



FROM ZBRUSH TO CUBEX, TECH TOOLS ARE CHANGING MAKE-UP DESIGN

By Andrew Clement

The latest innovations in manufacturing, from rapid prototyping to 3-D printing, are changing the way many things are being done, and make-up is no exception.

Like it or not, traditional sculpture in clay is being phased out of some areas of the business in favor of digital sculpture. Powerful software packages such as Pixologic's ZBrush or Autodesk's Mudbox are making it very easy to digitally sculpt and output files to a 3-D printer. With shorter production schedules and the need for either

multiple changes or iterations, digital sculpting and printing are becoming the only ways to keep up. Conversely, digital can be the best choice when a production doesn't want any changes: With a 3-D print, a director can be sure there will be no deviations from the concept art or from a digital model.

The first rapid-prototyping movie we did at my shop, Creative Character Engineering, was *Cloverfield*. Because of the time limit we faced, rapid prototyping was the only way we could accurately reproduce the film's detailed parasite puppets, with their tightly

meshing retractable jaws. Luckily, Neville Page had done his creature designs in ZBrush, and we could extract printable files from them.

At the time, you couldn't output the necessary file format directly from ZBrush to the printer—you needed expensive conversion software. It has gotten much easier since then as the software has caught up with the technology. Practically all you need to do now is push a button to export a usable object, and there is a wealth of online help. Tutorials showing you how

to prepare an object are just a Google search away.

Three-dimensional printing really began in our industry in the early '90s, back around the time of *Terminator 2: Judgment Day*, with Stan Winston Studios pioneering the use of computer-milled foam sculptures in our industry. This type of subtractive replication, done on CNC machines, is still widely used due to its relatively low cost, usually for larger sculptural items or for actor body forms.

Since then, however, additive printing has become affordable and accessible, which has direct benefits to us. Additive printing builds up an object layer by layer using a variety of methods. Fused Deposition Modeling, or FDM, creates a molten filament of plastic and extrudes it in very small layers, gradually

building up a solid object.

Stereolithography, or SLA, creates objects by slowly filling up a tank of photosensitive liquid as a beam of UV light traces out the object's pattern and solidifies the polymer. PolyJet 3-D technology prints out specific layered patterns of the UV-sensitive liquid and cures them.

FDM printers are the cheaper units, because they generally create a less-detailed part and the finish is not as smooth as SLA or PolyJet. These printers are enjoying a boom in sales to hobbyists and small manufacturing operations. Some printers are even available in kit form if you are handy and so inclined.

Mouldlife, the make-up effects supplier in the United Kingdom, has begun selling the CubeX 3-D printer, an FDM machine able to print objects

as large as a basketball, and also the Z Corp line of printers. The Z Corp printers use a binding liquid, rather than heat, to fuse layers of a powder together. The advantages of the Z Corp printers are that they print at a higher resolution than FDM printers and can print in color.

There is already a wide range of materials and processes available in 3-D printing, and the technology is expanding quickly. Artists can print in a variety of plastics, both rigid and flexible, and in a variety of colors. You can even print with metal directly, by using a technique known as sintering, which melts together powdered metal dust.

The highest-resolution printers, which have a minimum of artifacts and a range of plastics options, are still quite



FACING PAGE: *Cloverfield* 3-D print. ABOVE (CLOCKWISE FROM LEFT): Steve Wang with Jim Raynor statues from *Starcraft*, which were built from a 3-D model; *League of Legends* figure with 3-D printed glasses and a sculpted face



expensive: more than \$100,000 for the high-end models. Luckily there are service bureaus that perform printing services on any machine you want, all over the world. Some of these service bureaus have even set up automated websites where you upload your file and choose your plastic and delivery time, and then they calculate your cost. I have had extremely high-quality prints turned around in as little as two days.

Cost is still a big factor in the choice between traditional and digital sculpture. The tipping point may be whether or not the printing can be done in-house. Legendary creature creator Steve Wang, who uses extremely large-scale 3-D printing for some of the more mechanical elements of his full-sized figures, says, "Organic printing at life-size is still too expensive and does not justify the cost. It's actually cheaper to sculpt traditionally. One other process is to CNC it out of foam and sculpt over that or do a junk mold and clay press it, then take it to finish."

John Rosengrant of Legacy Effects says, "Once you have the technology in house, we have crossed that bridge, and [having] multiple projects going through it becomes very cost-effective. We have five printers now of varying sizes and capabilities.

"It's important to have a make-up artist in charge—like we have Scott Patton here, who understands what the needs are—rather than a computer guy."

Even appliance sculpture has been done successfully by printing out 3-D patterns for make-ups rather than the appliances or molds themselves. Landon says, "We've gone as far now as where we are printing out for appliance make-ups, with the flashing edge all built in, everything. It's keyed and ready to go. We can have a mold maker take it and cap it, or continue the process."

