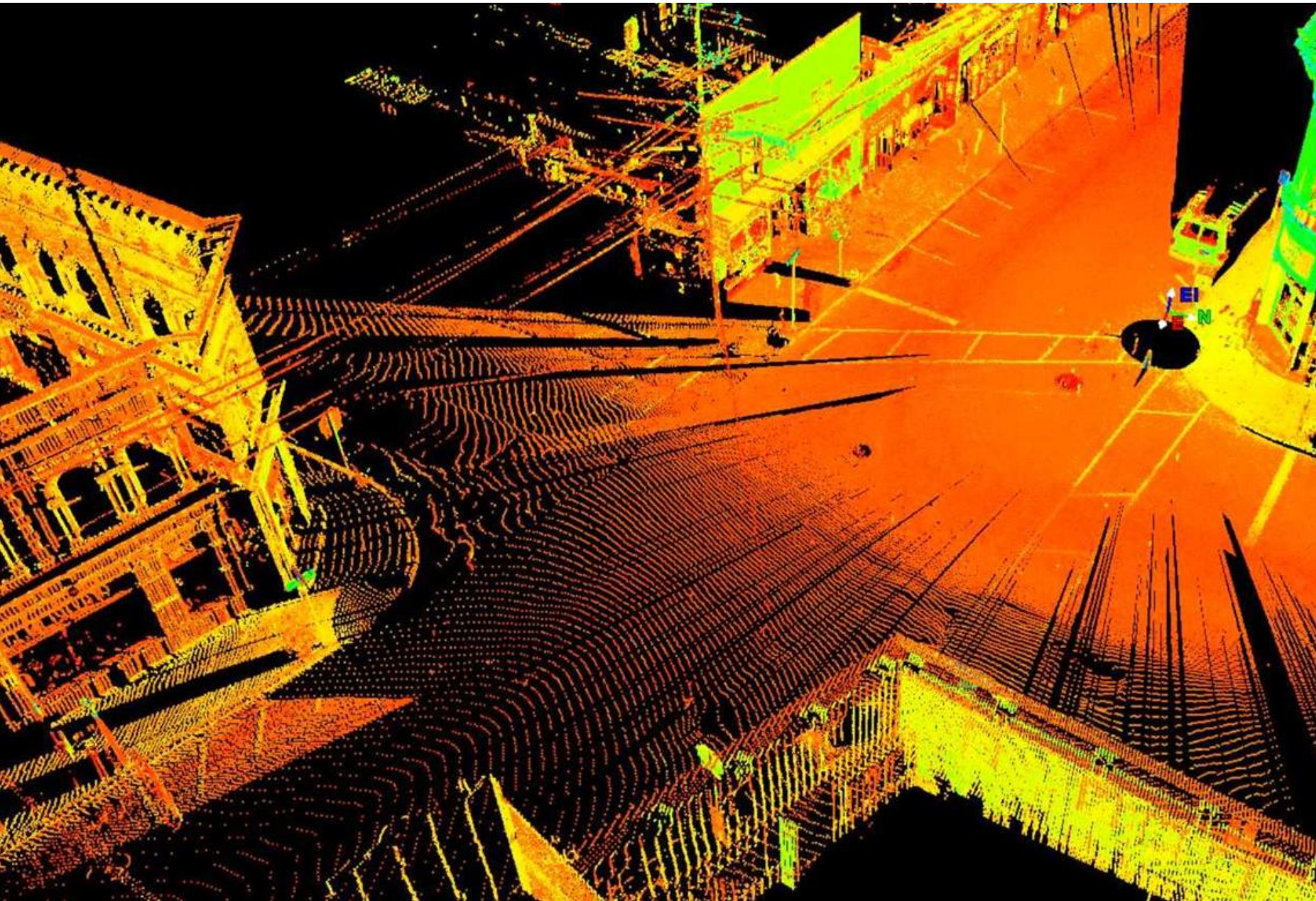




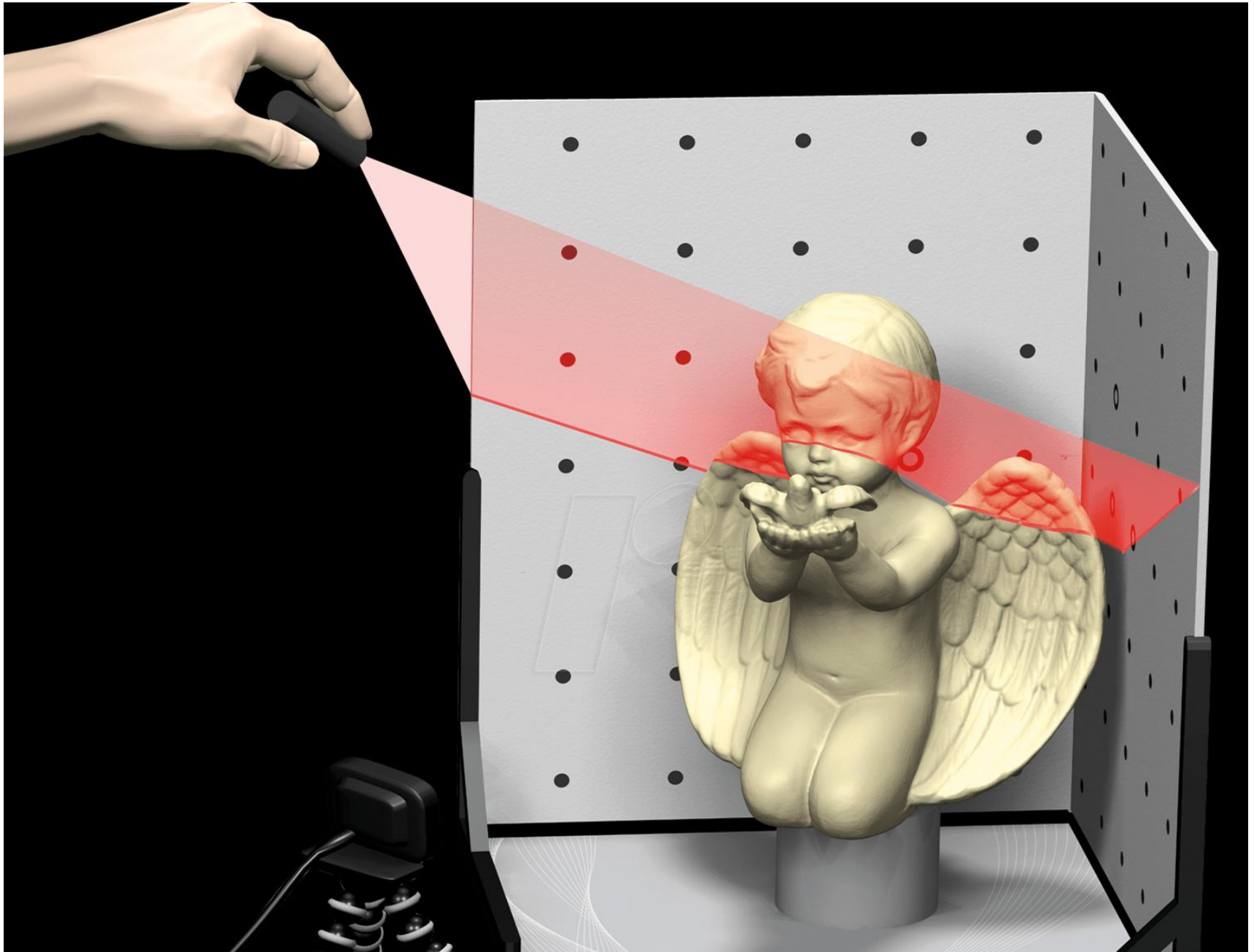
# TASTATORI



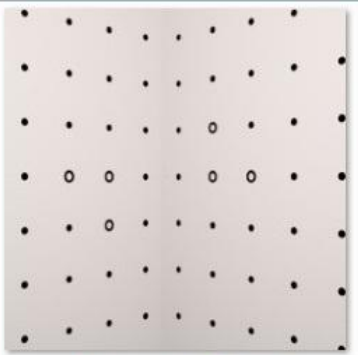
# TEMPO DI VOLO



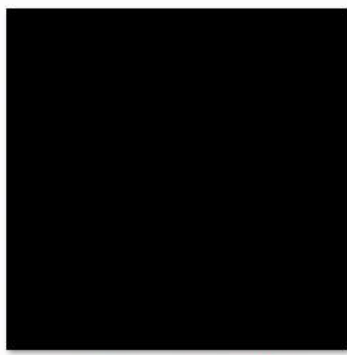
# LINEA LASER



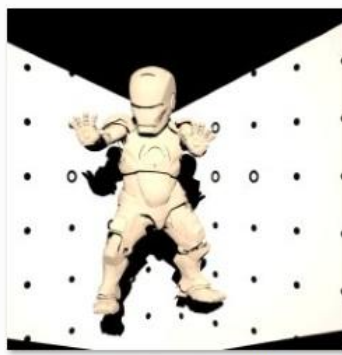
# LUCE STRUTTURATA



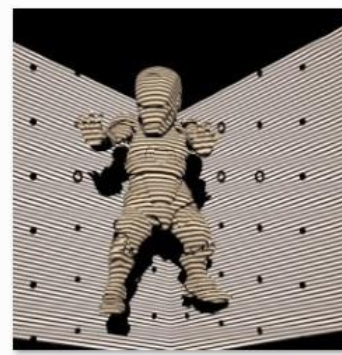
