The Official ZMorph Applications Catalog

Foreword.

5 years ago, when I was launching ZMorph I didn't expect that multifunctionality and versatility will bring us so many interesting use cases and success stories, mostly instigated by our users and steadily growing fan base. Now in 2017 we see tremendous growth in industry applications, specialized fabrication processes and user-generated ideas that are partially demonstrated in this 90-page publication. Never before we were able to summarize this 'body of work' in such beautiful form, so inspiring and so honest.

You can treat this book as a journey through technical possibilities brought to you by ZMorph multitool 3D printer. Browse from beginning to end, and let yourself immerse in the fantastic world of robotically made objects. On the other hand, feel free to open on random page and get inspired. If you don't know how any of these objects were made - give us a shout! We are more than happy to help with your journey through the world of 3D printing, milling or laser cutting.

And one final note: most of the things presented on further pages were made by designers, engineers, artists and educators - creative people like you and me. If you make something worth sharing - let us know! I believe our users are the most important drive that keeps us moving forward, so whatever story you have - share it with us and help inspire others. Maybe soon this catalogue will feature your project?

Enjoy the browsing!

Przemek Jaworski
ZMorph CEO
and Founder

Contents.

Concept models.

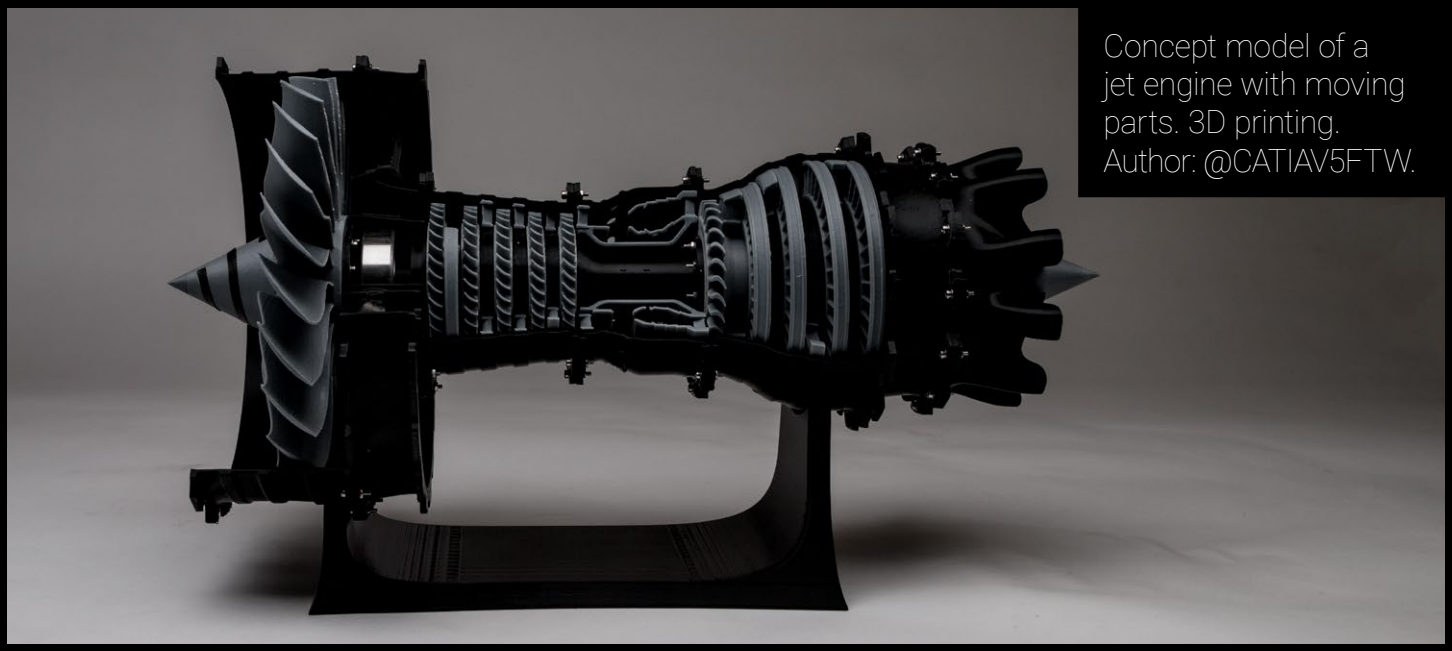
If a picture is worth a thousand words, then a showcase model is worth tens of thousands. 3D printing gives product designers, architects, and artists means to materialize their ideas and make their point during presentations and business meetings. It also gives them the advantage of hands-on experience when working on consumer products.

Industries:
consumer products, automotive, aerospace, electronics, design, fab labs and makerspaces

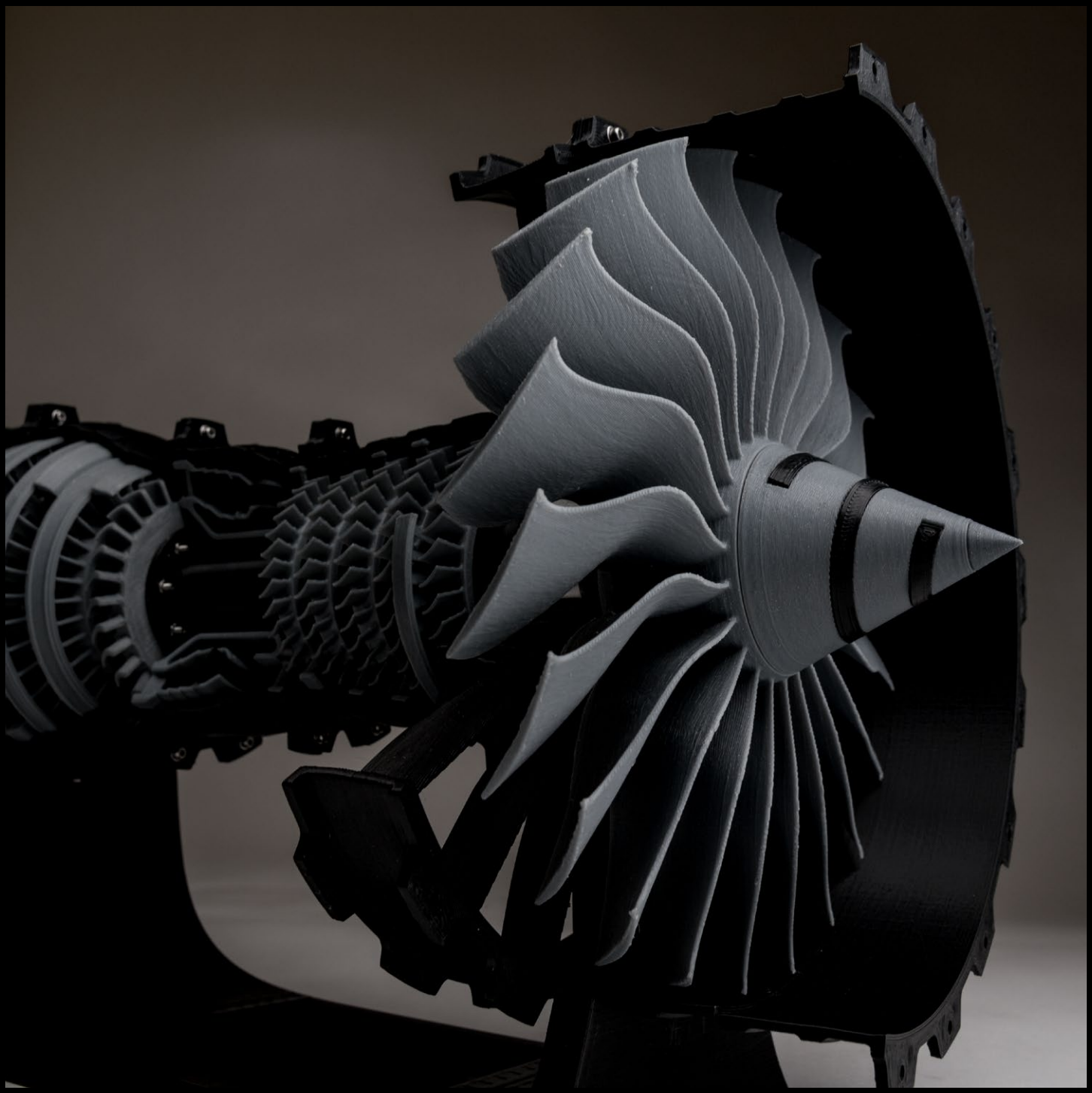
Recommended fabrication methods:
3D printing

Recommended materials:
ABS, Nylon, HIPS, PET, ASA

Concept model of a wireless mouse, 3 design stages. 3D printing and post processing. Author: Paula Szarejko.



Concept model of a jet engine with moving parts. 3D printing. Author: @CATIAV5FTW.



"Surgo" and "Tur". Concept models of cars for emergency services.3D printing, post processing. Author: 2sympleks.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R01

Concept model of a multi-functional walker. 3D printing. Author: Eliza Wróbel.

Functional prototypes.

Rapid prototyping is one of the most popular applications of digital fabrication. The technology enables reliable and cost-effective product development. Designers and engineers have full creative freedom over the manufacturing process, which means they can iterate faster and improve their projects at low costs. They can also use materials identical or similar in properties to those planned for the final product, which allows additional testing at an early stage of development.

Industries:
consumer products, automotive, aerospace, electronics, design, fab labs and makerspaces

Recommended fabrication methods:
3D printing

Recommended materials:
ABS, HIPS, ASA, PLA (limited post-production)

Functional prototype of a power tool casing. 3D printing and post processing. Author: Roman Broda.

"Shoetopia". Functional prototype of eco-friendly and functional shoes. 3D printing. Authors: Zuzanna Gronowicz, Barbara Motylińska.

RC car prototype. 3D printing, post processing. Author: Jakub Ratajczyk.

Functional prototypes
of perfume bottles.
3D printing.
Author: Paula Szarejko.

Functional prototypes of mugs with ergonomic variations. 3D printing. Author: Eliza Wróbel.

End use parts and low volume production.

Digital fabrication gives an innovative set of tools to craftsmen and artists previously limited to traditional methods. Now they can offer new products and higher level of customisation, whether they're making home interior decorations, original jewelry, clothing, or shoes.

Industries:
consumer products, automotive, aerospace, electronics, design, fab labs and makerspaces

Recommended fabrication methods:
3D printing
CNC
Laser

Recommended materials:
ABS, PLA, all types of wood, polycarbonate, acrylic glass

Functional prototype of a handle for GoPro cameras. 3D printing. Author: Marcin Stępień.

Shoes with spring and hinge hydraulic system (up) and pneumatic hydraulics (down). Partly 3D printed. Author: Silvia Fado.

Jewelry inspired by animal shapes. 3D printing. Author: Paula Szarejko.

Fully functional bluetooth speaker. 3D printing, CNC milling. Author: Filip Dominas, Krzysztof Świątczak.

Modular lamp. 3D printing. Author: Paula Szarejko.

Modular lamp. 3D printing, post processing. Author: Paula Szarejko.

Wooden keychains inspired by the 90s. CNC milling. Author: Eliza Wróbel.

Beechwood casing for a wristband watch. CNC milling, post processing. Author: Eliza Wróbel.

Bug inspired brooches. Laser cutting. Author: Paula Szarejko.

Lessons.

3D printing is on the constant rise at all stages of education.Technology invented for rapid prototyping and boosting manufacturing is proving to be a useful tool for inspiring the creativity of young people. 3D printed items can serve as teaching aids, but also as tools in the workshops where students can develop practical skills.

3D printing is only one of several digital fabrication methods. Previously limited to huge and expensive machines, now technologies like CNC milling, laser cutting and engraving, food and ceramics printing and available within one desktop multitool 3D pirinter from ZMorph.

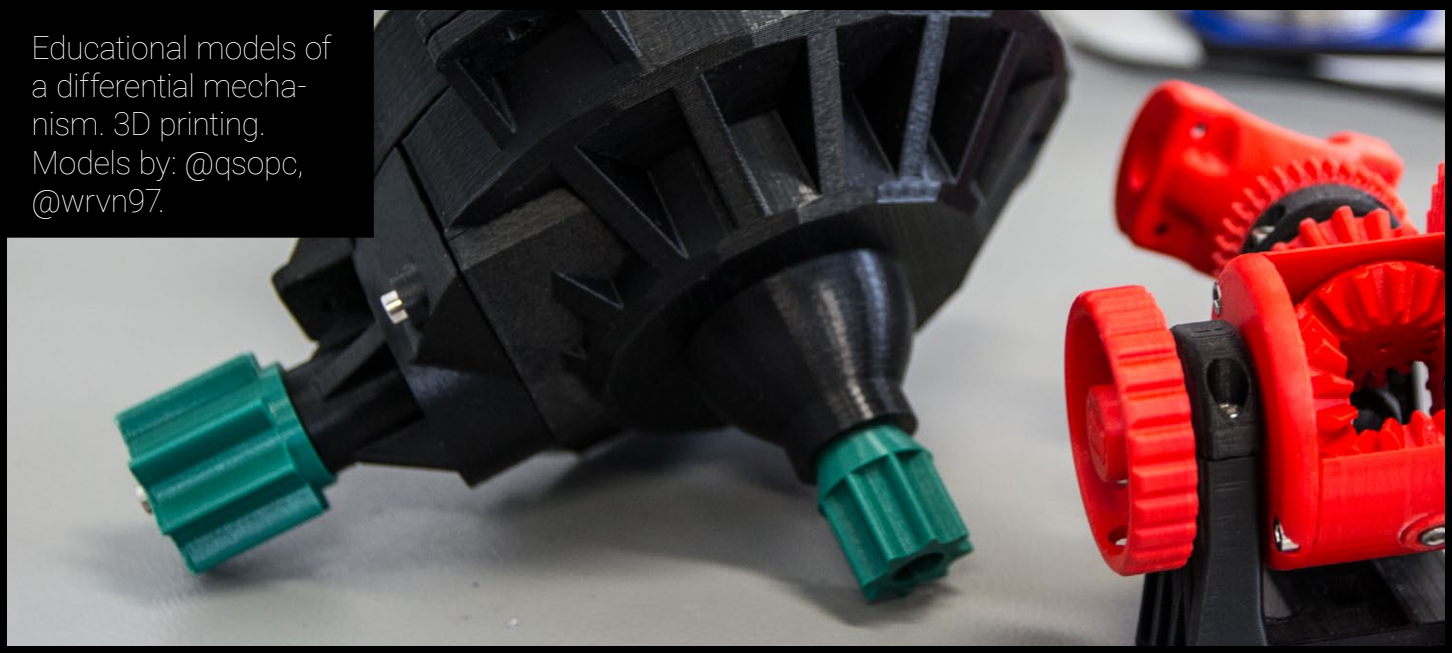
Industries:
consumer products, automotive, aerospace, electronics, design, fab labs and makerspaces

Recommended fabrication methods:
3D printing
CNC
Laser

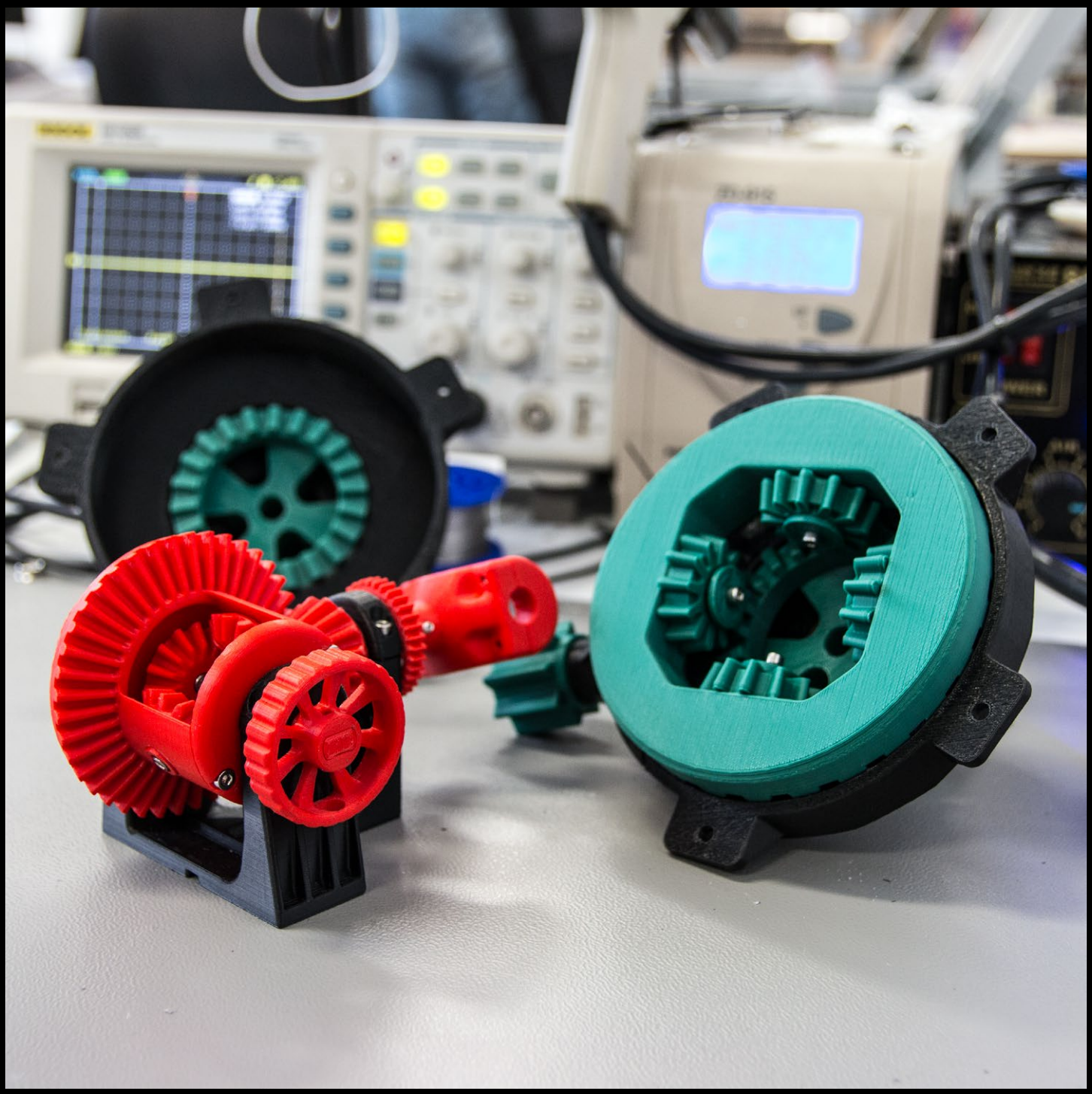
Recommended materials:
ABS, HIPS, ASA, PLA (limited post-production)

Mockup of 15th century Kołobrzeg. 3D printing, post processing. Author: Jacek Kawałek and the students of Henryk Sienkiewicz Technical High School in Kołobrzeg, Poland.

