



SPRING 2008

# TEXAS Innovator

SUSAN COMBS  
Texas Comptroller of Public Accounts

TODAY'S IDEAS FOR TOMORROW'S TEXAS

*"We cannot make a profit unless we take care of the customer, and we can't take care of the customer unless we make a profit."*

— Gerard Arpey, AMR CEO

## ➤ NANOTECHNOLOGY

### Quantum dots for solar power

Scientists at Rice University have devised a cheaper, faster way to produce molecular specks of semiconductors called quantum dots. The discovery could clear the way for better, less expensive solar energy panels.

Their work involves a new chemical method for making cadmium selenide quantum dots, which can effectively convert sunlight into electrical energy. Scientists at Rice's Center for Biological and Environmental Nanotechnology (CBEN) led the study.

"Our work knocks down a big barrier in developing quantum-dot-based photovoltaics as an alternative to the conventional, more expensive silicon-based solar cells," says Michael Wong, assistant professor of chemical and biomolecular engineering.

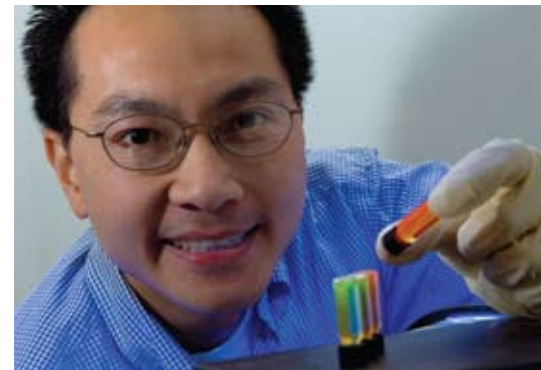
Quantum dots are megamolecules of semiconducting materials that are smaller than living cells. Scientists have studied them with an eye toward using them in medical tests, chemical sensors and other devices.

Researchers have found that four-legged quantum dots — tetrapods — are more efficient at converting sunlight into electricity than regular quantum dots.

There is still no efficient way to produce tetrapods, Wong says. Current methods lead to uneven particles. CBEN's formula produces same-sized particles, of which more than 90 percent are tetrapods.

The worldwide market for nanoelectronics was estimated at \$1.83 billion in 2005 and is forecast to reach \$4.2 billion by the year 2010, according to the *World Nanotechnology Market 2006* report by RNCOS Publishing Solutions.

For more information, contact Jade Boyd, (713) 348-6778, [jadeboyd@rice.edu](mailto:jadeboyd@rice.edu)



## ➤ MEDICAL SCIENCE

### Mapping the genome

A \$500,000 University of Texas System grant helped the University of Texas at Arlington's School of Nursing establish a Genomics Translational Research Laboratory (GTRL).

The laboratory's research focuses on how the entire human genome interacts not only with itself but with its outside environment, says Patricia Newcomb, an assistant professor at the GTRL.

"Because we focus on translational research, we ask questions about how genomics can influence the care of patients," Newcomb says.

The UTA nursing program, which has more than 900 students, organized the facility's ribbon cutting in January 2008. GTRL is expected to include several Ph.D. and master's degree students within a few years.

For more information, contact Carolyn Cason, [ccason@uta.edu](mailto:ccason@uta.edu), (817) 272-5781, [www.uta.edu/nursing/](http://www.uta.edu/nursing/)



see more  
**Innovator**  
online

Find *Innovator* on the Web  
[www.texasinnovator.org](http://www.texasinnovator.org)

Get *Texas Innovator* in your inbox!  
Why wait for the printed copy? Now you can have *Texas Innovator* and its exciting content in your e-mail inbox. All you have to do is drop us an e-mail at [txinnov@cpa.state.tx.us](mailto:txinnov@cpa.state.tx.us) with "Sign me up" in the subject line. We'll do the rest.

To read an issue or subscribe to our publications, go to [www.window.state.tx.us/fnotes/](http://www.window.state.tx.us/fnotes/) or call (800) 531-5441, ext. 3-4900, or direct in Austin at 463-4900.

