



## Marc Rosen, PhD, P.Eng. –Automated education

by Dwight Hamilton

**W**hen Ontario's first new university in 40 years opens its doors in Oshawa this September, Marc Rosen, PhD, P.Eng., expects its engineering school to be participating on the "leading edge" of engineering education.

This will be no easy task. But as the founding dean of the University of Ontario Institute of Technology's (UofOIT) School of Manufacturing Engineering, Rosen would appear to be in the right place at the right time to achieve such a goal. "The government thought that we should be a career-driven, market-oriented university. We've gone through all our programs and they are designed to meet career aspirations and market needs," he says. "Technology is vital for the future and all our programs focus on the use of it."

province's demographics. According to its new president, Gary Polonsky, the university was specifically created to address shortages of highly qualified people in many employment sectors. Rosen confirms that if the double cohort "had looked like a one off, it would have been a no-go. But enrolment is predicted to go steadily up and stay that way for 20 years, as that will be the echo of the baby boom generation."

Rosen is expecting about 75 students for his first-year program, give or take 25. The entire university's enrolment will be about 1000 undergraduates. One of his first challenges will be to pass muster with the Canadian Engineering Accreditation Board (CEAB), but he's pretty sure his program's on track. And he should be able to tell, having served as an expert visitor for CEAB and also having been on the receiving end of CEAB accreditation visits while chair of Ryerson University's department of mechanical, aerospace and industrial engineering. Nevertheless, "everything's a challenge," he says.

"Everything around the program is examined, not only quantitative aspects, but qualitative as well," he says. "They check the fac-

and computer-integrated manufacturing (CIM). "We want to strike a balance with research and teaching to ensure we have the strategic research thrusts



and that the faculty are involved. It keeps you up to date, not just reading but participating on the leading edge," says Rosen.

He plans his new, state-of-the-art, manufacturing lab to be the showcase of the program. Eight robotic work cells will be linked to a conveyor system, which will take raw material "pallets" out of storage automatically. As the materials pass each robot, each will perform specific functions, although there is also some redundancy between machines, Rosen explains. When a pallet reaches the final robot with the raw materials, the final product will be assembled and automatically backloaded into storage. "There will be visual tracking and inspec-

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### Countdown

While certain facilities like a library and athletic centre will be shared with nearby Durham College, the four cranes towering over campus construction sites demonstrate that this is a just-in-time university.

And although it's likely no coincidence that UofOIT is working overtime to open its gates to meet the first wave of Ontario's four-year secondary school system, the so-called double cohort, it was conceived to do more than absorb a spike in the

ulty—they want top-notch credentials, both in teaching and research and in professional activities—and what capabilities [the school] has and how students utilize them. Are they learning proper safety practices? They even interview students to see if what they've learned is what's supposed to be covered."

In addition to a general engineering curriculum, the program's research focus will include flexible and high-performance systems, robotics, mechatronics, micro-electrical mechanical systems (MEMS)

tion along the way, and everything will be controlled by a computer lab adjacent to the room, with windows separating the students. When they begin, they will be able to run an individual robot, and they will run the whole assembly in the advanced years," he adds.

New labs pose formidable difficulties, but also great opportunities, says Rosen: "I want it decided that what we design into those labs will be future-oriented. Design it properly and don't worry about



Marc Rosen, PhD, P.Eng., (right) receives his Fellowship certificate from Guy Gosselin, P.Eng., president of the Engineering Institute of Canada. Founding dean of the new University of Ontario Institute of Technology's School of Manufacturing Engineering, Rosen expects his school to offer "leading edge" engineering education.

past technologies. It takes two years to design, install, commission, and write the lab manuals. You shouldn't fritter away the opportunity and panic and then buy at the last minute."

### The right place

Some might say that the new school's proximity to the head works of General Motors of Canada in Oshawa will be a boon. Manufacturing accounts for about 20 per cent of Ontario's GDP and the auto sector is the biggest slice of that pie. "GM's a very big player in the Durham Region and one of their VPs sits on our advisory board," says Rosen. "But we're not designing the program around them and they're not making any commitments either. I want my grads to be able to work for any auto company, but also in things like aerospace and medical equipment."

Rosen predicts his program will be "resilient" because graduates will likely be able to find work in manufacturing no

matter which sectors are expanding or contracting. "The beauty of manufacturing is that it's a common set of skills," he points out. "You're learning how to take ideas from areas of specialized engineering and make 10,000 of them a month. Automation might be important or human labour when the quality is better or more cost effective. You might bring in robotics, automated controllers and laser vision inspection for quality control. The same tool set is used when making industrial computer chips or consumer paints."

### To the top

Setting up the labs and achieving CEAB status may be the program's first hurdles, but how does Rosen plan to position his brand new and very small school to be on the leading edge of teaching and research? "Certainly, the University of Toronto has made no bones about wanting to be the leading research institute in Canada," he says. "How we will address that is not to compete head on, but to

pick selective areas where we think we can excel. We're going to focus on those limited areas and build up some strength and a strong reputation."

As for Marc Rosen, his own niche is in thermodynamics and energy conversion, including cogeneration, district energy, thermal storage and the uses of renewable energy. He has received over 40 research grants and contracts and contributed to 170 technical publications. He is a 1997 recipient of an award for excellence in research and technology development from the Ontario environment and energy ministry, and the next year received Ryerson University's Distinguished Scholar Award.

Rosen is also president of the Canadian Society of Mechanical Engineering and a fellow of the Engineering Institute of Canada. He has worked at Finland's Imatra Power Company, the Institute for Hydrogen Systems near Toronto and the Argonne National Laboratory in the United States. ◆