

INSTITUTE OF
TECHNOLOGY
ALUMNI HAVE
WON THE FIRST
TWO YEARS OF
A MINNESOTA
COMPETITION
SEEKING THE
STATE'S BEST
ASPIRING
ENTREPRENEURS

>>> BREAKTHROUGH IDEAS

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Institute of Technology alumni John Berger and David Emmons were the winners of the first-ever Minnesota Cup competition in 2005. Their invention is an innovative, low-cost optical switch and attenuator for rerouting information carried on fiber-optic networks.

SOME STUDENTS SPEND THEIR COLLEGE YEARS tossing Frisbees. John Berger and David Emmons built a machine to launch them—an exercise in four bar linkages optimizing the ratio between linear and angular velocity—but you wouldn't want to play catch with it.

"We demonstrated it by firing a Frisbee into a concrete wall. Believe me, the first two rows of the audience got up and moved back before our second throw," joked Berger.

Now the two mechanical engineering alumni are using their skills to launch another idea—a switch that could transform the fiber optics industry.

Meanwhile, another team of University of Minnesota Institute of Technology alumni are using their expertise to reinvent a simpler technology: the paving stone. VAST Enterprises is developing environment-friendly brick pavers from recycled tires and plastic bottles.

Both innovations have one thing in common: winning the Minnesota Cup, a statewide competition that honors promising innovations.

"We're looking for breakthrough ideas," said Scott Litman, co-founder of the Minnesota Cup. "We're also looking for concepts where we believe the entrants can take it into the marketplace and make it a success."

It's not surprising that the U's Institute of Technology alumni have swept the first two Minnesota Cup competitions. The college has spawned thousands of entrepreneurial startups as well as giant corporations such as Medtronic and Ceridian. According to a 2005 survey, Institute of Technology alumni have started 4,150 active companies with revenues of \$90 billion worldwide.

"The University of Minnesota Institute of Technology has a long history as the primary science and engineering program in the state," said Mos Kaveh, associate dean for research and planning. "If you look at technology-oriented businesses, most of them are initially started by engineers and scientists, not businesspeople. You have to have the technical know-how that comes out of the engineering and physical sciences."

A SWITCH IN TIME

John Berger (ME '84, MBA '93) and David Emmons (ME '84) have been solving problems together for most of their lives. They met in seventh-grade science class and attended the same schools right up until they both graduated from the Institute of Technology in 1984. In addition to their Frisbee-launching device, they collaborated on a machine that turned pages for handicapped readers, an idea that was patented



Berger and Emmons met during the 1974-75 school year in seventh-grade science class at what was then Fairview Junior High in Roseville. More than three decades later, they are still friends and now are business partners.



Fiber optic lines have revolutionized telecommunications.

opposing fiber and position them in optimal alignment. Without the expense of lenses and manual labor, the switch would cost much less than competing technologies.

It seemed like an idea whose time had come. At the time, the dot-com industry was booming and the installed capacity of fiber optic lines was doubling every three months. They applied for patents and considered quitting their day jobs.

Then the boom went bust.

“We mothballed it to be honest,” said Emmons, who holds 25 U.S. patents. “We joked that when all these other dot-com startups were going out of business our competitive advantage was our burn rate—we were bleeding slower than everybody else.”

In 2005 when the aftershocks of the dot-com bust had calmed, Berger’s wife, Caroline, heard about the new Minnesota Cup competition and prompted Emmons and Berger to dust off their idea. They polished their business plan, put together a compelling presentation and beat 600 other entrants. “The Minnesota Cup was a great third party validation, a fabulous experience for us,” said Berger, who also has an MBA from the University of Minnesota and works at Fiserv’s Personix division, a leading source for plastic card manufacturing and personalized print/mail services. “It really re-energized the whole effort.”

The \$25,000 prize helped them recoup a portion of the \$100,000 in personal funds they have invested so far. It also provided them with advisory services from Wells Fargo and the Maslon law firm, media exposure, and an opportunity to network with people who have provided invaluable help.

Emmons recently left his job with Proctor & Gamble’s PUR Water Filter brand to devote himself to the startup full-time. He and Berger are looking for venture capital or a corporate partner to help fund the remaining development and qualification testing.

“We’re in it for the long haul,” says Berger. “We always believed we had the best optical switch. Now we’re confident the market timing is finally right.”

And another problem will be solved.

PAVING A NEW WAY

A few miles away, Troy Achterkirch (ME '94) demonstrates a solution to a very different problem.

He stands on what appears to be a traditional brick patio. In fact, the pavers are made out of recycled tires and plastic bottles and weigh only about a third as much as brick or concrete. He stoops, removes a few bricks from their grid-like base and rearranges them into a new pattern as quickly as a card dealer

(From left to right) Institute of Technology alumni Andy Vander Woude, Steve Smith, and Troy Achterkirch are part of a team of business partners who have created an alternative to the traditional paver using 99 percent recycled materials. Their idea helped them win the 2006 Minnesota Cup competition.



