



Press release

CaixaForum Madrid

From 7 February to 21 May 2023

CaixaForum Madrid prints the future in the *PRINT3D* exhibition

- The *Print3D. Reprinting reality* exhibition, which will remain in the centre until the end of May, invites you to travel into the future and enables you to delve into this fast, simple, economical and versatile technology which has a long way to go.
- For over 30 years now, 3D printers have been opening up a new world of possibilities which were hitherto unthinkable. With a good idea, a computer and printing material, these printers have begun to open new doors in such fields as health, art and architecture.
- The exhibition allows you to explore the impact of 3D printing on our society, as well as to wonder how much it will transform our everyday life and what its increasingly widespread use will mean for today's productive system. This is a transformation which, without doubt, will motivate the reformulation of fundamental concepts such as authorship, production and accessibility. Are we facing an authentic technological revolution?
- More than 200 pieces printed with this collaborative technology make up the display. Some of them are as unique as the *Kinematics* dress, by Nervous Systems, an iconic garment generated in a personalised way from a person's real measurements and printed in one piece. Visitors can check out in situ how this dress would look on them, in the exhibition's virtual fitting room.

PRINT3D. Reprinting reality. Organisation and production: "la Caixa" Foundation. **Scientific advisers:** César García Sáez and Gianluca Pugliese. **Dates:** from 7 February to 21 May 2023. **Place:** CaixaForum Madrid (Paseo del Prado, 36).

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Madrid, 7 February 2023. Javier Hidalgo, head of science exhibitions of "la Caixa" Foundation, **Isabel P. Fuentes**, director of CaixaForum Madrid, and **César García Sáez**, scientific adviser of the exhibition, have today presented *PRINT3D. Reprinting reality* in [CaixaForum Madrid](#). The display invites you to take a journey through the present and future of 3D printing, a technology that seems to have no limits. Visitors will be able to discover some of its properties, such as versatility and speed, and learn about the scope of the revolution driven by the use of this technology.

PRINT3D. Reprinting reality is the second scientific knowledge dissemination exhibition to be held this season at CaixaForum Madrid. The display analyses the possibilities offered by 3D printing, an essentially collaborative technology which represents new challenges in our productive model, since it means various people from different places in the world can plan and share their designs of a product, which can subsequently be printed locally.

Throughout the route, multiple practical applications in which 3D printing is already being used can be seen, such as in the fields of medicine, fashion, construction or art. This technology is increasingly accessible and capable of producing at scales and sizes that were unthinkable a few years ago. And, although it may seem science fiction, the bio-printing of living fabrics, or the futuristic construction of the first lunar dwelling, is already a reality.

Divided into eight thematic areas through which 3D printing can be explored in situ, as well as raising scenarios of a future that seems ever closer, the exhibition is made up of more than 200 pieces printed in 3D, accompanied by audiovisual elements and multiple educational modules for visitors to discover this world and delve into it. During peak visiting times on weekdays and at weekends, an educator service will be available in the halls of CaixaForum Madrid to resolve any doubts about the exhibition.

3D printing. How does it work?

The idea of printing three-dimensional objects has become a reality thanks to 3D printing, which makes it possible to create an infinite number of physical objects from a digital model. Through various modules, visitors will be able to understand the difference between working with two dimensions, using the X and Y axes, or working with three, X, Y and Z. They will also see how the different ways of printing and the different materials that can be used go from the idea or data to the print.

3D printing is based on additive manufacturing, which consists in adding material layer by layer to produce the parts. The popularisation of this technology has led to the appearance of various materials with their own characteristics, adapted to specific uses. This has opened up a world of possibilities for science, industry and, of course, for creative people with access to the technology. All it needs is for the imagination to be given free rein to create from small everyday objects to large format pieces.

In this area, CaixaForum Madrid is exhibiting a Black Belt printer, which uses a carbon fibre transporter belt that allows long-format items to be printed, as well as the production of mass-produced individual pieces.



Printing health

The advent of 3D printing has brought about a revolution in the field of health. It has become a crucial element for diagnoses, treatments and surgical interventions, among other applications. For some time now, the use of digital models to carry out

pre-surgery simulations has significantly improved results. With 3D printing, personalised treatments are achieved that help to improve people's lives while at the same time saving time and money.

The creation of low-cost prostheses for both people and animals has changed their everyday lives, as has the printing of organs or broken bones, which is now being used prior to operations in reference hospitals. On the other hand, work is currently ongoing for the printing of medications to be a reality, with the advantage that it would be possible to adapt the proper doses for each person according to their pathology or age.