Educational puzzle of the brain. CNC milling, laser engraving.
Author: Eliza Wróbel.

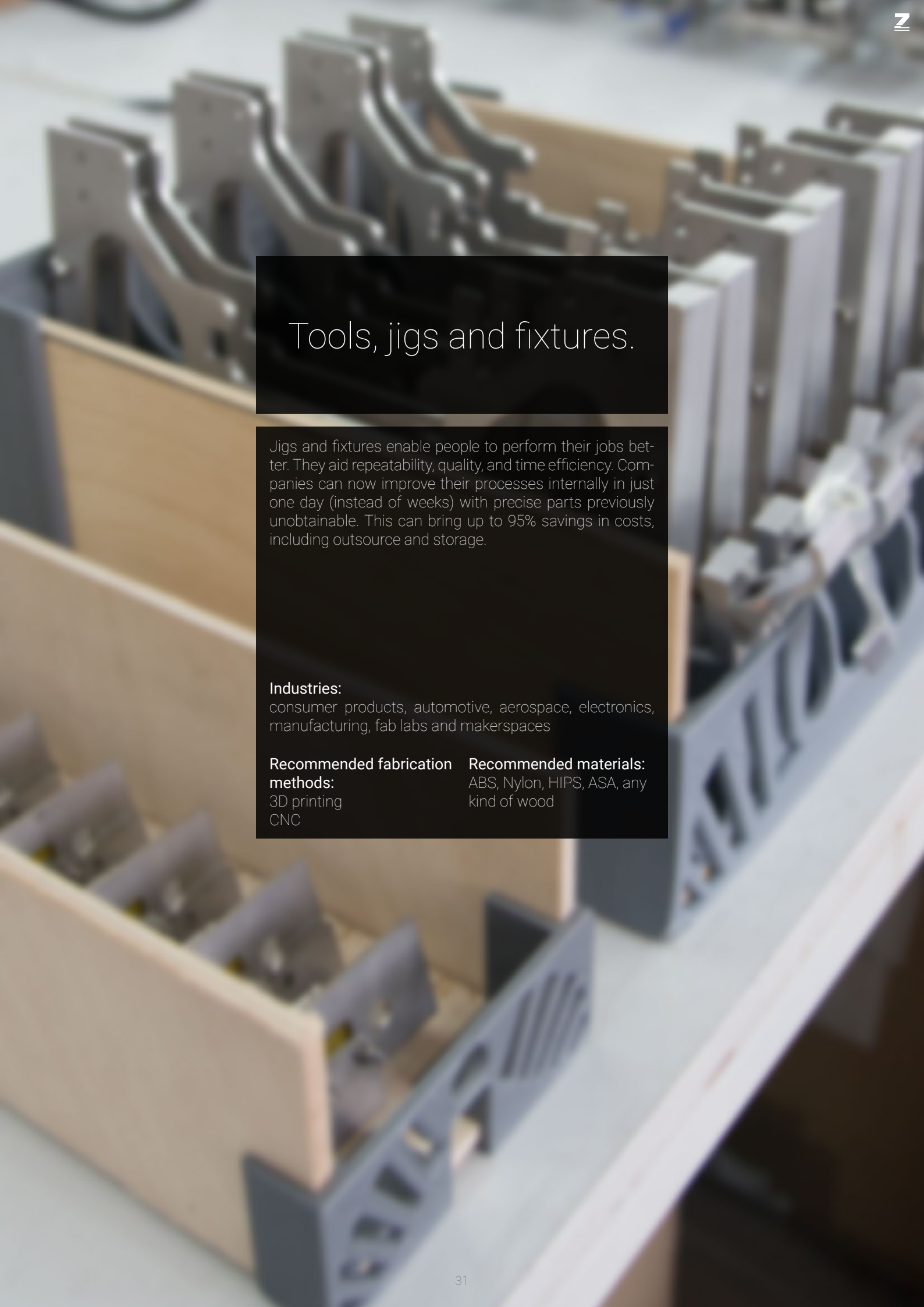


Educational models of a differential mechanism. 3D printing. Models by: @qsopc, @wrvn97.



Model of the solar system. 3D printing, post processing. Model by @caj.

Educational model of a cell. 3D printing. Author: @mfritz



Tools, jigs and fixtures.

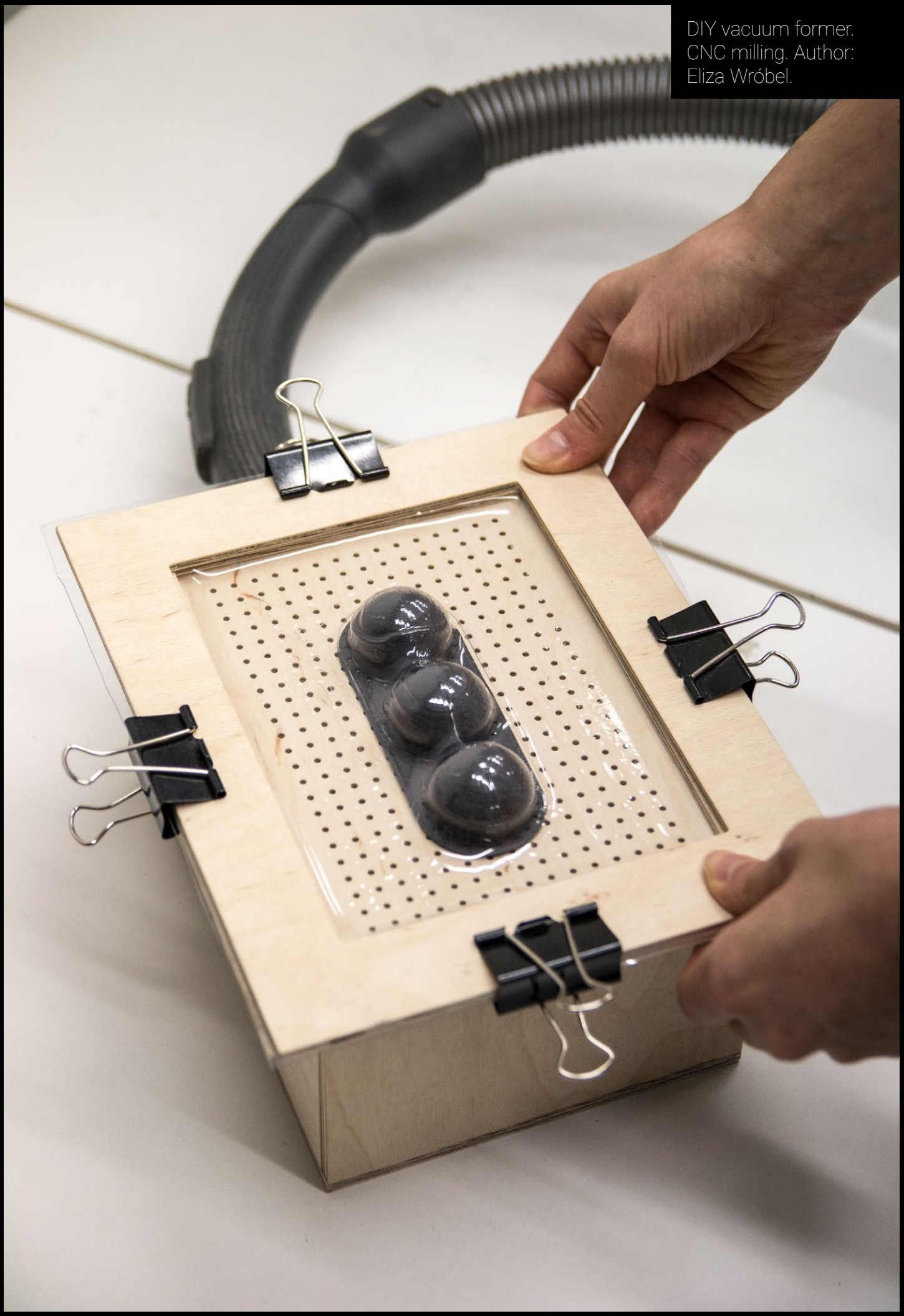
Jigs and fixtures enable people to perform their jobs better. They aid repeatability, quality, and time efficiency. Companies can now improve their processes internally in just one day (instead of weeks) with precise parts previously unobtainable. This can bring up to 95% savings in costs, including outsource and storage.

Industries:
consumer products, automotive, aerospace, electronics, manufacturing, fab labs and makerspaces

Recommended fabrication methods:
3D printing
CNC

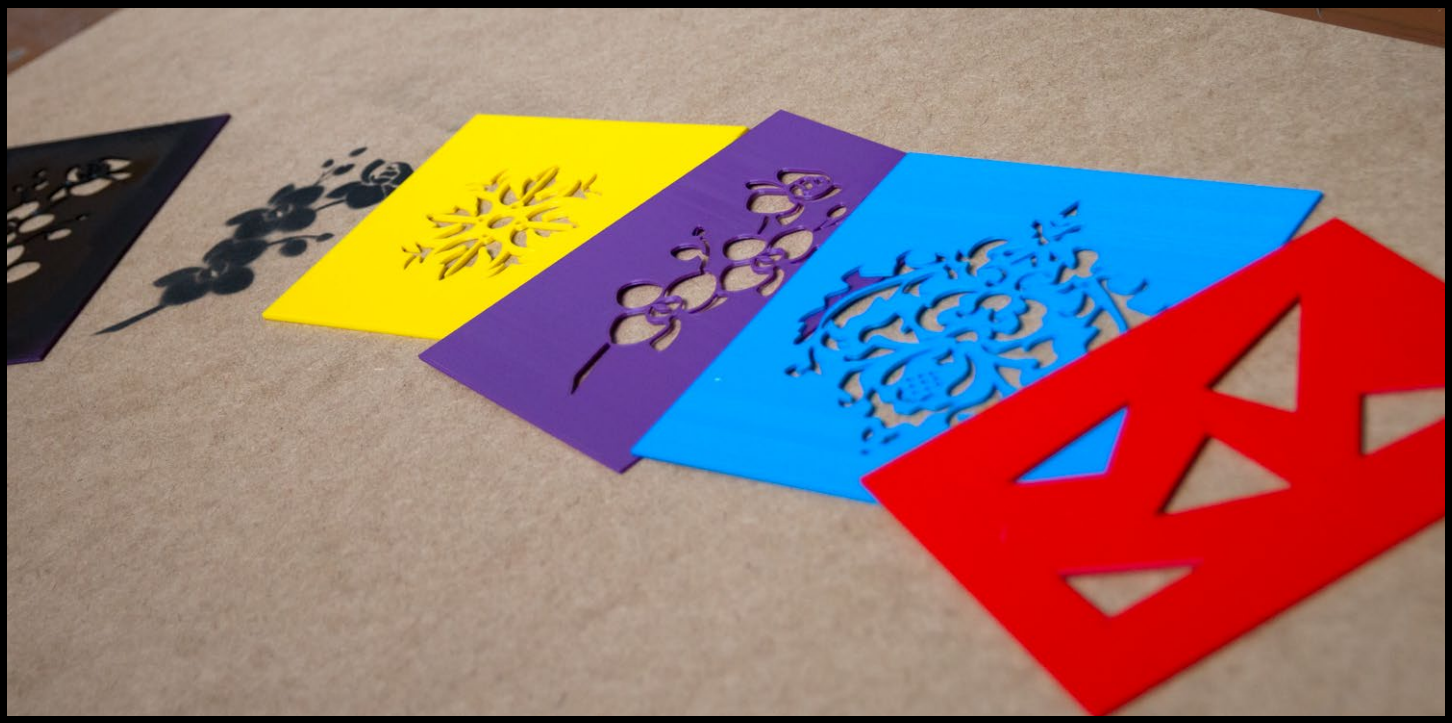
Recommended materials:
ABS, Nylon, HIPS, ASA, any kind of wood

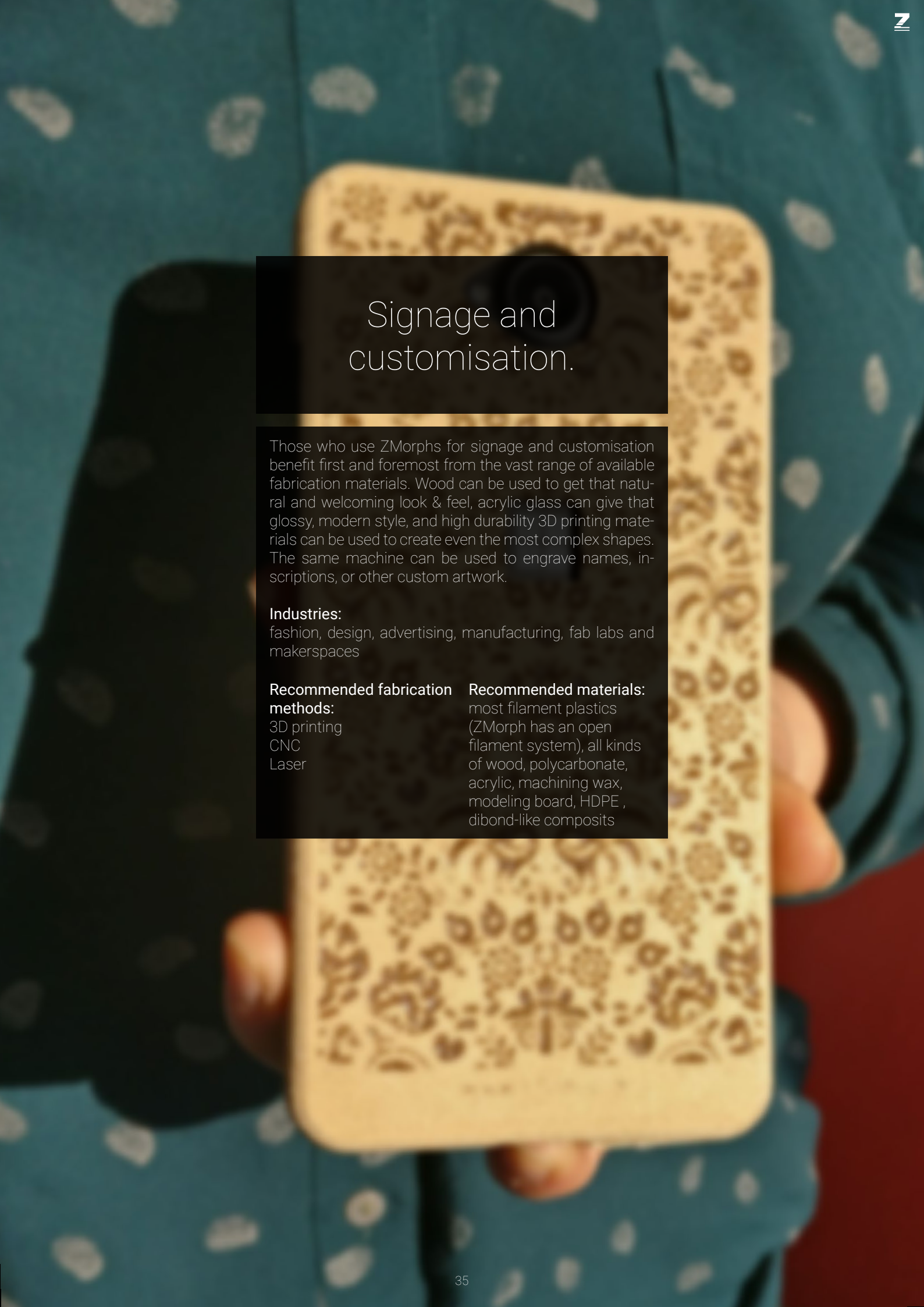
Custom storage boxes. Partly 3D printed. Author: Filip Dominas.



DIY vacuum former. CNC milling. Author: Eliza Wróbel.

Painting stencils. 3D printing. Author: Eliza Wróbel.





Signage and customisation.

Those who use ZMorphs for signage and customisation benefit first and foremost from the vast range of available fabrication materials. Wood can be used to get that natural and welcoming look & feel, acrylic glass can give that glossy, modern style, and high durability 3D printing materials can be used to create even the most complex shapes. The same machine can be used to engrave names, inscriptions, or other custom artwork.

Industries:
fashion, design, advertising, manufacturing, fab labs and makerspaces

Recommended fabrication methods:
3D printing
CNC
Laser

Recommended materials:
most filament plastics (ZMorph has an open filament system), all kinds of wood, polycarbonate, acrylic, machining wax, modeling board, HDPE , dibond-like composits

Engraving on a smart-phone case. Laser engraving. Author: 3deshop.sk

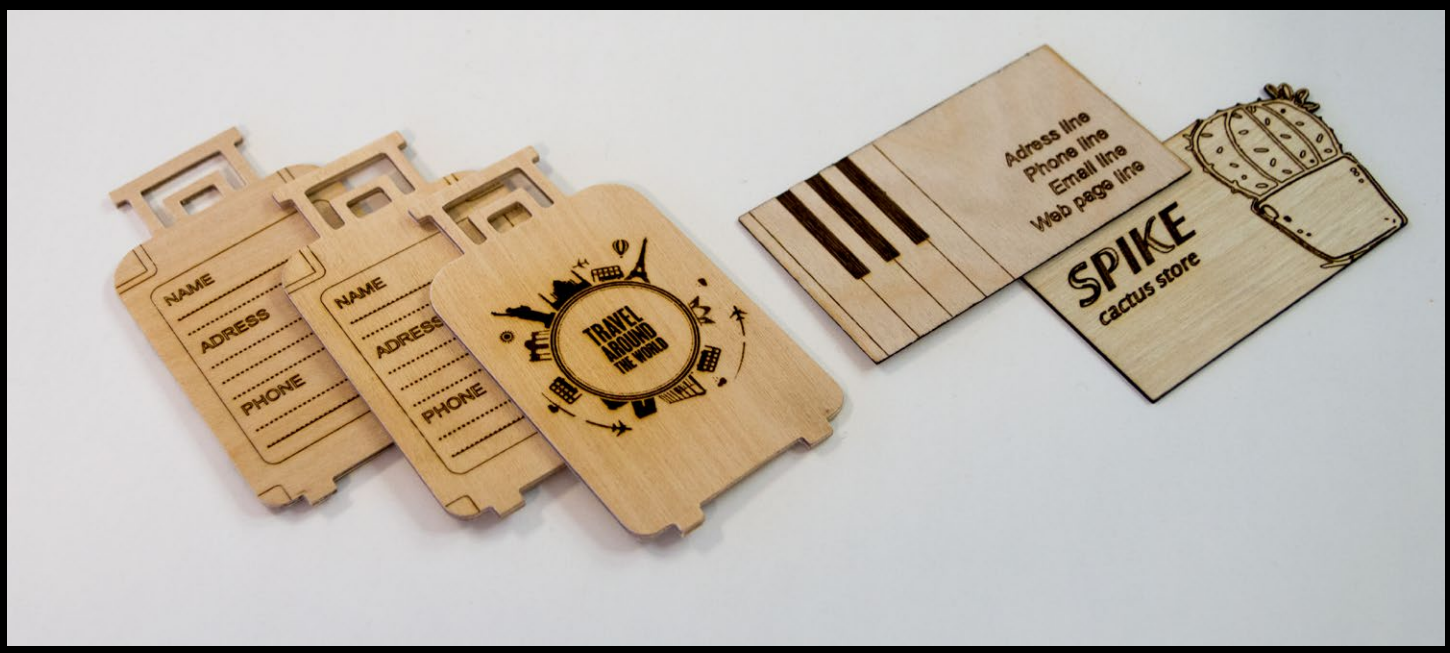
Informational signs. CNC milling. Author: Paula Szarejko.