Inside

- Distant early warning
- From waste to the tank
- Cool technology
- Too cool of a school
- A quiet night on the road
- The In Crowd - Paul Castella
- World of Innovation

Find *Innovator* on the Web at [www.texasinnovator.org](http://www.texasinnovator.org)



SPRING 2008

# TEXAS Innovator TODAY'S IDEAS

## A Message from Comptroller Susan Combs

*When hurricane season comes to the Gulf of Mexico, a Texas-based flood prediction center will be watching. The group comprises local governments and eight universities in Texas and Louisiana. Their unique collaboration will provide warnings to coastal residents about storm strength and flood damage as well as advice on evacuations.*

*You'll find this innovative idea along with others on genome research, alternative energy sources, reduced diesel engine emissions and more in this issue of Texas Innovator. And visit us online at [www.texasinnovator.org](http://www.texasinnovator.org) for Web-only content, including stories on a futuristic space suit for tomorrow's astronaut, and a treadmill that helps brain-injury sufferers learn to walk again. Texas Innovator, like Texas itself, is full of innovators. As it inspires your creativity, we invite you to e-mail us at [txinnov@cpa.state.tx.us](mailto:txinnov@cpa.state.tx.us).*

**SUSAN COMBS,**  
Texas Comptroller of Public Accounts

**DELANE CAESAR,**  
Director of Public Outreach and Strategies

**CREATIVE DIRECTORS**  
Beth Hallmark and Dan Lynch

**EDITOR:** Clint Shields

**DESIGNERS:** Dwain Osborne and Raul Santos

**CONTRIBUTING TO THIS ISSUE:**  
Michael Castellon, Jack Grieder, Karen Hudgins, Tracey Lamphere, David Rivers, Barbara Schlieff, Karl Wolfshohl and Bruce Wright

✦ DENOTES A TEXAS INNOVATOR

✦ ATMOSPHERIC SCIENCE

## Distant early warning

A new, Texas-driven initiative aims to help coastal communities and state and local officials weather the worst effects of the next perfect storm.

The 80th Texas Legislature created the Severe Storm Prediction, Education and Evacuation from Disaster Center, or SSPEED. The program is a unique collaborative effort based at Rice University involving six other Texas universities, the Louisiana State University Hurricane Center and the Houston-Galveston Area Council of Governments.

"The main mission is to address the issue of severe-storm prediction and link that to both coastal and inland flooding, infrastructure risk and evacuation," says center director Phil Bédient, a Rice University professor of engineering. "Right now, a lot of those functions are in separate state and federal agencies, and there's not a lot of



Hurricane Rita before her 2005 Texas landfall.

dialogue between them. We're attempting to bring that all under one umbrella and get the different groups talking to one another."

Bédient, nicknamed "Dr. Flood" by peers, says SSPEED will supplement official weather warnings with predictions of onshore flooding and other effects. "Instead of just relying on the National Weather Service to talk about where the hurricane is going to go, we'll be bringing the predictions inland and talking about exactly where flooding is going to occur," he says.

For more information, contact Philip Bédient, [bedient@rice.edu](mailto:bedient@rice.edu), or visit <http://hydrology.rice.edu/sspeed/>

MATERIALS SCIENCE

## From waste to the tank

U.S. ethanol production is nearing 7 billion gallons annually, with the majority of that made from sugar-laden food crops such as corn and sugar cane. California-based RangeFuels is attempting to diversify the ethanol supply through cellulosic ethanol, says Mitch Mandich, chief executive officer for RangeFuels. Cellulosic ethanol can be produced from lawn clippings, sawdust, agricultural and municipal wastes and almost anything else that contains cellulose.

RangeFuels plans to build a commercial scale plant in Georgia that will ultimately produce 100 million gallons of cellulosic ethanol annually, at about the same price as corn-produced ethanol.

