

Robot Pottery's Golden Age

How the U.K.'s 3D Ceramix Renaissance Inspired U.S. Artists to Combine Ancient Craft With Modern Tech

By Chris Martins

For most of its 30,000-year history, pottery has been a tactile experience. A gift from hands masterfully skilled and unbelievably composed. But with 3D printing's induction into the world of ceramics, the art form has, finally, found itself in the midst of a long-overdue period of rebirth.

Its most prominent and pioneering players are from the U.K., traditional ceramicists turned technophiles, inspiring awe and action amongst their countrymen as well as their U.S. contemporaries. Today's nascent ceramix movement, marked by forms and techniques that are experimental, unexpected, forward-looking, and ever-evolving, has a great big future to mold, one that is not only assisted by machine, but sometimes even by voice.

Chris Gustin's Tea Bowl is one such marvel of modern ceramix, a vessel so organic-looking it seems woven, its rough façade and soft curves bearing the hues of the earth and fire from whence it, presumably, came. Gustin's Tea Bowl appeared in a 2015 U.S. show curated by Kate Blacklock, a veteran potter and adjunct professor at the Rhode Island School of Design, called Hfire RESolutions: 3D Printing in Clay. "It looks like it's made of rope," says Blacklock. "But those patterns are from sound waves. How, you ask? Gustin recorded a friend singing into one of his vessels, then used a CAD (computer-aided design) program to convert the peaks and valleys of her voice into a cuppish shape that was 3D-printed before being firing in a kiln.

"I was taking these forms that can only be made with this 21st century technology and putting them back into wood-fired kilns—that is really old technology, says Gustin. "I was interested in those two worlds colliding. ... We're kind of in the Wild West right now. ...I think some really good stuff will come out of it."

These results are proof positive that this technology won't replace traditional craft with tawdry facsimile. To the contrary, 3D printing using clay materials or creating forms associated with clay, from ancient amphorae to tableware to fine art, is revitalizing ceramics. These modernizations are propelling the art form toward reaching its greatest potential, making once-impossible designs, sketches and moonshots a reality.

Stephen Hoskins, Director of the Centre for Fine Print Research at the University of the West of England, has been pursuing one moonshot in particular. He's been searching for the perfect ceramic printing material, for fine-art as well as commercial use, since 2007 with help from Arts and Humanities Research Council grants—a.k.a. U.K. government money. A Massachusetts company is close to producing his formulation for use in inkjet-style 3D printers, which work by binding layers of matter within a bed of powder.

Working with experimental materials hasn't stopped ceramics' English pioneers from innovating all the while. Take Michael Eden, a punk rock potter if ever there was one. After 22 years of handcrafting kitchenware for high-end department stores, he returned to school to learn CAD. "I thought, if I can draw things on a computer, I can make anything," says

Eden. His 2008 final project at London's Royal College of Art was a 3D-printed vessel (using minerals and plaster) cheekily dubbed Wedgwoodn't Tureen. "People regard 3D printing as the new Industrial Revolution, so I figured I'd make something from the previous one, when Josiah Wedgwood was making his miraculous pots." It was the beginning of an exhilarating career. Eden installed his Innovo Vase at the Los Angeles County Museum of Art just this June, a remix of an ancient Roman vase so intricate, so complex, and such a complete impossibility just a few years ago.

And then there's Jonathan Keep, a lifelong ceramist who in 2010 hacked an inexpensive extrusion printer—the kind that squirts building material out of a nozzle—so it'd take clay. He's now one of the trend's most exciting minds. Keep also builds 3D printers, shares schematics via the online community he founded, and demos his machines at colleges across the U.S. Keep says some of his peers are "hostile" toward the tech—"This is a tool just like the potter's wheel," he says, "yet they hold onto that fear of the machine"—several Americans are proudly pushing the practice. Blacklock timed her Hfire RESolutions show to align with a large northeastern ceramics conference, and had her students participate. And UC Berkeley professor Ronald Rael, who presented at an Eden-curated section of the 2015 British Ceramics Biennial, has been embraced for his 3D explorations.

In February, Rael and his partner Virginia San Fratello debuted their GCODE.Clay pottery project, in which they programmed a series of "controlled errors" to offset the perfection of 3D printing. Their vases are stunning—classic forms covered with irregular loops, twists, and dips of coiled clay—but their large cement-based works could literally change lives. To the layperson's eye, their 9-foot-tall Bloom structure, installed briefly on the Berkeley campus in 2015, looks to be an interactive public art piece. But the aim of their Emerging Objects architectural studio and startup is to create a more artful solution to the concept of instant housing, or 3D-printed domiciles. "Most of these conversations revolve around producing an entire building at once," says Rael. "We can't have homogenous architecture. I see the boundaries between art and craft and design as more and more blurry."

But until Emerging Objects starts printing out artisanal dwellings, it's all about those uncanny objets d'art you can gaze at in galleries and museums or, better still, place ever-so-carefully in your own old-timey, boringly constructed home. As it happens, Nebraska company now offers a porcelain resin for stereolithography printers, the super futuristic ones that pull fully formed objects from shallow vats of liquid; Eden is working with them on new prototypes. Similarly, an Etsy-style New York-based 3D printing marketplace now prints porcelain. And one Florida company just rolled out a series of clay-extruding machines, including one that moves to the sound of your favorite music.

All of which begs the question: What's next?

"It will be the new generation who sees new possibilities, people who don't have the hang-ups of what shapes come off a wheel, who are coding from the start," says Keep.

In other words, the ceramicists of tomorrow? They'll all be just a little bit computer geek.

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IMAGE TEXT

A CAD rendering of Eden's famous Wedgwoodn't Tureen, a nod to the work of Josiah Wedgwood, credited for revolutionizing the 18th-century pottery industry. The 2D design for Wedgwoodn't is inspired by a cross-section of bone. Eden is one of the world's most celebrated 3D ceramicists.

The son of a tile-manufacturing family, Gustin is known for his traditionally crafted large-scale, ceramic vessels. With his Tea Bowl, Gustin allowed his two worlds to "collide" by introducing the 3D-printed creation to a 14th century-style Japanese wood-fired kiln.

Jonathan Keep, Icebergs. A ceramics veteran, Keep's modern-day triumphs include DIY-ing a 3D printer to accept clay, and building an open-source online community to inspire and engage with other innovators. His designs are first written in code. For his Icebergs series, Keep added "noise values" to the computer code to create a bit of randomness in the printing process, resulting in natural-looking textures.

A veteran potter, multimedia artist, and adjunct professor of Industrial Design at Rhode Island School of Design, Blacklock is an advocate for 3D-printed ceramics, inviting both her peers and her students to proactively experiment with the new technology. Her Vessels are 3D-printed renditions of her 2D paintings. Blacklock's 2D work is also featured in public and private collections internationally.

Ronald Rael and Virginia San Fratello, GCODE.Clay. UC Berkeley Associate Professor of Architecture Rael and design professor and architect San Fratello created GCODE.Clay, a series of 3D-printed ceramic objects. The irregular coils and twists are meant to offset the perfection of 3D printing. They are also the founders of a 3D-printing "make-tank" experimenting with 3D-printed homes.