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Thin panels could enhance collection of solar energy

By STEVE EVERLY

A collaboration that includes a University of Missouri engineering professor is aiming to revolutionize how solar energy is collected and converted into electricity.

Tapping solar energy now relies on photovoltaic panels, but that technology can take advantage of only about one-third of the radiation spectrum in sunlight.

But the research group that includes MU is taking a different approach that uses 90 percent of the spectrum, by using tiny antennas in paper-thin film. The approach is still in development, but the group is far enough along in the work, which began in 2005, that its members are confident it will perform as expected and eventually be commercially successful.

“This isn’t evolutionary, it’s revolutionary,” said Patrick Pinhero, an associate professor of chemical engineering at the University of Missouri in Columbia. “Ten years out I think we replace photovoltaics.”

The collaboration making the effort includes the federal Idaho National Laboratory, where Pinhero once worked, and MicroContinuum Inc. of Cambridge, Mass., a company started by former Polaroid scientists and engineers that turn laboratory-scale technologies into devices that can be mass produced. Garrett Moddel, a professor of electrical engineering at the University of Colorado, is providing expertise in the electronics needed to convert the solar radiation into electricity.

Besides solar energy, the technology could be used to collect waste energy in industrial plants. For example, the energy thrown off in the manufacturing of aluminum could be collected by the antenna film.

The approach relies on nanotechnology, which is the manipulation of material at the molecular level. Three square feet of the film contains 1.5 billion antennas. Pinhero said the film could be incorporated into roof shingles to collect solar energy or even custom made to power vehicles.

“If successful, this product will put us orders of magnitude ahead of the current solar energy technologies,” he said.

The group is seeking funding from the Department of Energy and has lined up partners that will provide matching funds as the technology progresses to the prototype and commercial stages.

Disaster onslaught: Relief groups scramble to cope

By DAVID CRARY

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Confronted with an unprecedented string of tornadoes, floods and wildfires, the American Red Cross and other relief groups are scrambling to raise money fast enough to meet the demand for help.

"The disasters just keep coming," said Red Cross spokesman Roger Lowe, reporting that the organization has spent \$41 million thus far responding to the seven-week onslaught while raising \$33.6 million to cover the costs.

Those figures were tallied before the latest violent storm system rampaged through a wide swath of the Midwest starting late Tuesday.

No single one of the recent disasters - not even the cataclysmic tornado in Joplin, Mo., on Sunday - poses a challenge on the scale that the Red Cross confronted after Hurricane Katrina in 2005. However, Red Cross officials said the period that began March 31 is unique in their memory for the sheer number of major natural disasters in such a short span.

During that period, the Red Cross has launched 29 separate relief operations in 22 states, responding to wildfires in Texas, flooding along swollen rivers, and the rash of tornadoes that have killed more than 500 people. More than 9,200 Red Cross disaster-responders have been deployed; they've served more than 2.1 million meals and snacks, and opened more than 200 shelters.

Lowe said costs are running high in part because of the long-term effects of many of these home-destroying disasters. For example, he said 93 people were still living in Red Cross shelters in Alabama, where tornadoes wrecked their homes a month ago.

"The public truly has been very generous, but the series of tornadoes and floods is really stretching our resources," Lowe said. "The fundraising is not keeping up with our extended needs, and we don't know how long we need to be providing shelter, food, mental health assistance."

So far, Lowe said, the Red Cross has been able to meet essential needs despite the gap between expenses and fundraising. One reason is the charity's Annual Disaster Giving Program, involving 28 companies that collectively donate more than \$15 million a year so that the money is in place for immediate disaster response.

Aside from government entities, the Red Cross is by far the largest U.S. disaster-relief organization, but many other national and local groups also are facing fundraising challenges as they respond to the recent calamities.

"We are really struggling," said Roger Conner, spokesman for Catholic Charities USA. "We've not seen this number and extent of spring storms in 40 years ... and we just don't have the outpouring of donations we would like. The need is huge."

Through mid-May - before the Joplin tornado - Catholic Charities had received about \$300,000 for the spring disasters, which Conner described as very low. He noted that the charity raised \$2 million in the same timespan after hurricanes Gustav and Ike in 2008.

The Salvation Army said it raised \$7.7 million in response to the tornadoes in the South in April but doesn't have an updated figure to account for this month's disasters. By comparison, it raised \$382 million for Katrina relief efforts.

The Southern Baptist Convention's North American Mission Board, which engages in disaster relief, said it has raised only about \$100,000 thus far for tornado relief work in a half-dozen states.

"That doesn't go far - to do as much as we're trying to do," said board spokesman Mike Ebert. In contrast, the board raised \$25 million for Katrina relief.

"The desire is there to help," Ebert said, referring to a steady supply of volunteers. "It's the donation part that seems to be lagging. ... A lot of these folks have ongoing economic issues and are in a recovery mode themselves."

Jim Rettew, a Red Cross spokesman deployed to Joplin, said another factor in the fundraising challenge was the tsunami and earthquake disaster in Japan in March, which prompted an outpouring of donations from Americans.