Engraving on a skateboard. Laser engraving. Author: 3deshop.sk

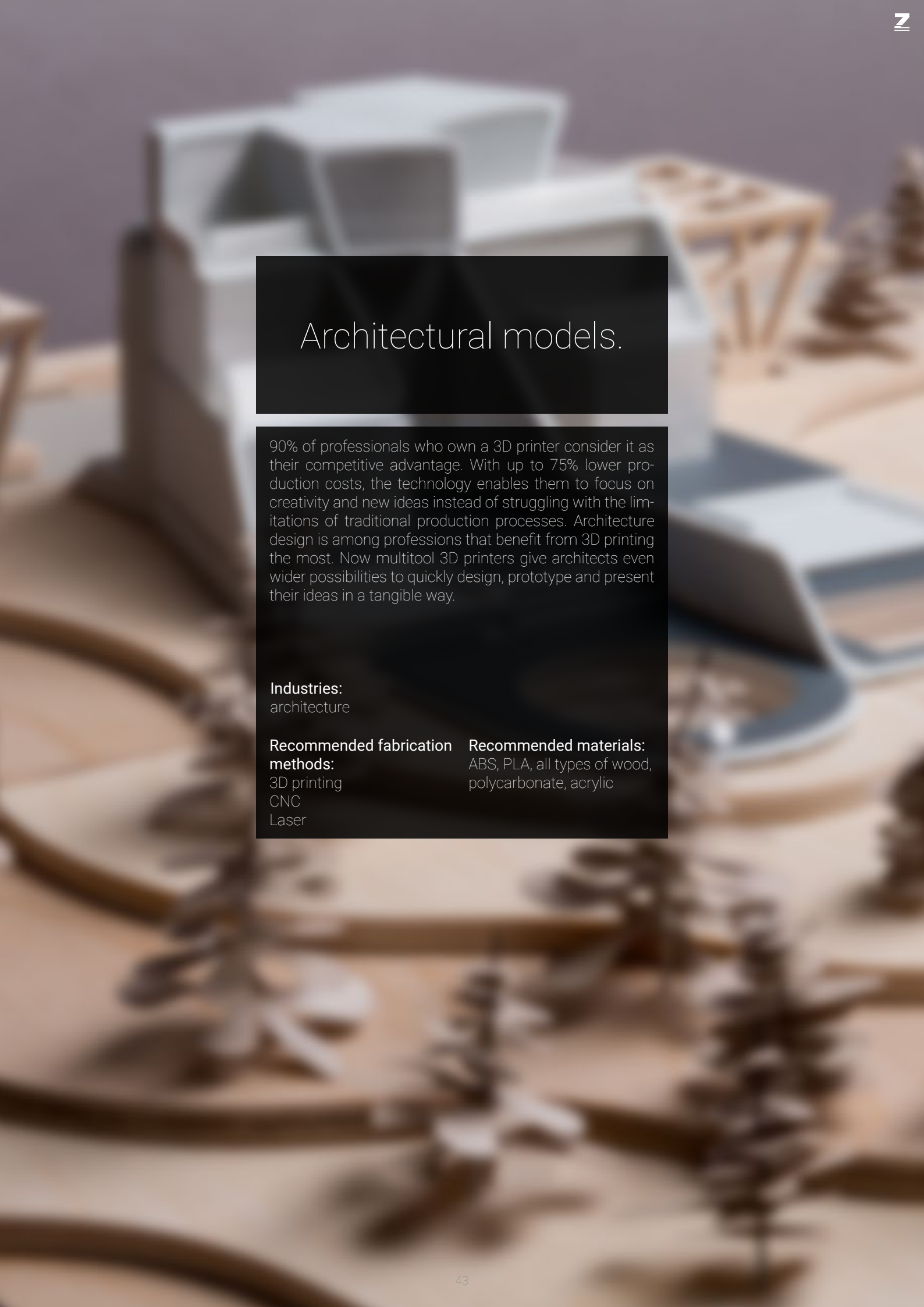
Book covers. Laser cutting and egraving. Author: Marcin Stępień.

Stands for business cards and flyers. CNC milling. Author: Eliza Wróbel.

Personalised business cards and travel badges. CNC milling, laser engraving. Author: Eliza Wróbel.



Backlit company sign. 3D printing. Author: Paula Szarejko.



Architectural models.

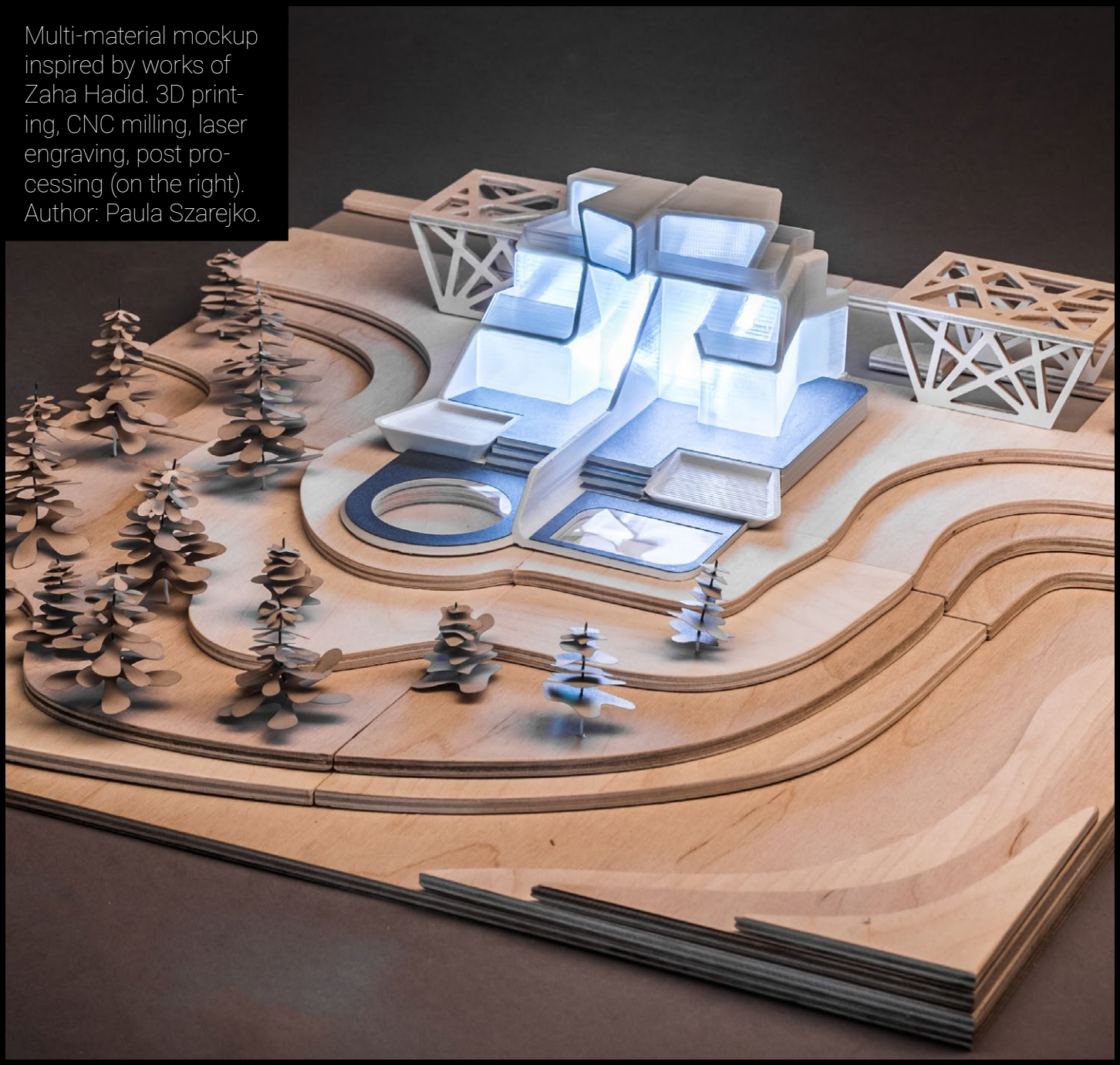
90% of professionals who own a 3D printer consider it as their competitive advantage. With up to 75% lower production costs, the technology enables them to focus on creativity and new ideas instead of struggling with the limitations of traditional production processes. Architecture design is among professions that benefit from 3D printing the most. Now multitool 3D printers give architects even wider possibilities to quickly design, prototype and present their ideas in a tangible way.

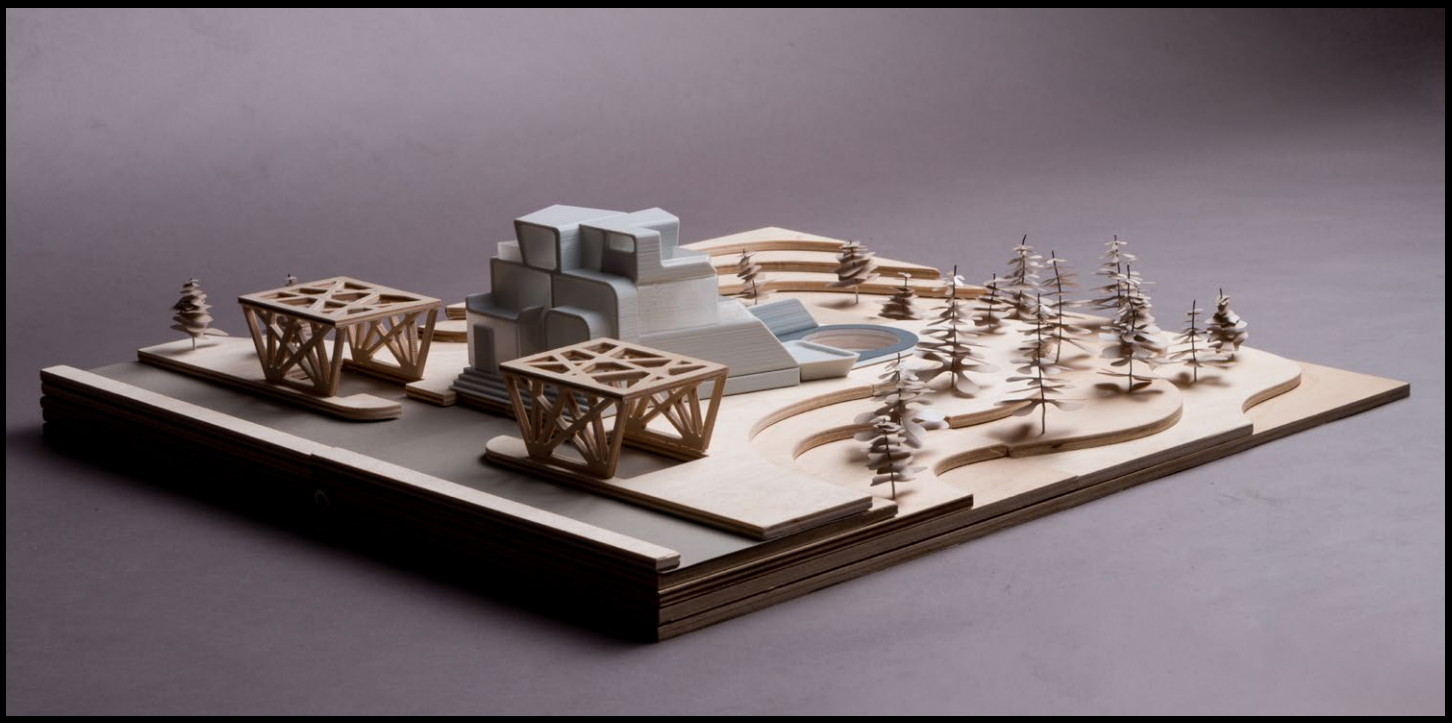
Industries:
architecture

Recommended fabrication methods:
3D printing
CNC
Laser

Recommended materials:
ABS, PLA, all types of wood, polycarbonate, acrylic

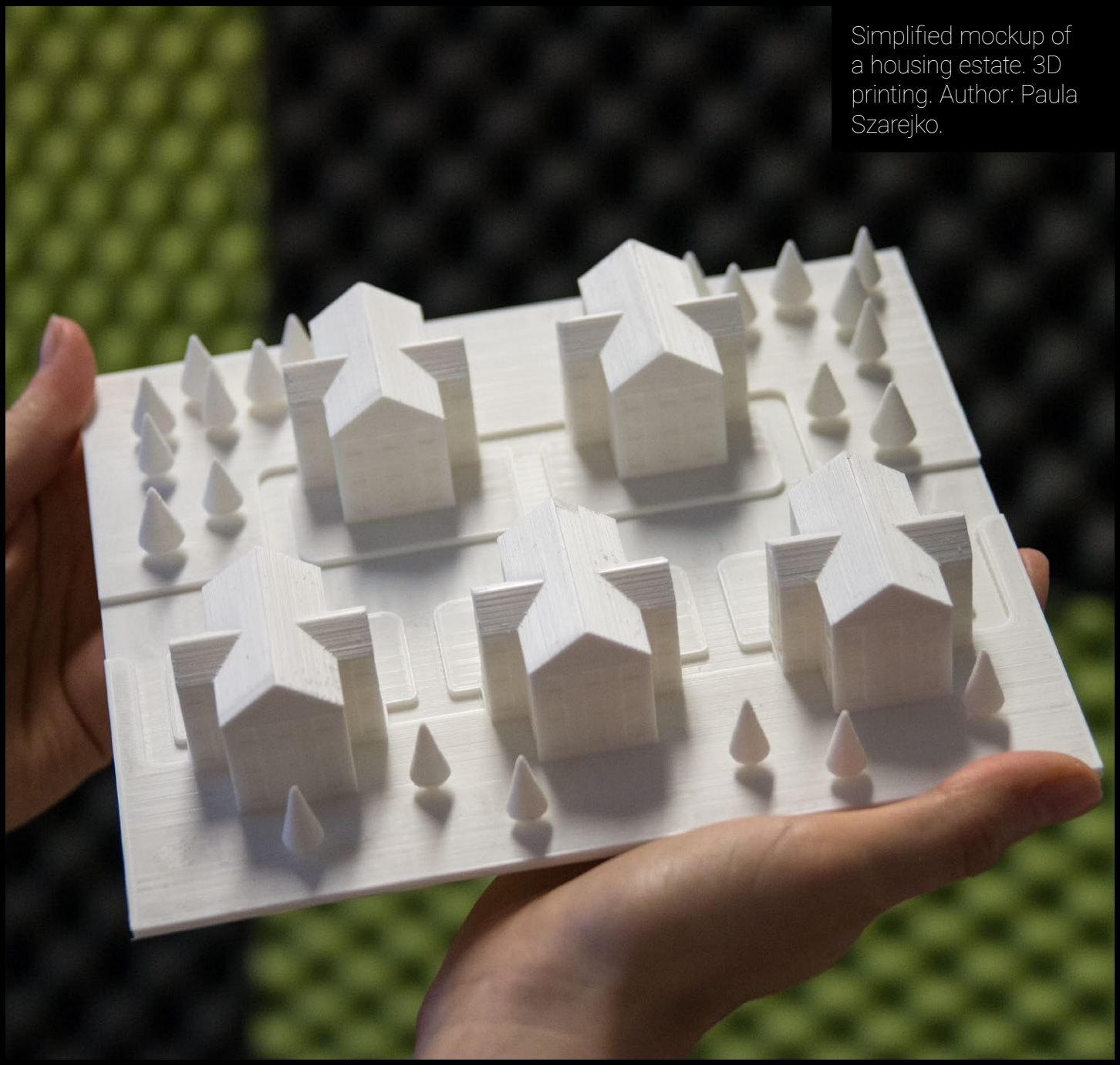
Multi-material mockup inspired by works of Zaha Hadid. 3D printing, CNC milling, laser engraving, post processing (on the right). Author: Paula Szarejko.