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—JOHN BERGER

by the University.

“An engineering education is four years of problem solving,” Berger said. “By the end, you’re just a problem-solving machine. Everything you look at in life, you’re thinking, how can I solve this?”

Their ultimate search for a solution began with a casual conversation. One day in the late 1990s they were discussing the growth of fiber optics, and Emmons mentioned an interesting problem he had encountered in a past job at ADC Telecommunications.

Fiber optic lines have revolutionized telecommunications but switching light from one fiber to another has been difficult because the lines are as fine as a human hair. As a result, fibers often must be attached to larger lenses and aligned by hand, a process that is labor-intensive and results in an expensive and space-consuming switch.

Was there a way to “build a better mousetrap”? Berger and Emmons started brainstorming. They designed a switch with optical fibers bundled onto two armatures that moved in arcs. The switch could be programmed to “remember” the location of each

“Our product addresses many problems with one solution.”

—STEVE SMITH

shuffling a deck.

“You can do any different sort of patterns that you want,” Achterkirch said. “It pre-aligns everything for you.”

Things are snapping into place for his company, too. VAST Enterprises—a startup of five people, most of them Institute of Technology alumni—has created an alternative to the traditional paver using 99 percent recycled materials. Last year, the company became the second winner of the Minnesota Cup, and now the startup is preparing to ramp up manufacturing and distribution in time for the spring season.

“Our product addresses many problems with one solution,” says Steve Smith (ME '94 and M.S. MOT '04), another member of the team. “We make an eco-friendly green product out of recycled materials. It's lighter, better performing and looks better than traditional concrete pavers.”

The idea took hold a few years ago when Achterkirch, the general manager of Thermotech injection molding facility in Hopkins was approached by a colleague, Steve Thorkelson, who had an idea for easing the back-breaking labor of installing pavers. The two developed a prototype and decided to bring in more expertise by tapping into a network of Institute of Technology alumni.

Achterkirch contacted Smith, a college friend who was working at Victory Motorcycles, a division of Polaris. In turn, Smith recruited Andy Vander Woude (M.S. MOT '04), a colleague from the Institute of Technology's master's program in Management of Technology (MOT). At that time, Vander Woude was working as director of product marketing at the security firm Fargo Electronics. Later, they rounded out the team by recruiting George Solnitzky, a veteran of the construction and real estate industries.

“One of the smart things we did was to put together a team that was very complementary in our strengths in different areas,” says Vander Woude.

They spent last year engaged in research, seeking patents and developing a business model. They decided to initially focus on the green building industry—a fast-growing area of the construction business. Their invention offers a new use for the 300 million tires scrapped per year in the United States. Each square foot of patio uses the equivalent of about half a car tire and six gallon milk jugs (used as a binder).

The materials will cost more than traditional pavers, but reduced labor will make the total price of installation roughly equal, says Vander Woude. The bricks, which come in a variety of colors, snap into a base as easily as LEGOs. Afterwards they are locked in place with sand just like traditional pavers.

Their idea already has won kudos. The pavers will be featured on an upcoming episode of “Landscape

Smart” on HGTV. Last year, VAST won the second Minnesota Cup competing against more than 600 entries. After they unveiled their concept to the competition judges, they pointed out the window at a patio that had been assembled during their 15-minute presentation. Litman, one of the judges, said the VAST team made a compelling case that “they not only have a great product but something that will really move the needle.”

Smith and Vander Woude recently began working at VAST full time after quitting their day jobs. As they sit inside their new offices along the banks of the Mississippi River in Northeast Minneapolis, they're betting that the paving stone—a technology that hasn't evolved much in the last few thousand years—is ready for a retreat.

Smith explained, “The fear of not doing this was greater than the fear of doing it and failing.” ■

FOR MORE INFORMATION see www.vast-enterprises.com



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2007 MINNESOTA CUP
LET THE INNOVATION BEGIN

THE THIRD ANNUAL MINNESOTA CUP competition will accept entries from the end of March through the end of May. The contest seeks “the next great entrepreneurial success story in our state” and has drawn more than 600 entries each year for the past two years.

Entries will be judged on innovation, commercial viability and quality of presentation. Five finalists will make presentations to a panel of executives, investors and entrepreneurs at a final event in the fall.

The winner will receive \$25,000 in seed capital and advice from the Wells Fargo Advisory Board (made up of leaders in finance, accounting, legal and management support services).

Second and third place winners will receive \$5,000 and \$2,500.

There also is a separate category for student entrepreneurs with a \$5,000 prize. Entrants must be full-time students and have less than five years of professional work experience.

FOR MORE INFORMATION, see www.breakthroughideas.org