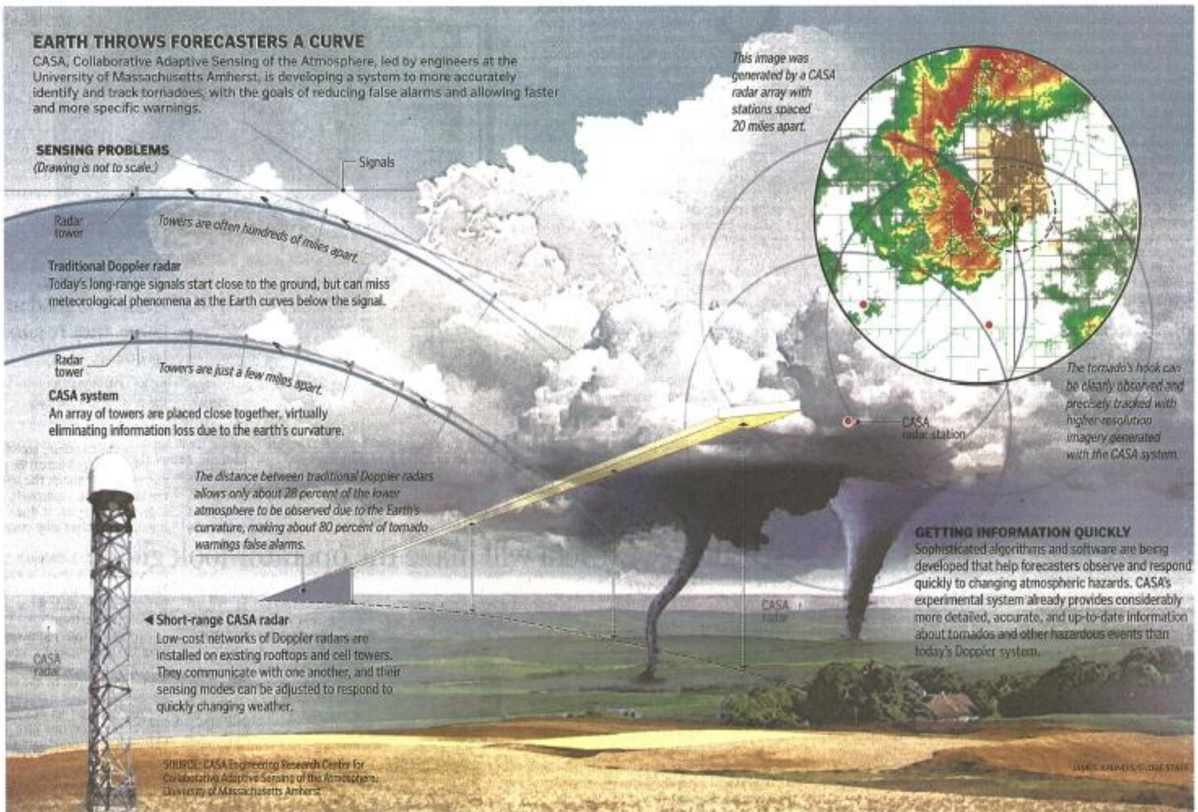
# Business

## Science&Innovation




# PRECISION TWISTER TRACKING

## UMass team leads project to develop a system of far more accurate warnings

By Marion Davis
GLOBE CORRESPONDENT

The storm that hit Oklahoma on May 24 had been brewing for hours. Forecasters saw it on the Doppler radars and issued an early warning.

Shortly before 5 p.m., the radars showed a twister heading into Newcastle. Lee Kuhlman, who leads a team of storm spotters, sent them out to look. The town's emergency manager dispatched rescue teams and sounded an alert siren.

But then, between Doppler scans, the powerful EF4 tornado changed direction. The spotters couldn't see it — it was wrapped in rain — but Kuhlman did on a separate, experimental radar system.

