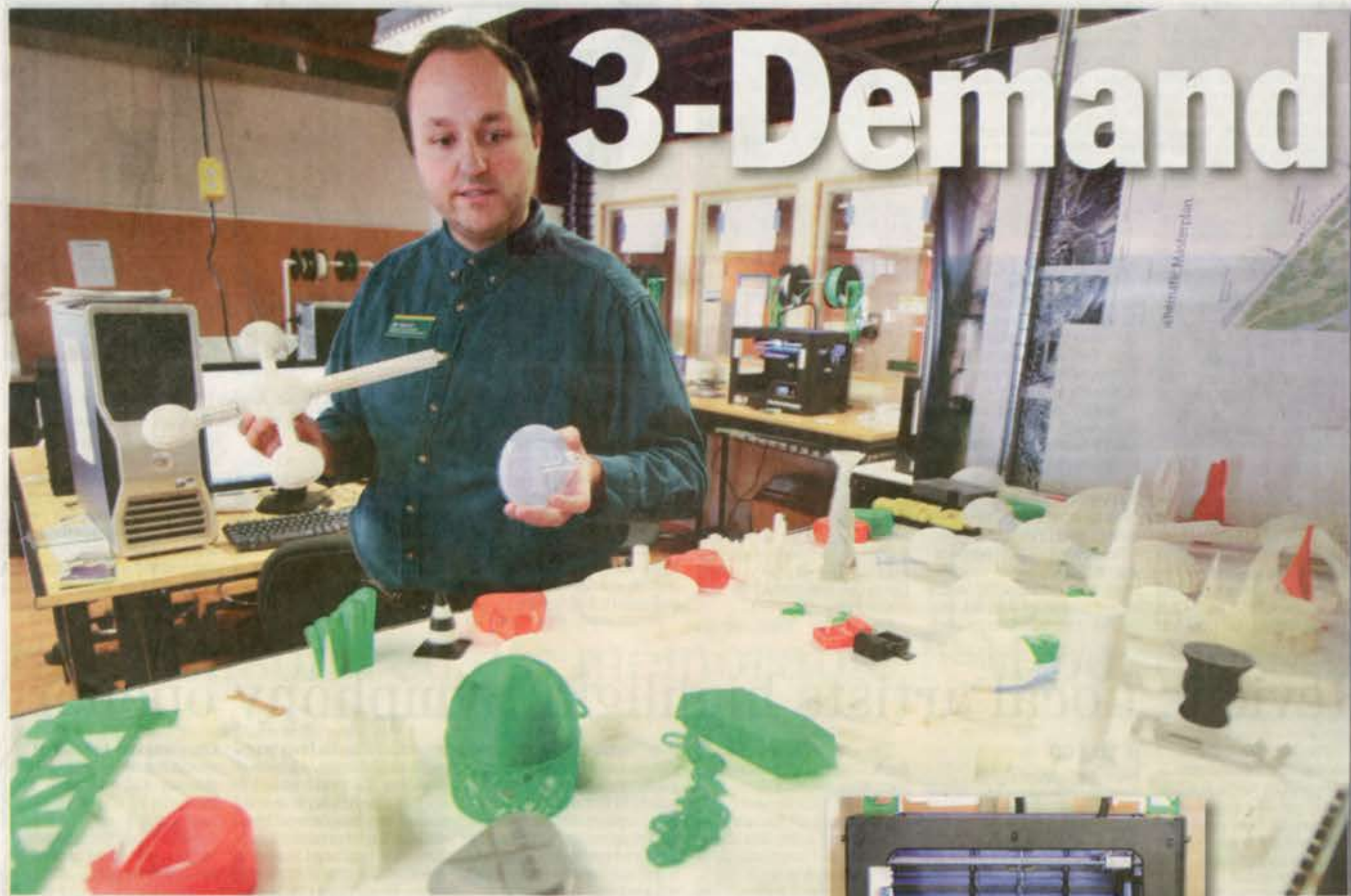


# METRO + STATE



## 3-D Demand

Photos by Michael Vosburg / Forum Photo Editor

**Above:** Ben Bernard shows some of the objects made in his 3-D printing lab Thursday in the architecture department of North Dakota State University's downtown campus in Fargo.

### High-tech printing expands for NDSU architecture and engineering students

By Cali Owings  
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FARGO - For students in North Dakota State University's architecture and landscape architecture program, if you can dream it, you can print it.

In a matter of minutes, students can design any object and have it printed before their eyes using one of the department's 3-D printers located in Renaissance Hall.

Since December, the department has acquired six, low-cost printers used by students for modeling projects and other entrepreneurial applications.

Ben Bernard, a technology specialist for the department who runs the lab, wants to see 3-D printing technology in the hands of almost everyone as it becomes more affordable and easy to use. Bernard said he's considering partnerships to make 3-D printing available across the university, at K-12 schools and for the larger community.

"As a land-grant school, it's our job to be on the bleeding edge of technology and share that technology with the rest of the state," Bernard said.

While technology experts posit that 3-D printing will change

manufacturing and revolutionize the way objects are produced, Bernard sees practical household uses for everyone, such as replacing a shower curtain hook or knob.

For architecture students, 3-D printing saves time and allows them to easily create detailed models that would be hard to replicate by hand using wood or cardboard.

Students can create their own designs using free software or download and edit 3-D design templates. Designs are transmitted via SD card to the printer.

Depending on the size of the

object, the layers and level of detail, a print job can take a few minutes or several hours.

The machines use PLA filament - a corn-based biodegradable plastic available in a wide array of colors. While the architecture students use plastic, 3-D printing is possible with many other materials: ceramic, metals, bone and even tissue.

Other departments at NDSU have 3-D printing capabilities, and their machines are higher quality and more expensive.

The electrical and computer

engineering department at NDSU purchased a 3-D printer in 2010 for nearly \$20,000. It's more precise and uses higher quality materials than those in the architecture lab, said Laura Dallmann, an administrative assistant in the electrical and computer engineering department.

Dallmann said 3-D printing is mainly used for senior students' capstone design projects like building enclosures for electronic equipment they've built.

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**Left:** The architecture department at NDSU uses six MakerBot Replicator 2 3-D printers in its downtown lab.

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### 3-D

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For the architecture department, that kind of technology wasn't practical, Bernard said.

"It's exciting that the technology has become inexpensive enough for education to jump on board," he said.

The technology they're using is relatively user-friendly. Bernard said it only takes students about an hour to get set up and learn to use the printers for the first time.

John Schneider, a December 2012 NDSU graduate, is bringing 3-D printing technology to the public



**Lab assistant Brian Glur holds a 3-D-printed ball Thursday at North Dakota State University's downtown campus in Fargo.**

Michael Vosburg  
Forum Photo Editor

be an engineer to understand how the 3-D design works," he said.

While he said consumer use right now is limited, it will grow as designs for printable materials become more widespread.

"It's only a matter of time before you start to see people having 3-D printers in their homes," Schneider said.

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through the studio he's opening in October.

At his studio, Meld Workshop, members have access to 3-D printers, laser cutters and other equipment for creative types, inventors

and hobbyists.

He agreed the technology behind 3-D printing and design has simplified, especially the programs used to create printable designs.

"Before you almost had to