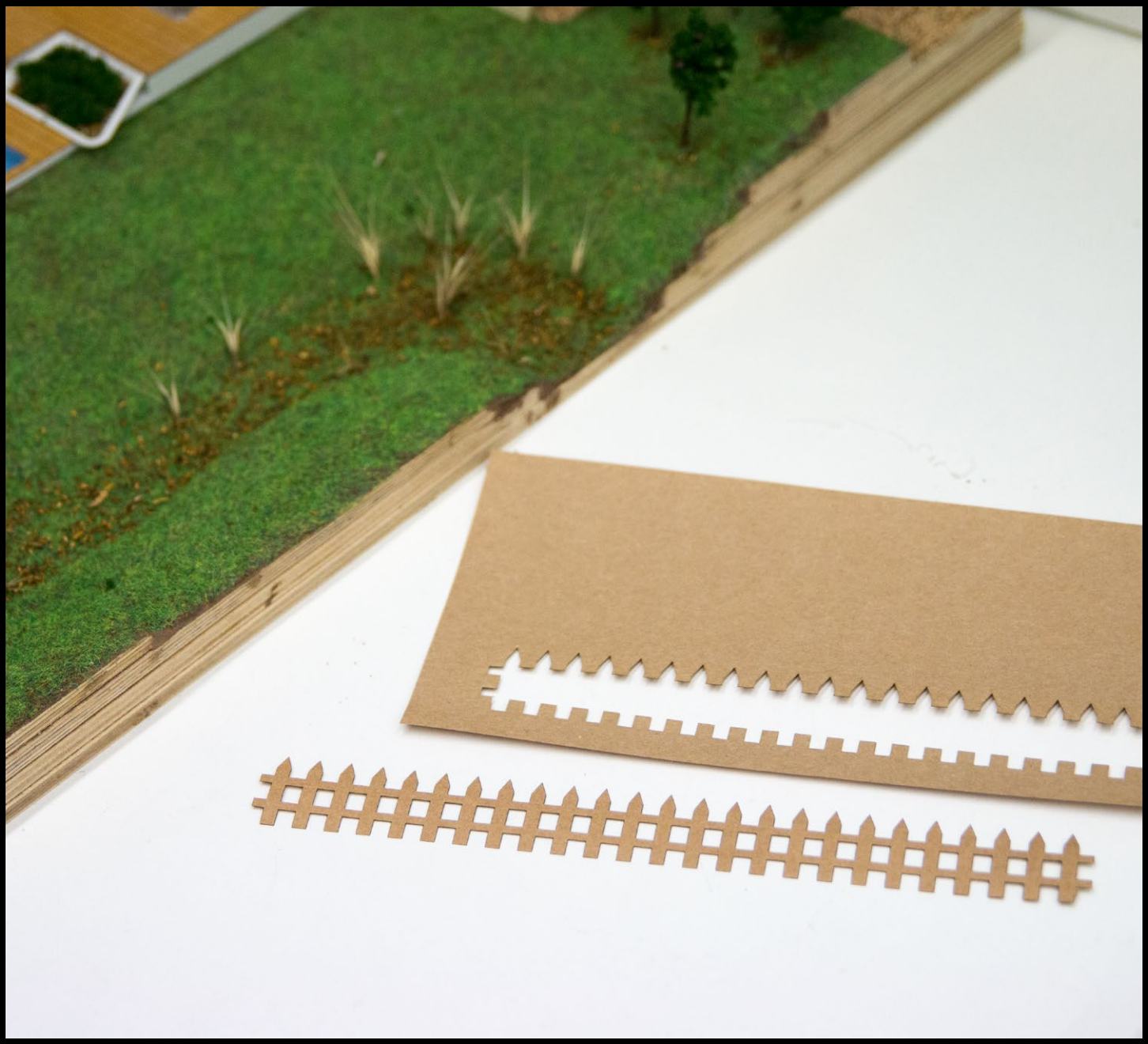


"Varso Tower". 3D printing. Model by Foster + Partners.

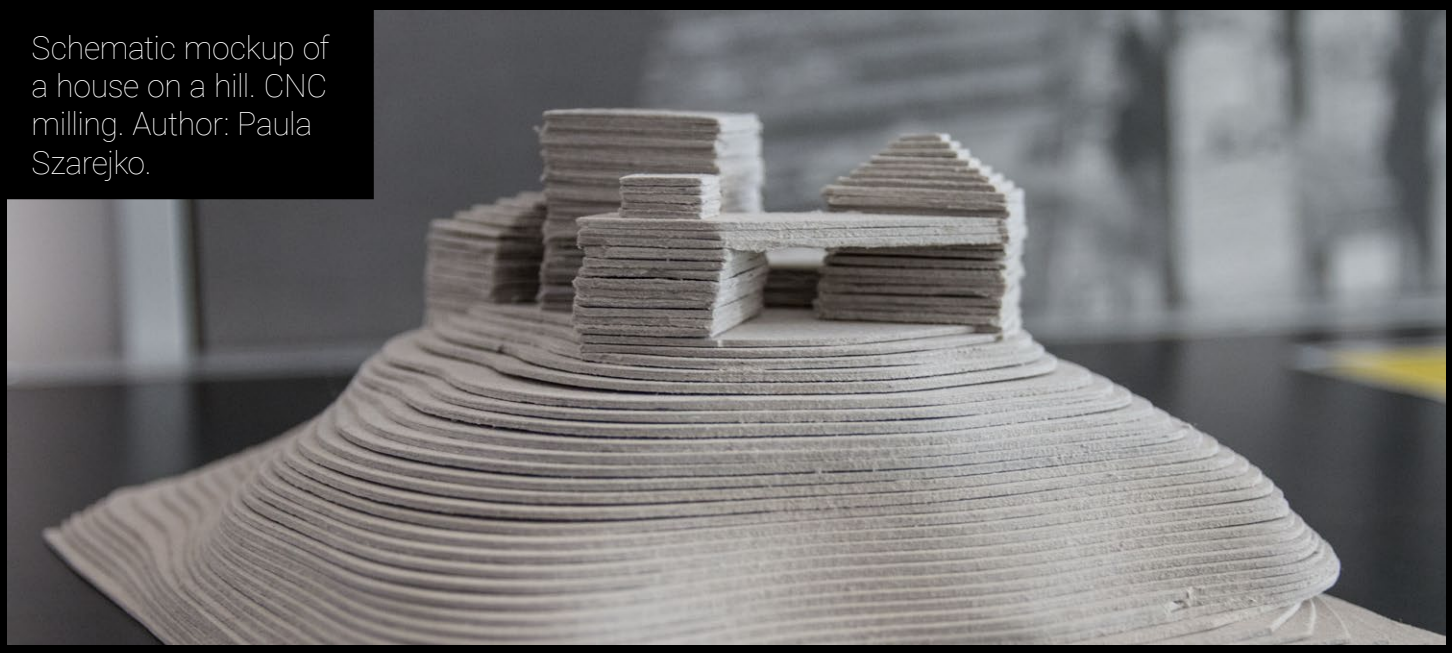
Simplified mockup of a housing estate. 3D printing. Author: Paula Szarejko.



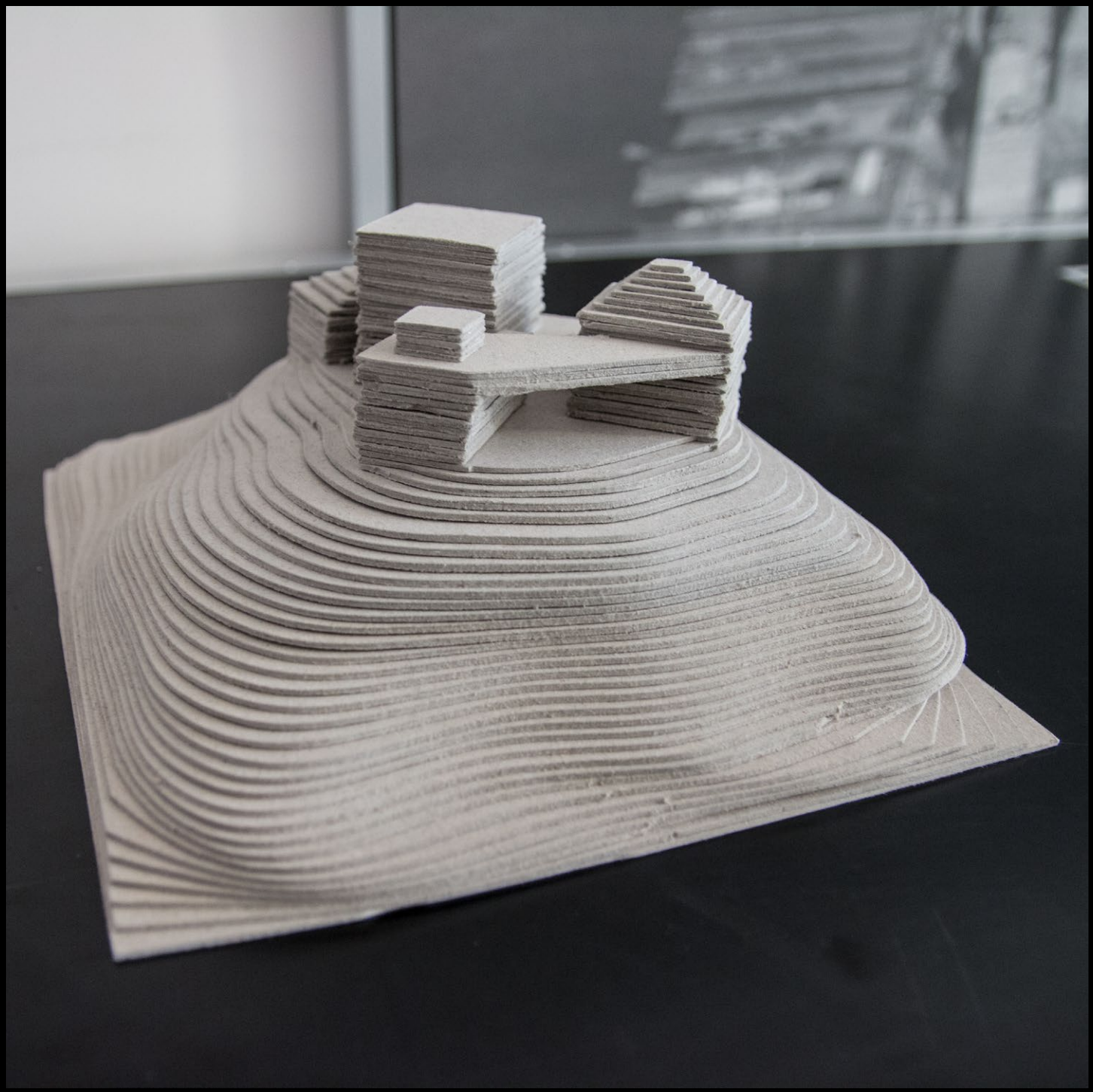
Architectural mockup accessories. Laser engraving. Author: Paula Szarejko.

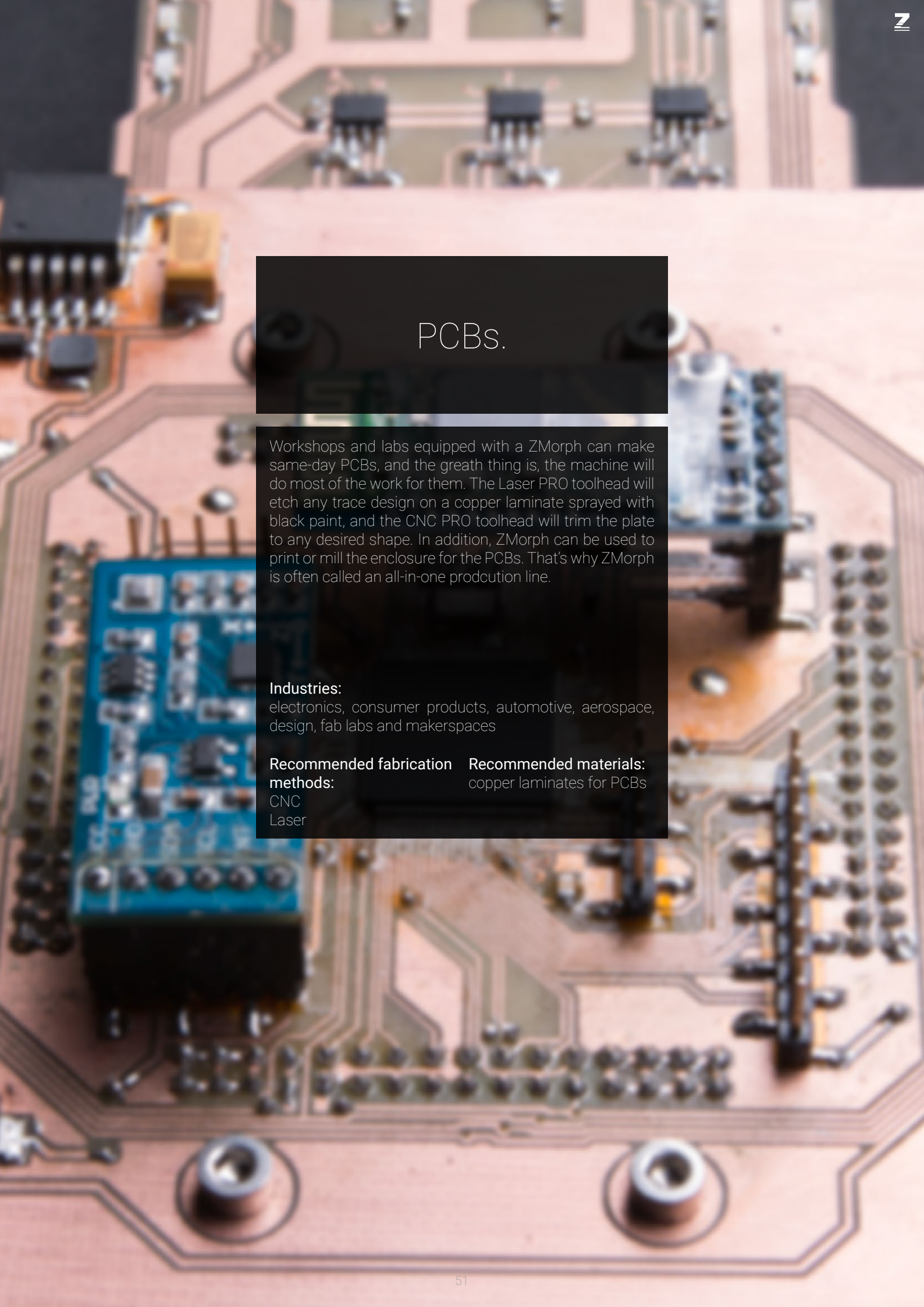


"La Garenne Colombes". 3D printing. Model by Foster + Partners.



Schematic mockup of a house on a hill. CNC milling. Author: Paula Szarejko.





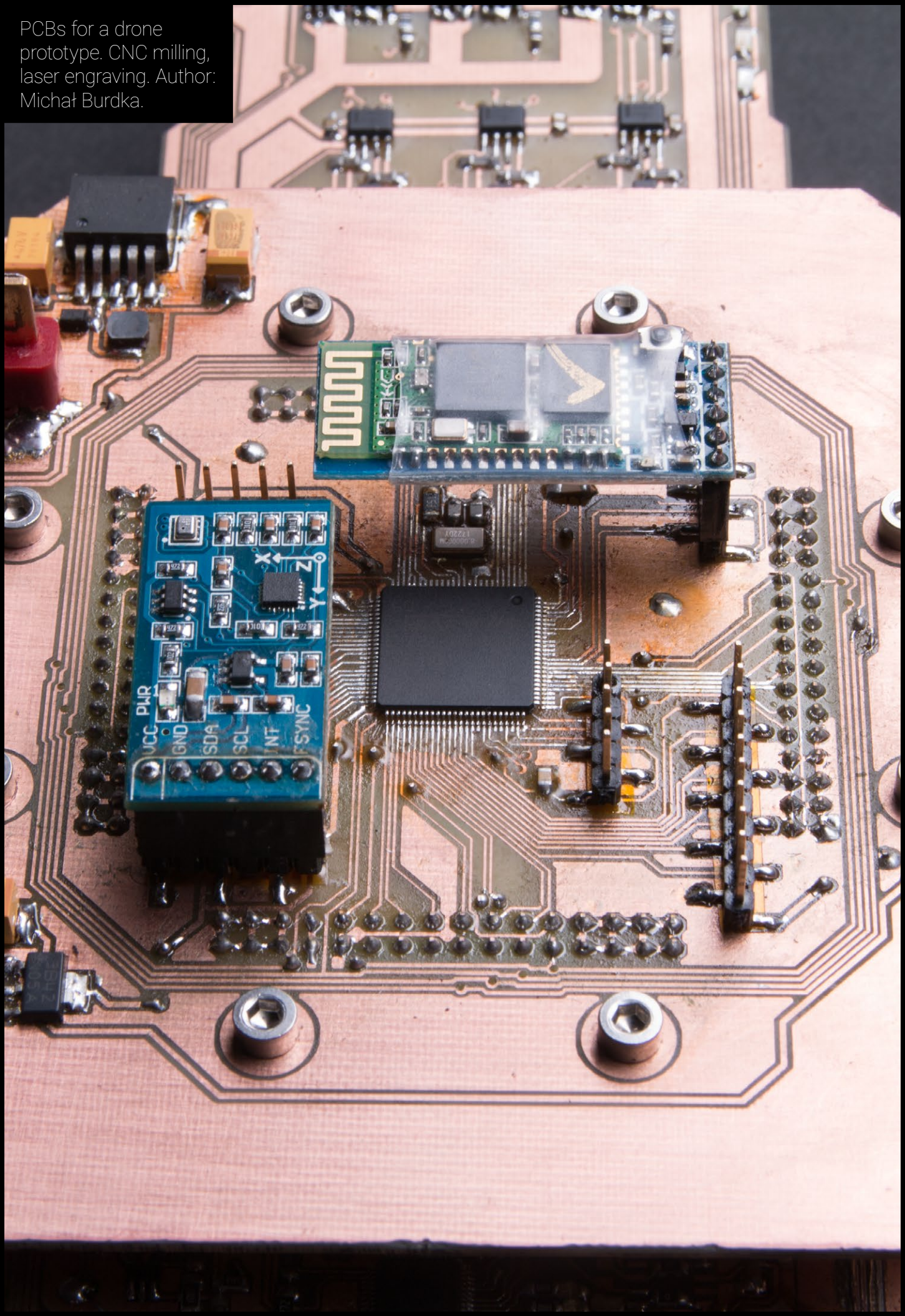
PCBs.

Workshops and labs equipped with a ZMorph can make same-day PCBs, and the greath thing is, the machine will do most of the work for them. The Laser PRO toolhead will etch any trace design on a copper laminate sprayed with black paint, and the CNC PRO toolhead will trim the plate to any desired shape. In addition, ZMorph can be used to print or mill the enclosure for the PCBs. That's why ZMorph is often called an all-in-one prodcution line.