"It completely changed our target area," Kuhlman said. "The emergency manager got on the radio, and with literally minutes to spare, got EMS and fire to move, possibly out of the way of the storm."

The system Kuhlman used is part of a $43 million, 10-year project called CASA, for Collaborative Adaptive Sensing of the Atmosphere, that engineers at the University of Massachusetts Amherst have been leading since 2003.

Funded by a highly competitive National Research Foundation grant, CASA is a partnership with state universities in Colorado, Oklahoma, Puerto Rico, Virginia, and Delaware, the National Weather Service, technology giants Raytheon Co. and ITT Corp., and specialty manufacturers including EWR Weather Radar and Vaisala, and Weathernews Inc.

The project's goal, director David J. McLaughlin said, is to create a better hazardous-weather warning system that gives geographically specific, actionable information to all who need it.

The United States has the best Doppler network in the world, McLaughlin said, and it does "a pretty good job" with tornadoes, issuing warnings for 80 percent. But roughly 80 percent of warnings turn out to be false alarms, and none are very specific.

Take the June 1 tornadoes that hit Western Massachusetts.

In the Springfield area, there were three deaths,

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## 'Cambridge crude' may charge up e-cars

By Calvin Hennick
GLOBE CORRESPONDENT

Electric cars have yet to make the sort of

## Bio-sensor work gets MIT priz

By Mark Baard
GLOBE CORRESPONDENT

Sensors embedded in consumer and medical devices can do much to measure a person's health. Monitors strapped to the chest measure a heartbeat. GPS transponders gauge how far

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# Bio-sensor work gets MIT prize

By Mark Baard
GLOBE CORRESPONDENT

Sensors embedded in consumer and medical devices can do much to measure a person's health. Monitors strapped to the chest measure a heartbeat. GPS transponders gauge how far and fast an individual walks or runs. Accelerometers and gyroscopes count footfalls, and can warn of the onset of disease by noting a change in gait.

But getting sensors to work inside the body is another story.

The rigidity and sharp edges of semiconductor wafers, for example, make them a poor match for soft tissues and organs.

John Rogers, a materials scientist and physicist at the University of Illinois, is working with his colleagues to develop thin, stretchable, and flexible "biointegrated electronics," which could line the walls of failing hearts or the bumpy surfaces of the brain.

Such technology could be used to build devices that conform tightly to organs, allowing doctors to better map, measure, and modify body functions, Rogers said.

The idea is to mesh biointegrated electronics, which have layers of silicon 100 nanometers thick, with organs.

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# MIT prize cites work on sensors

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"We eventually hope to blur the distinction between man-made circuits and devices and tissues of the body," said Rogers, who this week will receive a $500,000 Lemelson-MIT Prize for his work in biointegrated electronics and other fields, such as solar power.

For example, Rogers and his collaborators have created a cardiac catheter with an electronics-laced rubber balloon at the tip; it maps the inside of a heart valve and can send a charge to the source of irregular electrical signals.

A surgeon using the biointegrated electronics catheter would be able to do a "map and zap" procedure, identifying and ablating malfunctioning heart tissue in five minutes, said Marvin Slepian, director of interventional cardiology at the University of Arizona. He recently coauthored (with Rogers and others) an article about the catheter for the journal Nature Materials. It currently takes up to three hours to accomplish the same task using two catheters — one to map, and one to zap — Slepian said. Rogers hopes surgeons will be testing the catheter in humans within nine months.

He is receiving the Lemelson-MIT Prize partly for his ability to market the technologies he is helping to develop, said Michael Cima, an MIT engineering professor and faculty director for the Lemelson-MIT program.

In 2008, Rogers cofounded Cambridge-based MC10 Inc. to market so-called conformal electronics, which can reside on flexible substrates.

"He is responsible for a string of translatable ideas, which he's taken from the benchtop to industry," said Cima, who compared Rogers to Thomas Edison.

Rogers, 43, will speak this week at Eurekafest, an annual celebration students attend to be inspired by inventors.