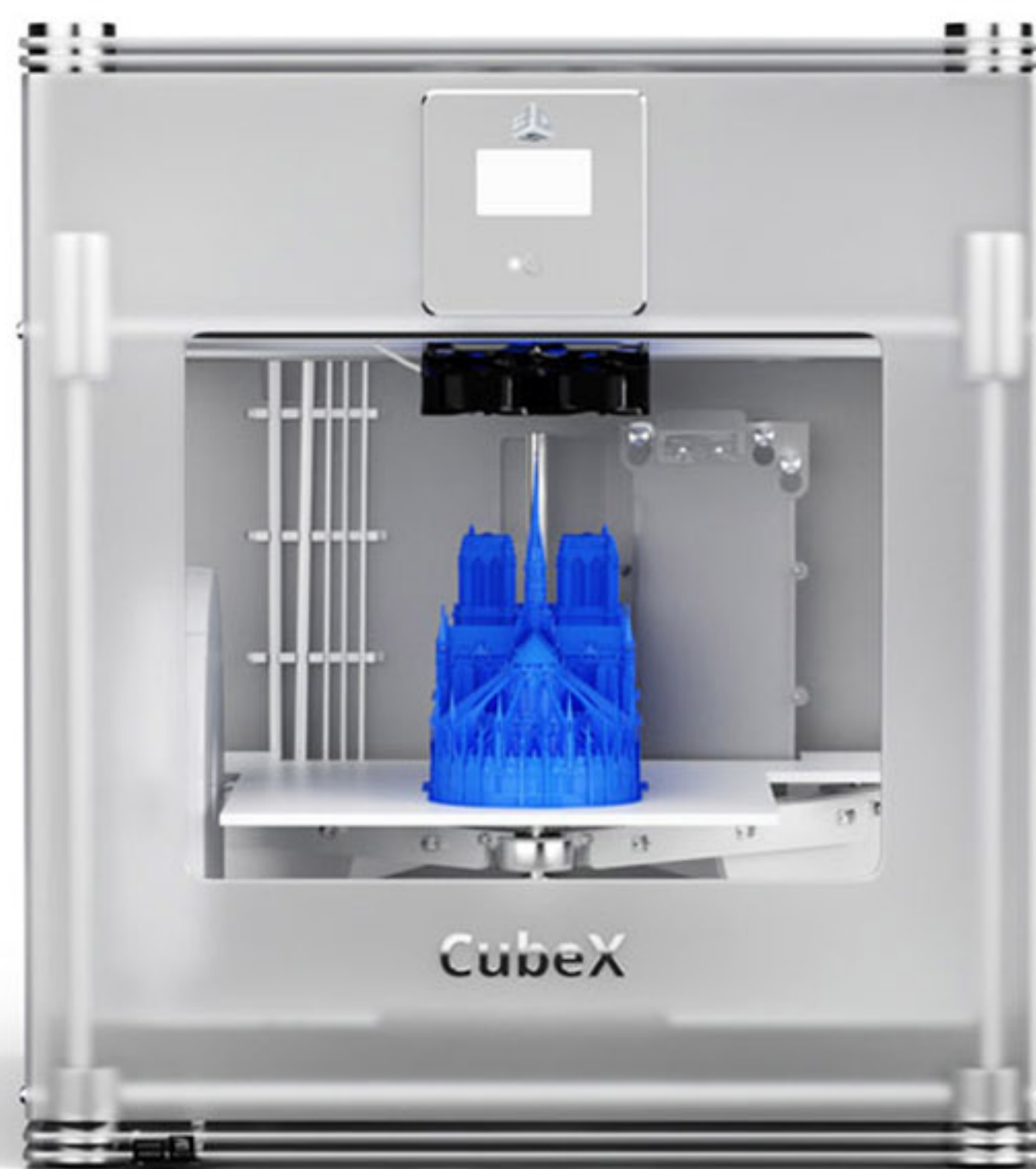
It is likely that we will eventually be able to print appliances directly with graduated softness and intrinsic paint jobs. How cost-effective this will be remains to be seen.

It's important, however, to distinguish the hype from the reality: Depending on the type of machine you use, and your

desired result, you may wind up doing a lot of remolding and finishing work such as sanding build lines, filling holes or adding sculptural detail. It's rare that a piece comes out ready to use. A print can also be expensive (\$100 per cubic inch is a good estimate) and take hours or days to complete. Printed parts can be weak, often unsuitable for a final application. However, in certain circumstances, the technology is hard to beat.

One day you will simply go to a local store and pick up 3-D printing supplies just as you do now with printers and ink. The office-supply giant Staples recently announced that it would begin carrying 3-D printers in June. The first models will be small units with a low resolution, but it's a sign of how ubiquitous and easily accessible this technology will be in our lives and our industry.

“IT'S IMPORTANT TO HAVE A MAKE-UP ARTIST IN CHARGE.” —JOHN ROSENGRANT



Images courtesy of 3-D Systems (left) and Legacy Effects