



# Stainless steel vanishes into thin air

Imagine a sculpture that shapeshifts based on the viewer's position. Physicist-turned-sculptor Julian Voss-Andreae uses stainless steel to reflect insights from discoveries made in his former profession. His "disappearing" sculptures are a meditation on perception and reality, inspired by the study of quantum physics. Now molybdenum ensures they will never truly "disappear."



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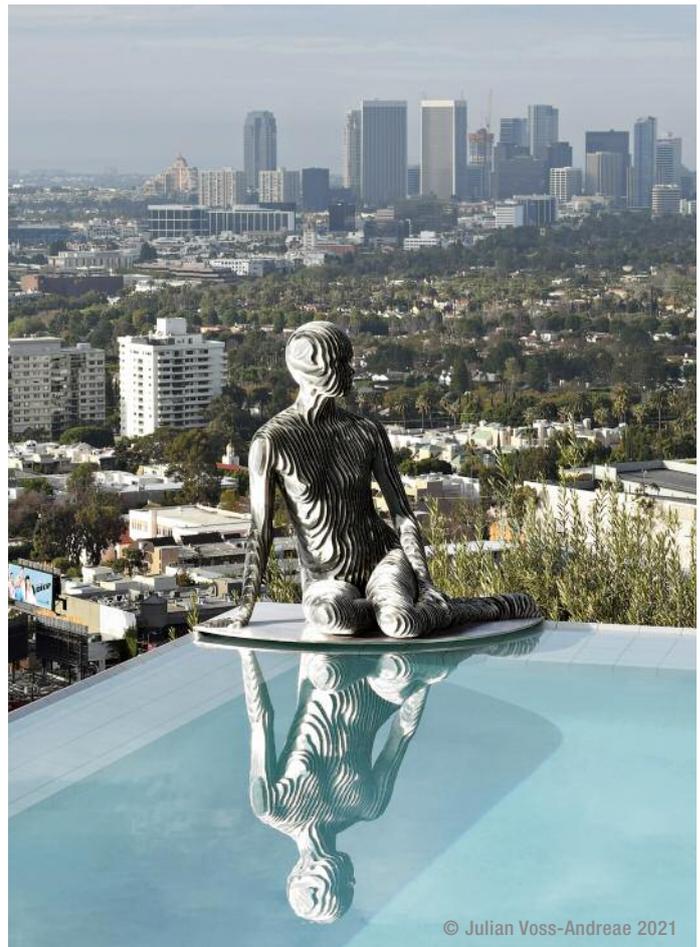
Across a field stands a sculpture of a man. His position is fixed, yet he's moving somehow. When approached, he ripples and glitches in and out of view like a hologram. Then, from head on, he disappears completely. Parallel slices of stainless steel form this trickster, the *Quantum Man*. By changing appearance based on the viewer's position, the *Quantum Man*, along with the rest of the disappearing sculpture series, nod at the limits of perception. The sculptures rely on an illusion achieved through welding evenly-spaced, thin stainless steel sheets together. However, the environment in these narrow spaces between the sheets is likely to be corrosive, if exposed to salts, especially in humid environments. This is because rain does not easily reach these spaces to clean off deposits of corrosive substances. Fortunately, the molybdenum in Type 316 stainless steel increases the longevity of the sculptures' visual impact in a range of more challenging environments.

## The disappearing act

There is more than meets the eye with these mysterious sculptures. They suggest the possibility of a different world – one where everything is interconnected. The disappearing sculpture concept comes from the artist's former career as a physicist, which included work on seminal experiments at the University of Vienna.

A famous example of quantum physics is the double-slit experiment. By firing electrons from a very tiny gun through a slit onto a wall, scientists discovered bewildering properties of particles smaller than atoms. The experiment helped establish that subatomic particles don't exist in one place, as traditional physics would suggest. Instead, these particles, the foundation of all matter, exist as a wave of potentials. Most miraculously, scientists discovered that particles changed their behavior while they were being observed. When photographed, the particles fanned out as a wave. When looked at by humans, they instead formed a straight line. Scientists have repeated this experiment with increasingly large particles. Voss-Andreae worked on a double slit experiment with the largest matter at the time, a carbon "buckyball." The disappearing sculptures, which shapeshift in relation to the observer, visualize this experiment at a human scale. Rippling like subatomic waves when passed, they nod at an underlying reality quite unlike the "outerlying" one.

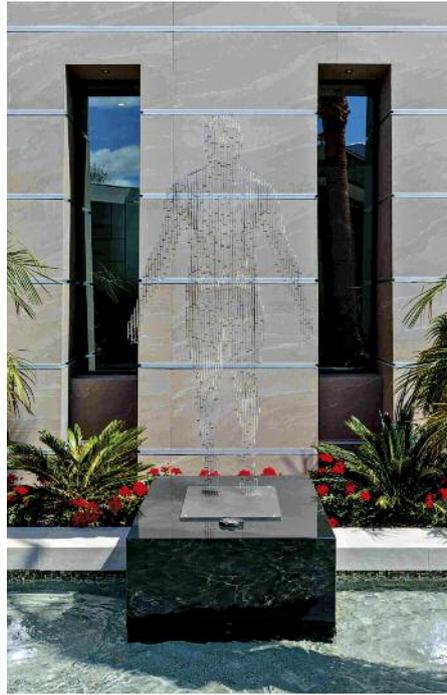
Stainless steel is key to the rippling effect. The metal's shimmering surface reflects colors and forms from the surrounding environment, which helps the sculpture blend in. This reflectivity requires a smooth, polished finish on the stainless steel. A smooth surface finish also helps prevent corrosion, so most of the disappearing sculpture series are made with Type 304 stainless steel. However, especially corrosive conditions necessitate the addition of molybdenum, of which Type 316 stainless steel contains 2%.



