

A startup's system for cleaning 3-D printed items could revolutionize additive manufacturing

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Daniel J. Hutchinson, left, and Jeff Mize stand amid the products that PostProcess Technologies sell from their Buffalo headquarters. Credit: Douglas Levere

The wonder of 3-D printing has a dirty little secret: It can be very tedious to clean away the support structures and extra material once an item is printed. And getting the item smooth and polished is another hurdle.

It's a challenge that could be holding back the large-scale adoption of 3-D printing among manufacturers.

But a Buffalo company, PostProcess Technologies, has developed an automated system for cleaning off 3-D printed items. And the results have been so dramatic, the machines are selling as fast as the company can make them.

"We currently have a backlog," said Daniel J. Hutchinson, who invented the system and founded the company, which is affiliated with the University at Buffalo via the state's START-UP NY economic development program. "It's a great problem to have in any seasoned company, and as a startup it is a blessing."

The process takes a complicated metal or plastic printed item and polishes it to gleaming luster, including interior spaces. It removes support structures that most parts require in order to be printed.

Hutchinson, a U.S. Navy veteran, saw the need for cleaning 3-D printed components when visiting a defense contractor. His system uses software, chemicals and hardware that use patent-pending technology for support removal, surface finishing and wastewater treatment.

Now, an array of businesses that use additive manufacturing—as 3-D printing is called—are beating a path to his company's cramped headquarters in the Olmsted Center for Sight on Main Street in Buffalo.



3-D printed product cleaned by PostProcess Technologies. Credit: Douglas Levere

The company has received help from UB through START-UP NY—which eliminates state taxes for 10 years—and in making connections throughout the university and local manufacturing community. The company has also hired UB interns and one recent UB graduate, with plans to hire more.

"Our primary objective is removing the growing post-printing bottleneck, and as a result, creating jobs in downtown Buffalo," said Hutchinson, a 1999 Orchard Park High School graduate who holds degrees in electrical and mechanical engineering, and computer science, and an MBA.

Four-part harmony

In use since the 1980s, 3-D printing has been hailed as the beginning of a fourth industrial revolution. While the technology is getting more sophisticated, Hutchinson saw that little was being done to address needs after a part was printed.

"There is a misconception about additive manufacturing that the printed parts come out and they are ready to go," said Jeff Mize, a former Silicon Valley executive who was lured to invest in PostProcess and quickly agreed to become the CEO. "You have to remove the supports and in most cases finish the surface to deliver a customer-ready part."

Mize said the company's process has three integrated elements that make it unique: software, hardware, and consumables.

The motion of fluids within the machine is controlled by a software algorithm using sensor data that adjusts in real-time so that the waves are not sinusoidal. That prevents items from being forced into a corner of the tank.

Energy is tightly controlled and monitored to prevent part damage.



3-D printed product cleaned by PostProcess Technologies. Credit: Douglas Levere

Detergents used in the cleaning process have been specifically formulated for 3-D printed materials and are able to remove supports from most materials and technologies. The detergents can be tuned using nanosecond switching times to attack less dense forms of a material—like a metal support structure—without affecting the final printed object.

The surface finishing technology that polishes objects is filled with proprietary media and tuned to gently circulate the items without deforming them.

Consistency attracts customers

The consistency of the cleaning process is the No. 1 attraction for companies. Currently, many companies hand clean printed items, often with high-pressure sprayers. The PostProcess machines allow for a much faster and more consistent cleaning process, enabling companies to dramatically increase production—into the tens of thousands per day if required.

The company outsources assembly of the machines, with many parts coming from Western New York suppliers. Size varies from small (as big as a toaster) to the size of two household refrigerators that can clean parts up to 3 feet long. Prices range from \$1,500 to \$150,000.

The evolution of digital dentistry has created a huge potential market for PostProcess. Many dentists and orthodontists now scan a patient's mouth and print a 3-D model of the teeth. Then a clear dental aligner can be thermal-formed over the model. But getting the printed teeth smooth enough has been a painstaking manual process.

Other growth markets are automotive, aerospace and medical, Hutchinson said.

Provided by University at Buffalo

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