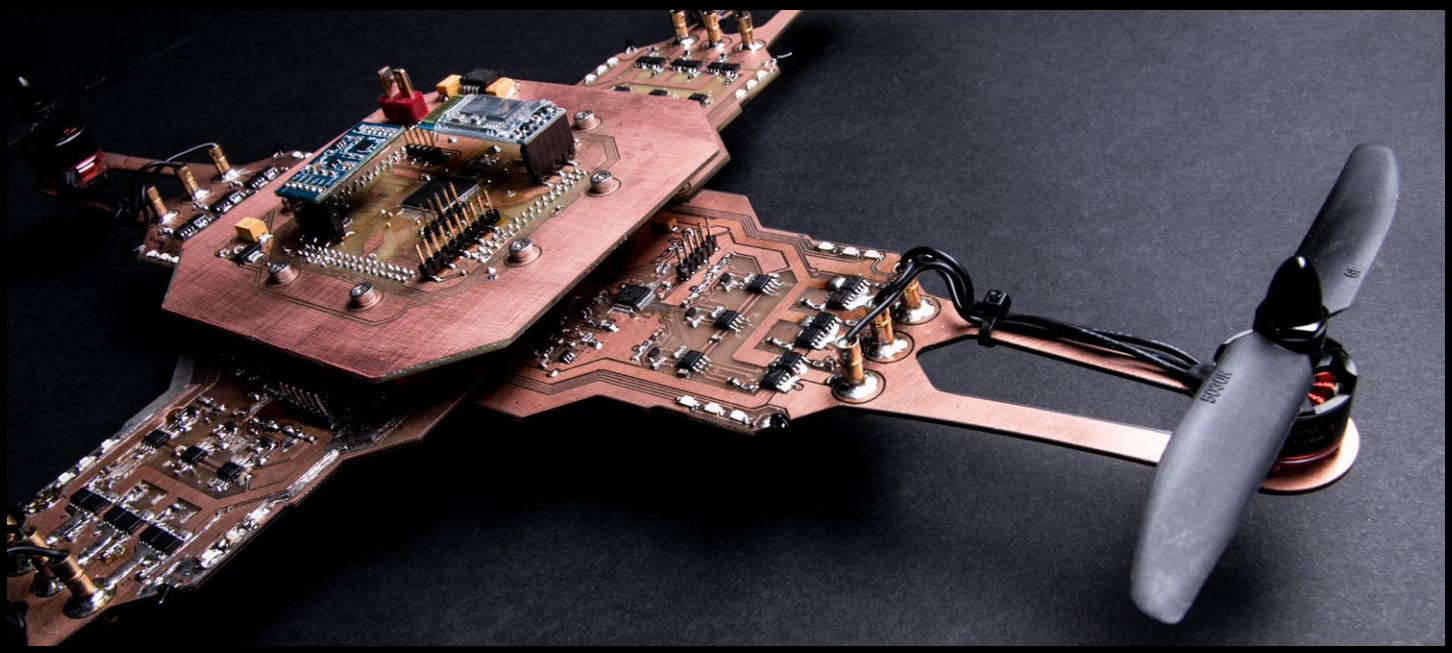
Industries:
electronics, consumer products, automotive, aerospace, design, fab labs and makerspaces

Recommended fabrication methods:
CNC
Laser

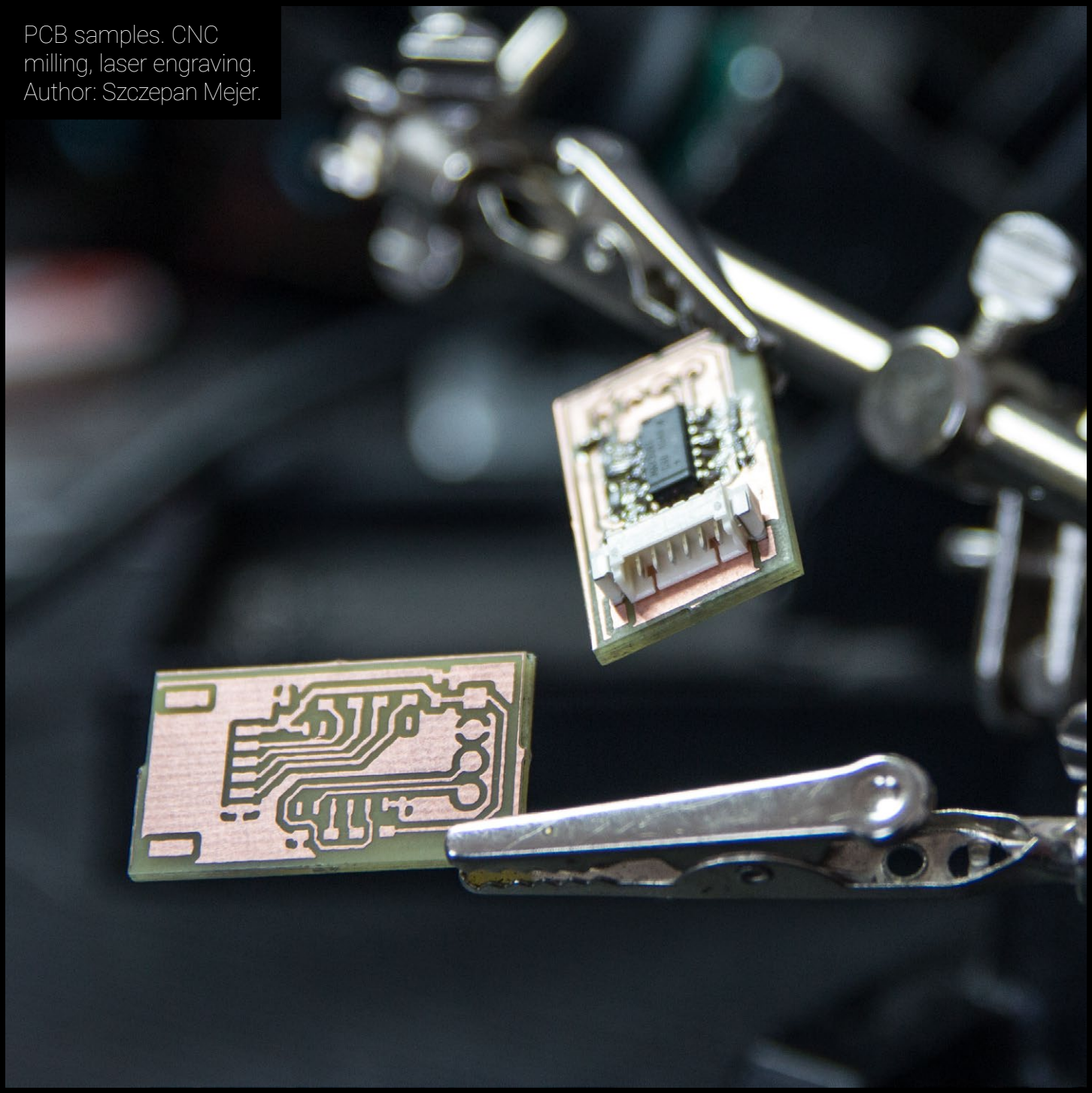
Recommended materials:
copper laminates for PCBs

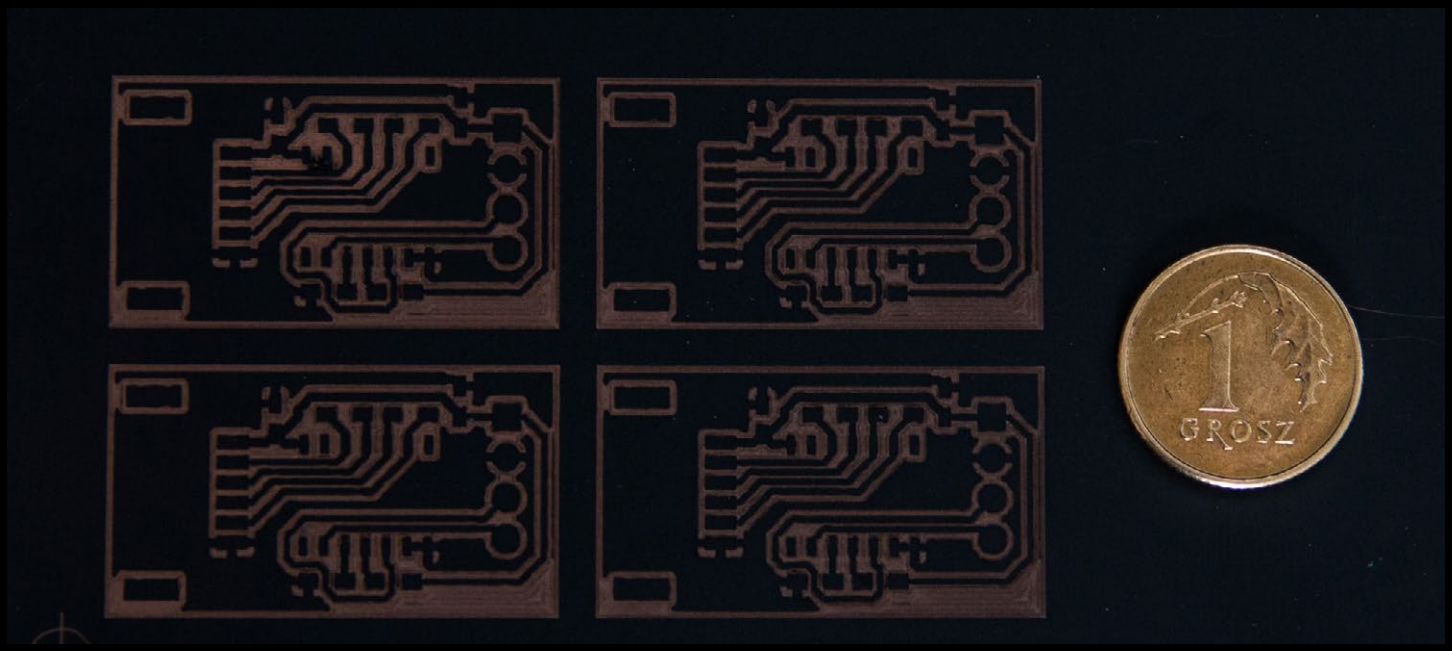


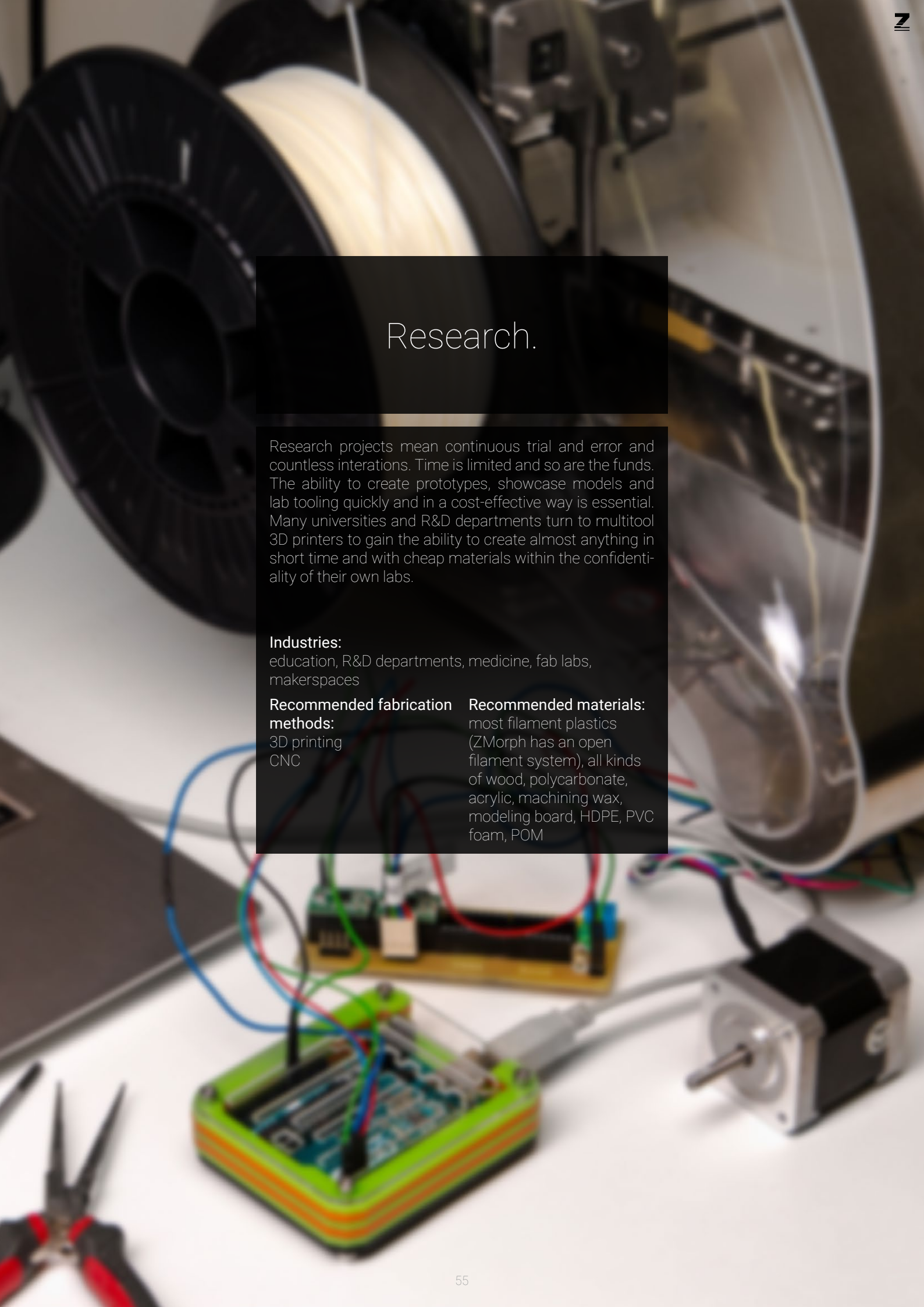
PCBs for a drone prototype. CNC milling, laser engraving. Author: Michał Burdka.



PCB samples. CNC milling, laser engraving. Author: Szczepan Mejer.







Research.

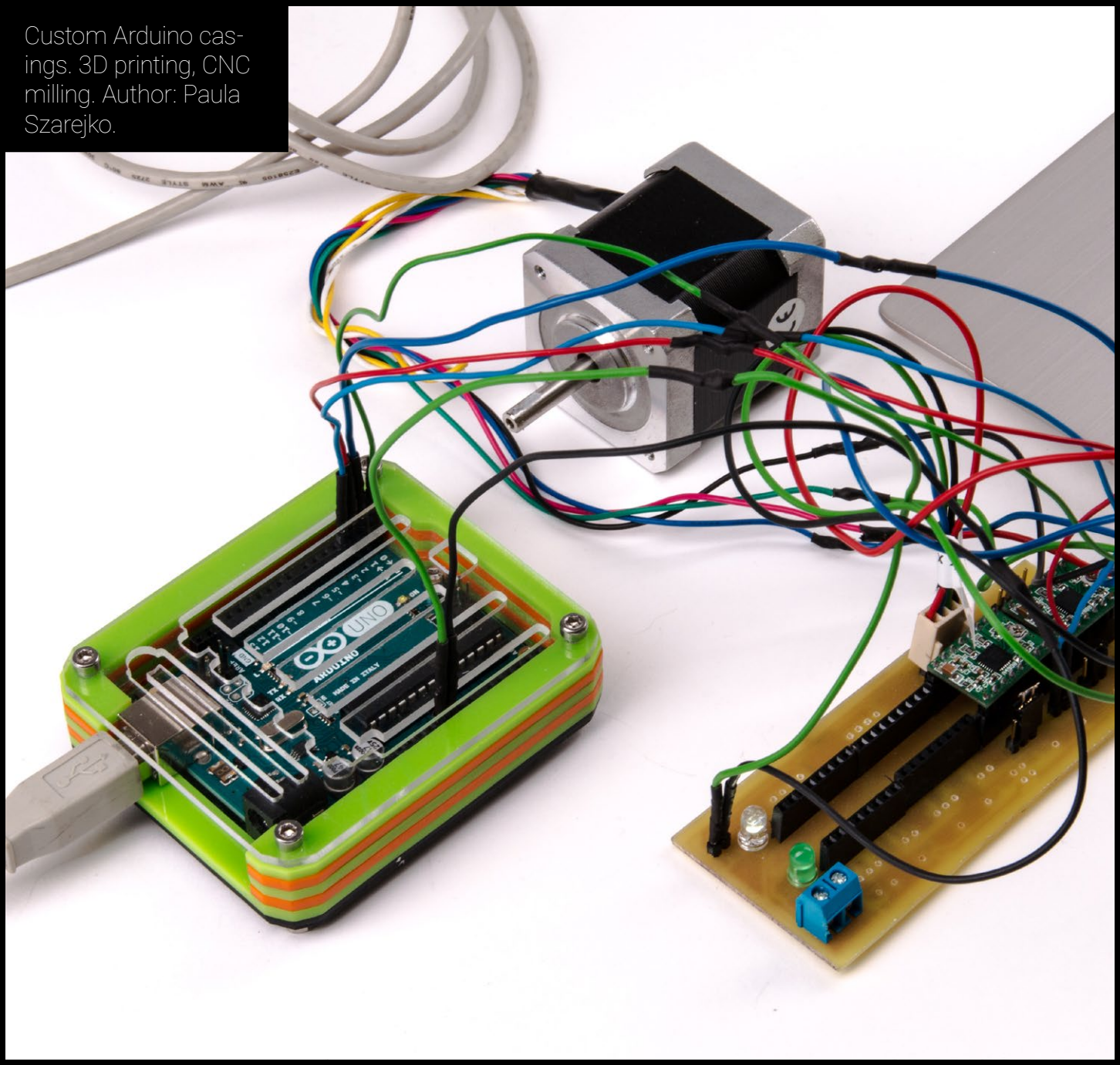
Research projects mean continuous trial and error and countless interations. Time is limited and so are the funds. The ability to create prototypes, showcase models and lab tooling quickly and in a cost-effective way is essential. Many universities and R&D departments turn to multitool 3D printers to gain the ability to create almost anything in short time and with cheap materials within the confidentiality of their own labs.