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david\_testScan\_pattern\_00000.jpg



david\_testScan\_pattern\_00001.jpg



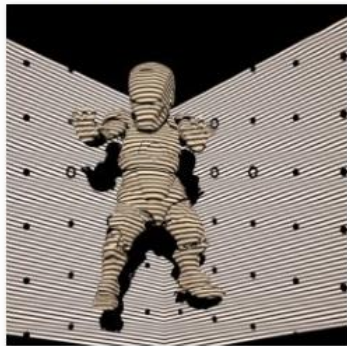
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david\_testScan\_pattern\_00003.jpg



david\_testScan\_pattern\_00004.jpg



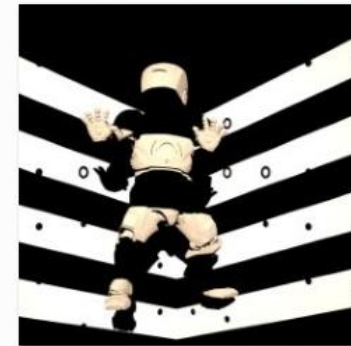
david\_testScan\_pattern\_00005.jpg



david\_testScan\_pattern\_00006.jpg



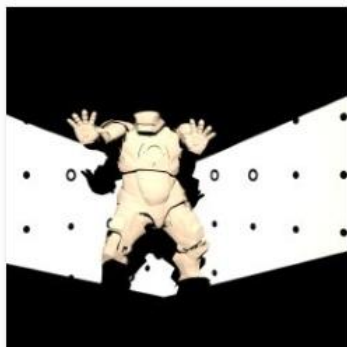
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david\_testScan\_pattern\_00010.jpg