➤ *Annabelle's* dramatic, but corrosive, location at the edge of a pool, high above Los Angeles, requires a durable material such as Type 316 stainless steel.

## Moly, *Annabelle* and friends

Several of the disappearing sculptures benefit from Type 316 stainless steel. All are in locations that pose unique environmental challenges for metal constructions. For example, *Receptor*, *Dream* and *Annabelle* reside in southern California. *Annabelle* is a reclining figure, *Dream* is a standing figure leaning slightly forward, and *Receptor* is a seated figure. As a resident of Los Angeles, *Annabelle* braves coastal salts paired with infrequent rain washing. She also floats above a swimming pool, one of the most notoriously corrosive fixtures of the modern landscape. Swimming pools, like fountains, are usually chlorinated to keep algal growth at bay. Splashes and aerosols of chlorinated water are particularly corrosive to most metals. Newer designs of pools use salt water, which is similarly aggressive. Though *Dream* is farther inland, he leans over a fountain. He also gets little rain exposure to wash off any corrosive substances.



➤ Like all sculptures of this series, *Dream* likes to hide in plain sight. © Julian Voss-Andreae 2021



*Receptor*, located just a kilometer from the San Diego coast, contains an astonishing 3000 welds. Each of these presents an opportunity for crevice corrosion. Like with *Annabelle* and *Dream*, there's little rain to wash deposits of sea salt and other chlorides from these junctures. Moreover, Type 316 stainless steel is indispensable to the design of all three sculptures. With this material, *Receptor*, *Dream* and *Annabelle* will require less maintenance overtime, remaining pristine in the California sun.

## A human becomes art

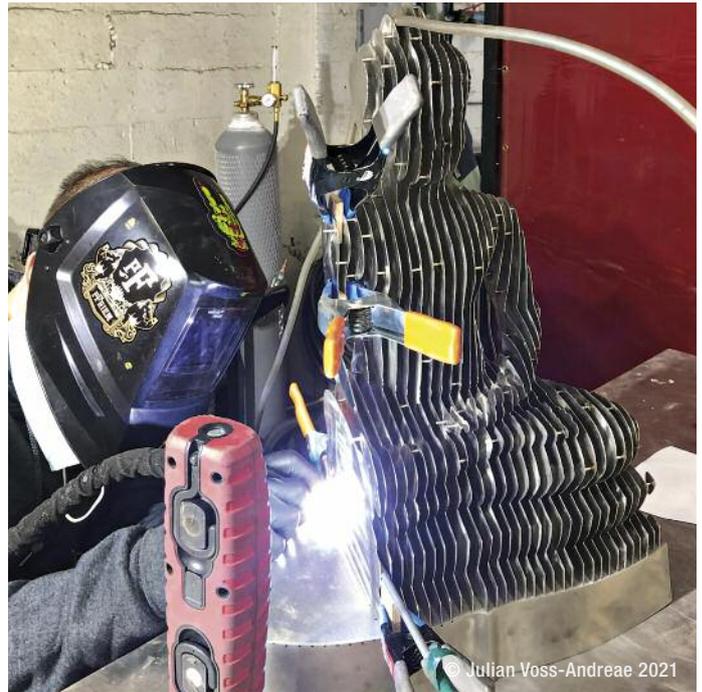
All three sculptures are based on scans of real peoples' bodies. The artist uses a method called photogrammetry to precisely map each subject. The process begins by taking hundreds of 3D scans of the person from 360 degrees. He built his own rig of 170 computers with 8-megapixel cameras to capture each subject in the round. Then begins a long process using complex algorithms to "sculpt" a digital replica of the subject on the computer. He will often test and compare 3D prints of computer-sculpted parts with those he's hand sculpted in clay to get the shapes exactly right.

➤ *Receptor* is one of the largest sculptures in the series. He longs for the gilded orb hanging from a nearby tree.

Once the sculpture is mapped entirely in the computer, corresponding metal sheets are laser cut and prepped for fabrication. Hundreds of hours of expert craftwork go into the welding, grinding, polishing and sanding of each sculpture.

The parts of the sculpture are numbered and assembled one by one. Building out from the center, each metal slice is placed onto the last, attached by TIG welding onto a series of dowels. Every piece is 120 grit sanded with either a medium or fine conditioning disk. Then, they are hand polished with red scotch brite pads on pins. If the sculptures are in difficult environments such as those mentioned above, they'll also receive electropolishing, a type of passivation, at the end. The thousands of delicate pieces must be crafted to perfection, involving the work of several apprentice artists.

Without the benefits of molybdenum alloying, all this meticulous work could stain badly in many environments. But the sculptures will remain beautifully reflective and structurally sound under conditions that often damage outdoor art. Shimmering in and out of view, their metal skin reflects an intertwined and everchanging world. With Type 316 stainless steel in the arsenal, the vanishing sculptures' mission is only likely to expand, entangling its viewers in shared wonder. (Karlee Williston)



➤ Each panel is plug welded onto the dowels of the last, then it is resanded and polished.



➤ The disappearing sculpture series vary widely in size, scale and figure positions.