

## Old Media, Digitized, Make New Forms

Computers are changing art in unexpected ways.

By [Martin Gayford](#) on October 24, 2012



On July 6, 1507, Michelangelo wrote from Bologna to his brother, Buonarroti. He was engaged in casting a colossal bronze sculpture, of Pope Julius II, and because he was not an expert in bronze casting, he had sent to Florence for someone who was: Bernardino d'Antonio del Ponte di Milano, Master of Ordnance to the Republic of Florence. Michelangelo had great faith in him, he told his brother: "I could have believed that Maestro Bernardino could cast without fire." Though the initial attempt had not gone well, he hoped that with "a great deal of anxiety, exertion, and expense" they would eventually succeed – as indeed they did, although later the statue was melted down by the pope's enemies and transformed, ironically, into a cannon.

Fast-forward a little over half a millennium, and the contemporary Swiss artist [Urs Fischer](#) was also facing a technical challenge. He wanted to make a perfect facsimile of Giambologna's

intertwined three-figure marble sculpture *The Rape of the Sabine Women* (1582) in candle wax (plus wax sculptures of an office chair and an artist friend of his named Rudolf Stingel). Just like Michelangelo, he sought out technical assistance – in his case Kunstgiesserei, an art foundry at St. Gallen in Switzerland. The original 16th-century sculpture, in the Loggia dei Lanzi in Florence, was digitized by a state-of-the-art optical scanner, and the resulting information was used to create a model, then a mold, and, eventually, a sculpture in wax, precisely mimicking the stone of the original – plus wicks.

The wax statue slowly burned throughout the 2011 Venice Biennale, in the center of a display of contemporary art in the Arsenale. At the beginning only the figures' fingertips and other extremities were alight; at the end nothing was left except a few distorted remnants. This was an aesthetic meltdown, an image of time and its deconstruction of form. It was one of the spectacular sights of the Biennale.

In one respect, there was little difference between the ways these works were made. Each artist had an idea and needed technical assistance to realize it. Michelangelo required Bernardino to help him cast a big bronze sculpture, a technical challenge for Renaissance artists (contemporary eyewitness accounts describe him taunting Leonardo da Vinci for his inability to cast a gigantic horse in Milan). Fischer wanted to make a perfect copy of *The Rape of the Sabine Women* in wax, and digital scanning gave him the help he needed.

The point, as Fischer emphasized in an interview with *The Art Newspaper* this spring, is that digitization is everywhere in the contemporary world – including the artist's studio. "People see I use computers, so they say I'm making computer art," he said. "It's not about making computer art; it's just using the new thing. Everybody uses it." To carry out certain ideas, new technology is essential – or to put it another way, computer technology is making possible projects that only a few years ago would have been utterly unfeasible.

Artists are using computer systems in all manner of time-honored art forms. Painters such as Jeff Koons and Michael Craig-Martin construct images using a method of computer screen "collaging" (that is, by selecting and assembling images from various sources digitally), and when they have the visual result they want, they make it into a painting (or, in Koons's case, hand it over to assistants to reproduce in paint). In other cases, new technology makes a wild idea practicable. It is now common for artists to digitally scan an image, manipulate its perspective and colors, and then project the result onto a canvas upon which they paint.

Monumental sculpture, meanwhile, has always been at least partly a matter of engineering, and the bigger the project, the trickier it is to realize. Take Antony Gormley's *Exposure*: a nearly 85-foot-high, 60-ton crouching figure made out of steel girders, unveiled on a spit of land near the shore of the Zuiderzee in 2010. The essential idea – a gigantic sculpture of a male figure – is a simple one. As a matter of fact, it is one that Michelangelo had but was unable to execute. Condivi's *Life of Michelangelo* records that while he was quarrying at Carrara, one day the idea came into his mind of carving an entire mountain into a figure. Later, he remarked, "If I could have been sure of living four times longer than I have lived I would have taken it on." The mechanical stonecutting equipment necessary for Michelangelo's project didn't actually come along until the 19th and 20th centuries. The art that gets made is naturally limited by the technology available – but that doesn't stop artists from having notions that exceed those limits.

Gormley's idea for *Exposure* was more modest than Michelangelo's, but it was nonetheless on the edge of technical feasibility. He wanted to make a human figure that would respond to changes in sea level caused by global warming: sited on a sea dike, it may disappear if the Zuiderzee rises. "Over time," Gormley writes on his website, "should the rising of the sea level mean that there has to be a rising of

#### UNTITLED

Urs Fischer, Untitled, 2011. Wax, pigments, wicks, steel. On view at the 2011 Venice Biennale

#### EXPOSURE

Antony Gormley, 2010 Steel girders Lelystad, the Netherlands

#### THE VANITY OF SMALL DIFFERENCES

Grayson Perry, 2012 Tapestry On view at the Victoria Miro Gallery, 2012

#### PENELOPE'S LABOUR: WEAVING WORDS AND IMAGES

Fondazione Giorgio Cini, Venice, 2011

#### MULTIMEDIA

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the dike, this means that there should be a progressive burying of the work."



*Exposure*  
Antony Gormley, 2010  
Steel girders

Digitization was vital to realizing the idea. *Exposure* required it at almost every stage. The starting point was a plaster cast of Gormley himself, but the artist wanted to translate this into an openwork structure of steel girders in the most economical fashion: that is, to find the pattern of metal struts that described the body in the smallest number of components.

