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X-ray for the super tiny

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The company Xradia continues to get smaller. But in this case, that's a good thing. The word "small" doesn't refer to budget cuts, employee layoffs, or future growth for this Concord-based company. It's about creating 3-D imaging X-ray microscopes that can capture images too small to be seen before.

These aren't systems one would use in a doctor's office. Researchers with interest in everything from bones to rocks to semiconductors are more likely to find interest in them. The images are impressive. The edge piece of paper, for example, looks like a canyon wall. And a knee bone of a mouse looks like it belongs in an elephant.

"We are able to non-destructively image the internal structure of objects, and bring out details and bring out details at resolutions never before imagined," said Itzik Goldberger, general manager of micro imaging. "Sometimes to really understand what you're looking at, you need to see a 3-D image of it."

The company, which has more than 50 systems installed worldwide, has been around for about 9 years. If the economic climate improves, and the demand for these tools increases, the company hopes to go public in the next three-to-five years.

Revenues are up this year even after the company came off a year-over-year growth of 60 percent, said Rod Browning, chief executive of Xradia. Current annual revenues are just around \$20 million. When Browning arrived here two years ago, the economic downturn easily could have presented rough waters ahead. Browning wouldn't let that happen. "I made sure we hunkered down and took prudent steps to navigate our way through these difficult times," Browning said. "While we are really trying to control the costs, we are also focused on finding those customers that can really use us and where we add the most value."

In the past, the company was focused mostly on research and development. Now it's the commercial end that Browning hopes will drive Xradia to success. One of its systems can capture images down to the nanometer, which is 1 billionth of a meter. A typical germ is about 1,000 nanometers. Xradia uses X-ray special scanning technology combined with proprietary optics to get its results. The systems range in price from \$500,000 to \$2 million.

For Xradia, the company was thrust into the limelight when one of its scanners was used by researchers at the University of Texas Austin to examine Lucy, the famous ancient fossil of a human ancestor who lived 3.2 million years ago. The scanner analyzed selected pieces of the fossil to help scientists compare bone structure then with modern humans.

"The imagery we obtained with the Xradia scanner is stunning, and will allow scientists to see details of Lucy's anatomy that have never been seen before," said Richard Ketcham, a professor

at the university who worked with the Lucy project.

Browning believes the association with Lucy helped the company because it "resonated" with the general public. But some of its other capabilities are impressive as well, he said.

In the semiconductor arena, the systems can look at chips through packages and allow people to determine right away whether the chips are defective. Such a task would be impossible with the naked eye.

At the University of California, San Francisco, Sunita Ho, an associate professor, is using the technology to break down soft and hard tissue surfaces, such as those in teeth, to analyze disease progression. By using the image scanners, volume analysis can be made as well.

"I think the technology is phenomenal because of the details in which you can see the tissues," Ho said. "Not only will this help us in coming up with treatment techniques, but diagnostic techniques as well."

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