



Innovator and Inventor of the Year

The Innovator and Inventor of the Year awards, presented by the Office of Technology Management, recognize UIC researchers for innovative spirit and their invention's potential impact to society. The awards include a \$3,500 prize.

Insulation saves energy, costs

By Jeanne Galatzer-Levy

Alan Feinerman's experiment with empty yogurt containers led to a start-up company, two patents, two Small Business Innovative Research awards from the National Science Foundation and two UIC prizes for innovation.

"It's been a learning experience," said Feinerman, who adds the Innovator of the Year Award to his 2011 Inventor of the Year honors, both from UIC's Office of Technology Management.

Feinerman, associate professor of electrical and computer engineering, developed an insulation that is light, thin and inexpensive, produced by his company, Thermal Conservation Technologies.

"Almost half the energy we use is lost through poor insulation," he explained. "We've been trying to commercialize an advanced thermal insulation for a variety of uses, including refrigerated transportation."

Feinerman's company produces a thin vacuum insulation panel made with inexpensive tensile supports and a stainless steel, puncture-resistant exterior.

Feinerman knew that a vacuum would make a good insulator.

"We all know it in the form of a cylinder we call a thermos," he said.

Vacuum insulator panels made with the same metalized plastic film found in a thermos have been around a long time, but Feinerman said the product is inefficient and expensive.

"I thought, 'I can do better,'" he said.

The problem for vacuum insulation is withstanding atmospheric pressure, 15 pounds per square inch or 2,000 pounds per square foot.

"That means if you have a one-foot panel, you have a Mini Cooper trying to crush it," he said.

"I wanted a material that would be lightweight and non-conductive, and plastic seemed perfect," he said.

He started by putting three yogurt cups on his basement floor, then placing a 250-pound weight on top.

After documenting the resulting crash — and reassuring his wife that he was OK — Feinerman got to work on a tensile structure that doesn't buckle because the materials are under tension.

This elegant structure, which looks like a suspension bridge, is "better and cheaper." It is the basis of his patents, Feinerman said.

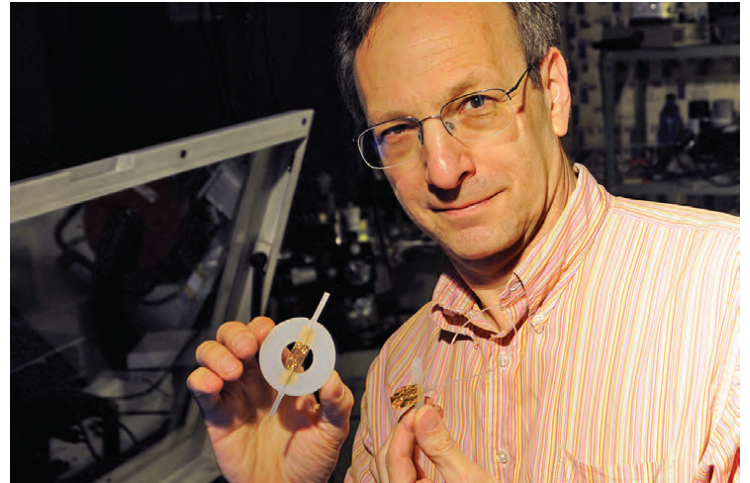


Photo: Kathryn Marchetti

"Almost half the energy we use is lost through poor insulation," says Innovator of the Year Alan Feinerman.

The Thermal Conservation Technologies team includes the firm's president, Prateek Gupta, a 2008 Ph.D. graduate in materials engineering who also has an MBA from University of Chicago, and scientist Michael Walsh, an engineering Ph.D. from Northwestern University who was a postdoctoral fellow at National Institute of Standards and Technology.

Feinerman majored in applied physics in

college, but when he found his first job at Polaroid boring, he decided to return to school.

He was lucky to find a mentor "who was interested in using physics to solve problems, which is exactly what I wanted to do," he said.

"I've always just liked science and if something bothers me, I start thinking, 'Is there a better way?'"

"It's a curse I was born with."

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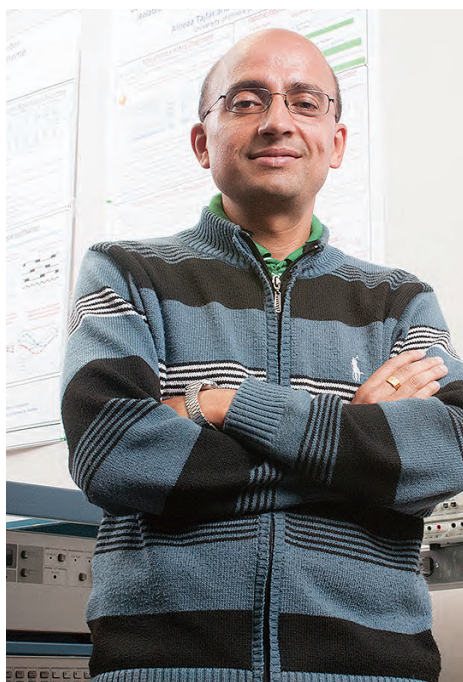


Photo: Joshua Clark

"I literally enjoy my work," says Inventor of the Year Sudip Mazumder.

Efficient, reliable and small power systems

By Christy Levy

Sudip Mazumder faces a dilemma: how do you create a power electronic system where the requirements are contradictory?

Mazumder is creating highly efficient and reliable systems that also take up a small amount of space.

"How do you come up with answers when those things do not go hand-in-hand together? It's a design challenge," said Mazumder, professor of electrical and computer engineering.

It's a challenge he accepted and found solutions for through his patented power electronics technology. For his ingenuity, Mazumder was awarded UIC's Inventor of the Year award.

Mazumder's research focuses on interactive power electronics and power networks, smart grids, energy storage and

renewable and alternate energy options for power electronic systems.

He designs reliable, efficient, sustainable and economical power electronics that can be used in technology ranging from smart power grids to electric vehicles.

"The objective of the electronic system is that you are really controlling power, which is at a higher voltage and current, using intelligent devices and systems," Mazumder said. "The innovations I have address some of the issues including efficiency, reliability, power density and cost."

Devices exist on the market for similar purposes, but the difference is that Mazumder's patented devices are optically controlled rather than electrically controlled.

"The advantage of having an optical device is that the impact of the electromagnetic noise associated with switching large electrical power is mitigated," Mazumder said. "Optically, it makes devices more efficient in terms of the mechanics used to turn them on and off."

Mazumder joined UIC in 2001 after receiving his doctoral degree at the Virginia Polytechnic Institute and State University.

He received his master's in electric power engineering at Rensselaer Polytechnic Institute in New York and bachelor's degree at the University of Delhi, India.

His interest in power electronics stems from his master's degree project in power electronics, when the field was just emerging.

"When you make something work, the interest grows and you think, 'Maybe I can do more,'" he said. "The very notion of controlling power, it's exciting."

Power electronics is a practical field, Mazumder said, with a range of applications. "It doesn't always get the limelight — most people don't look at an electronic vehicle and want to know something about the power system," he said. "But it's a global field, and power and energy are fundamental."

Mazumder encourages the undergrads and graduate students he teaches in the College of Engineering to follow their passion.

"If your heart isn't in it, then the time you put in doesn't always matter," he said. "If you work hard, it often pays off."

"I literally enjoy my work. I don't even know how the time passes by some days."

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