VERTICO

quality precision innovation

3D concrete printing

CATALOGUE **VERTICO**

WE
sell machines
print on demand
support design

Contents

VERTICO

3D Concrete Printing Solutions

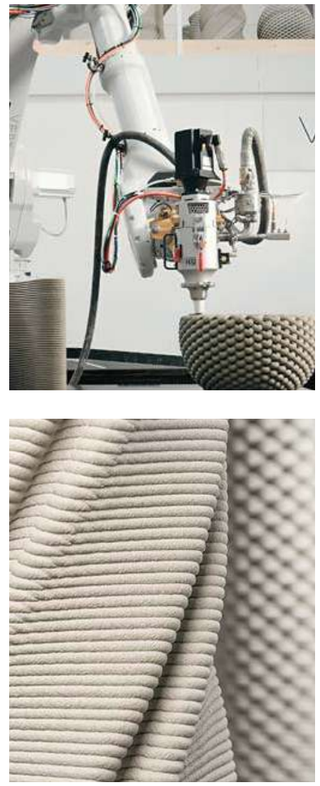
Our mission is to create a new paradigm in design, architecture and construction by removing the barriers of conventional manufacturing.

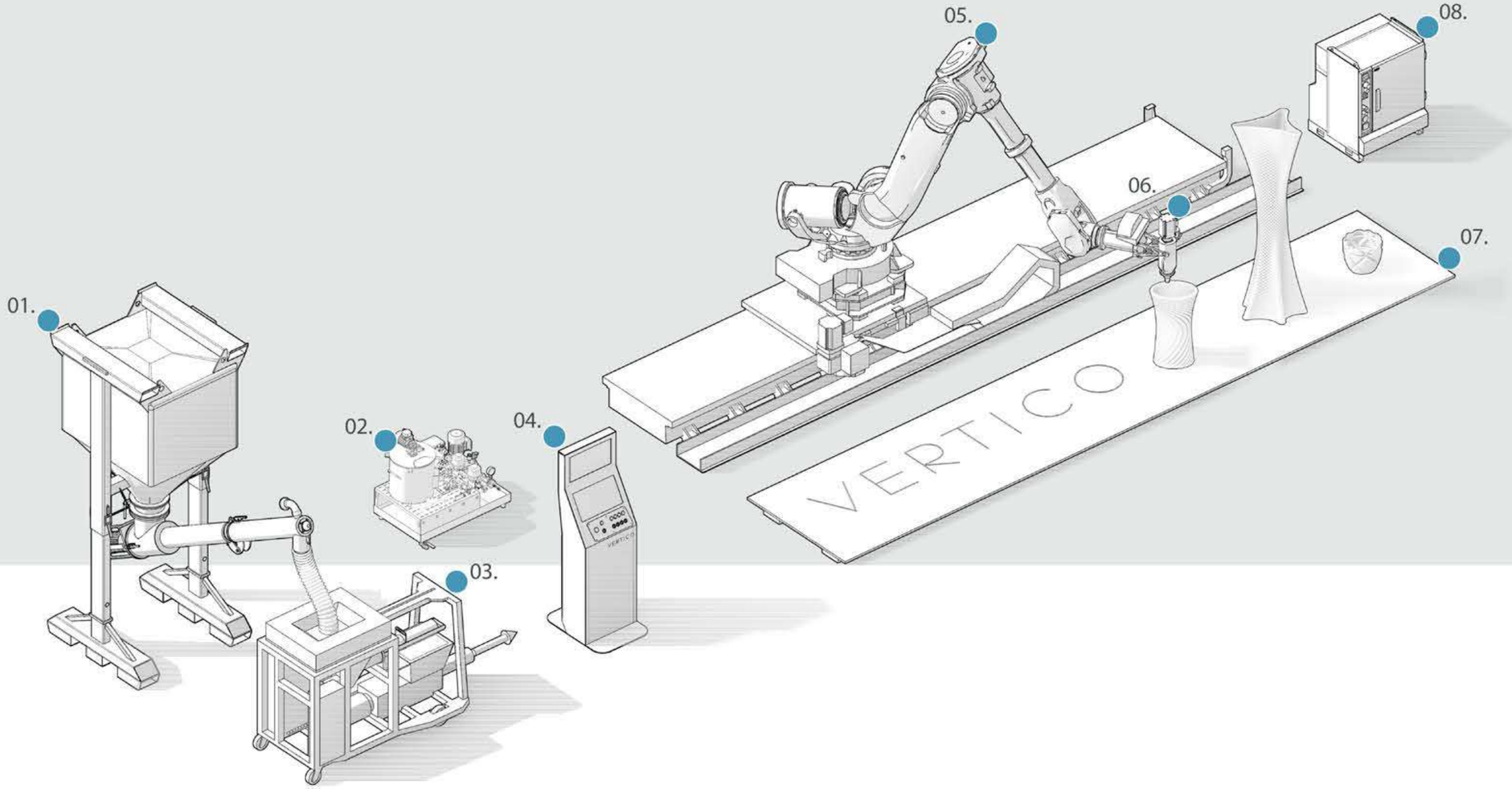
We offer a full range of concrete 3D printing solutions tailored to fit your unique needs.

We specialise in 6-axis robotics and offer solutions in the full range shapes and sizes available in the market. Our largest combination is mounted on a 10 meter track, our smallest is on wheels in a portable cabin.

Our flagship product is our coveted Accelerator Printhead solution. Providing unrivalled quality and design freedom. We also offer conventional printers for Construction and R&D.

In addition, we provide clients with our license free slicing software, seamlessly integrated with Rhino+Grasshopper. Enjoy intuitive control and real-time insights, streamlining your creative projects with ease.





01
Silo

Silo allows loading of cement efficiently and dust-free.

02
Accelerant Pump

Accelerant station mixes and adds accelerant material during 3D printing, ensuring fast concrete curing.

03
Concrete Pump

Pumping station delivers mixed concrete to the printer nozzle.

04
Control Stand

Touch-screen HMI allows the user full control of the printing equipment.

05
Robot

We specialise in 6-axis robotics and offer solutions in the full range shapes and sizes.

06
Printhead

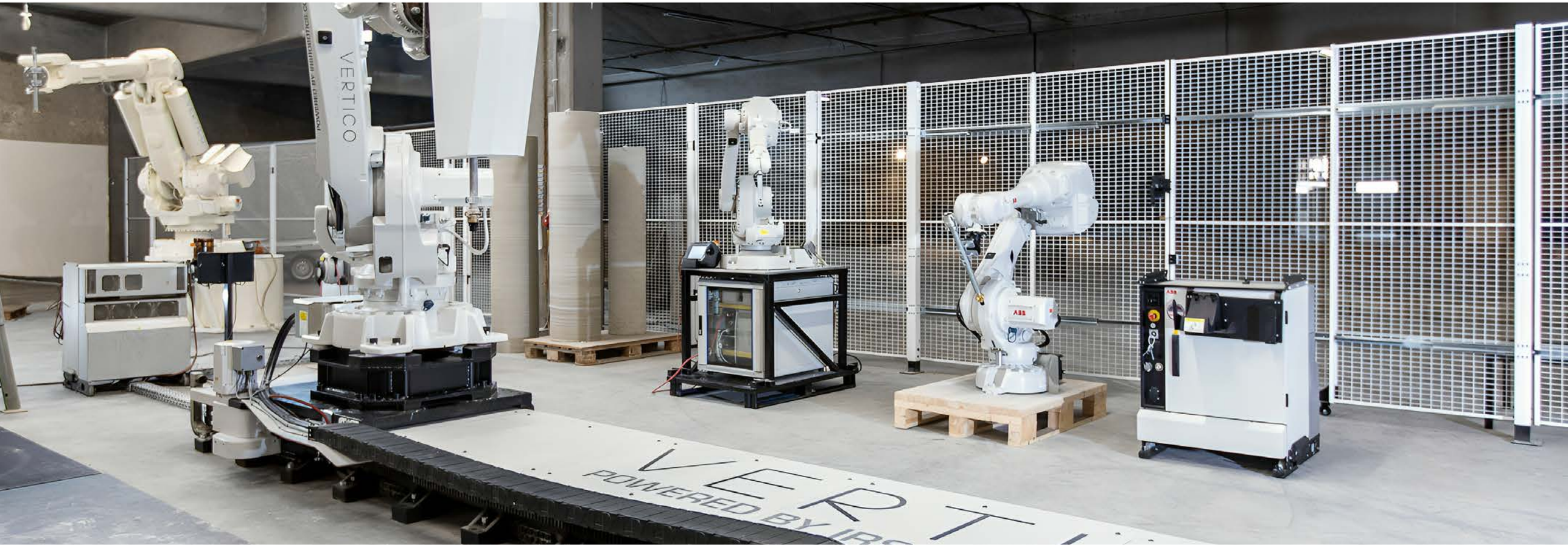
Accelerator Printhead provides unrivalled quality and design freedom of the prints.

07
Printbed with prints

The size of the printbed can be determined by the size of the potential prints.

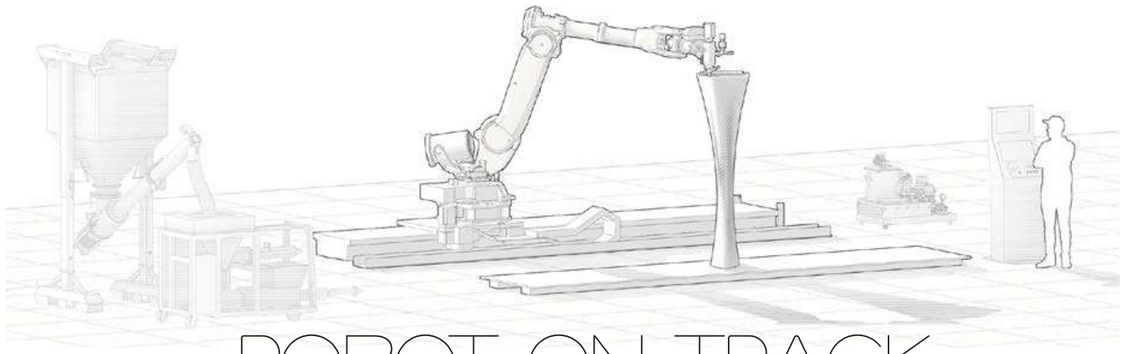
08
Robot controller

Provides superior motion control and quick hardware integration.