Obviously, *Exposure* was a novel engineering project as well as an artistic one. It was a sculpture made using techniques employed for bridges. But a human figure is quite unlike a bridge, its geometry complex and curvaceous. Solving the problems involved in making *Exposure* required several separate teams of specialists. First, software developed by Roberto Cipolla and his team at the University of Cambridge transformed photographs of the cast into a fully rotational 3-D computer model. This was then translated into an open steel lattice with help from an algorithm devised by Sean Hanna of University College London. Next, engineers at Royal Haskoning drew up a detailed design. Using a webcam, the engineers then monitored the construction process – carried out by the Scottish steel fabrication firm Had-Fab – to ensure that the sculpture was developing as it should. *Exposure* could not have been created 10 years ago.

New technology had also helped Gormley bring a number of earlier projects to fruition. Much of his work

has had to do with finding novel physical equivalents to the human form – often, his own naked physique. The series *Insiders* (1997–2003) was made by reducing the volume of the human body by 70 percent, while retaining dimensions such as height. The result was spiky, spectral figures of a kind never quite seen before. Although the first series was worked out using mechanical templates, the second – entitled *Inside Australia* – was produced by scanning naked inhabitants of Menzies, an Outback community. The scans went through a process the technicians nicknamed "Gormleyization." Horizontal sections were taken of each; they were reduced by two-thirds and the contours joined. The digital files were sent to a polystyrene mill in Sydney, where they were turned into patterns. These were sent to a foundry in Perth in a form that the architect Finn Pedersen, who was assisting Gormley, described as "a giant model aeroplane kit," and finally they were cast in an alloy of iron, molybdenum, iridium, vanadium, and titanium.

Technology was yet more crucial to Gormley's *Quantum Cloud* (1999), commissioned for a site on the Thames in London. A computer-aided design program configured a mass of galvanized steel units into a nearly 30-meter-high cloud, in whose center the fuzzy form of the artist's body seems to condense.

These are all cases of new technology applied to a very old art form: figurative sculpture. Concurrently, the almost equally antique medium of tapestry was undergoing a digital transformation. When Michelangelo's contemporary Raphael designed a set of tapestries for the Sistine Chapel in 1515–16, the process involved first making full-scale painted versions. These were completed by the artist and his workshop in Rome before being sent to the workshop of Pieter van Aelst in Brussels. There, Raphael's designs were woven into textiles of wool, silk, and gilt-wrapped thread. The process involved placing the paintings underneath the looms. Raphael's original works – the so-called cartoons, on display at the Victoria and Albert Museum in London – are now regarded as among the greatest masterworks, but essentially they were files that were used to weave multiple sets of tapestries for centuries before they were resurrected as independent works of art.

In some ways, not much has changed. High-quality tapestry is still often manufactured in Belgium. An example is *The Vanity of Small Differences*, a series of tapestries by the British artist Grayson Perry that was on exhibit at the Victoria Miro Gallery during the summer of 2012. These were designed in collaboration with Factum Arte, a Madrid-based organization dedicated to creating art through digital means, and woven from digital files in Flanders. Though Perry's quirky graphic style is different – rooted in the work of untrained painters, known as "outsider art" – the process of creating the tapestries was a digital version of the procedure Raphael followed.

But developments in tapestry technology are also opening some new possibilities. Weaving and computing are, as it happens, interconnected historically, as was emphasized by "Penelope's Labour," an exhibit (curated by Factum Arte) at the 2011 Venice Biennale.

The mechanized Jacquard loom, invented by Joseph Marie Jacquard in 1801, operates by the use of punched cards – which in turn gave Charles Babbage the inspiration for his unrealized "analytic engine." An article on the engine, written in French by the Italian mathematician Luigi Menabrea, was translated by the poet Byron's daughter Ada, Countess Lovelace. In her annotations to Menabrea's article, Lovelace wrote what is believed to be the first computer program.

In the last few years, mechanical weaving, driven by digitized designs, has reached a point where it is possible to reproduce a photographic image in threads, with fine detail and smooth tonal transitions. In



the past, that was always the technical hurdle for tapestry: the reason Raphael cartoons had to be transported halfway across Europe to Van Aelst's workshop was that there the craftsmen were enormously skillful at re-creating the effects of painting in threads.

The possibility of transforming a photograph into a tapestry was exploited by some artists in the "Penelope's Labour" exhibition, including the Cuban Carlos Garaicoa and Britons Marc Quinn and Craigie Horsfield. Garaicoa showed textiles woven from shots of the Havana pavement, Quinn gigantic blowups of flowers – neither part of the medium's traditional repertoire.



*Pixelation of a Hybrid*  
Marc Quinn, 2011  
Tapestry

Horsfield explained his interest in this venerable art form to *Modern*

*Painters* magazine: "Tapestry was going through a technical change, a really radical technical change, which allowed you to do things that you previously hadn't been able to do." It had been impossible to reproduce a photograph without the tonal gradient breaking up into banding. Then, suddenly, in the early 21st century it could be done. In "Slow Time and the Present," an exhibition at the Kunsthalle Basel in Switzerland last summer, Horsfield showed wall-sized tapestries based on street scenes in southern Italy, a circus in Barcelona, and a zoo in Oxford. (He also displayed yet another novelty: digitally printed frescoes.)

The visual effect was old and simultaneously new. Horsfield's crowd scenes bring the shadowy drama of Caravaggio's paintings irresistibly to mind. On the other hand, a camera image metamorphosed into a monumental fabric is something novel: it's a photograph given the luxurious surface and scale of the grandest art of the past.

Art is like that: a lot of the aims haven't altered since the days of Lascaux. But new technical means are constantly evolving, and that – as Michelangelo would have ruefully appreciated – profoundly affects what artists can actually make.

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