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Degree research evolves into new company for WMU alumnus in semiconductor industry



Dr. Deepak Ravindra became a business owner at the same time he completed his Western Michigan University doctoral degree through a unique collaboration with a faculty researcher focused on developing methods to cut extremely hard and brittle materials.

Ravindra worked with Dr. John Patten, former chair of WMU's manufacturing engineering department, to launch Micro-Laser Assisted Machining Technologies LLC in July 2012. The new technology they have developed utilizes a diamond cutting tool capable of focusing gigawatts of laser power onto a concentrated surface to soften the material so a diamond can easily cut it. "People cut with diamonds, people cut with lasers—we merged the two into a hybrid device," Patten said.

The researchers said the technology could replace the current method for making advanced engineered ceramics and semiconductors smooth—a lengthy and expensive polishing process.

"In the machining industry, materials are getting better, but the manufacturing of them is getting trickier," said Ravindra, a native of Klang, Malaysia, who earned his bachelor's, master's and doctoral degrees at WMU. "When I entered the Ph.D. program, I was looking for a dissertation project in which I solved either a societal or industrial problem. Three to four companies that we were already working with had a grant for this kind of research, so we collaborated. John submitted an NSF proposal and was awarded close to \$1 million, so I decided to do my Ph.D. along those lines."

As part of the process to launch a business, in March 2012 Patten and Ravindra were selected to attend an Innovation Corps boot camp hosted by Stanford University and the National Science Foundation with their product, where they were required to interview a minimum of 100 potential customers. Acceptance into I-Corps came with a \$50,000 grant and the NSF provided another \$850,000 to get the company off the ground, which has already received state-level

recognition as a semifinalist in the Accelerate Michigan business plan competition. The company now has a lab in WMU's College of Engineering and Applied Sciences and a manufacturing facility at Battle Creek Unlimited, an economic development and business assistance resource in Battle Creek, Michigan.

Within two years of completing his Ph.D., Ravindra had engaged with about 160 prospective companies to identify 25 as strategic partners—a group that has a cumulative value of about \$100 billion. "We have grown from a one-person company to a staff of nine, which includes WMU graduate and undergraduate students," he said. "I am very proud of WMU, and almost everyone working with me has a WMU connection. It is a great sense of accomplishment to see things happen and to make an impact in such a short period of time."

As a young man new to WMU's campus, Ravindra said his goals were very lofty and he aspired to "solve every problem on the face of the earth." He soon figured out how little he knew about the engineering world he intended to enter, but said he found plenty of chances to learn what he needed to become a successful researcher and business owner.

"In WMU's engineering college, even as undergraduates, we were taught to engage very closely with industry," Ravindra said. "Many students at other universities don't get to do that, which can cause a huge disconnect between the academic and real worlds. Students need that engagement to become marketable. They need to have meaningful senior research projects and to go through the entire process to see how things work in a commercial setting. It is important to me that my company inspires a spirit of entrepreneurship in our employees."