Solutions in all sizes
With the Vertico 3D concrete printing setup you are fully set to enter a new market. Our deep industry knowledge and all-round printing experience make us excellent partners to get you started.

You are free to choose your material supplier and our advanced slicer software is license free.



ROBOT ON TRACK

3D Concrete Printing Solutions

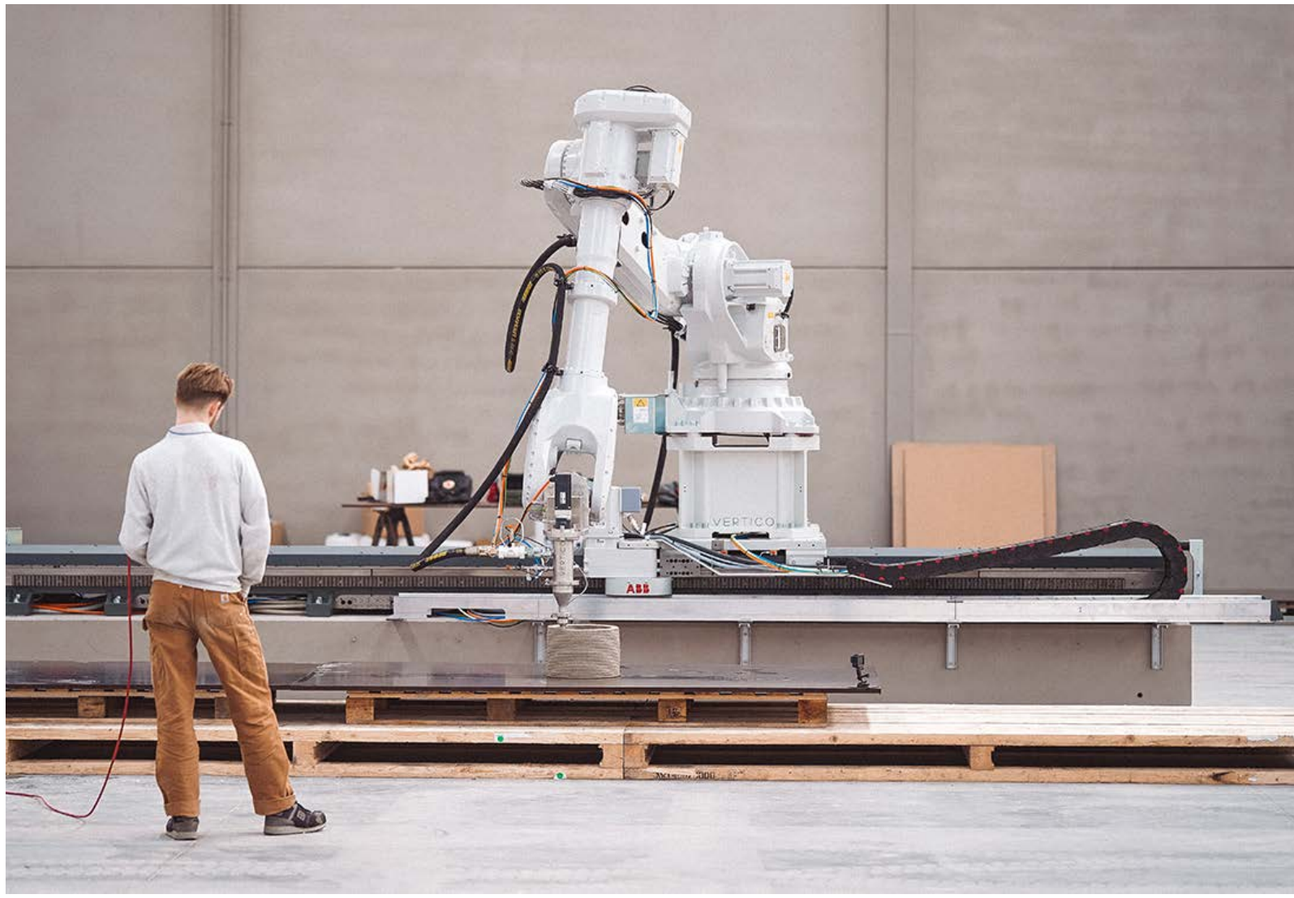
Our largest and most popular machine is the robot on track. Offering 3.2 meters reach on a rail system, this setup allows for continuous printing with a span of more than 10 meters.

After every print you can simply move the robot to print the next object. This robot can easily handle both Accelerated and Standard concrete printing.

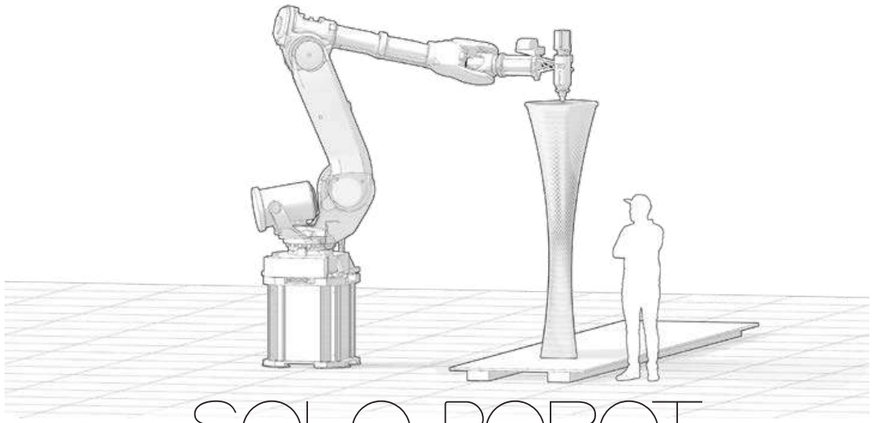
Full reach
The full system boasts robot with 3.2 meters reach and a 10 meter track. You can print objects that are over 2.5 meters high along the entire width.

User-friendly
The machine includes slicing software that doesn't require an additional license fee, making it straightforward for students and educators to start hands-on learning and experimentation in 3D concrete printing.

High quality
With world-class layer consistency an quality, this system boasts the very best of concrete 3D printing. With added modular upgrades it is a very versitile setup.



Robot on track. Mounted on slab.
Portugal, 2023



SOLO ROBOT

3D Concrete Printing Solutions

The most powerful robot in our arsenal, this setup comes with a pedestal as standard. Not only does this increase the maximum height of printing, it is also safer.

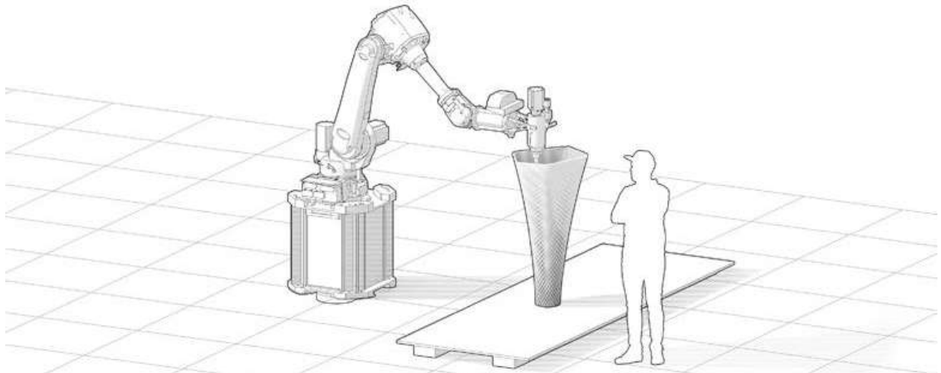
We offer this solution in different brands to fit your needs.

Full reach
Boasting 3.2m reach on a 50cm pedestal, this setup can print around its base 270 degrees. The pedestal increases the printing height, user-friendliness and safety.

User-friendly
The machine includes slicing software that doesn't require an additional license fee, making it straightforward for students and educators to start hands-on learning and experimentation in 3D concrete printing.

Safety
The increased height results in a better overview and decreased change of collision. Safety fences can also be installed around the setup.

Solo Robot. Mounted on a pedestal.
Madrid, 2024



COMPACT ROBOT

3D Concrete Printing Solutions

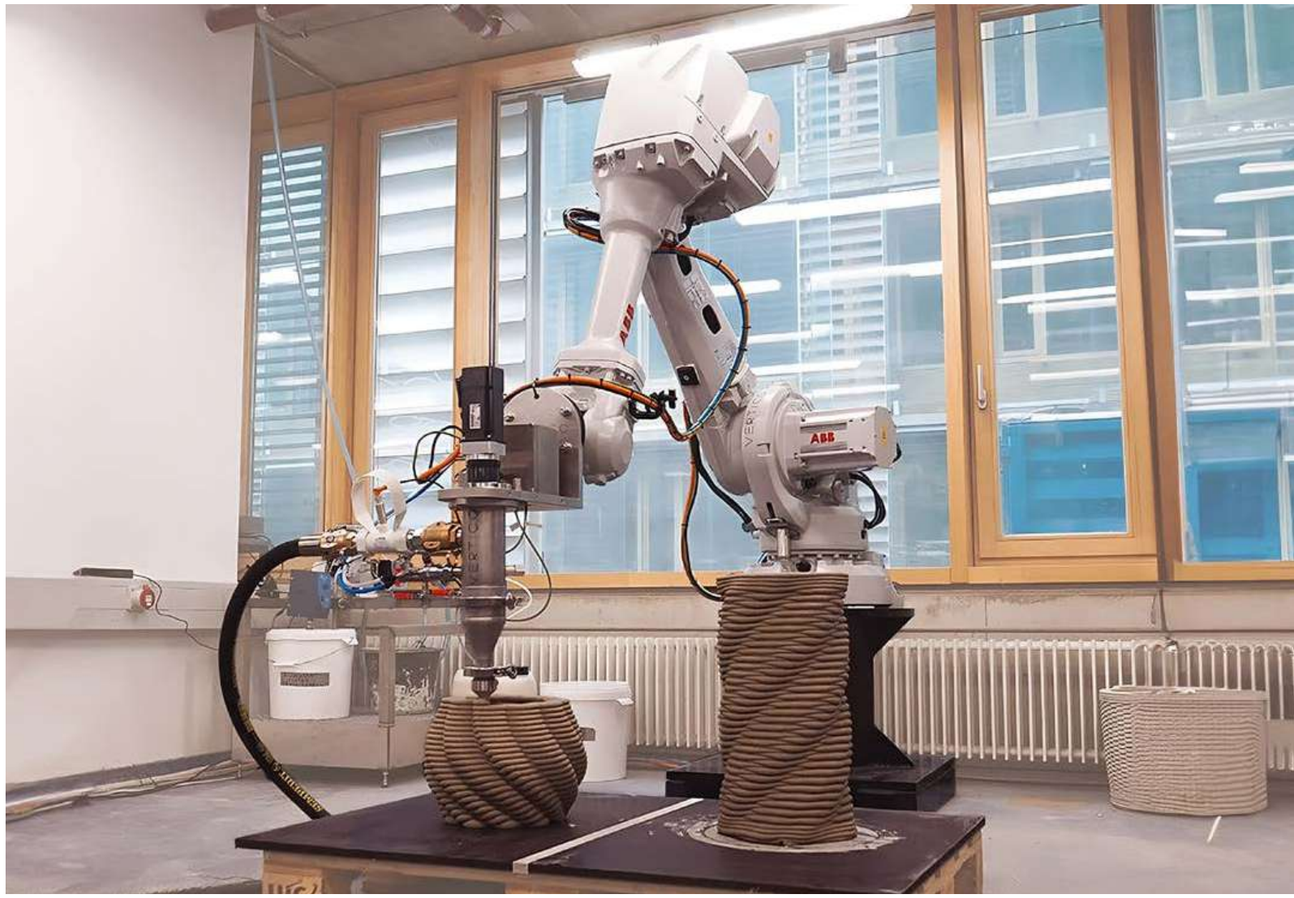
Our compact machine is an excellent solution for clients with limited space, especially in terms of ceiling height.

