Focus: Innovations: Patents

Arbor Photonics seeks spinoff success with more powerful lasers

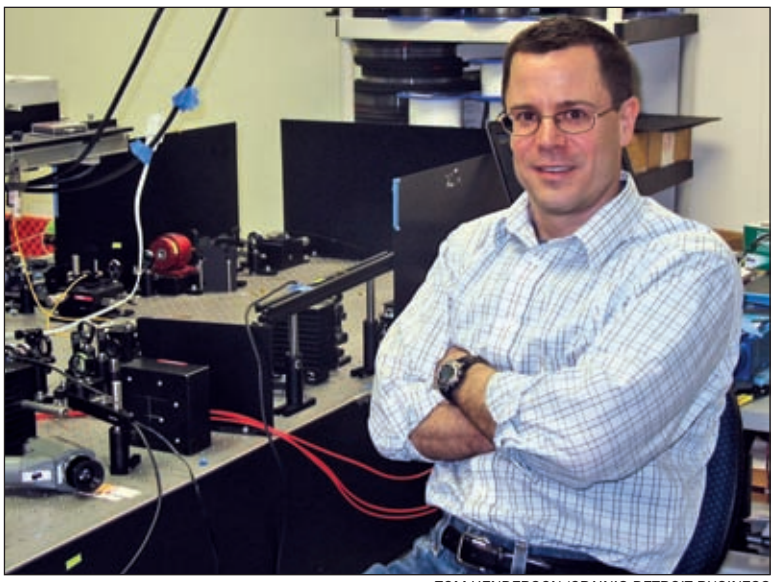
BY TOM HENDERSON
CRAIN'S DETROIT BUSINESS

Arbor Photonics Inc. hopes to parlay a recent series of grants and awards, including $150,000 at last December's **Accelerate Michigan** contest, into the kind of commercial success enjoyed by previous spinoffs from the **University of Michigan**'s **Center for Ultrafast Optical Science**.

The Ann Arbor-based company uses a UM patent in optical fiber design to improve the power and quality of laser beams with potential industrial, aerospace and military applications.

It has begun shipping working prototypes of its fiber amplifiers to customers and hopes to generate revenue of $500,000 this year, $2.5 million next year and $40 million to $45 million in 2015. Its would-be customers are manufacturers of lasers and laser components who incorporate Arbor's amplifiers into prototypes of their own for their customers to evaluate.

If Arbor Photonics can generate those kinds of revenues, it will join the ranks of **IntraLase Corp.** and **Picometrix** as successful spinoffs from the school's center.



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Thomas Sosnowski, vice president of engineering for Arbor Photonics Inc. in Ann Arbor, sits at a high-powered fiber laser test bed.

IntraLase, which made lasers for LASIK surgery, was a big success for local investors, going public in an $84 million IPO in 2004, then being sold for $808 million to 2007 to **Advanced Medical Optics Inc.**

Picometrix is a subsidiary of **Advanced Photonics Inc.**, a publicly traded company in Ann Arbor that makes electro-optical receivers and other high-speed electronic instrumentation for homeland defense, military, telecommunications and medical applications.

Arbor Photonics, founded in 2007 and based on research by UM associate professor Almantas Galvanauskas, uses something called a chirally coupled core to improve the performance of high-powered lasers.

> *"If you can make it work, there's a lot of low-hanging fruit."*
>
> **Phillip Amaya, Arbor Photonics Inc.**

The key is to make a larger fiber cable that retains its beam quality. Usually a larger fiber means a less-focused beam, but by wrapping the core of the fiber with a smaller, helical core, the beam maintains a tight focus. That's been shown in the lab, and now Arbor has begun translating lab performance into commercial product, selling beam amplifiers for between $10,000 and $20,000 for such potential applications as making more-efficient solar cells and the next generation of integrated circuits for the semiconductor industry.

The company's research has been well-funded from inception. Venture-capital funds, grants and loan sources have ranged from **Ann Arbor Spark** to the state's **21st Century Jobs Fund** to the **National Science Foundation** to the **U.S. Army** and **Navy**.

Based on a recent report by a review panel, Arbor is likely to receive a phase-two NSF grant of $500,000 in April or May.

At the first annual Accelerate Michigan contest, funded by the **New Economy Initiative** in what was billed as the world's largest business plan competition, Arbor Photonics beat hundreds of other companies in finishing runner-up to **Armune BioScience Inc.** of Kalamazoo, which won $500,000.

"We love these guys. It's not easy taking technology out of the university and translating it the way they have — especially translating physics theory into the world of manufacturing — and they've accomplished it," said Marc Weiser, managing director of **RPM Ventures**, an Ann Arbor-based venture capital firm that led the investment round of $2.2 million.

The company is planning to do a second VC round later this year of $6 million to fund growth and ramp up manufacturing. It currently employees 8.5 full-time equivalents, plans to hire a supply chain expert and three manufacturing engineers later this year, and to employ 25-30 by the end of 2012, according to CEO Phillip Amaya.

Amaya, a 25-year veteran of the laser industry, was living in California in 2007 when he was asked to vet Arbor on behalf of RPM.

"I had a predisposition to tell them the world didn't need another laser company, especially in fiber optics. There are a lot of proven laser companies," he said.

Not only did Amaya change his mind, he decided to join the company.

"It looked like an interesting company. If you can make it work, there's a lot of low-hanging fruit," he said. "You can make it a $30 million or $40 million company with existing applications, and then if you can enable something new, there's a big upside."

Amaya said that while beginning to generate revenue is a nice milestone, "this year isn't about revenue, it's about customer testimonials."

Arbor's amplifiers show such promise that its would-be customers pay for the alpha and beta versions they are testing.

"It has compelling enough performance that if they won't pay for it one of their competitors will," Amaya said.

One defense contractor has been evaluating Arbor's amplifier since last summer and using it in its R&D.

"We excited about the technology and wish them well," said the head of the company's advanced technology group. He said he could be quoted provided neither he nor his company was named because he didn't have approval from the **U.S. Department of Defense**.

His company doesn't make components of its own, but combines component parts from suppliers in laser systems it sells to the military. He said Arbor's amplifiers show promise because they are resistant to vibrations and temperature swings, which is crucial to performing in the cold of Earth orbit or in the jostling atmosphere of a helicopter.

A $70,000 Phase I Small Business Innovation Research grant that Arbor got in December calls for it to begin work on a laser-based method for remotely detecting hazardous materials.

Fraunhofer USA Inc.'s **Center for Laser Technology** in Plymouth helped evaluate Arbor's technology before it was spun off from UM. A research nonprofit that helps bridge the gap between university research and industry, Fraunhofer invested $150,000 of the $2.2 million round led by RPM.

In addition to helping the school evaluate the technology, Fraunhofer helps with improvements in design and provides introductions to would-be customers, particularly in Europe.

"Their technology is very unique in enabling a bigger fiber without making the beam quality worse," said Stefan Heinemann, the executive director of the Center for Laser Technology. "It extends the limitations to the current state of the technology."

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