david\_testScan\_pattern\_00011.jpg

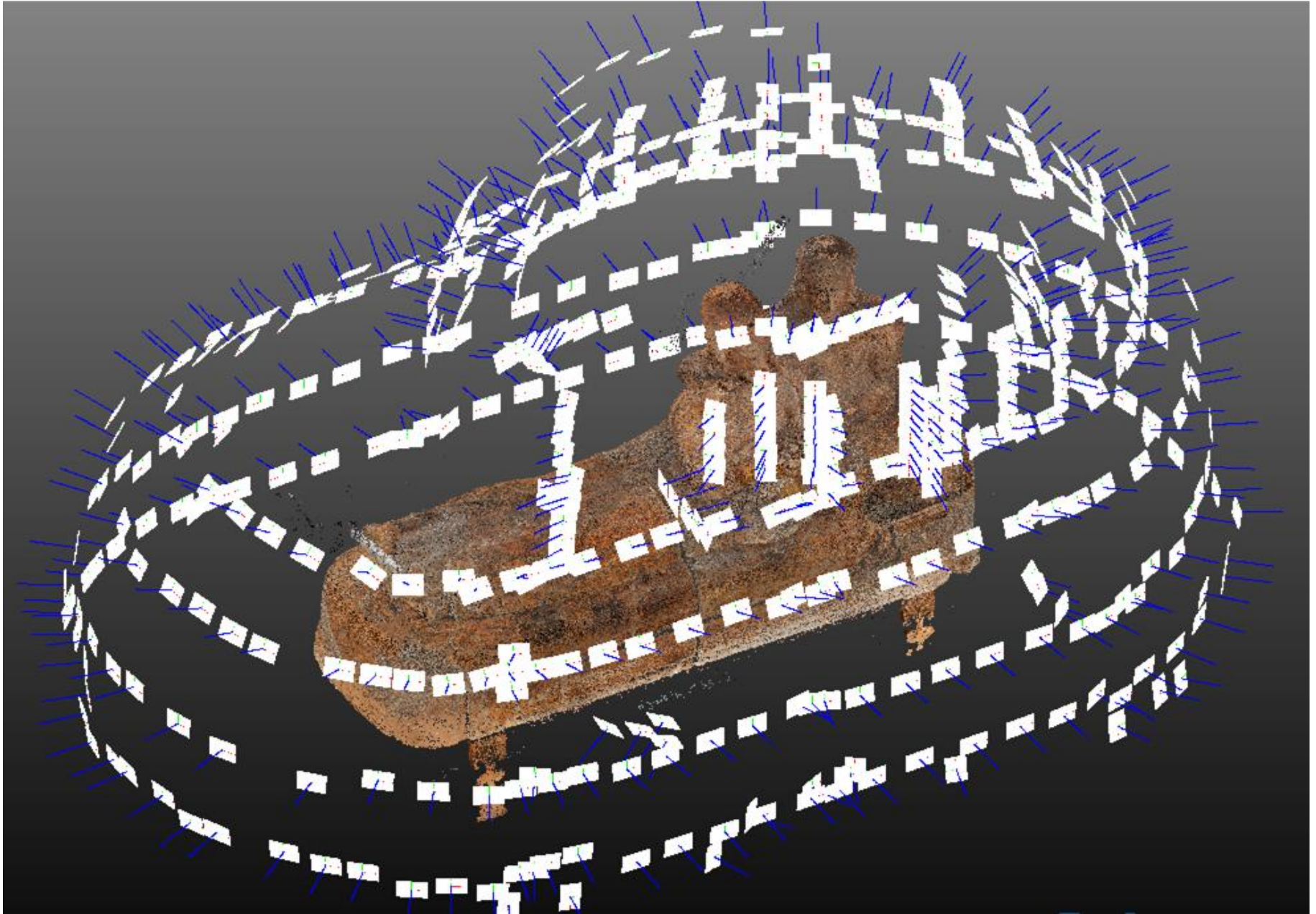


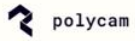
david\_testScan\_pattern\_00012.jpg



david\_testScan\_pattern\_00013.jpg

# FOTOGRAMMETRIA





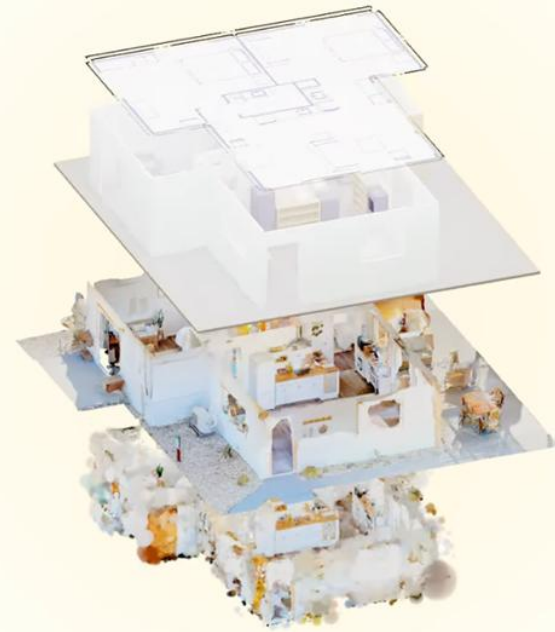
3D scanning platform

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David



Head of Michelangel...



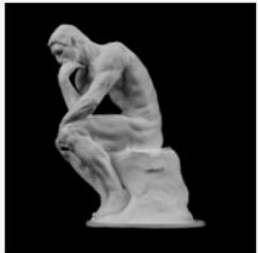
Bust of Nefertiti at th...



Pieta in St. Peter's Ba...



Gayer-Anderson Ca...



The Thinker at the M...



Bust of Medusa at T...



Winged Victory of Sa...