With a 60kg payload, it can handle both Accelerated and Standard concrete printing applications.

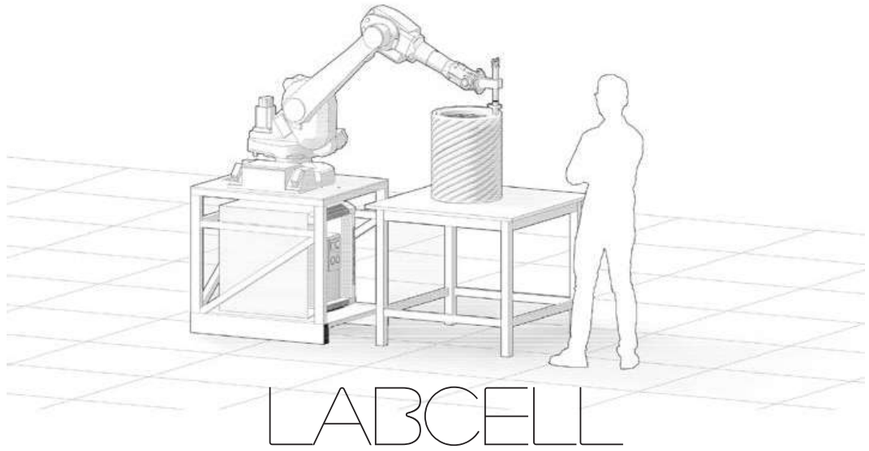
Compact design
The Compact Setup can be installed in spaces with ceiling heights of 2.7m or more. The floor requires a low carrying capacity.

User-friendly
The machine includes slicing software that doesn't require an additional license fee, making it straightforward for students and educators to start hands-on learning and experimentation in 3D concrete printing.

Full range
The robot boasts a 2.05m reach, rivalling the larger machines and allowing for a large print volume without taking up a lot of space.



Compact Robot. Mounted on a pedestal.
Frankfurt, 2022



3D Concrete Printing Solutions

Designed for material research & development, our LabCell is ideal for universities and laboratories.

This printer was designed to be portable and compact, while maintaining full 6-axis capability. It requires no installation, runs on 230 volts and can be moved by pallet jack at your convenience.

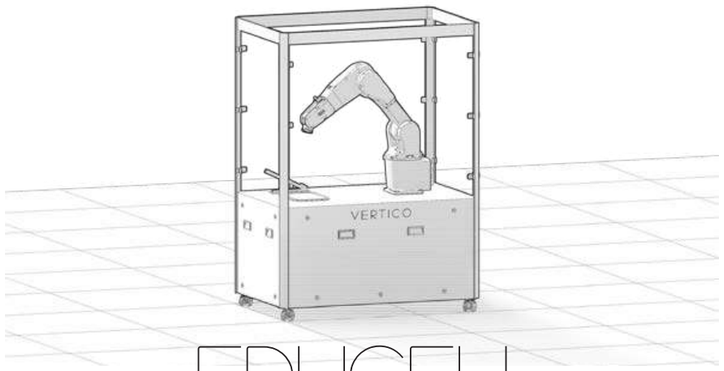
A great way to get started in the world of concrete printing.

Space saver
The total space required for the robot is the same as a europallet: 80cm x 120cm. It can be folded to a height of less than 2 meters for easy storage.

Mobile
The entire system can be moved with the use of a simple pallet jack.

Easy installation and use
Ready to go, straight out of the box, the LabCell only requires 230 volts standard power supply to run. No installation is required.

LabCell.
Arizona, United States, 2022



EDUCELL

3D Concrete Printing Solutions

Our smallest machine removes another hurdle when entering into robotic fabrication. This solution boasts different printheads and tools designed for eduction.

The electric gripper, pen holder and TCP-cone, all allow new users to experience robots close-up and in a safe environment.

With licence free software and a training handbook, this beautiful, portable and flexible cell arrives ready to use out of the box.

Compact design

Designed for educational settings, small and easy to set up with no need for on-site installation.

It's also lightweight, making it simple to move around as needed, fitting easily into classroom spaces.

Designed for workshops

With different actuators including an electric gripper, pen holder and TCP-cone, students can get to work learning different aspects of 6-axis robotic fabrication.

Safety

The fully enclosed space with magnetic safety switches on the doors guarantees safe operation. In addition, a special partition is designed to give acces to I/O modules but not mains power, allowing students to add sensors to the machine but only at very low voltage.

EduCell.
New Jersey, United States, 2023

PRINTHEADS

3D Concrete Printing Solutions

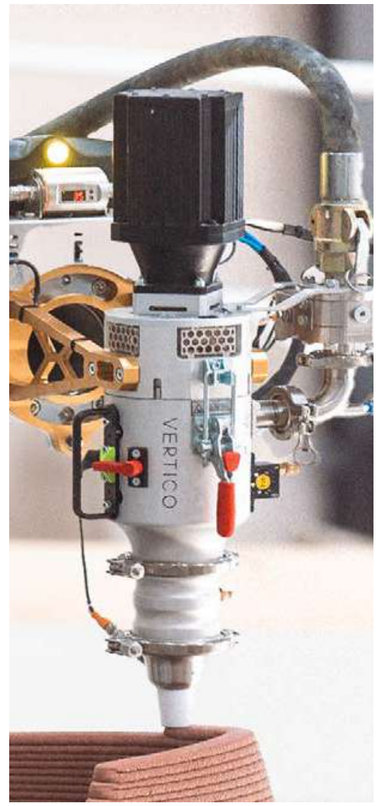
Accelerated Printhead
By injecting a liquid accelerant at the printhead, our mix is able to harden within seconds, allowing for unparalleled form freedom.

In addition, our patented mixing head delivers unrivalled mixing quality and consistency.

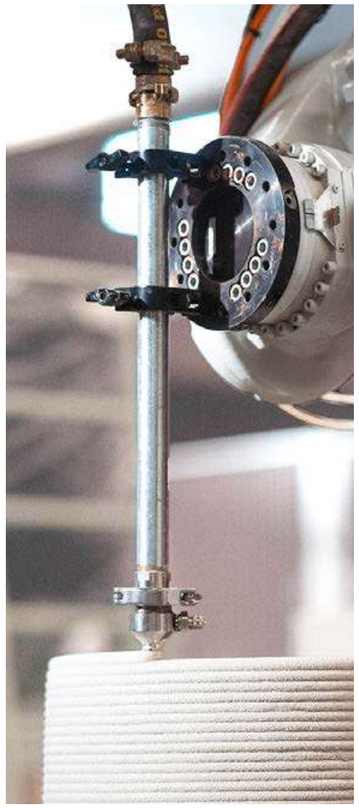
Developed in collaboration with Mai International, this state-of-the-art solution raises the bar for industrial set-on-demand concrete printing.

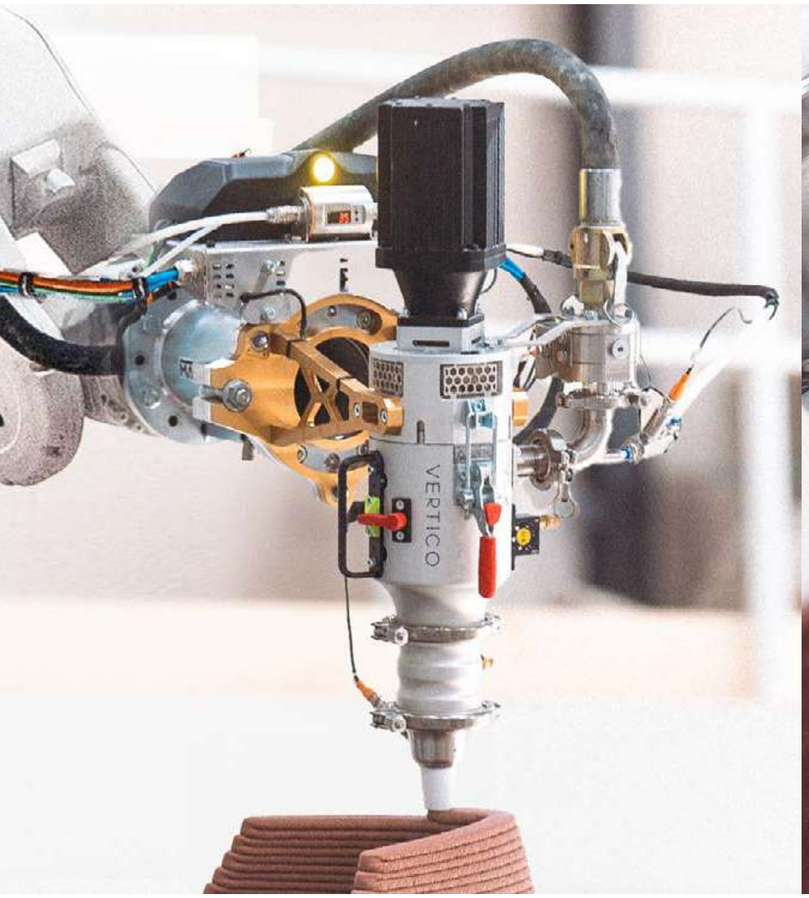
Standard Printhead
Standard concrete concrete printing relies on the pre-mix material properties for setting. This slower setting time is more suitable for large structures such as walls or water tanks.