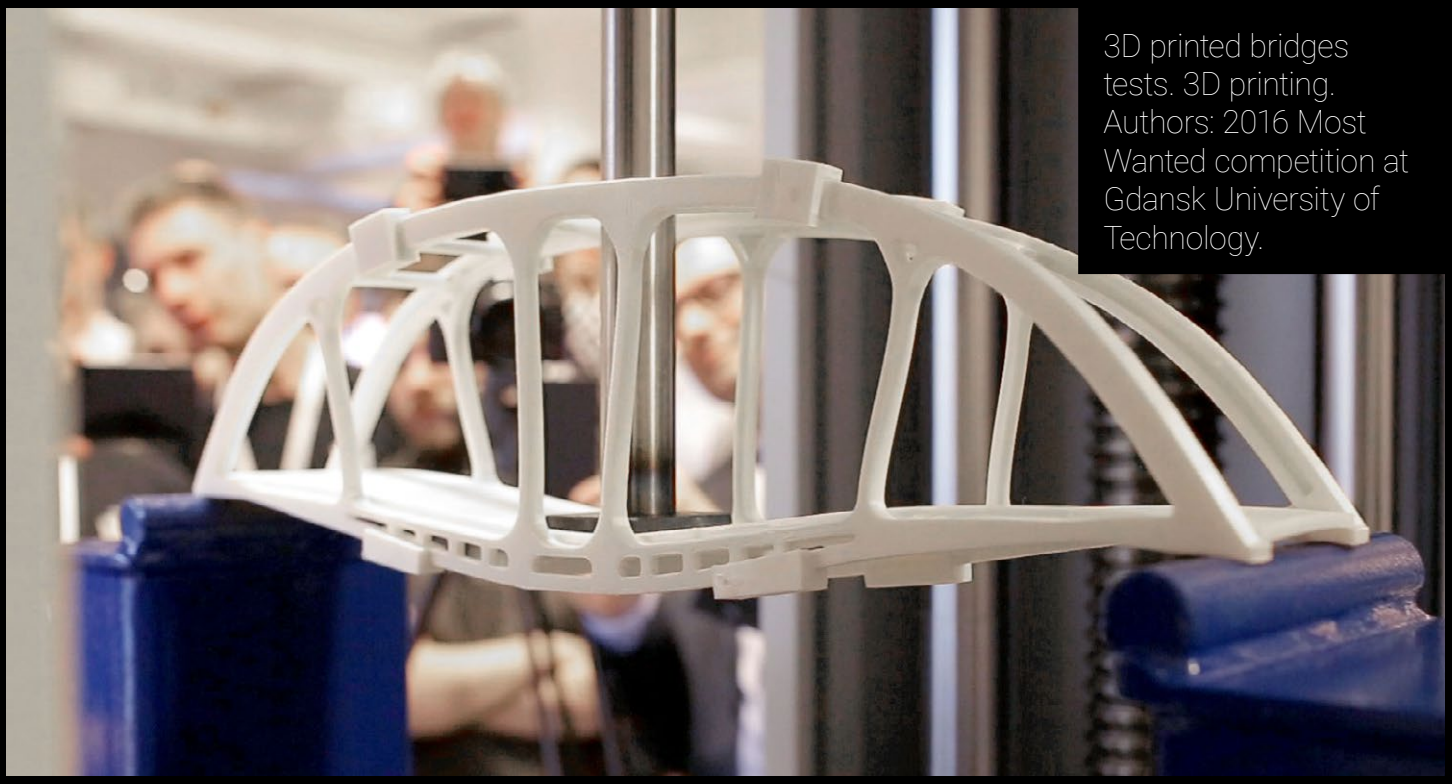
Industries:
education, R&D departments, medicine, fab labs, makerspaces

Recommended fabrication methods:
3D printing
CNC

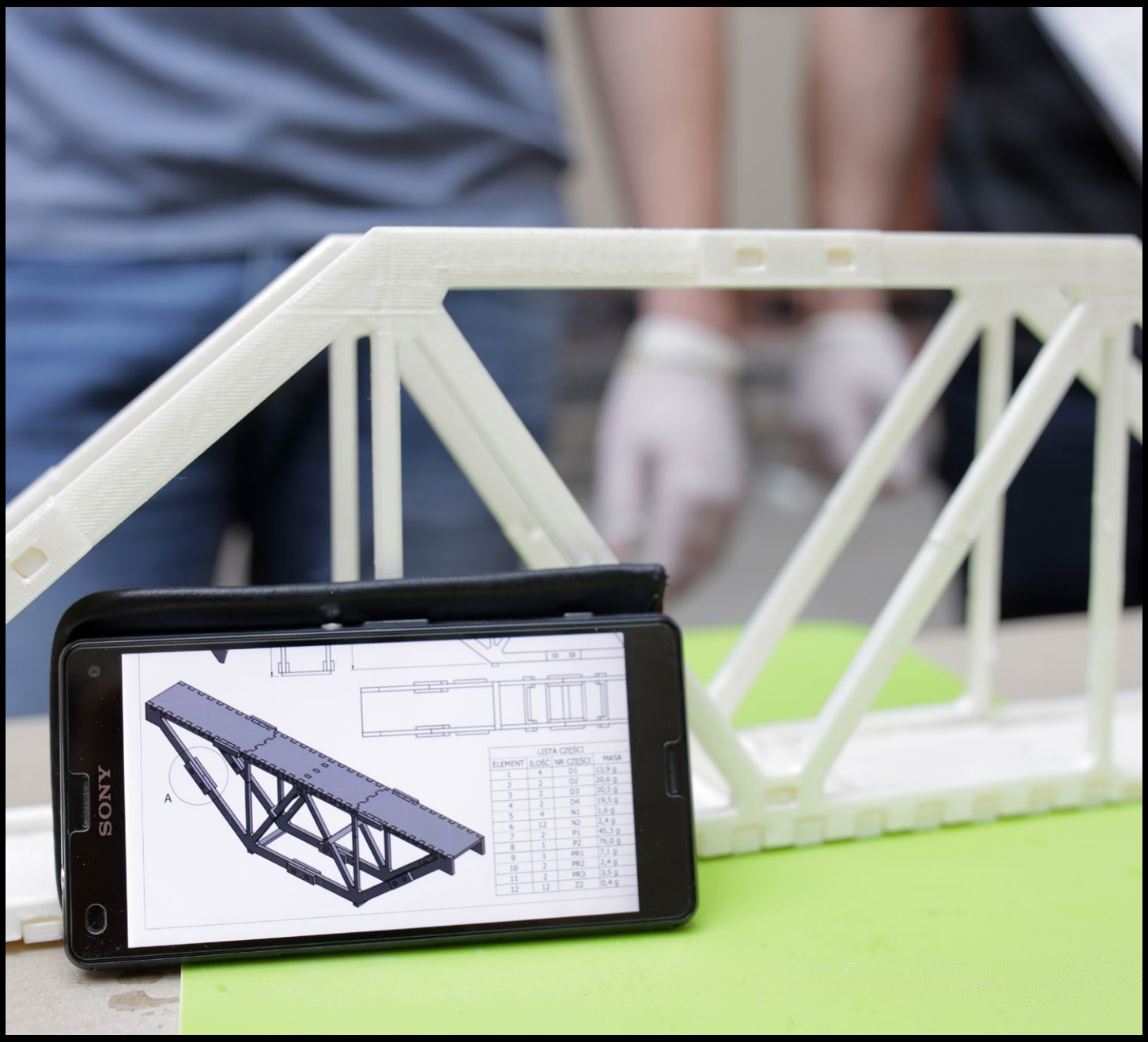
Recommended materials:
most filament plastics (ZMorph has an open filament system), all kinds of wood, polycarbonate, acrylic, machining wax, modeling board, HDPE, PVC foam, POM

Custom Arduino casings. 3D printing, CNC milling. Author: Paula Szarejko.

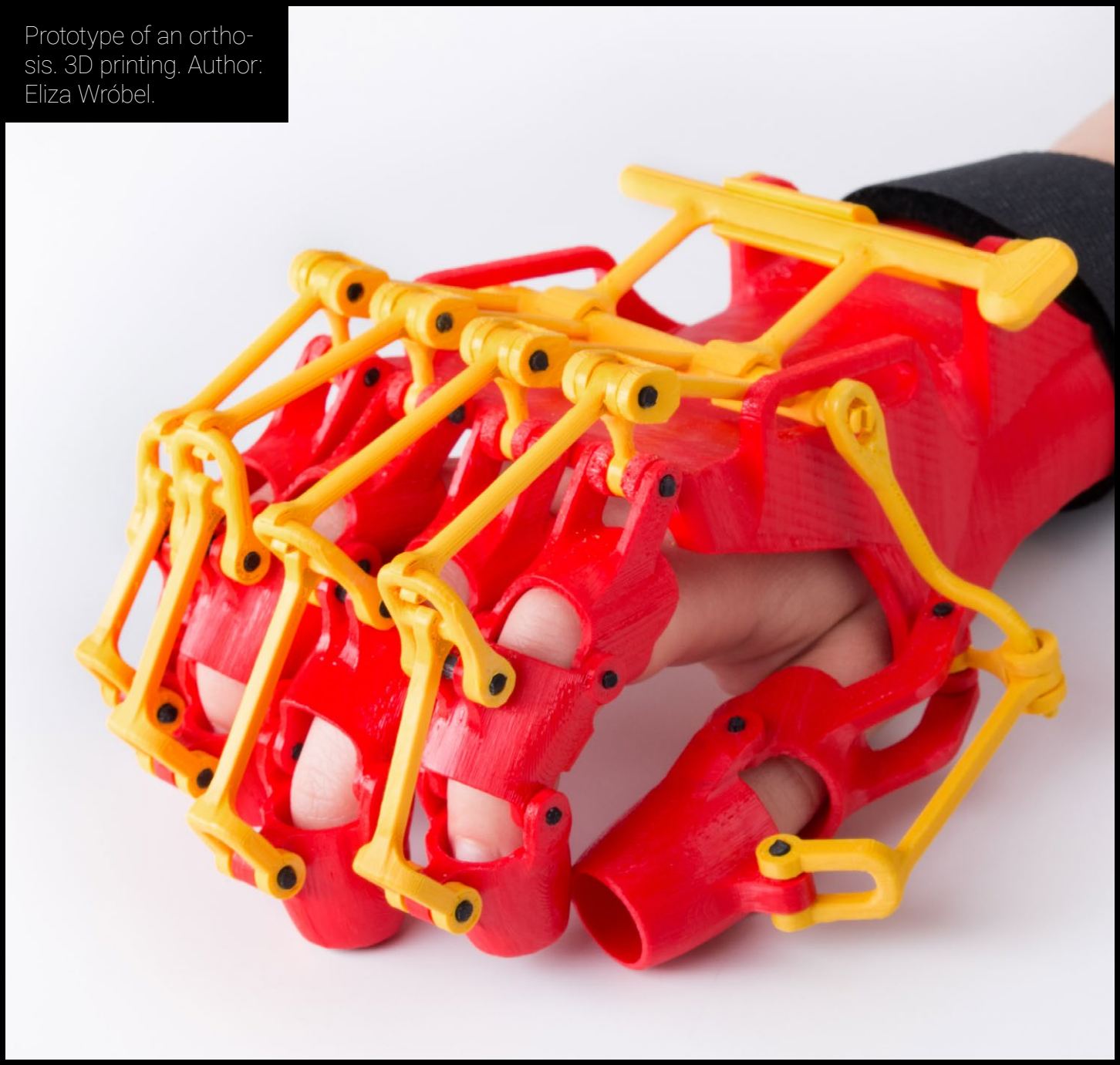


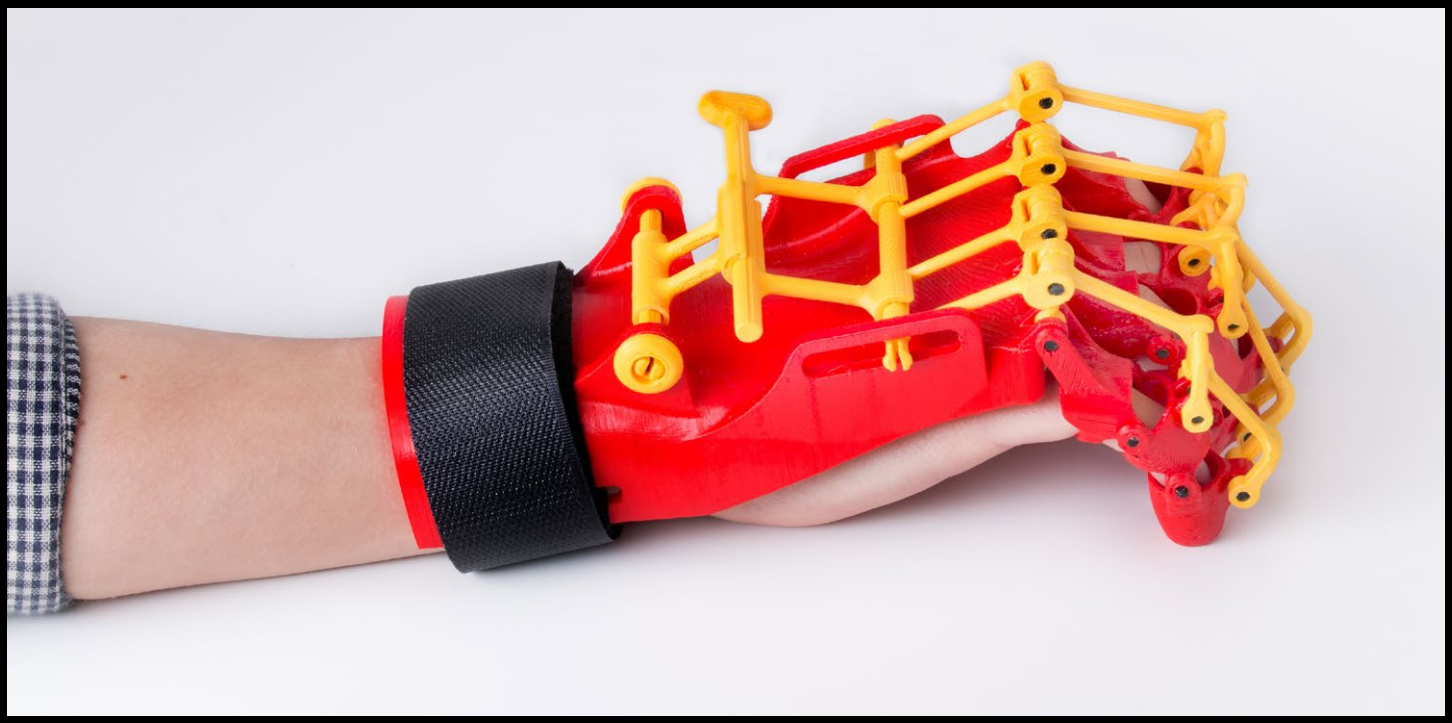


3D printed bridges tests. 3D printing. Authors: 2016 Most Wanted competition at Gdansk University of Technology.



Prototype of an orthosis. 3D printing. Author: Eliza Wróbel.





Old age simulator. 3D printing. Author: Get Models Now.

Material stress tests. 3D printing. Author: Magda Dudycz.

Molding.

Shouldn't 3D printers make traditional manufacturing methods like molding and casting obsolete? Well, there are still areas where these methods are more effecient, and the great thing about 3D printing is that it can make them less time consuming and cheaper. There are a few different ways you can use a 3D printer in molding: prototyping molds for injection molding, final molds for RTV molding, patterns for master molds, and more. And if your 3D printer can perform CNC milling like ZMorph, you can use professional materials like machining wax and modeling board.

Industries:
jewelry, consumer products, manufacturing, fashion, design, fab labs and makerspaces

Recommended fabrication methods:
3D Printing
CNC

Recommended materials:
ABS, machining wax, modeling board, HDPE

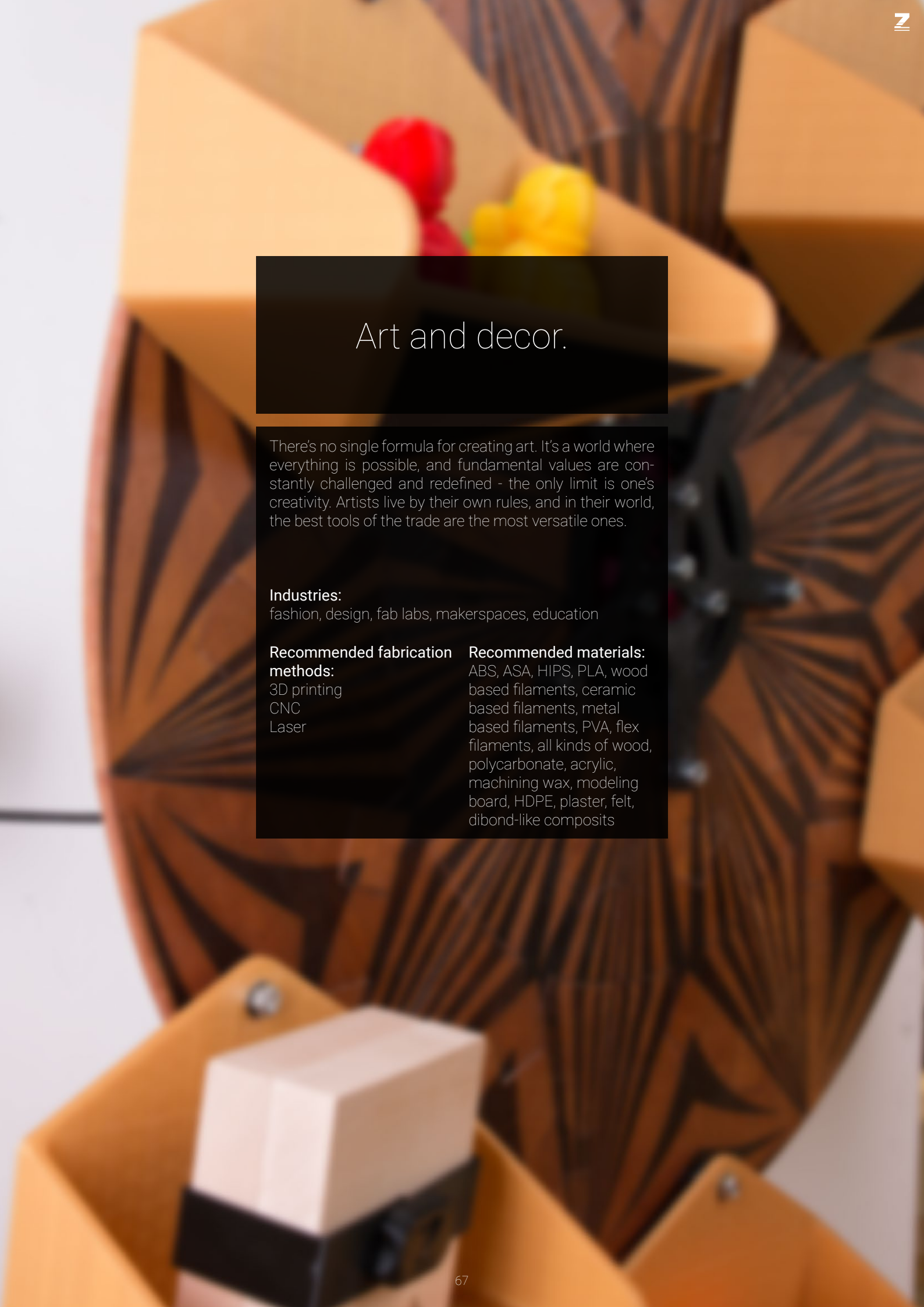
Molds and casings for a silver jewelry collection. 3D printing. Author: Paula Szarejko.