In addition, the health emergency brought about by COVID-19 demonstrated the potential of this technology to print healthcare materials at the most critical times of the pandemic. Visors or respirator parts were just some of the designs carried out by the Coronavirus Makers, a network formed by thousands of volunteers who did not hesitate in collaborating to find quick and easily printable solutions.

Printing fashion

Each person is unique, as are their aesthetic preferences and environmental commitment. 3D printing allows the creation of pieces adapted to the singularities of each body and to the preferences of the individual. It is very simple: from the data obtained by a body scanner, garments can be created that adapt to each person's body, as well as footwear or any other type of accessory. The materials employed play an essential role in achieving new textures and reducing the carbon footprint. Thanks to the 3D printing technique, we are moving from mass



production to total customisation and unique designs.

By means of a virtual fitting room, visitors can see how they would look in the *Kinematics* dress, by Nervous Systems, an iconic piece which can be viewed for the first time in Spain in this exhibition. The garment can be generated in a

personalised way from each person's real measurements once they have passed through a body scanner, and is then printed as a single folded piece.

Printing for the home

Knowing how to operate a 3D printer can convert any user into a designer of their own creations. As can be seen in the exhibition, it is possible to print from pieces of furniture, which are characterised by being stable and robust while also light in weight, to everyday objects such as cutlery. All with a high level of personalisation in shape, colour and size.

Other extraordinary uses of 3D printing even enable the manufacture of houses using ecological and recycled materials, or the creation of elements with mechanical properties for the motor industry.

Printing in industry

Large format 3D printing offers numerous applications in the fields of the automotive industry, manufacturing, etc. Engineering companies rethink their processes to detect cases in which the technology allows them to reduce costs, optimise the production of prototypes or final parts and guarantee their quality. Many of the advances in this field are determined by the use of new materials that meet industrial requirements and the printing of large-volume parts. 3D printing makes it possible to generate lighter objects without losing any of their structural properties.

Examples we can see in this area range from the first bridge to be printed in Spain with 3D technology to a motorbike with printed parts, while we can also discover how a *Fab-lab* works.

Printing awareness

Any new technology that is deployed on a large scale causes global changes. For users, 3D printing can become an everyday tool with which to explore the world with new eyes. Socially, it can transform consumption habits and the production model, passing from the current version, based on the linear economy, to one which produces on-demand, favouring more sustainable approaches, such as recycling and the circular economy.

At the same time, digitalisation and 3D printing can create new ethical challenges, depending on the use made of the data obtained and the models created.

Aware that plastic, the most widely-used material in 3D printing creations, is generating a huge problem worldwide, *makers* have started looking for new materials to employ in their projects. On the one hand, they can use recycled plastic from bottles or tyres but, in addition, they are currently exploring the use of industrial waste such as cellulose, or old fishing nets, or domestic waste like potato or orange peel and coffee grounds.

Printing art

3D printing is a very attractive medium of expression for artists. The incorporation of this technology offers numerous creative possibilities, such as rethinking everyday objects, reinventing such classic disciplines as music by creating new sounds, or working with movement to create genuine works of art. 3D printers can be used as an expressive resource or as a working tool, and the piece produced in three dimensions can constitute the work itself, or be a step in the process of creating the final work.

In music, for instance, 3D printing offers instrument designers new possibilities, since the layer-by-layer manufacturing process allows pieces to be created with complex geometries that would be unthinkable with conventional materials, such as wood.

In this area, visitors can also see a zoetrope in which, following a generative design, the figures have been printed that will give rise to this optical phenomenon.

Printing in space

3D printing offers new possibilities for space exploration. On the one hand, it will be possible to print habitats on the Moon or Mars, using local materials and robotic systems. On the other, the versatility of this manufacturing technology will also be key to overcoming some of the most important logistical challenges brought about by high transport costs. From the same base material, it will be possible to create spare parts or customised tools on demand. All it will take is to transmit the digital models, and then produce them at the last frontier of humanity. Perhaps 3D printing knows no frontiers.

ACTIVITIES PARALLEL TO THE EXHIBITION

The temporary exhibitions held in CaixaForum have a set of associated activities that enable visitors to obtain a more cross-cutting understanding of their subject matter.

GENERAL PUBLIC

SERIES OF LECTURES: The 3D printing revolution

With the aim of promoting the dissemination, research and democratisation of this technology, technically known as *additive manufacturing*, we present this innovative [series of lectures](#) on 3D printing, given by leading specialists on the subject in different sectors.