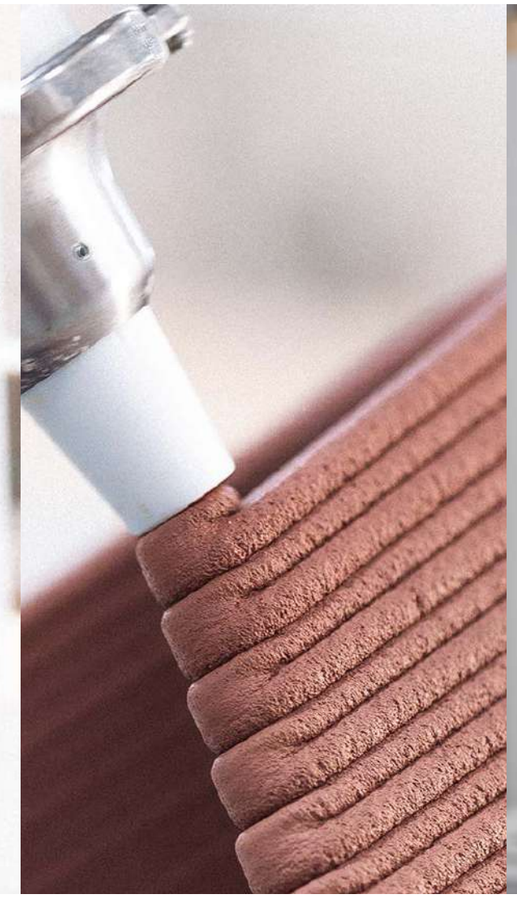
With our high mixing quality, freedom to operate with any material supplier and open software - Vertico offers a highly user-friendly solution.



Accelerated Printhead


Standard Printhead





2K Printhead
Discover unparalleled mixing quality and eliminate deformations with the Accelerator Printhead Solution. The printhead works with the best concrete printing pump available on the market - the Mai Multimix.

The solution is fully integrated and runs from a centralised Human Machine Interface (HMI).

Material. We have developed our own material which produces high resolution, stable printing. Our material recipe is provided free of charge with the purchase of a machine for your own local production. Additionally, you are free to use any suitable material on the market.

Slicer. Our advanced slicer software was developed in-house. The full software and training are provided, license free with the purchase of a machine. At Vertico we work to design and realise the most complex prints on the market. Our software reflects this ambition.

Standard Printhead
Standard printhead is compatible with any robot we offer, ensuring seamless integration across all systems.

Conventional concrete 3D printing often relies on pre-mixed material properties, resulting in longer curing times that are better suited for large structures like walls, water tanks, and other substantial builds where a slower setting is beneficial.

Pump. *We work with the best concrete printing pump available on the market - the Mai Multimix. This pump is able to pump the largest range of materials and has a wide output volume range. It can be integrated with a silo and boasts advanced data reading.*

Material. *For construction 3D printing we are open to working with material from any supplier. We have succesfully printed many of the materials currently on the market and can provide relevant feedback and local reseller contacts.*

SOFTWARE

3D Concrete Printing Solutions

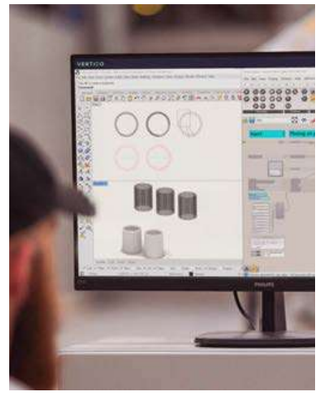
Slicer
We strongly believe that user-friendliness is key in this new technology, but we have managed to combine this with full, and powerful capabilities.

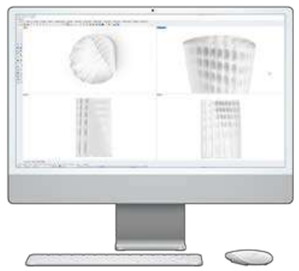
Our Slicer software is built in Rhino+Grasshopper and has no skin. This means you have unparalleled acces to modify the software as you see fit for your application.

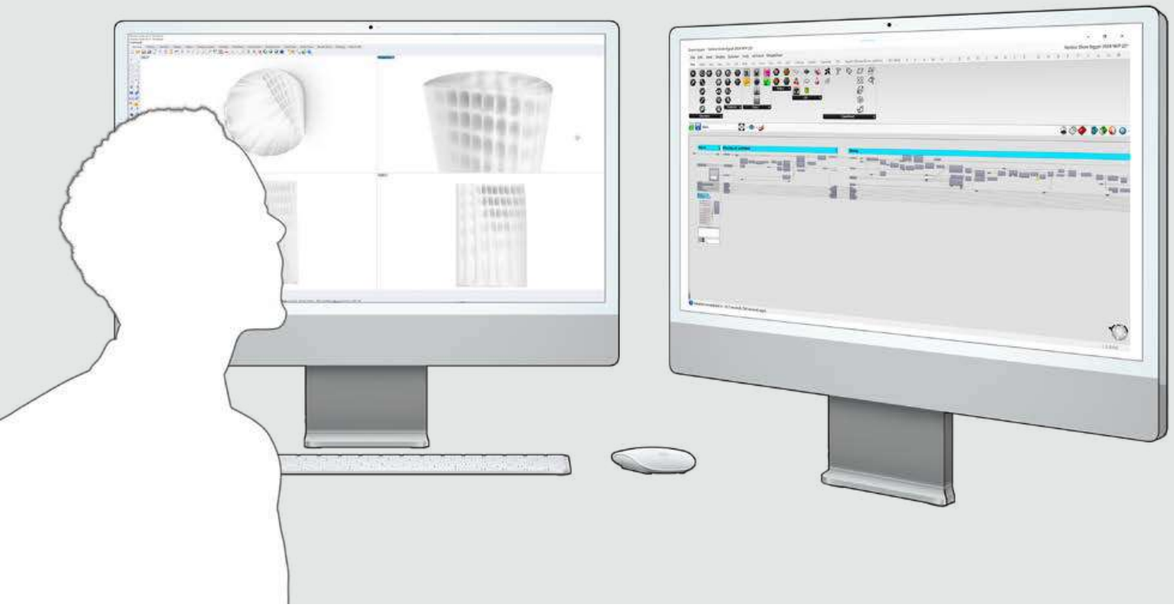
All this allows for seamless integration of design and output.

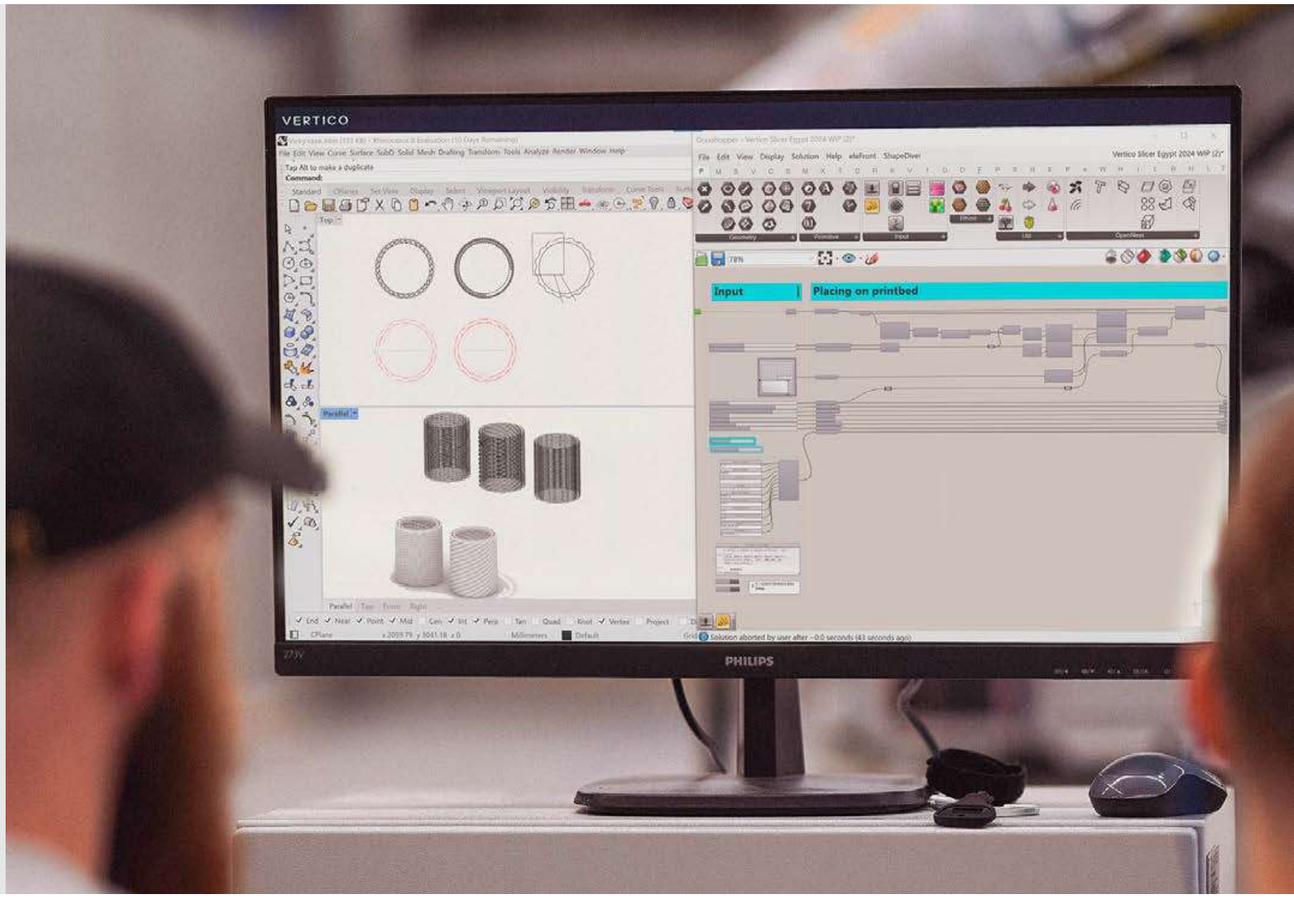
HMI
We strive to create the best user experience. To this end, all communication between hardware components has been centralised to a single control stand.