"What we've seen is when there are international disasters, the local donations go down," Rettew said. "We try to help them make a distinction - that we really appreciate that they've given to the international relief effort ... and now we need your help locally."

Local efforts to help have taken myriad forms - telethons, blood drives, collection drives. The University of Missouri, in support of the United Way's relief campaign in Joplin, is selling T-shirts with the slogan "One State. One Spirit. One Mizzou."

Greg James, development director for the southern Missouri region of the Red Cross, said some corporate donors have been generous. He cited gifts of \$1 million from Joplin-based Tamko

Building Products Inc., \$500,000 from Potash Corp., a fertilizer company, and \$350,000 from Wal-Mart Corp.

In Joplin, Red Cross volunteers running a shelter at Missouri Southern State University said they have received all the donated food and clothing they can handle.

But the shelter - which accommodated about 350 people on Tuesday night - needs money to assist the throngs of displaced residents, said volunteer Angela Statton-Hunt. As hospitals begin to release patients and people who fled Joplin on Sunday start to return, many people are finding their homes destroyed or severely damaged, she said.

"We really, really are in a need for monetary donations," Statton-Hunt said. She wasn't sure how much the local Red Cross branch had received but said, "I know we don't have enough."

The temporary shelter, where hundreds of cots lined the floor, could be needed for a prolonged period. Many new arrivals said they had nowhere else to go and no idea what they would do next.

Joe Petronis, whose apartment was destroyed, sat on a cot and fed his 2-year-old son, Alikia, spoonfuls from a cup of peaches. They had spent two nights in the shelter and were unsure how long they'd stay.

"We're talking about moving," Petronis said. "We haven't really figured it out yet."

At this stage, Red Cross officials are making no assumptions that the disaster onslaught will abate. The six-month Atlantic hurricane season begins June 1, and government forecasters expect it to be an above-average season.



Billions of cicadas begin emerging

Expert: Enjoy insect intruders.

By Janese Silvey

Wednesday, May 25, 2011

They're starting to crawl up your trees now, and in the coming weeks, there are going to be billions — that's with a "b" — of cicadas across the Midwest, mating and laying eggs on limbs.

And when the choir of 13-year cycle cicadas starts singing its mating song in unison, it might seem a little annoying, Bruce Barrett said. Rather than covering your ears and running for cover, though, Barrett encourages Columbians to sit back and enjoy the show.

"It's one of those magical moments in nature," said Barrett, a professor of entomology at the University of Missouri. "If you stop and think about it, this is really neat. Nature is elegant and sophisticatedly beautiful."

This year marks the final stage of a generation of bugs that was born in 1998 and has been living underground since. They've mostly been stationary, using sticky mouth parts to suck juices out of plant roots to survive.

Once they crawl up trees and plants, winged insects will crawl out of the hard shells, then mate and produce another generation that will burrow into the ground and return in 2024.

Outside the Enns Entomology Museum in MU's Agriculture Building this morning, entomology experts gathered to educate reporters about the 13-year cycle cicadas. One take-away is that the insects don't bite or sting or produce any sort of threat to humans. They can cause damage to some cultivated crops and landscaped trees by scarring tree branches, but there's not much landowners can do about it, Barrett said. He doesn't recommend pesticides, which aren't always effective.

If there's a certain tree you want to protect, wrapping cheesecloth netting around it might help. Of course, that won't rid you of the noise: You'll still hear the songs from cicadas on neighboring trees.

Cicadas can produce sounds up to 120 decibels — think rock concert or jet engine. They're loudest during the hottest times of day and should quiet down by bedtime.

Birds, skunks, snakes, frogs and a whole host of other predators will take care of some of the periodical cicadas. Because they're so plentiful, the 13-year cycle cicadas are an "easy buffet," Barrett said.

Cicadas are edible for humans, too. Barrett said records indicate Native Americans ate them and that insects aren't uncommon delicacies in other countries.

"Insects kinda have a bad rap," he said. "But in actuality, if you look at their cousins — shrimp, crabs — they're considered a delicacy."

Feeling adventurous? Recipes for cicada-portobello quiche, cicada cheese wontons and other creations are online.

Richard Houseman, an associate professor of urban entomology at MU, grew up in the West and has yet to experience an emergence of cicadas. "It's a phenomenon unique to this part of the world," he said. "I'm looking forward to seeing them this year. ... I'm curious and excited. I'm looking at this not as a noise but as a fun experience, a natural phenomenon."

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Professors say cicadas pose little threat

By Katy Mooney

May 25, 2011 | 5:54 p.m. CDT

COLUMBIA – The bulbous red eyes and loud buzzing of this summer's cicada brood might be intimidating, but professors from the MU College of Agriculture, Food and Natural Resources say the bugs are harmless.

"My main message is to fear not," Chris Starbuck, MU associate professor of horticulture, said.

Starbuck was one of four MU professors who talked about the cicada emergence during an informational meeting on Wednesday morning in the Agriculture Building on the MU campus. The experts addressed public concerns about the insects, especially relating to crops, orchards, trees and decorative landscaping.