RangeFuels expects to break ground at the facility in November 2008.

For more information, contact Mitch Mandich, [info@rangefuels.com](mailto:info@rangefuels.com), (303) 410-2100, or visit [www.rangefuels.com](http://www.rangefuels.com)



ENERGY/UTILITIES

## Cool technology

New York City, with its predominantly concrete, steel and asphalt construction, is typically seven or eight degrees hotter in the summer than surrounding areas.

Credit Suisse is cooling its offices with ice in Manhattan's Metropolitan Life building.

Large steel holding tanks, each storing thousands of gallons of water, are frozen overnight when energy demands and costs are low. During the day, the melting ice provides chilled air that circulates through the offices.

William Beck, head of critical engineering systems for Credit Suisse, estimates the ice-cooling system will save the company \$1 million annually in energy costs.

For more information, contact William Beck, [bill.beck@credit-suisse.com](mailto:bill.beck@credit-suisse.com)



Source: National Aeronautics and Space Administration

EDUCATION

## Too cool of a school

The University of Texas at Austin has purchased a 2.4-acre, \$1.5 million site for its 50,000-square-foot UT Elementary School campus, the first university-school-community partnership of its kind in Texas. The 260-student public charter school, which opened in 2003, has been rated “exemplary” by the Texas Education Agency based on its spring 2007 Texas Assessment of Knowledge and Skills (TAKS) scores.

“We are committed to a delicate balance between rigorous academic expectations and a nurturing educational environment that respects each child, parent and teacher,” says Ramona Treviño, the school’s principal.

“We are changing the lives of students in our school, but UT’s motto is, ‘What starts here changes the world,’ so we’ve got more work to do.”

*For more information, contact Ramona Treviño, ramonatrev@austin.utexas.edu, (512) 495-9705, or visit [www.utexas.edu/provost/elementary](http://www.utexas.edu/provost/elementary)*



## The In Crowd

*Innovations and innovators come in all forms. In each issue of Texas Innovator, The In Crowd will help bring you a little closer to some of Texas’ brightest innovators, their perspective on why Texas is ideal for new approaches and even tips on fueling the creative mind inside us all.*

## Paul Castella, Ph.D., MBA

CardioSpectra Inc. – President and CFO



Innovation’s road can be long and bumpy, but also navigable with the right people and a lot of patience, says Paul Castella, president and chief financial

officer for CardioSpectra Inc.

“You need to surround yourself with the right people, be open to the right idea when it comes along, have a lot of staying power and always retain the flexibility to adapt as circumstances and opportunities evolve,” he says.

San Antonio-based CardioSpectra specializes in Optical Coherence Tomography (OCT), a technology that provides body tissue images with greater speed and resolution than current practices, including ultrasound.

The group has several OCT patents and is working toward Federal Drug Administration approval and a marketplace launch.

Historically, Texas has needed improvement in funding and developing its intellectual property into successful products, says Castella. But that is starting to change.

“If you couple that with the advantages that Texas does have, such as people with a great ‘can do’ attitude, a substantially lower cost of doing business and the fact that it is a great place to live and raise a family, then you have fertile ground for entrepreneurs looking to start up new businesses,” he says.

*For more information, contact Paul Castella, paul@targetedtech.com, (210) 582-5820*

*Find the expanded interview online at [www.texasinnovator.org](http://www.texasinnovator.org)*



The IdleAire service module.

ENVIRONMENTAL SCIENCE

## A quiet night on the road

Trucks are the delivery backbone for U.S. goods. But truck engines often idle all night while their drivers sleep, producing tons of engine emissions and lots of noise as they wear down engine parts.

Tennessee-based IdleAire has the answer. The IdleAire service module, installed at 130 locations, including 21 in Texas, attaches to the truck’s cab allowing the driver to plug in a television and laptop computer and enjoy Internet access, cable TV, electrical outlets, a telephone connection and heating and air conditioning.

The module lets drivers unwind with comforts similar to those they would have at home, says John Doty with IdleAire’s Corporate Communications.