With step by step instructions and live monitoring, feel free to step back and let the magic happen.







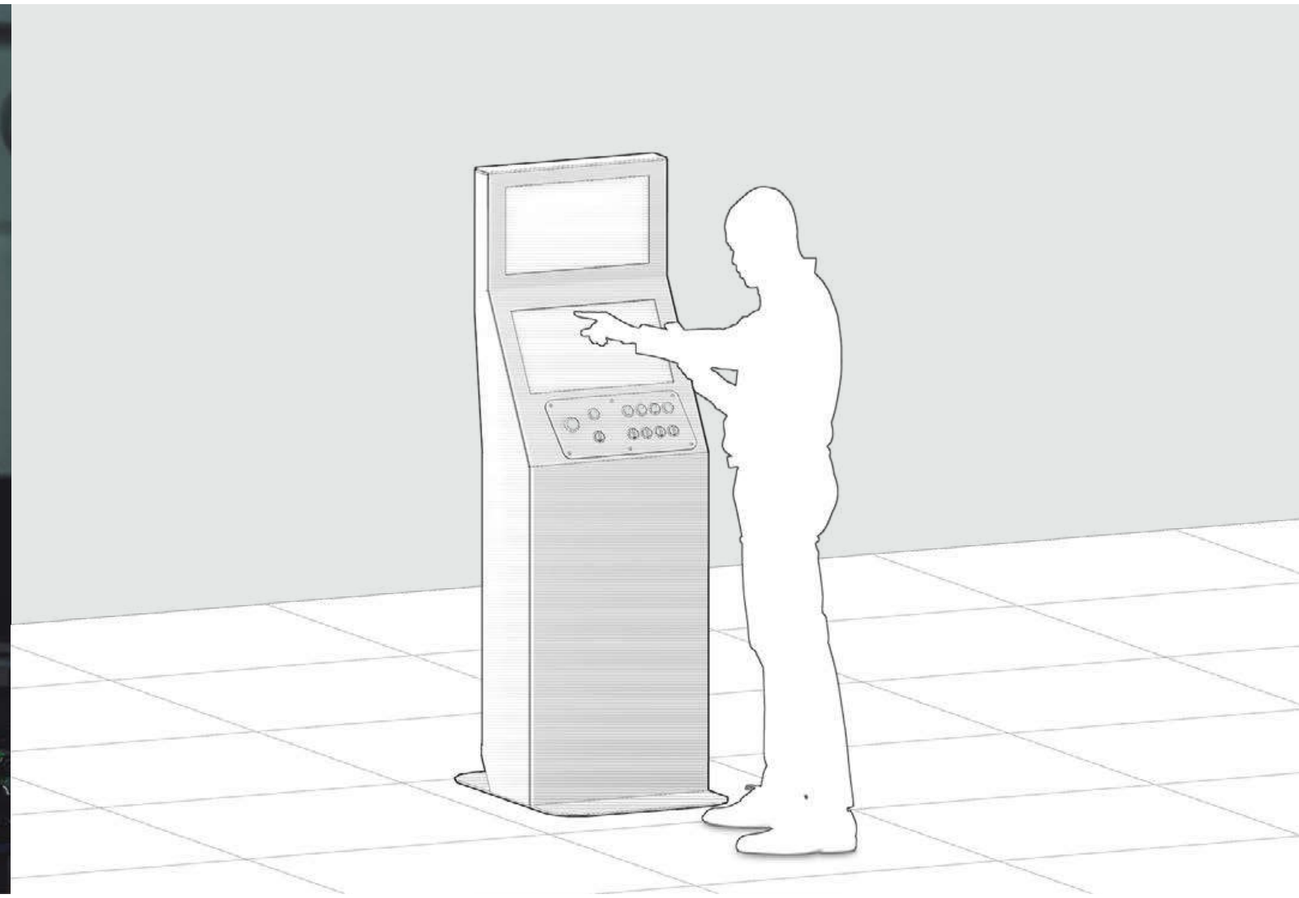


Slicer Vertico
Using our custom-made software, your design is automatically translated to robotic code for printing. A direct link between design and production.

Ease-of-use
Our slicer is built in Rhino+Grasshopper and has no additional skin. This allows users unprecedented access to the code for quick adjustments and customizations. It is designed to be user friendly for both novices and advanced users.

License free
Delivered with the machine, there is no yearly license fee, only a one-time-cost included in the machine price. There are no limits on the number things you can slice.

Advanced programming
For the more advanced users, we offer additional modules for full non-planar printing and control of robotic quaternions. Advanced training is also provided.



Human Control Monitor
Exceptional user-friendliness allowing for full control from the centralised control center.

Touch Screen Interface
The Vertico HMI boasts a large touch screen interface with checklists, live printing parameters and different screens for all components in operation.

Centralised access
Everything in the Vertico system is connected and communicated from a centralised control environment. No need to view the different components seperately.

Live monitoring
While printing, all relevant data is graphed live on a large screen to track operation. Changes in these values will signal the operator to change values where necessary.

PROJECTS

Creating with concrete

Construction
Vertico transforms the construction industry with state-of-the-art concrete 3D printing solutions, enhancing efficiency and creativity.

Education
Vertico brings research and development to new heights in universities with cutting-edge concrete printing technology.

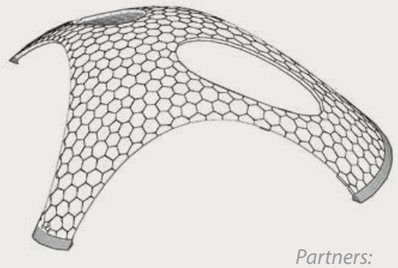
Design
The highest quality and form freedom in concrete 3D printing is now unleashed for design and architecture.

HEXASTONE

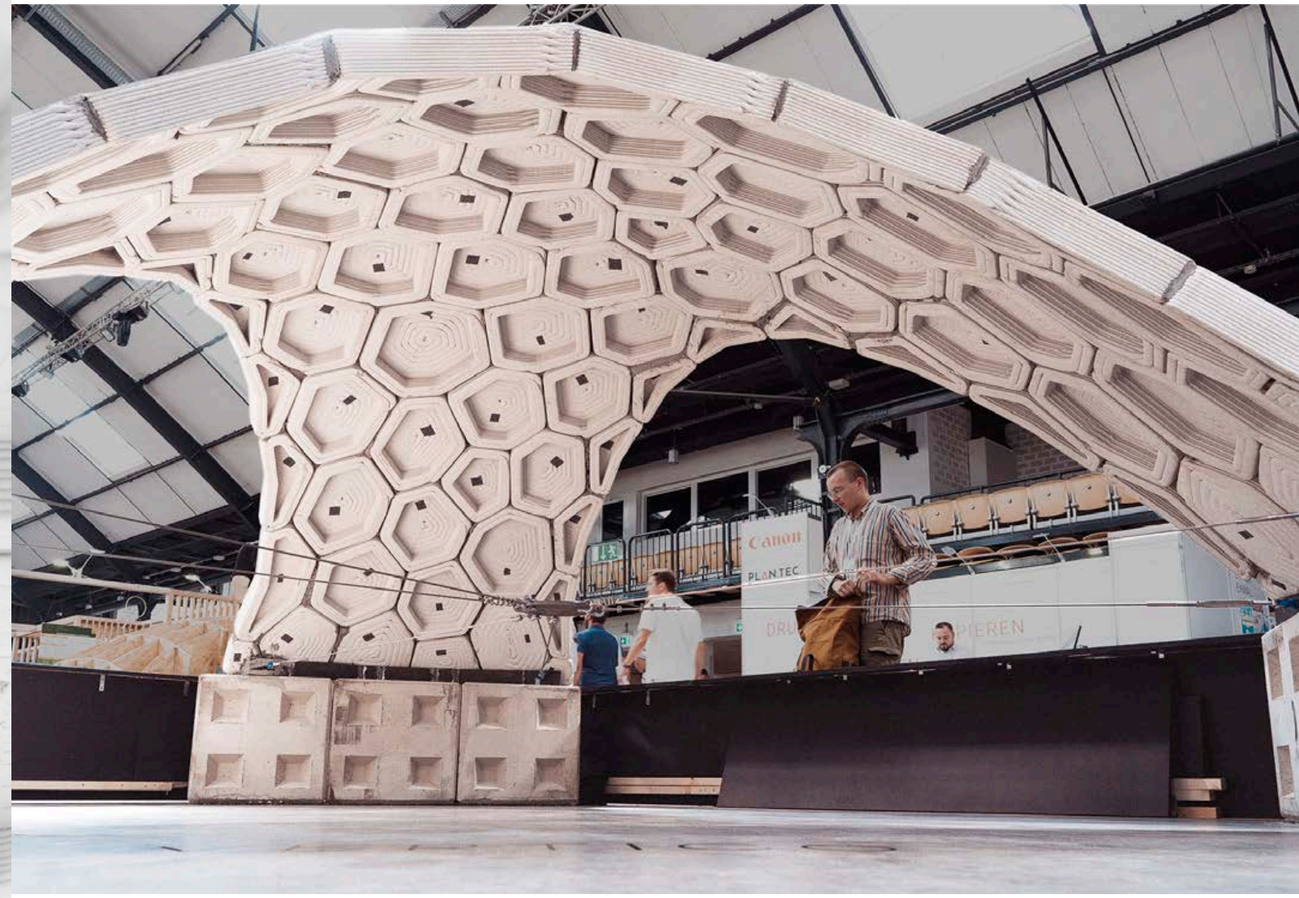
Year 2023

Vertico had a chance to participate in a ground-breaking technology project. The Hexastone structure consists of 102 interlocking stones with a diameter of about 4.5 meters, which took Vertico only 2 days to 3D print. Each element is unique and has an individually inclined perimeter.

The Hexastone pavilion aims to blend state-of-the-art technology with long standing architectural principles, Prof. Hermann and Prof. Spaeth from Technische Hochschule Lübeck who are pioneers in computational modeling and digital structural design, teamed up with Vertico, specialist in 3D concrete printing, and Sika, a global leader in construction materials, to create this innovative structure.