La Pietra



Laocöon and His Sons



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# LA RICAMATRICE CNC



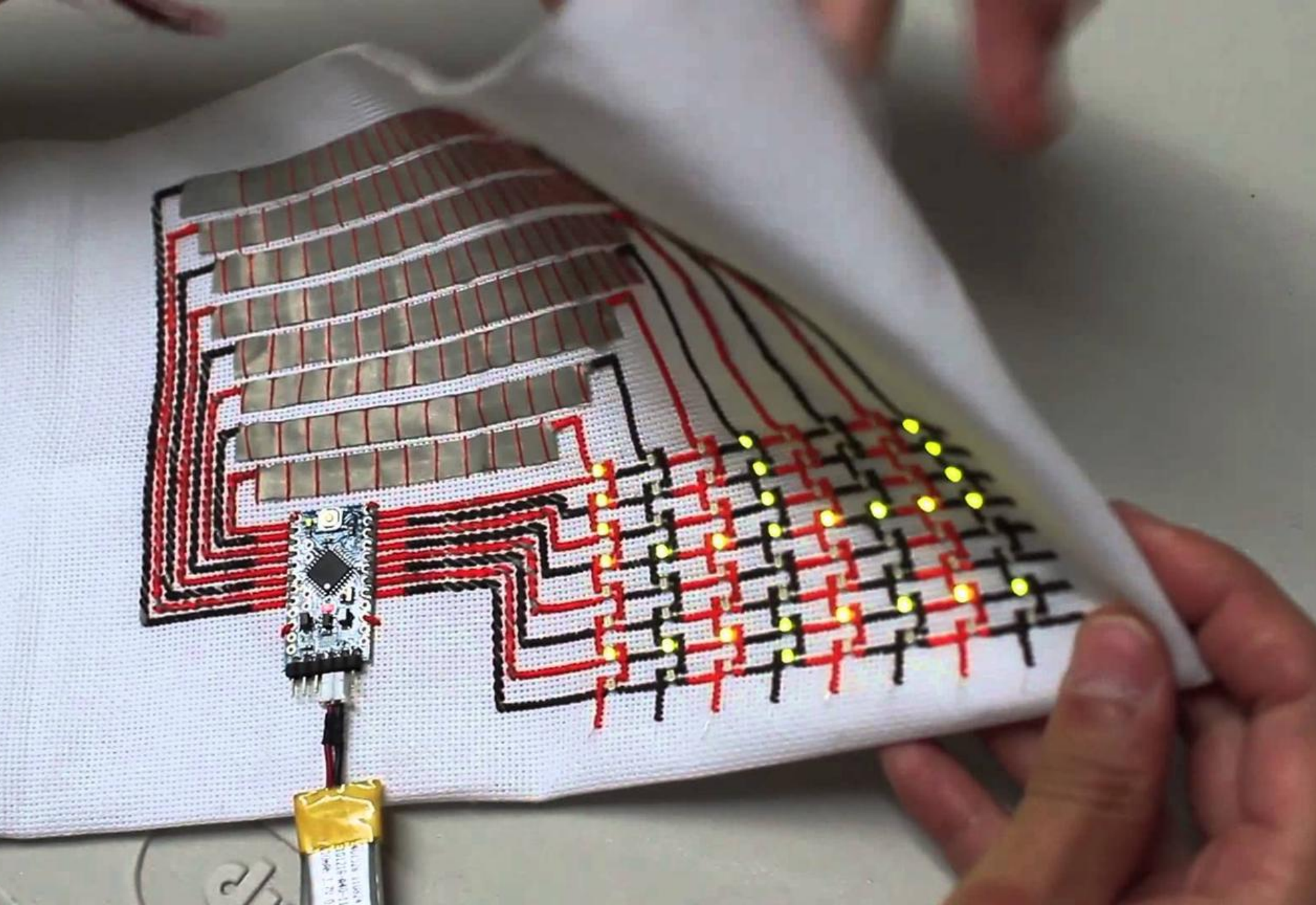
<https://youtu.be/td2AcnTvSD0?si=qtMDMVw361lx98iw>



[https://www.brother.eu/-/media/product-images/supplies/sewing-and-craft-supplies/embroidery/embroidery-frames/xpmsf254/xpmsf254\\_03.png](https://www.brother.eu/-/media/product-images/supplies/sewing-and-craft-supplies/embroidery/embroidery-frames/xpmsf254/xpmsf254_03.png)



<https://fabacademy.org/2018/labs/fablabopendot/students/laura-cipriani/assignment/week017.html>



# In Sintesi

La fabbricazione digitale offre un'alternativa alle tecniche di produzione tradizionali, più **flessibile e distribuita**, ma soprattutto **più efficace** nella fase di sviluppo iniziale delle idee e **più accessibile** per chiunque voglia sperimentare, prototipare o produrre su piccola scala.

**GRAZIE!**

**Enrico Bassi**

[enrico@enicobassi.com](mailto:enrico@enicobassi.com)

<https://www.linkedin.com/in/enricobassi/>