“From a benefits perspective, IdleAire provides higher-quality rest or sleep without the noise, vibrations or emissions of an idling engine,” says Doty.

IdleAire designs the layout for each site, installs the units at no cost and shares profit with the truck stop. The standard rental rate for using the service is \$2.18 per hour. The company claims its installations could eliminate about 12.5 million tons of emissions and save about 2 billion gallons of fuel annually.

*For more information, contact John Doty, jdoty@idleaire.com, or visit [www.idleaire.com](http://www.idleaire.com)*



## A real winner

The Texas Commission on Environmental Quality awarded IdleAire a 2005 Texas Environmental Excellence Award in the “Innovative Technology” category.



# TEXAS Innovator

Visit Window on State Government on the World Wide Web at:  
[www.texasinnovator.org](http://www.texasinnovator.org)

Material in this publication is not copyrighted and may be reproduced. The Texas Comptroller of Public Accounts would appreciate credit for the material used and a copy of the reprint. Questions, comments and subscription requests can be directed to the Comptroller's Public Outreach and Strategies Division by contacting:

*Texas Innovator*

E-mail at [txinnov@cpa.state.tx.us](mailto:txinnov@cpa.state.tx.us)  
Fax: (512) 463-4226 or (800) 252-3620

Texas Comptroller of Public Accounts  
P.O. Box 13528  
Austin, Texas 78711-3528

Or call (800) 531-5441, ext. 3-3116;  
or 463-3116 in Austin.

In compliance with the Americans with Disabilities Act, this document may be requested in alternative formats. Contact the Public Outreach and Strategies Division at (512) 463-4900 or (800) 531-5441, ext. 3-4900 (VOICE), (512) 475-0345 (FAX), or visit the LBJ State Office Building, 111 E. 17th St., Room 301, Austin, Texas.

Texas Comptroller of Public Accounts  
Publication #96-401, Spring 2008

PRSR STD  
U.S. POSTAGE PAID  
AUSTIN, TX  
PERMIT NO. 1411



## Australia

Scientists researching drug therapies for children with Acute Lymphoblastic Leukemia (ALL) have found that a molecule called ABT-737 can make standard treatment more effective, according to findings published in the scientific journal *Blood*.

Richard Lock, chief of the Leukemia Biology Program at Sydney's Children's Cancer Institute of Australia, says the molecule enhances the effectiveness of the cancer-destroying drugs with little effect on normal cells. ALL is the most common form of childhood cancer.

*For more information, contact Richard Lock, [rlock@ccia.unsw.edu.au](mailto:rlock@ccia.unsw.edu.au), or visit [www.ccia.org.au](http://www.ccia.org.au)*

## Dubai

Dubai's newest luxury hotel will be unusual even for Dubai. The brainchild of designer and developer Joachim Hauser, the Hydropolis hotel will sit 70 feet below the surface of the Arabian Gulf.

The Hydropolis, scheduled for completion in 2009, will include a number of amenities including 220 guest suites, restaurants, a shopping mall, library and a theater.

*For more information, contact Mansoor Ijaz, or visit [www.crescent-hydropolis.com](http://www.crescent-hydropolis.com)*

## England

British researchers have identified a toxic compound in vegetables and fruit peels that kills certain human cancer cells. Salvestrol 40 is a natural repellent in plants, but with fruit peels often discarded, it is lacking in most diets. Scientists expect five to seven years of clinical trials before the research yields treatments.

*For more information, contact the Leicester School of Pharmacy, [PSecretary@dmu.ac.uk](mailto:PSecretary@dmu.ac.uk)*

## United States

Less insulin in the brain may increase your lifespan, and diet and exercise hold the key...

### *Want to know more?*

*Find this and more Texas Innovator exclusively online at [www.texasinnovator.org](http://www.texasinnovator.org).*



Find *Innovator* on the Web  
[www.texasinnovator.org](http://www.texasinnovator.org)