Partners:
Technische Hochschule Lübeck
Sika



Structural efficiency

The pavilion is a testament to structural ingenuity. It embraces old architectural principles that prioritise form and function. By leveraging 3D concrete printing technology, structural efficient shapes become cost-effective.

Design for disassembly

Design for Disassembly approach not only reduces waste but also demonstrates a sustainable approach to construction. Since the seams between the stones are only subject to compression forces the mortar is only used to compensate for tolerances. Therefore, the contact surfaces of the stones are coated with a non-adhesive agent to eliminate the potential transfer of tensile forces and to allow for easier disassembly.

Optimal material usage

The pavilion optimizes material use by placing concrete in compression and steel in tension, eliminating bending moments. This approach envisions a future of strategic material selection to reduce waste while enhancing structural strength and durability.

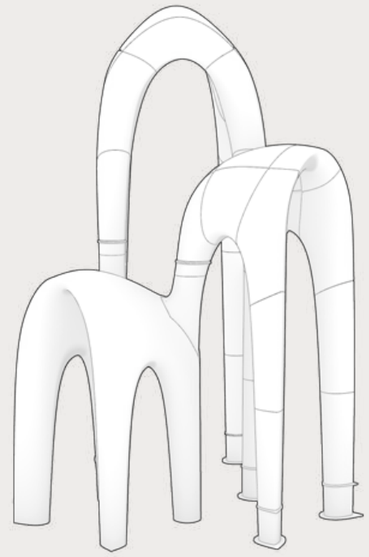
Vertico 3D concrete printing

AEVUM

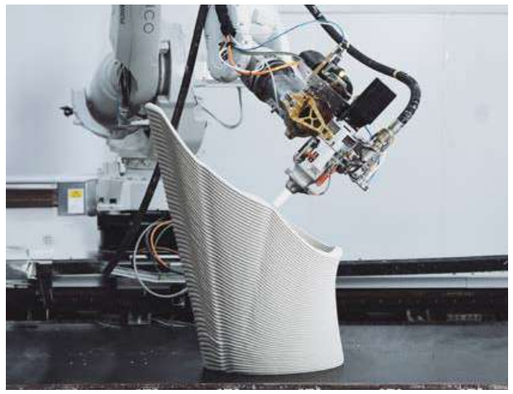
Year 2025

Aevum, meaning ‘eternity’ in Latin, is a collaborative installation between Vertico and Zaha Hadid Architects, unveiled at Milan Design Week 2025. This project juxtaposes a traditional marble arch with a modern 3D printed concrete counterpart, symbolizing the convergence of historical craftsmanship and contemporary technology.

Installation features two monumental arches—one sculpted from solid marble, the other 3D printed using Vertico’s advanced robotic printing system and proprietary 2K printhead. Slightly offset from each other, the arches establish a spatial and visual dialogue between tradition and innovation.



Partners:
Design: Zaha Hadid Architects
3D Printing: Vertico
Natural Stone Contractor: A.A.T.C. and Co. srl - Italy
Structure: Eckersley O’Callaghan
Installation: Carpenterie Pezzetti
Lighting: GRIVEN S.r.l.



Design Philosophy: A Bridge Across Time

Set within the historic courtyard of the Università degli Studi di Milano, Aevum serves as a metaphorical bridge, connecting:

- Traditional stone carving techniques
- Digital fabrication methods
- Natural materials with algorithmic design

This installation exemplifies how parametric design and 3D concrete printing can harmoniously blend with classical architecture, paving the way for sustainable architectural solutions.

Interesting facts:

- Height: 5.6 meters
- Weight: 5.5 tons
- Print Time: 48 hours over 6 days
- Number of Elements: 21 unique printed parts

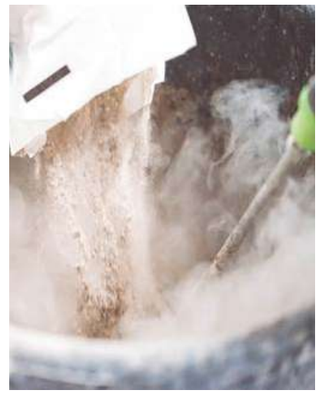
Vertico 3D concrete printing

STRUCTURAL COLUMNS

Year 2024

Vertico specializes in printing concrete columns. Despite their intricate and modern shapes, these columns do not compromise on structural capabilities. They showcase the perfect blend of aesthetic appeal and strength.

Structural reinforcement
On the next page you can see the textbook example of 3D concrete printed, thin walled formwork with reinforcement inserted and standard self compacting concrete, with very high compressive strength. Design by the University of Liverpool.



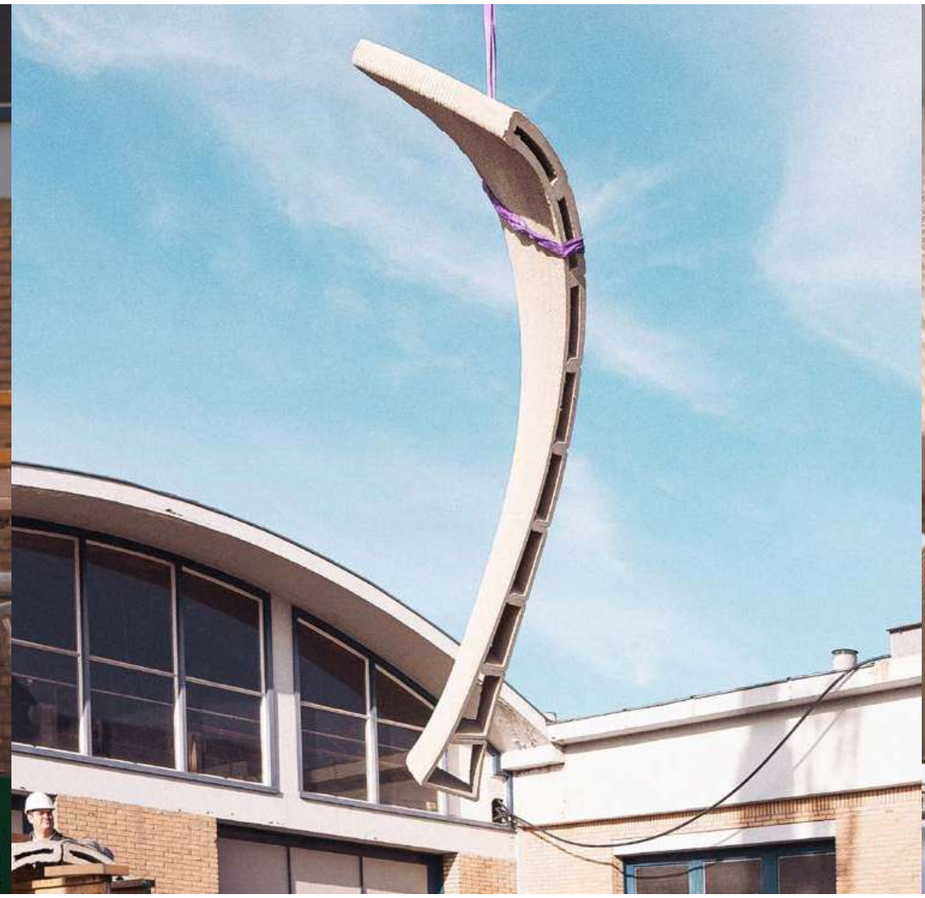
Vertico 3D concrete printing

HPA Pavilion

Year 2021

When consortium the Huizenprinters set out to 3D print a structure in 2018, they had just completed initial trials of developing concrete for robotic additive manufacturing. At that time, they still had little knowledge of robotics and a material mix that could only stack 30cm high before collapsing. Four years later, they have completed an impressive first in 3D concrete printing – a fully printed concrete shell structure pavilion.

The innovation couldn't have happened without the consortium of like-minded professionals who are experts in different fields. Big thanks to Herman Broekhuizen, Heilijgers, Bas de Haan, Van der Kamp B.V., Harmen Zijp, De War, Dirk Kaan, Blueways, Diederik Veenendaal, Summum Engineering, Jelle Feringa and Fablab Amersfoort. In addition, this was made possible with the financial support of the Provincie Utrecht.



Parametric design
Through the use of parametric software, many iterations of the pavilion were tested, and based on the structural analysis of the object for weather loads and other forces acting upon it, the final design was approved.

Non-planar printing
The entire structure was split into 8 segments, each of complex geometry with variable height and double curvature. It resulted in the introduction of Vertico's accelerated printhead and controlled conditions in the facility, which allowed the printing of complex geometry.

Sustainability and no custom formwork
One of the major benefits of concrete 3D printing is the potential to eliminate formwork altogether. Not only were the objects printed without any support structure, but they were assembled using only temporary, standard struts, which can be reused for the next project.

"The promise of 3D printing in any industry is form freedom with mass customization. We are only at the very beginning of realizing this potential for concrete which drives us to continuously improve our technology."

– Volker Ruitinga, founder, Vertico BV

Optimised CONCRETE BRIDGE

Year 2019

The TU Gent and Technion designed this topology optimised bridge. Compared to traditional manufacturing, this bridge boasts significant material reduction.

3D concrete printing is ideally suited to take advantage of these structual principles and create organic forms. The reduction in cost and formwork plays an important role.

The shape of the bridge was optimized and combined with steel cables to minimize stress peaks.

Printed by Vertico client Staikos 3D / Photos by Guido Leifhelm

3D Printed House

Year 2024

Vertico offers advanced robotic systems for 3D printing concrete houses, supporting clients who want to build faster, reduce labor, and minimize material waste. Our technology is ideal for creating custom wall designs with ease and precision.

While we don't build houses ourselves, our robots are used in projects where efficient, scalable, and sustainable housing is the goal. From curved facades to layered textures, 3D printing allows new design possibilities without the need for formwork.

DESIGN

A new paradigm

Form freedom
Digital fabrication is unlocking form freedom in many different disciplines. At Vertico we are breaking the mold for design in concrete.

Molds
With 3D printing you are released from the need to make complex molds. This advantage is now being extended to larger structures and new materials.

Parametric
The use of our parametric slicing software results in a fully digital workflow that enables easy changes and unlimited variations.