Various mold samples in modeling board. CNC milling. Author: Paula Szarejko, Wojciech Biesiada.

Molds for metal resin cold casts. 3D printing. Author: Eliza Wróbel, models by: @Zorum.

Sample product packaging made with vacuum forming. 3D printing. Model by @ bardiaesm, packaging by Paula Szarejko, Piotr Jedwabny.

3D printed molds used in casting toothbrush handles. 3D printing. Author: Julia Kozieł.



Art and decor.

There's no single formula for creating art. It's a world where everything is possible, and fundamental values are constantly challenged and redefined - the only limit is one's creativity. Artists live by their own rules, and in their world, the best tools of the trade are the most versatile ones.

Industries:
fashion, design, fab labs, makerspaces, education

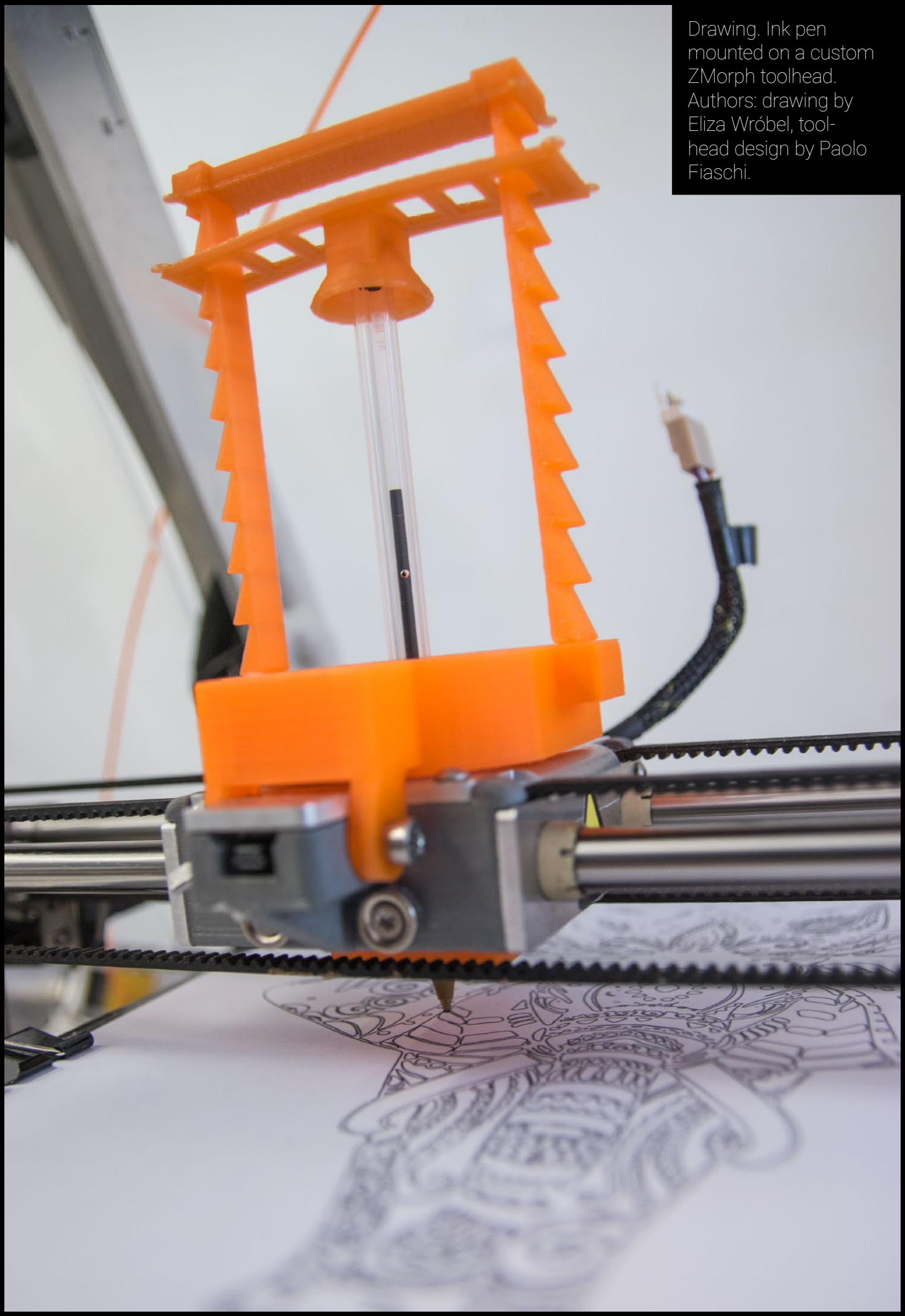
Recommended fabrication methods:
3D printing
CNC
Laser

Recommended materials:
ABS, ASA, HIPS, PLA, wood based filaments, ceramic based filaments, metal based filaments, PVA, flex filaments, all kinds of wood, polycarbonate, acrylic, machining wax, modeling board, HDPE, plaster, felt, dibond-like composits

Revolving bookshelf. 3D printing, CNC milling, laser engraving, post processing. Author: Eliza Wróbel.

"OGO" jewelry collection. CNC milling, laser engraving. Author: Paula Szarejko.

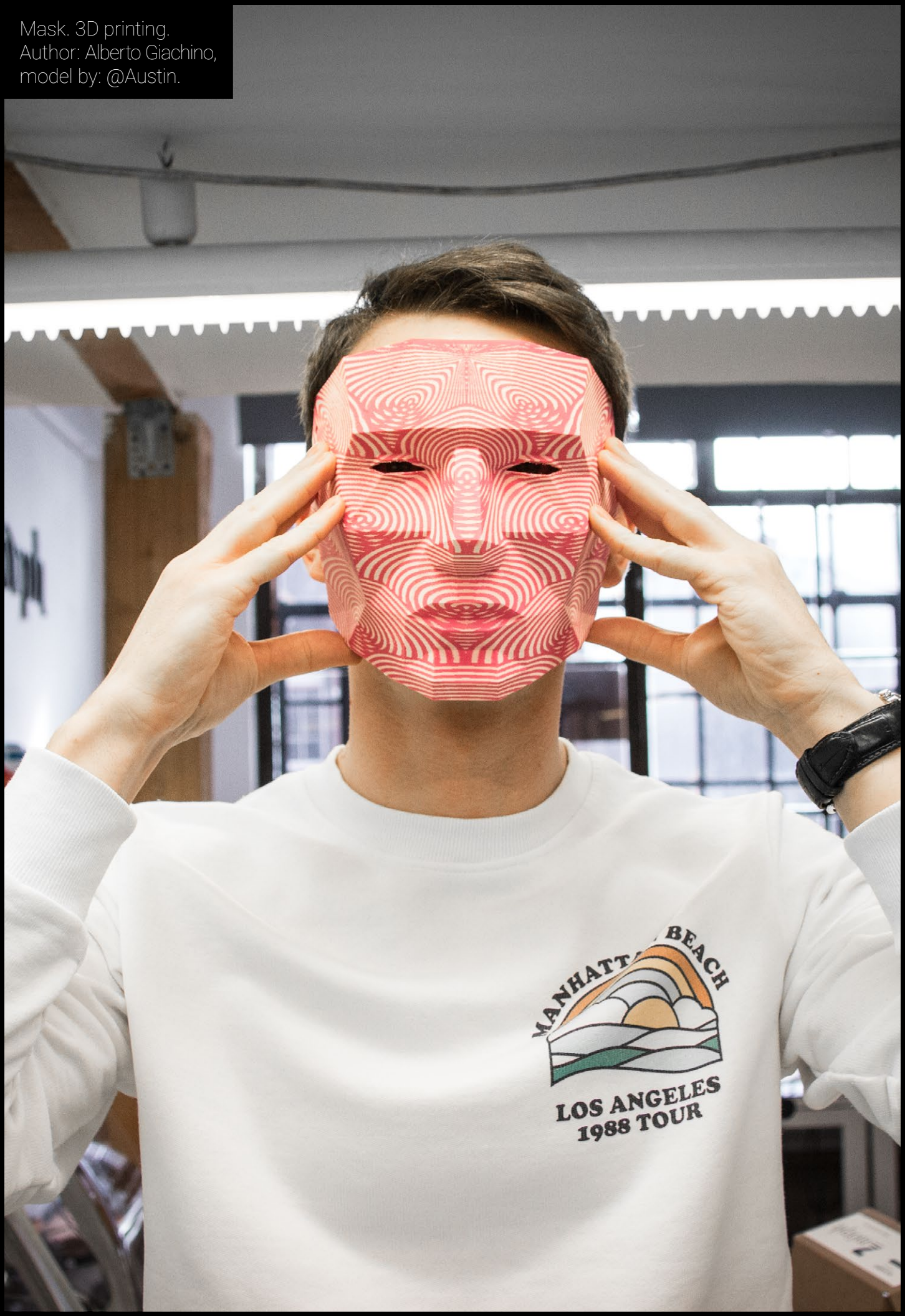
Customised desk accessories. Laser engraving, CNC milling. Authors: Eliza Wróbel, Paula Szarejko.



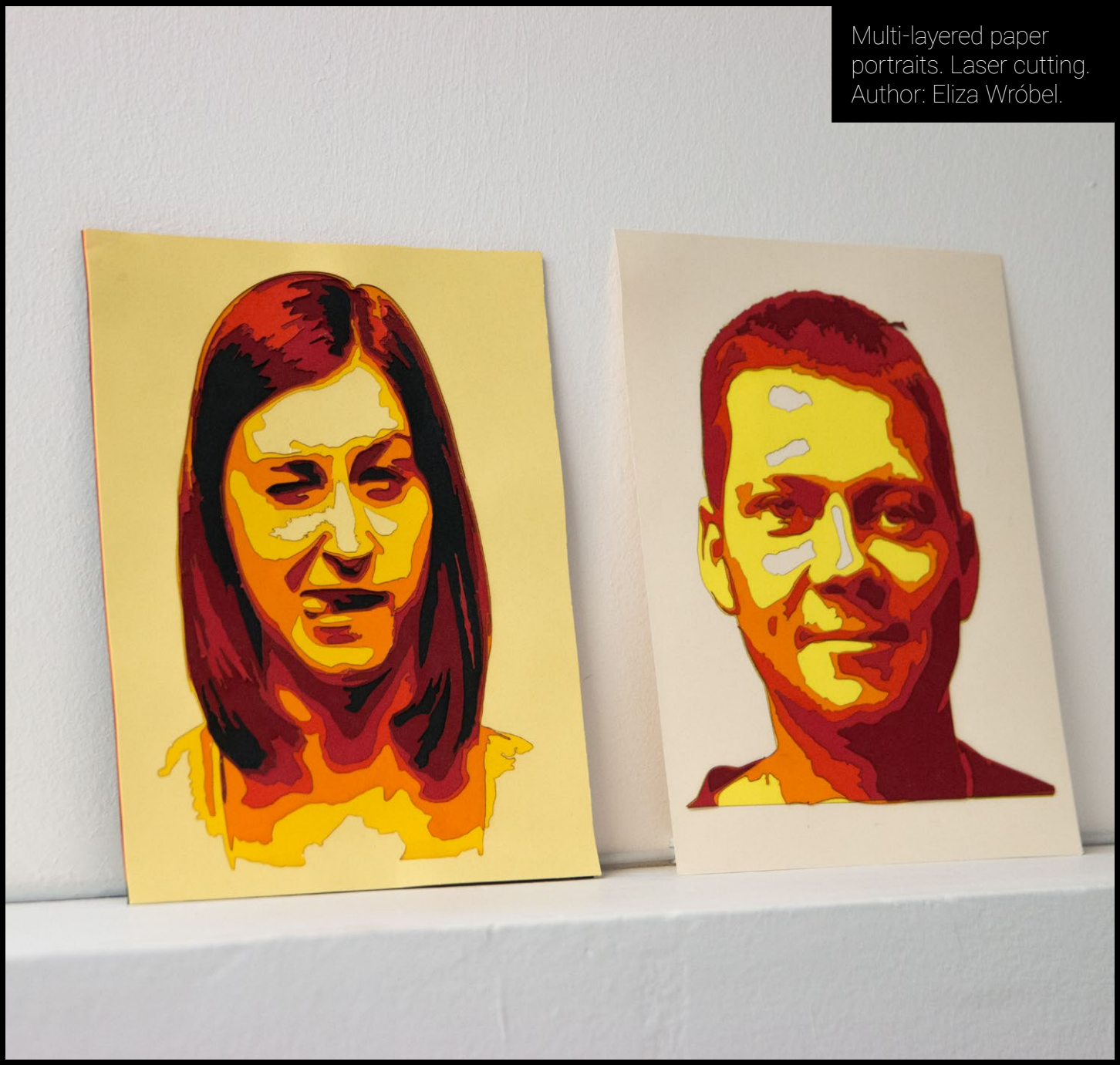
Drawing. Ink pen mounted on a custom ZMorph toolhead. Authors: drawing by Eliza Wróbel, toolhead design by Paolo Fiaschi.

Wooden ornament CNC milling, post processing. Author: Wojciech Biesiada.

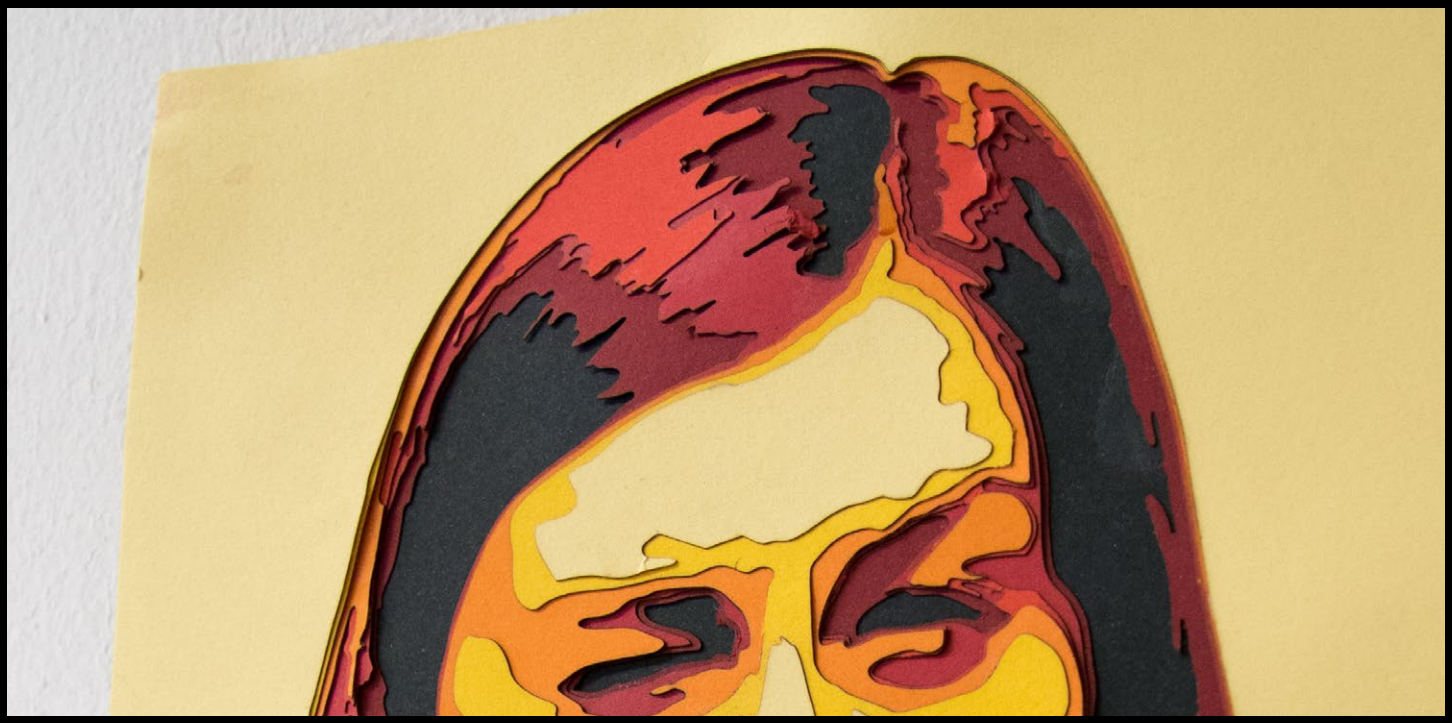
Sites of famous European cities. Laser engraving. Artwork by: Kursat Unsal.



Mask. 3D printing.
Author: Alberto Giachino,
model by: @Austin.



Multi-layered paper portraits. Laser cutting. Author: Eliza Wróbel.



Cake decoration with custom signage. Thick paste extrusion. Author: Asia Biesiada.

"A world that flew away on the back of a cow". 3D printing. Author: Wojciech A. Hoffmann, printed by: Get Models Now.