- Tuesday 11 April, at 7 p.m.
3D PRINTING: MANUFACTURING THE FOOD OF THE FUTURE
The researcher Giuseppe Scionti, from the Universitat Politècnica de Catalunya (UPC), will analyse existing alternatives to current industrial livestock production, such as the design of synthetic meats capable of generating healthier, more efficient and sustainable foodstuffs.
- Monday 17 April, at 7 p.m.
3D BIOPRINTING: ARE WE CLOSE TO PERSONALISED MEDICINE?
Maria-Pau Ginebra, Professor and Head of the Department of Materials Science and Metallurgical Engineering at the Universitat Politècnica de Catalunya (UPC), will describe how 3D printing is impacting on medicine and health, from the reproduction of physiological structures to prepare operations, to the bioprinting of tissues.

- Monday 24 April, at 7 p.m.

ADDITIVE MANUFACTURING: BUILDING AT THE EDGE

The architect Marc Zaballa will explain how, according to recent research, the possibility of building installations in inhospitable places like the desert or the Moon is becoming increasingly feasible.

GUIDED TOUR

Activity recommended for children over 12 years of age

From 18 February. Saturdays at 11 a.m. and Sundays at 5 p.m.

The [guided tour](#) is led by an educator who, based on dialogue with the participants, presents the key themes of the exhibition and contextualises them, resolving any doubts or questions that may arise. How far will 3D printing take us? To what extent will it transform our daily lives?

COFFEE AND CHAT FOR GROUPS

Check dates and times on the website

A [leisurely visit led by a guide](#) will allow you to discover how this revolutionary technology is already improving many aspects of human life and will delve into the themes and areas of most interest. Once the tour has ended, visitors can share their impressions of the exhibition in a participatory chat based on audiovisual materials, while enjoying a cup of coffee (or similar).

FAMILY VISITS

LAYER BY LAYER WORKSHOP

Activity recommended for children of 8 and over

From 18 February to 28 May. Check dates and times on the website.

In [this activity](#), visitors will collaborate to make a 3D print, just as a printer would do. They will also learn how an object is designed, what resources are available and which materials they can use in this disruptive technology of additive manufacturing, which enables objects to be created by repeatedly superimposing layers of material.

MISSION TO MARS

17 February, 5 p.m.; 19 February, 11 a.m.; 24 February, 5 p.m.; and 26 February, 11 a.m. Check other dates and times on the website.

Activity recommended for families with children of 7 and over

[In this visit, especially designed for families](#), we will travel through time, thanks to 3D printing. We will discover the way in which this technique enables us to recreate extinct species or archaeological relics in great detail, and how it is currently being used in such fields as biomedicine. Did you know it enables the printing of organs and tissues?

SCHOOLS

TOURS FOR SCHOOL STUDENTS

There are two types of guided tour of this exhibition:

[Active tours](#) for pupils of 2nd to 4th year of primary school

[Guided tours](#), adapted to levels from the 5th year of primary to secondary school and intermediate training cycles.

PRESENTATION TO TEACHERS

1 March

This [presentation aimed at teachers](#) of primary and secondary education (ESO, *Bachillerato* and intermediate training cycles) will enable teachers interested in the exhibition to discover the subjects of educational interest that can be worked on using the exhibition as a starting point, and to know the activities and educational resources organised around it. Teachers will be given useful information with which to prepare classroom activities and reinforce contents following the active tour.

A PODCAST TO FIND OUT MORE ABOUT 3D PRINTING

In conjunction with the *Print3D. Reprinting reality* exhibition, the "la Caixa" Foundation has recorded *Printing the world*, a three-part podcast, available on [Spotify](#) and [Ivoox](#), to provide the wider public with further details about 3D printing, made by such experts as César García Sáez, a *maker* and scientific adviser to the *Print3D* display; Esther Borao, engineer and director of the Technological Institute of Aragon; Gianluca Pugliese, founder of the Lowpoly company. Also participating in the podcast are Joel Castanyé, chef at the Restaurante La Boscana in Lleida, and the designer Laura Civetti.

In the first part, the experts explain how this technology was used during the first wave of the coronavirus to produce healthcare material that helped confront the hardest moments of the pandemic. In the second part, they explain the

functionalities of 3D printing in fields like fashion or cooking. And the third part speaks about the future possibilities of this type of technology in aerospace engineering, for example, and about the evolution of 3D printing itself, from its most collaborative essence to the restrictions that are beginning to be imposed.

Print3D. Reprinting reality

CaixaForum Madrid

Paseo del Prado, 36 (Madrid)

Times

Monday to Sunday and national holidays, from 10 a.m. to 8 p.m.

<https://caixaforum.org/es/madrid>

<https://fundacionlacaixa.org/es/>

General admission: 6 euros (includes access to the museum and exhibitions)

Admission is free for CaixaBank clients

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