OFFICE SPACE DESIGN

Vertico 3D concrete printing

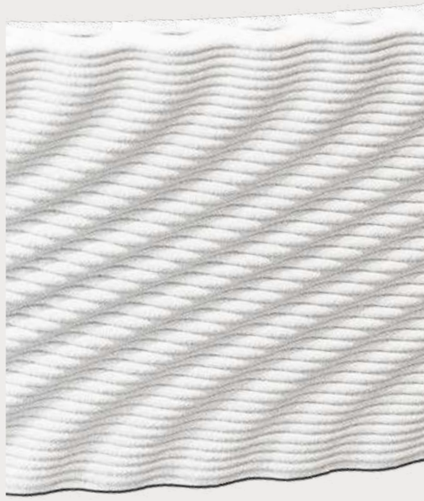
Year 2024

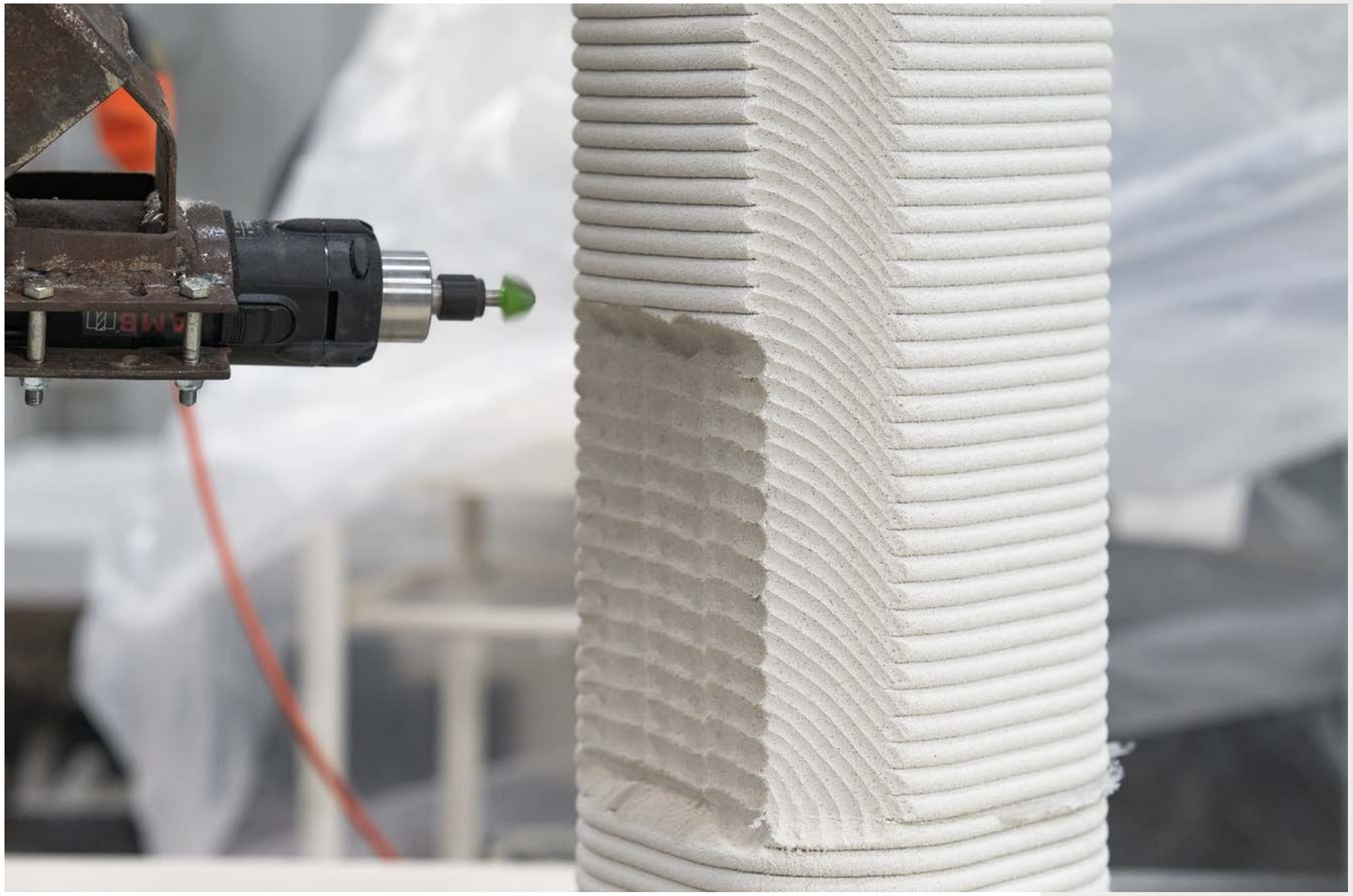
This office space entrance and foyer project may be the first of its kind.

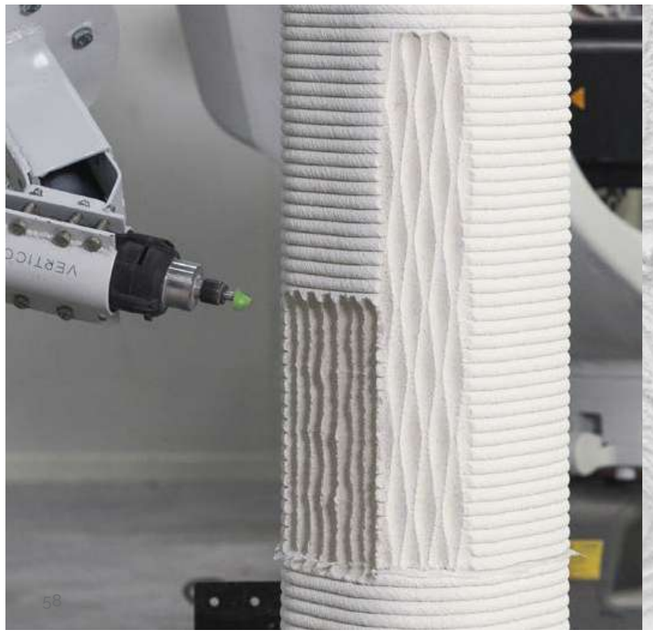
We successfully 3D printed this extensive installation for our long time partners Heilijgers. Our client wanted to showcase innovative technologies and chose our solution to do so.

The parametric design seamlessly blends with contemporary facades, enhancing the overall appeal of urban spaces while fostering a connection with nature.

The beauty of this technology is that you can create endless variation throughout your space while maintaining an overall aesthetic and keeping costs low compared to any other production methods.







Vertico 3D concrete printing

CONCRETE MILLING

Year 2025

Vertico is pioneering a new approach to concrete surface treatment with robotic milling—an exciting innovation in the world of digital fabrication. This method allows us to enhance 3D printed elements with refined finishes, intricate detailing, and modular connections that go beyond the limits of printing alone.

Currently, we're experimenting with surface patterns and precision features, unlocking a new aesthetic and functional potential for concrete in architecture and design.

Year 2024

Our latest products are the world's first 3d printed concrete speakers, which stand out with their unique shapes, embodying a contemporary design that is both functional and artistic. More than just a product, they highlight Vertico's commitment to innovation and craftsmanship, demonstrating the possibilities of 3D concrete printing.

Collaborating with Kubuni brought in top-tier expertise in electronics and audio hardware, adding precision to the project. In addition, concrete's dense nature makes it an ideal material for speakers, as it doesn't absorb soundwaves, ensuring clear and resonant audio quality.

SPEAKERS

FLOWER POTS

Year 2024

One of our standout products is our collection of flower pots. Using advanced 3D printing technology, we create pots with unique patterns, textures, and color gradients that blend functionality with modern elegance.

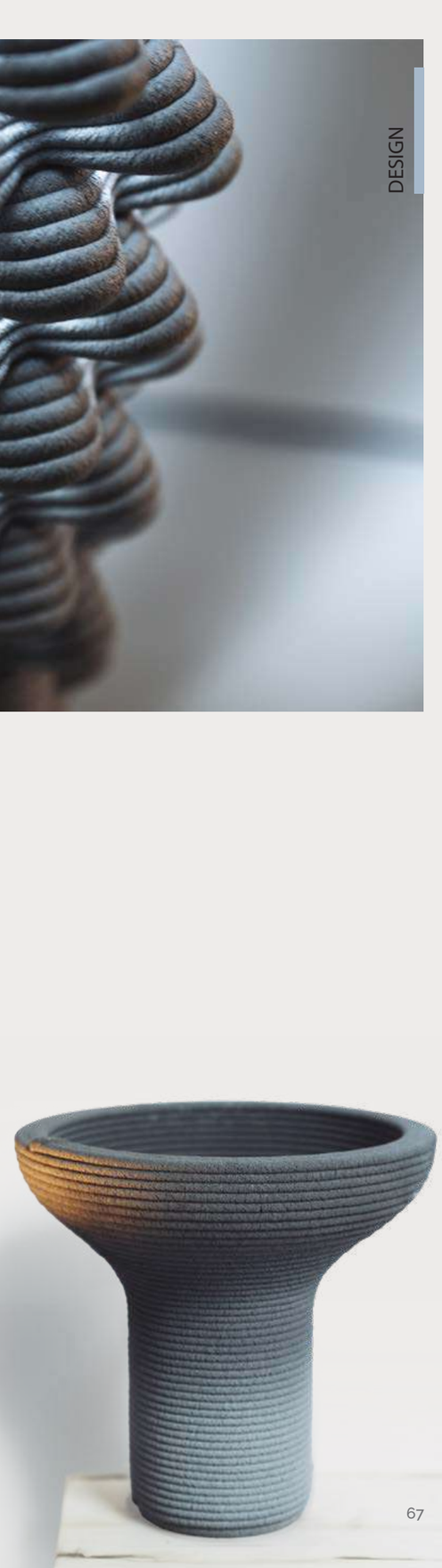
Each piece is crafted to enhance the beauty of your plants while adding a refined touch to any space.

Vertico 3D concrete printing

Lamp design

Year 2025

We explore the full spectrum of parametric design in lighting—from bold, intricate geometries to minimalist elegance. Whether it's the pinecone-inspired lamp casting dramatic shadows, or the refined gradient form, each piece showcases the creative and technical possibilities of 3D concrete printing in lighting design.

