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John Miller, chief operating officer and president of Micro Magnetics, holds a test sample.

Current flow is put under Magnetics' microscope

11/11/2002 08:26 AM

By [Patricia Resende](#)

Tucked away at the University of Massachusetts' Advanced Technology and Manufacturing Center is Micro Magnetics Inc., a startup founded on technology developed at Brown University.

Micro Magnetics, an 11-person business in Fall River, is working on the alpha version of its magnetoresistive (MR) scanning magnetic microscope, which will be used to study current flow within semiconductors.

Gang Xiao, a physics professor at Brown University in Providence, founded Micro Magnetics and is now its chief technology officer.

Xiao, a Johns Hopkins University graduate, is working on magnetic tunneling junctions, sensors and magnetoresistive random access memory (MRAM). Xiao worked on MRAM while at IBM where he received the IBM Invention Achievement Award.

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The founder wanted to take the research from the lab to the commercial world and called on John Miller, a former GTE and Polaroid executive, to help him do just that.

The duo incorporated the company in April and has an exclusive license to all the technology coming out of Xiao's lab at Brown.

To get the company off the ground, executives pursued private venture capital funding and landed \$1 million in financing from a "Southern New England" based firm.

"We are taking technology that goes into your hard drive ... and using it to measure the flow of electricity in the circuit," Miller explained.

Micro Magnetics has already landed a Small Business Innovation Research grant from the National Science Foundation to study electromigration in integrated circuits (ICs).

Electromigration is the erosion of the microstructure of metallic traces in circuits, which is the most common source of failure in chips.

"We can actually see electromigration as it happens," Miller said of the company's device.

Micro Magnetics' microscope, now in its alpha stage, can detect features smaller than 100 nanometers.

The technology available today, known as SQUID (superconducting quantum interference device), has limitations in its resolution, Miller said.

Companies such as IBM, Intel and Texas Instruments have attempted to use SQUID but it cannot attain the resolution necessary to image ICs, say Micro Magnetics executives.

That is why IBM, Intel and TI have sent their own chips to be scanned by Micro Magnetics.

The next step for the company is to get to the beta stage. Micro Magnetics is in talks with IBM, Intel and TI to be beta customers.

Once beta customers are secured, executives plan to seek additional funding between \$5 million and \$10 million to get the product into the market.

Miller said Micro Magnetics' relationships with UMass-Dartmouth and Brown Uni-versity have made it easier to start and expand the company.

"This is a great place to grow the company," he said referring to the Advanced Technology and Manufacturing Center. "The incubator provides a good place to do that."

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