

# Ready Response

Computer science professor Shashi Shekhar

Our world is changing. Luckily, U researchers are discovering ways to better prepare for unexpected events.

by Kermit Pattison

As Shashi Shekhar watched video footage of clogged highways leading out of New Orleans during Hurricane Katrina, he witnessed a failure in evacuation planning. He also saw a chance to make it better.

The Distinguished McKnight University Professor in the Department of Computer Science and some of his colleagues, including Jeffrey Wolff, '06 M.S., have developed a tool called Capacity Constraint Route Planning, or CCRP, which uses computer algo-

gorithms to determine optimal evacuation routes. "This research is trying to provide adequate tools to first responders," explains Shekhar.

The project grew out of his team's earlier research in routing (think MapQuest directions), which became focused on evacuation after the 9/11 attacks. Instead of moving one person, they now had to move thousands and consider factors such as traffic chokepoints and shelter capacity.

Shekhar's work shows that

dispersing people on foot yields dramatic benefits. A simulated evacuation of 100,000 people from the Minnesota State Fair revealed that if people walked one mile before climbing into their cars, the evacuation would take two hours and 37 minutes. If they got into their cars immediately it would take nearly nine hours (see sidebar).

Shekhar's work also demonstrates that phased evacuation—asking some people to wait—saves time in the long run, and that computer

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—Shashi Shekhar, Distinguished McKnight University Professor

algorithms are better suited than humans to make evacuation recommendations because of the vast amount of data involved.

In 2005, the Minnesota Department of Transportation used Shekhar's work to produce evacuation plans for the Twin Cities as part of a homeland security project. Shekhar is investigating ways to further develop the technology. "It's a tool that can help first responders in both planning and real time," he says. "If faced with an event like a highway choked because of a truck accident, in a minute they could specify alternative routes."

## Exit Strategy

Computer science professor Shashi Shekhar and his team have developed a method to determine the best evacuation scenarios in emergency situations. Here's what they found for the Minnesota State Fair:

### 20,000 people walking 1 mile

Evacuation time: 42 minutes

### 20,000 people driving 1 mile

Evacuation time: 1 hour 48 minutes

### 100,000 people walking 1 mile

Evacuation time: 2 hours 37 minutes

### 100,000 people driving 1 mile

Evacuation time: 8 hours 55 minutes

**View computer simulations of State Fair evacuations at [giving.umn.edu](http://giving.umn.edu)**

## Planning Starts at Home

Carol O'Boyle also saw an opportunity to help a group of first responders—health care workers.

O'Boyle, an assistant professor in the School of Nursing, founded the Minnesota Emergency Readiness Education and Training program, which trains statewide health care personnel to respond to bioterrorism and other emergencies. Funded by a \$2.7 million federal grant, the program will train nearly 10,000 nurses, physicians, pharmacists, psychologists, social workers, veterinarians, and administrators in its first three years.

The first lesson: Planning begins at home, since health care workers won't be able to do their jobs if they haven't prepared to protect their own families. "When people have that worked out, it gives them a more secure feeling," says O'Boyle. "The challenge is to prepare when there's no imminent danger."

Disaster drills form another part of the curriculum. Last summer in the Iron Range town of Virginia, a simulated chemical explosion taught participants how to use protective gear, decontaminate victims, and administer treatment. "We react emotionally to crises," says O'Boyle. "One of the ways you control the emotional response is by building familiarity with it."

These workshops also strengthen ties between key community partners who will need to rely on each other during emergencies. According to O'Boyle, "That integration of effort is essential. It's what the federal government wants and it's thrilling for us to see it."

## Focus on Flu

Similar interdisciplinary teamwork is helping the U monitor a flu pandemic. The new Minnesota Center of Excellence for Influenza Research and Surveillance is one of six such sites in the United States funded by the National Institutes of Health, which will provide \$22.5 million over seven years. Another \$3 million from the U.S. Centers for Disease Control will allow the U to investigate the human-animal interface of influenza.

"Disease surveillance is really the backbone of preparedness," says Marguerite Pappaioanou, the principal investigator and professor in the School of Public Health. "The more we know what we can expect day to day, the more we can detect any blips."

The center will coordinate studies in eight countries, including monitoring wild birds in U.S. wetlands and coastal Vietnam, poultry and swine on domestic farms, and wild bird markets from the United States to Laos. Information gained about the genetic makeup of viruses will help researchers develop vaccines.

The U was chosen because of its long history of disease surveillance among poultry and swine. "The U has some of the country's top experts," says Pappaioanou. "With this center, we just pulled everybody together in a coordinated effort on surveillance."

*Kermit Pattison is a writer based in St. Paul.*

# Legacy



**New Path to Success**  
 Preparing undergrads  
 for the game of life

Your lab results  
 aren't what you  
 expect, but  
 you're okay  
 with that



A prof just  
 received  
 private  
 funding and  
 hires you  
 to help with  
 a big  
 research  
 project

## What's the Big Idea?

Donors inspire  
 the next generation  
 of entrepreneurs

## Ready Response

U researchers plan  
 for a changing world

Good  
 writing  
 is an  
 essential  
 element  
 in your  
 chemistry  
 major



# Legacy



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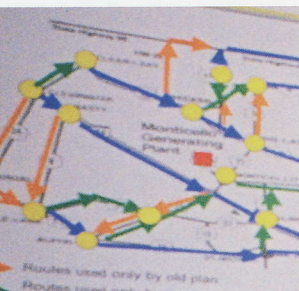
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U researchers are discovering ways to make us better prepared for unexpected events.

### On the cover:

A key component of the U's transformation is a redesign of the undergraduate experience to keep pace with the changing needs of today's student, tomorrow's employer, and a 21st-century world. The University hopes to challenge students to reach their academic goals and leave room for activities that make the undergraduate experience enriching and, well, fun. *Adventure begins on page 6.*

Visit [giving.umn.edu](http://giving.umn.edu) for these multimedia Web extras:

**Video of an adventure** learning trek to the Canadian Arctic  
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**A computer simulation** of the Minnesota State Fair under evacuation  
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