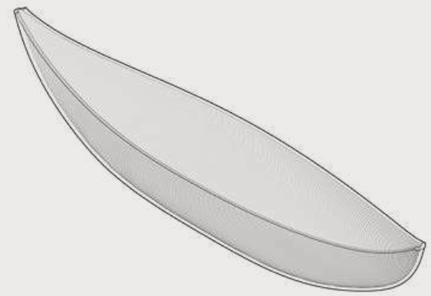


3D PRINTED CONCRETE CANOE

Year 2023

Vertico has proudly participated in a canoe race four times, marking our first-ever 3D printed project back in 2018. Fast forward to 2023, and our design has evolved significantly—this time producing a 4-meter-long, award-winning canoe with no support material needed and in color.

This achievement showcases the advancements in our 3D printing technology and our commitment to pushing the boundaries of what is possible with digital manufacturing technology.



PRINTING WITH COLOR

Our latest upgrade enables seamless color integration into your prints, allowing for gradients or distinct hues in each layer.

This is what the future of printing looks like—bold, vibrant, and full of possibilities.

Vertico 3D concrete printing

ACADEMIC

Advantages for Educational Institutions

Vertico brings research and development to new heights in universities with cutting-edge concrete printing technology.

Hands-On Learning
Vertico's printers provide students with direct access to advanced concrete 3D printing technology, bridging the gap between theory and practical application.

R&D Innovation
Empower academic research with tools that enable exploration into new realms of architectural design and material science, fostering innovation and discovery.

Curriculum Enhancement
Incorporate Vertico's technology into the curriculum to give students a competitive edge in modern design and construction methodologies.

SAND MOLD FACADES

Year 2023

Design, research, innovation, architecture. Exploring a world of possibilities with 3D concrete printing.

Here is another look at the project we completed with the Technical University Eindhoven, Prof. Juliette Bekkering, Ass. Prof. Cristina Nan, Alessio Vigorito of Summum Engineering and Neutelings Riedijk Architects.

These sand mold were formed by our robot and subsequently, the curved geometry was printed over the sand to create these unique facade panels. This technique avoids the need for formwork.

Vertico 3D concrete printing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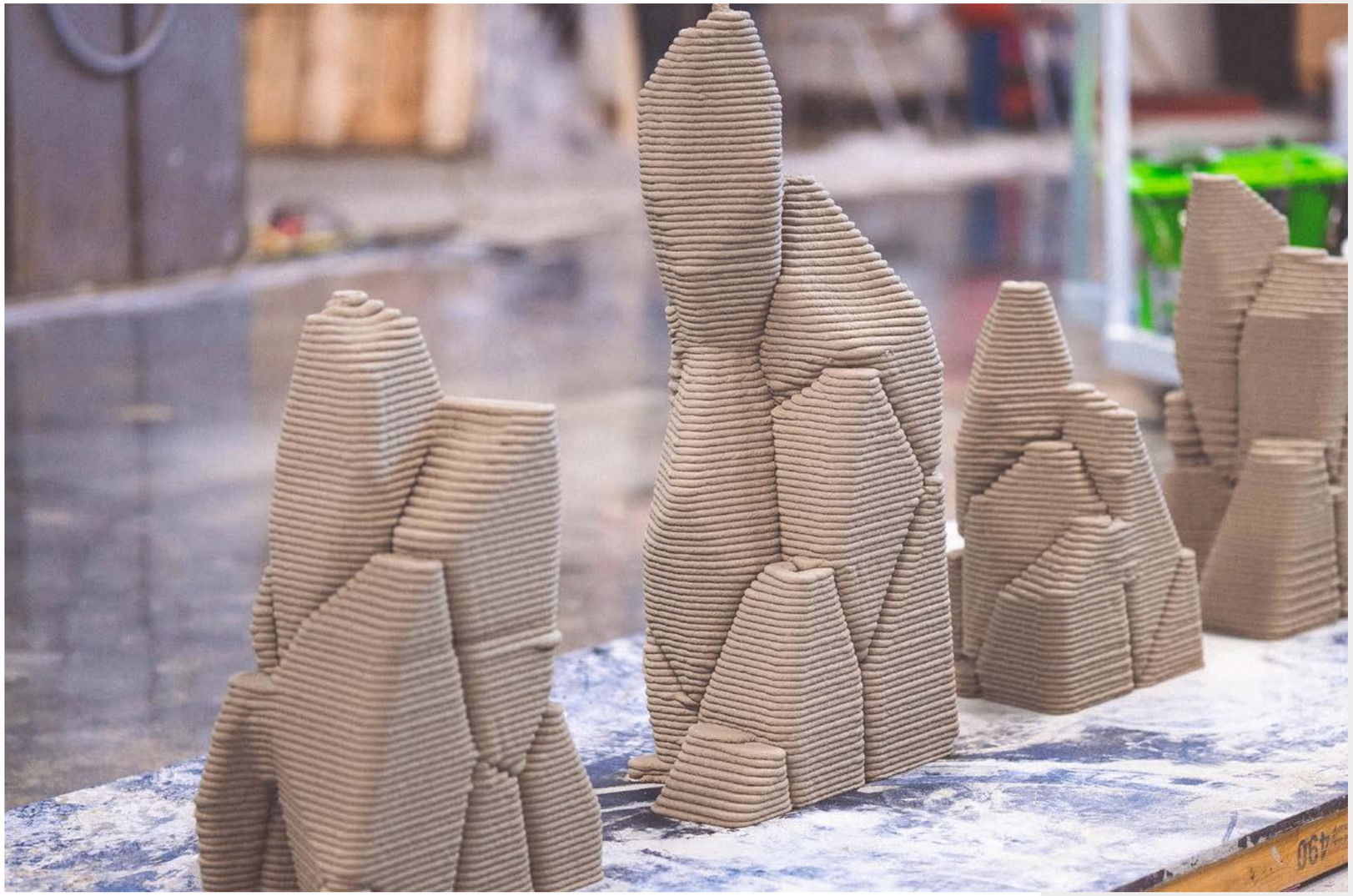
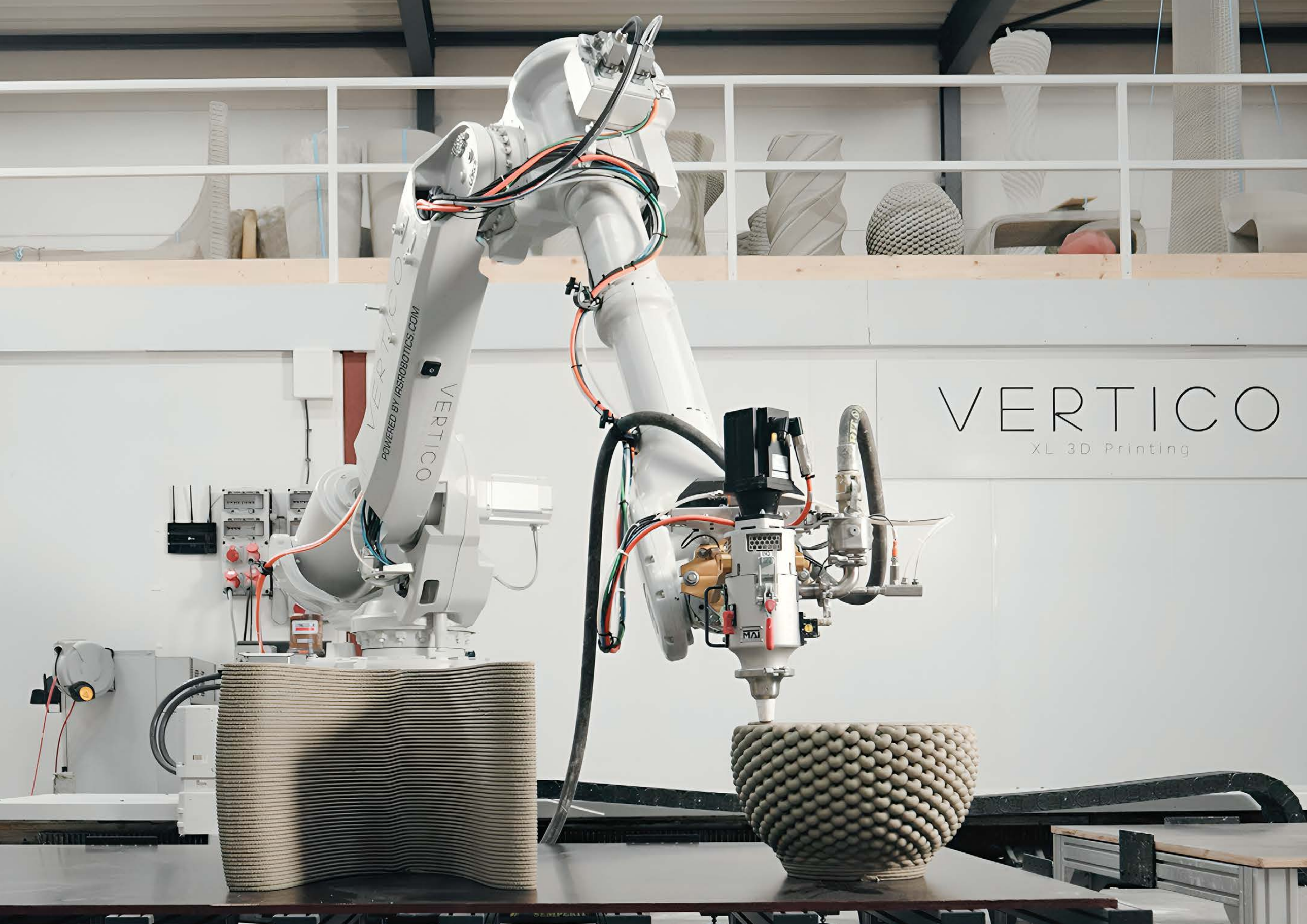


PRINTING ON MARS

Year 2023

The Technical University Delft (TU Delft) and the European Space Agency (ESA) have partnered with Vertico to use its cutting-edge technology to print future underground habitats on Mars. The subsurface structures are part of a project led by Associate Professor and Leader of Robotic Building Henriette Bier at the TU Delft and funded by the ESA.

For extraterrestrial structures to be built above the surface on Mars, their walls must be several meters thick to protect habitants from radiation. TU Delft's project proposes excavating the ground to create subsurface habitats that are radiation-safe and thermally insulated. The excavated material will be mixed with liquid sulfur to create concrete, which will then be 3D printed to build habitable structures in the excavated areas. Vertico will be using its slicing and robotic printing technology and expertise to translate the optimized geometry of the structures created by TU Delft into printable prototypes.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