

From left, students Charles Dawson and Justin Johnson consult with Andrew Bekkala, MME professor, in the robotics laboratory formerly located on site at Electrolux in St. Cloud. The laboratory has since been converted to a senior design project work space and the robots moved into the Engineering and Computing Center on campus.

Engineering outreach gives students, companies competitive edge and keeps jobs in communities

Just over 15 years ago, Andrew Bekkala, a new professor in St. Cloud State University's newly established manufacturing engineering program, went knocking on doors to find an area industry willing to give student engineers hands-on experience.

"If we can help companies be more competitive, then people working there won't have to look elsewhere for a job."

Having called on several companies without success, he tried Webway, Inc., a St. Cloud manufacturer of photograph albums owned by the Antioch Company.

"It was a cold call. I just banged on the door. Literally," Bekkala said.

When the door opened and he explained his mission, he was directed to the company's only engineer.

"I told him who I was and what I wanted to do, and Frank Gunasekera said, 'Come on in. I want to talk to you.'"

That was the beginning of a 10-year relationship that allowed numerous SCSU engineering senior design teams to tackle real industry challenges on site. In return, it gave Webway, Inc., now Creative Memories, access to minds and methods that improved their efficiency and their bottom line.

Eventually, similar relationships were developed other area companies, including Electrolux in St. Cloud and Whirltronics in Buffalo, Minn. (See Designing woman, page 6).

One goal in these relationships is to make the company more competitive, which is important to the community, especially when it comes to jobs, Bekkala said.

"We are part of the St. Cloud community and surrounding area. We're also part of the state community, and we do get state funds. Taxpayers want to know that the taxes they have to pay go to some purposes worthwhile in their community. So these joint partnerships with companies help the companies



and the employees that work for those companies," he said.

"If we can help companies be more competitive, then people working there won't have to look elsewhere for a job. They can keep working there," Bekkala said.

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Students can design a machine part or mold through computer-aided design (CAD) programs and upload their information into this Haas computer-controlled vertical mill. Located in the manufacturing laboratory in Headley Hall, the Haas mill will make their design "come alive" by producing the prototype. It has several tooling attachments to make complex components with a high degree of accuracy.



Jennifer Lindquist and Andrew Bekkala consult Jan. 4 about a custom-designed piece of equipment at Whirltronics.

Designing woman still 'awhirl' in learning

When Jennifer Lindquist graduated in 1989, she was among the first women to earn a degree in manufacturing engineering at St. Cloud State University.

Since graduation, Lindquist has been applying lean manufacturing principles to the various production processes at Whirltronics, a Buffalo, Minn., company that makes lawnmower blades for original equipment manufacturers.

In recent years, Whirltronics has hosted five or six senior design projects for students majoring in mechanical and manufacturing engineering at her alma mater.

"We're getting better at it. It's good for both of us. We get fresh eyes from the outside, and they get the experience in return. It's a win-win," she said.

"And we get access to the Ph.D.s," she said.

"Being a woman, you have to prove yourself even more than a man would."

But that doesn't mean the whole family at Whirltronics — 75 union employees — automatically agree with her when she proposes a change.

"It's always a challenge. You definitely have to prove yourself with the people who work with you. Being a woman, you have to prove yourself even more than a man would," she said.

After nearly 12 years at Whirltronics, "I'm still learning," she said, adding that she has great respect for the plant's machine operators.

"They know the processes better than I do," she said.

One of those Ph.D.s is Andrew Bekkala, who made it possible for Lindquist to do her senior project at Webway, Inc., now Creative Memories in St. Cloud. At the time, the album manufacturer was one of the few local industries allowing engineering students to take on one or more of the challenges of making their processes as efficient as possible.

"It was quite the learning experience — it takes you away from the books," she said. And what she quickly learned when she got away from the books, is that there is resistance to change in a manufacturing process. It was an important lesson — one that is still with her.

"You have to get the buy-in from the people who are operating the machines," she said.

Lindquist thoroughly enjoys her position as manufacturing engineering manager at Whirltronics.

"The atmosphere is really good," she said of the Minnesota-family-owned industry, where family values permeate the culture — something she, as a mother of two boys, really appreciates.

Unfortunately, one of the biggest challenges to a manufacturing engineer is persuading employees to embrace change.

"It's hard to make changes at a company. When we say, 'Here's how we can do it better, faster, with less waste, and be more competitive,' workers don't see it until their jobs are gone overseas somewhere. We work with that a lot," Bekkala said.

One approach Bekkala recommends to overcome this resistance is to involve the company's machine operators directly in the project.

"Once you get operator buy-in, it goes better," he said.

The relationship between the manufacturing engineering program and Creative Memories continued until 2001, when the Antioch Company made numerous internal and external changes, including construction of a new manufacturing facility.

Manufacturing engineering as a program also made changes. From its beginnings within Electrical Engineering in 1989, it became its own department. In 1995, it earned its first

Accompanied by COSE Associate Dean Dale Williams, Creative Memories representatives, Art Castronovo and Dave Thomsen, tour an ECE laboratory and visit with students Dec. 14, 2006. From left are Elizabeth Donnay; Sura Lekhakul, ECE chair; Amber Ahmann; Williams; Castronovo and Thomsen.



accreditation from the Accreditation Board for Engineering Technology. It has since been reaccredited several times. When it began offering a mechanical engineering program in 2000, it renamed itself Mechanical and Manufacturing Engineering (MME).

It has also been the means by which hundreds of well-prepared engineers have entered the workforce.

“It’s very rare for a student not to have a job by the end of summer following graduation. About half are offered jobs after their senior design projects. We tell them, ‘Get your resume out there in January.’ We are more practical oriented than theory oriented, so our students are up and running much quicker,” Bekkala said.

MME’s greatest accomplishment may be that it turns out class after class of the sharpest engineers in the nation, according to its pass rates on the fundamentals exam taken after graduation.

“We have the highest pass rate of any school in the country. It’s been 100 percent many times,” Bekkala said.

The on-site industrial experiences are only part of MME’s success story. The other part is the access engineering students have to their faculty, all of whom are registered engineers.

“We don’t have grad students teaching labs, and we rarely have them teaching classes,” Bekkala said.

In addition, class sizes have been relatively small. But that is changing.

“It’s the first time I’ve ever had two classes of 24 students,” Bekkala said of the fall 2006 enrollment.

Today, MME doesn’t need to knock on industry doors.

“We have so many projects that we never solicit. Companies call us every year. I don’t know where they get the info. It’s out there. Now we have about twice as many projects available as senior design teams,” he said.

Recently, Creative Memories knocked on the door of the College of Science and Engineering.

Art Castronovo, a representative from Creative Memories, toured the newly situated controls and thermo-sciences laboratory in the Engineering and Computing Center and the expanded manufacturing laboratory in Headley Hall in December. He also toured the Department of Electrical and Computer Engineering and visited with students about their laboratory projects.

With him was Dave Thomsen, an MME graduate hired by Creative Memories after he completed his senior design project there in 1996.

Castronovo has since been working with Warren Yu, MME’s chair, to explore possible internship and senior design collaborations.

Horizons Conference

Science can be fun and interesting!

The Society of Women Engineers holds this annual all-day event at SCSU for young women in grades seven and eight. Participants get hand-on experience in engineering, physics and chemistry workshops and insights into fascinating and challenging careers.



Conference Goals:

- 1.) To reinforce young women’s interest in science and mathematics.
- 2.) To create an awareness of career opportunities for women in science-related fields.
- 3.) To provide an opportunity for students to meet and form personal contacts with women working in traditionally male occupations.

<http://www.stcloudstate.edu/ece/horizons.asp>