The emergence should peak in Columbia about two to three weeks from now, the experts said. Cicada singing will increase as the weather warms and as more cicadas emerge from the ground.

"Just sit back and enjoy the show," entomology professor Bruce Barrett said.

The 13-year periodical cicadas began emerging in southern Missouri on about May 8, according to citizen reports, said Rob Lawrence, a forest entomologist at the Missouri Department of Conservation and an adjunct assistant professor of entomology at MU. The emergence began several days ago in Columbia.

This year's cicada swarm is known as Brood 19, or the Great Southern Brood. It is the largest brood in the country and extends throughout Missouri and much of the Midwest.

Temperatures must consistently exceed 60 degrees for cicada nymphs to creep out of the ground. Once they shed their skins and enter adulthood, they live for about six weeks feeding on plant juices. Male cicadas "sing" to attract mates.

Female cicadas lay their eggs in living branches between one-eighth and three-fourths of an inch in diameter, Lawrence said. Starbuck added that excessive egg-laying can damage twigs, but usually not to the extent that it endangers the life of a mature tree or shrub.

The insects may lay eggs on trees in orchards, but twig damage can be fixed with pruning, Barrett said.

Starbuck recommended people resist the temptation to use insecticide to kill cicadas. The poison harms birds and other animals, and it can kill beneficial insects. Pets might also suffer if they eat poisoned cicadas.

Wrapping mesh or cheesecloth around vulnerable branches is a better way to protect small trees or ornamental shrubs such as roses, Starbuck said.

THE TIMES OF INDIA

Is your kid into video games? Beware!

ANI | May 26, 2011, 02.44pm IST

Is your kid into video games? Beware! (Shutterstock photos/Getty Images)

A study has found that the brains of violent video game players become less responsive to violence, and that it in turn increases aggression.

The University of Missouri (MU) study helped explain why players of violent video games become more aggressive.

Bruce Bartholow, associate professor of psychology at MU, found that violent video games increase aggression by monitoring participant brain activity.

"Many researchers have believed that becoming desensitized to violence leads to increased human aggression. Until our study, however, this causal association had never been demonstrated experimentally," Bruce Bartholow, associate professor of psychology in the MU College of Arts and Science, said.

During the study, 70 young adult participants were randomly assigned to play either a non-violent or a violent video game for 25 minutes.

Immediately afterwards, the researchers measured brain responses as participants viewed a series of neutral photos, such as a man on a bike, and violent photos, such as a man holding a gun in another man's mouth.

Finally, participants competed against an opponent in a task that allowed them to give their opponent a controllable blast of loud noise. The level of noise blast the participants set for their opponent was the measure of aggression.

The researchers found that participants who played one of several popular violent games, such as "Call of Duty," "Hitman," "Killzone" and "Grand Theft Auto," set louder noise blasts for their opponents during the competitive task - that is, they were more aggressive - than participants who played a non-violent game.

In addition, for participants that had not played many violent video games before completing the study, playing a violent game in the lab caused a reduced brain response to the photos of violence - an indicator of desensitisation.

Moreover, this reduced brain response predicted participants' aggression levels: the smaller the brain response to violent photos, the more aggressive participants were.

"The fact that video game exposure did not affect the brain activity of participants who already

had been highly exposed to violent games is interesting and suggests a number of possibilities," Bartholow said.

"It could be that those individuals are already so desensitized to violence from habitually playing violent video games that an additional exposure in the lab has very little effect on their brain responses.

"There also could be an unmeasured factor that causes both a preference for violent video games and a smaller brain response to violence. In either case, there are additional measures to consider," he stated.

The article, "This Is Your Brain on Violent Video Games: Neural Desensitization to Violence Predicts Increased Aggression Following Violent Video Game Exposure", will be published in a forthcoming edition of the *Journal of Experimental Social Psychology*.

The Des Moines Register

FBL, students develop new app for iPhones

11:11 PM, May. 25, 2011

Written by ADAM BELZ

Students at the University of Missouri have helped Farm Bureau Financial Services build an iPhone app to help customers collect information for an insurance claim after a car accident.

The app, called My FBFS, also includes a gas mileage calculator, a game for kids, and simple ways to connect with an agent. Journalism and computer science students developed the app.

"A less conventional approach to mobile app development made a lot of sense," Scott Shuck, a Farm Bureau Financial Services vice president, said in a statement. "The fact that we could help students with a real-world, corporate experience through this process was an added benefit."

The free app is available at iTunes for iPhone, iPod Touch and iPad.

Mike McKean, an associate professor at the Missouri School of Journalism, said the project was good for students, who got real-world experience with a paying corporate client and learned how to work across disciplines.

"Our students are skilled in their chosen fields of study, but the opportunity to interact with peers from other majors, and draw from their perspectives and skill sets, is a unique and important part of their preparation for the business world they'll enter after graduation," McKean said.

Farm Bureau Financial Services is a brand of FBL Financial that sells financial services products in 15 states. FBL is a West Des Moines-based company that employs about 1,000 people in the metro area.