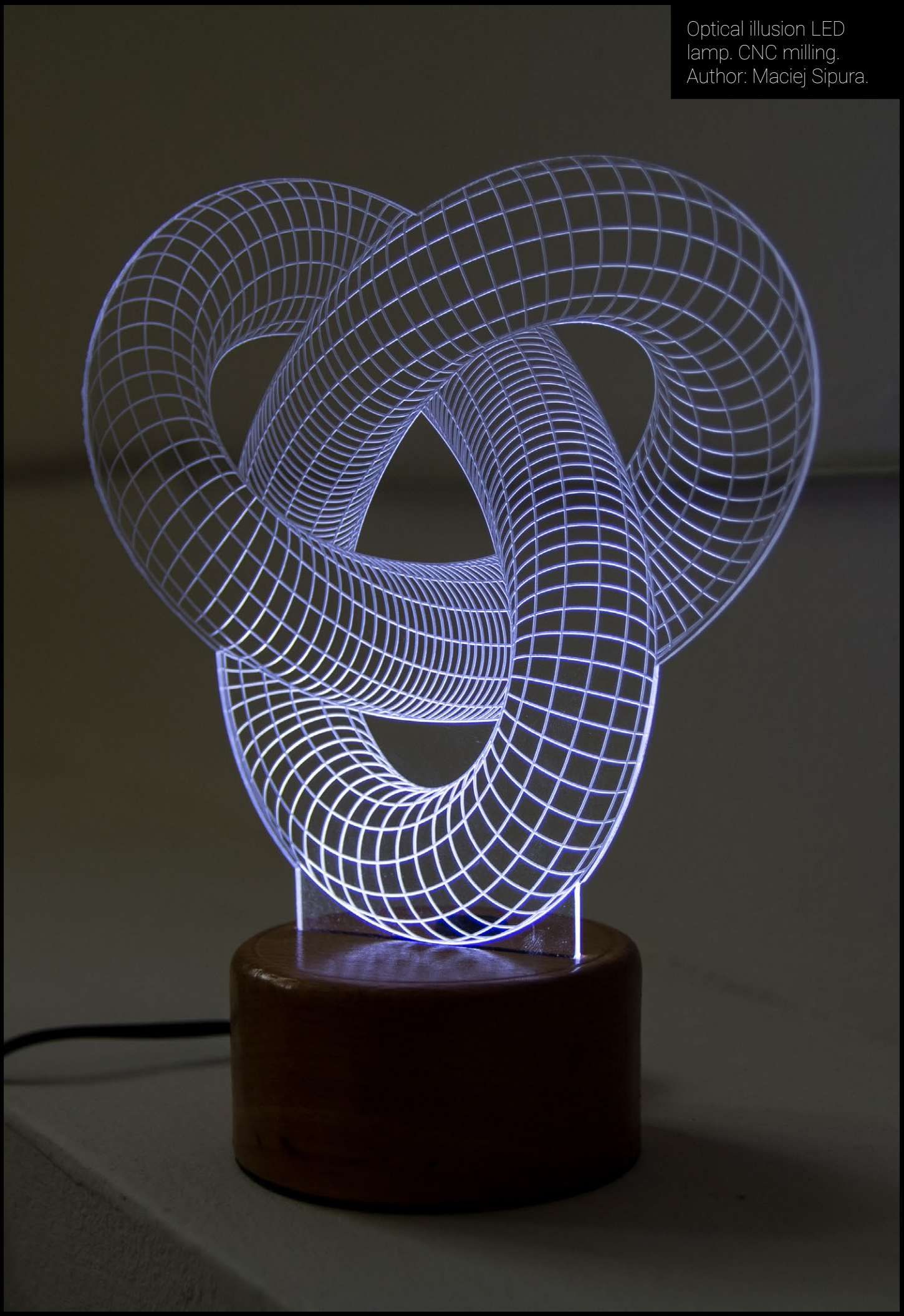
Movie inspired portraits with stand. Laser engraving, CNC milling. Author: Eliza Wróbel.

"E-bomb". Partly 3D printed, post processing. Author: Alice Woods.

Hulk inspired figurine. 3D printing, post processing. Author: Mendas Fotis.

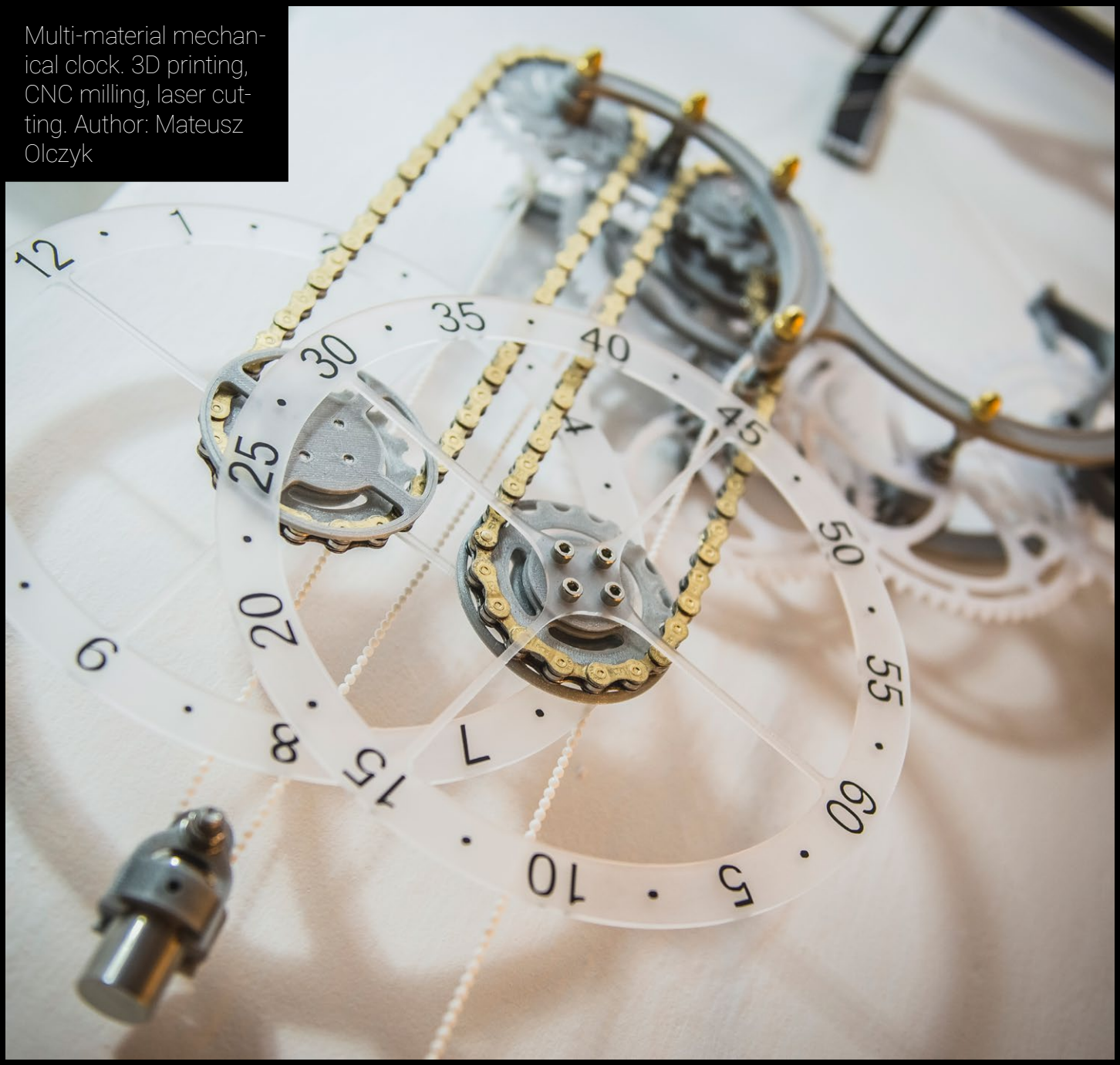
Door ornaments. 3D printing, post processing. Author: Mateusz Olczyk.

Mug coasters. CNC milling, laser engraving. Author: Eliza Wróbel.



Optical illusion LED lamp. CNC milling. Author: Maciej Sipura.

Multi-material mechanical clock. 3D printing, CNC milling, laser cutting. Author: Mateusz Olczyk



Historical reconstruction.

The most valuable museum exhibits are usually the most fragile ones too. They can be easily damaged, so the curators need to enclose them behind glass and visitors can't touch them. Museums often decide to make copies and replicas of their exhibits but the process is time-consuming and expensive. 3D printing and advanced post-production can be used to recreate valuable, historic objects to make them more availble for museum and gallery visitors.

Industries:
museums, design studios

Recommended fabrication methods:
3D printing
CNC
Laser

Recommended materials:
ABS, ASA, HIPS, PLA,
wood based filaments,
ceramic based filaments,
metal based filaments, PVA

Miniature interiors inspired by Baroque, Rococo, and Biedermeier periods. 3D printing, post processing. Author: Get Models Now.

16th century rifle replica. 3D printing, post processing. Author: Get Models Now.

Baroque frame replica. 3D printing, post processing.
Author: Get Models Now.

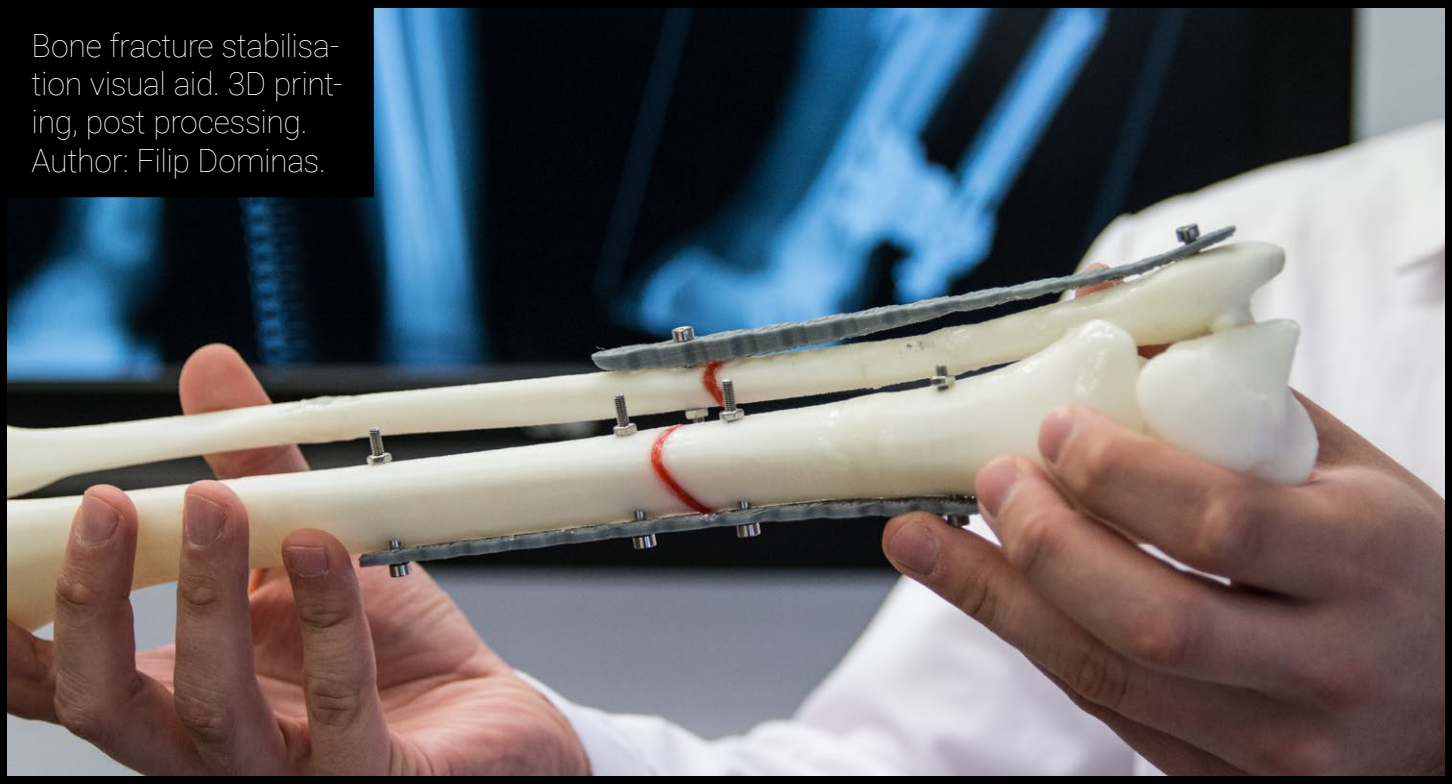
Medical visualisation aids.

Doctors, researchers and medical equipment manufacturers use 3D printers to lead the way for a healthier world. Medical visualisation aids are a great way to educate patients and even students, and true "life-savers" allowing doctors to train on a model before conducting medical procedures. 3D printing only began to revolutionize the healthcare system.

Industries:
medicine, education

Recommended fabrication methods:
3D printing

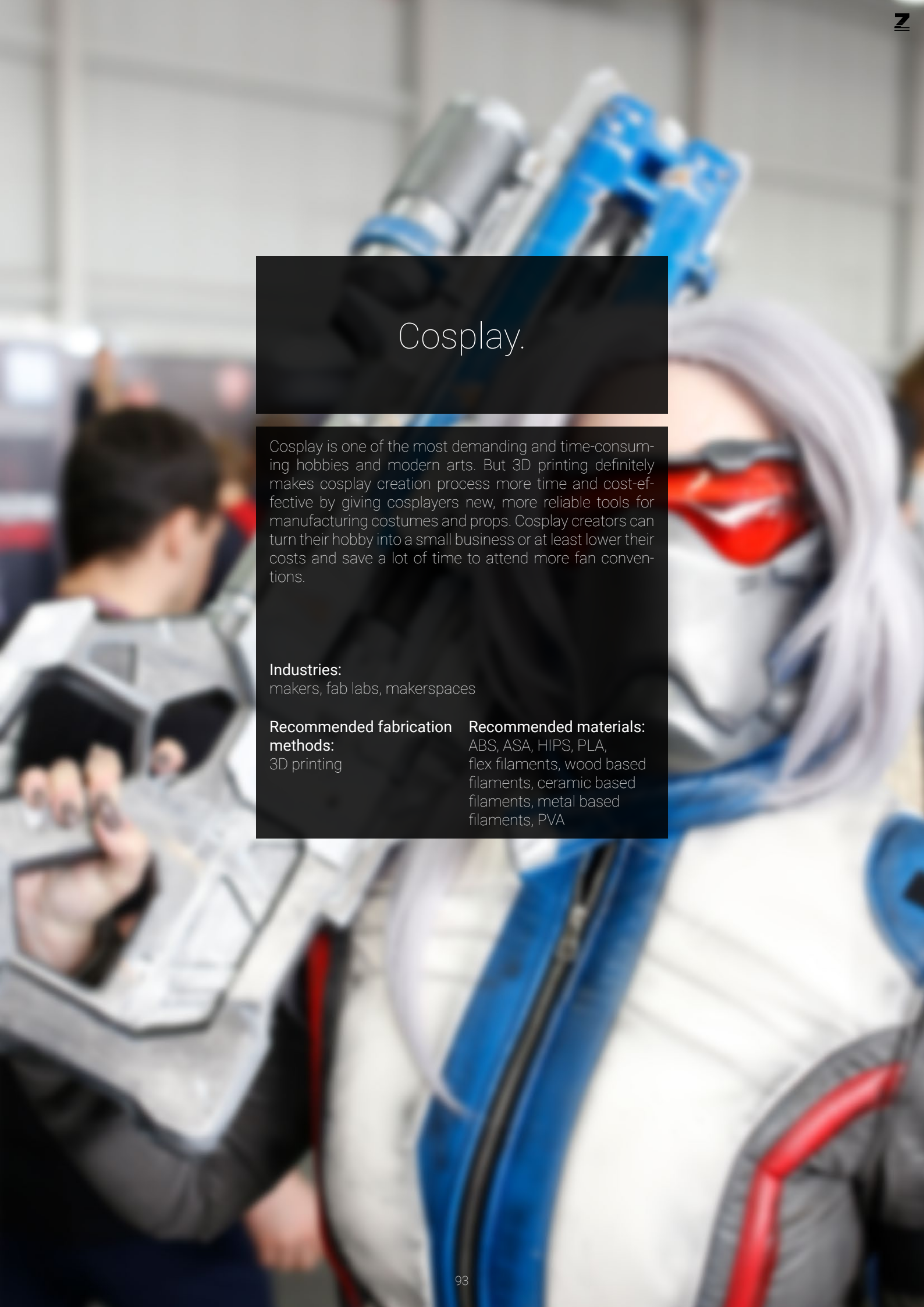
Recommended materials:
ABS, PLA, PVA



Bone fracture stabilisation visual aid. 3D printing, post processing. Author: Filip Dominas.

Model of a pelivs. 3D printing with water-soluble support. Model by: DogmaGab.

Various medical visualisation aids. 3D printing. Models by: @airforce, @yarvick, @bdario91.



Cosplay.

Cosplay is one of the most demanding and time-consuming hobbies and modern arts. But 3D printing definitely makes cosplay creation process more time and cost-effective by giving cosplayers new, more reliable tools for manufacturing costumes and props. Cosplay creators can turn their hobby into a small business or at least lower their costs and save a lot of time to attend more fan conventions.

Industries:
makers, fab labs, makerspaces

Recommended fabrication methods:
3D printing

Recommended materials:
ABS, ASA, HIPS, PLA, flex filaments, wood based filaments, ceramic based filaments, metal based filaments, PVA

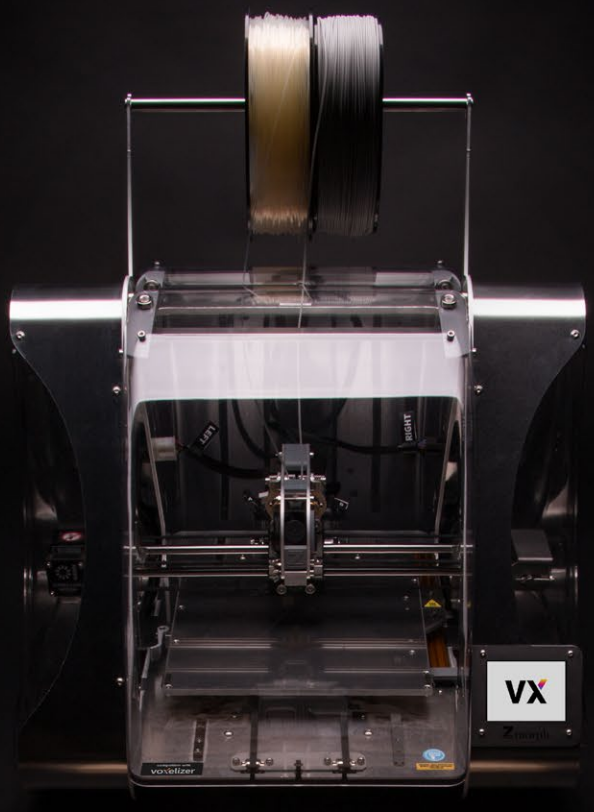
Overwatch costume elements. 3D printing, post processing. Author: Get Models Now.

Halo inspired helmet. 3D printing, post processing. Author: Get Models Now.

Thranduil's sword. 3D printing, post processing. Author: Mendas Fotis.

zmorph3d.com

Published: 02/2018.



Multi-material
3D Printing

CNC

Laser

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