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Student goes small in business world

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Summer Reporter

Imagine the difficulty of drilling a hole through the tip of a pen.

James Mann, a graduate student in Industrial Engineering, recently co-founded M4 Sciences, a company that focuses on manufacturing biomedical components, which means drilling tiny holes through small parts. They are also developing small-scale components similar to those found in a Swiss watch or swallowable surgery cameras.

The length of the holes M4 Sciences must make is 500 times deeper than wide. When working with small components like bone screws, which has a diameter of about a millimeter, Mann said drilling holes is hardly a trivial task.

"Some of these components are so small they can be difficult to see with the eye," Mann said.

In order to overcome the difficulty of manufacturing such small parts, called micro/meso-mechanical manufacturing, or M4, Mann is using a new technology called Modulation-Assisted Machining, or MAM.

"MAM, it turns out, is also an enabling technology that can be used to form nanostructure particulate metals and alloys with controlled shape and size," Mann said. "(It's a) way to create nanostructure powdered metals directly by machining." He said there was currently no commercial way to do this.

Mann, who holds a bachelor's and master's degree from Purdue's School of Aeronautics and Astronautics, said the process would make it easier to make holes in difficult-to-machine alloys such as stainless steel and titanium, which are commonly used for biomedical components like prosthetic limbs.

He said miniaturization was critical because the design space is limited in the human body.

"(We) want to be able to incorporate as many functional features and systems as possible into a limited design space," said Mann.

One of the important aspects of M4 Sciences for Mann and his partner, co-founder Brain Gootee, is locating the company in Indiana.

"Our strategic plan involves a collaborative relationship with Purdue University as a source, not only for new technology development, but as a key resource for M4 Sciences to find new employees," Mann said.

As Indiana natives who both went to Purdue, Mann said he and Gootee have a vested interest in developing the company in Indiana and giving back to the community.

"(We) want to create opportunity for people who are interested in advanced manufacturing to stay in Indiana." Mann said few people with his type of background stay in Indiana to start a high tech company. According to Purdue's Data Digest, in 2004 only 59 percent of all Purdue students remained in Indiana one year after graduation.

Srinivasan Chandrasekar, Mann's graduate adviser, said in an e-mail that advanced manufacturing was an important part of Indiana's economy. He said M4 Sciences would complement growth of companies currently developing products at Purdue Research Park and bring a focus of M4 technologies to West Lafayette.

Julie Goonewarden, of Purdue's office of technology and commercialization, said, "Purdue always is very interested in encouraging a culture of entrepreneurship on campus." She said this was done by helping faculty members understand when their intellectual property can be used to create a business.

M4 Sciences is in the process of applying for grants and funding from organizations like the Indiana 21st Century Technology and Research Fund to raise money for their business. Their goal for the near future is to have their own manufacturing space at Purdue Research Park.