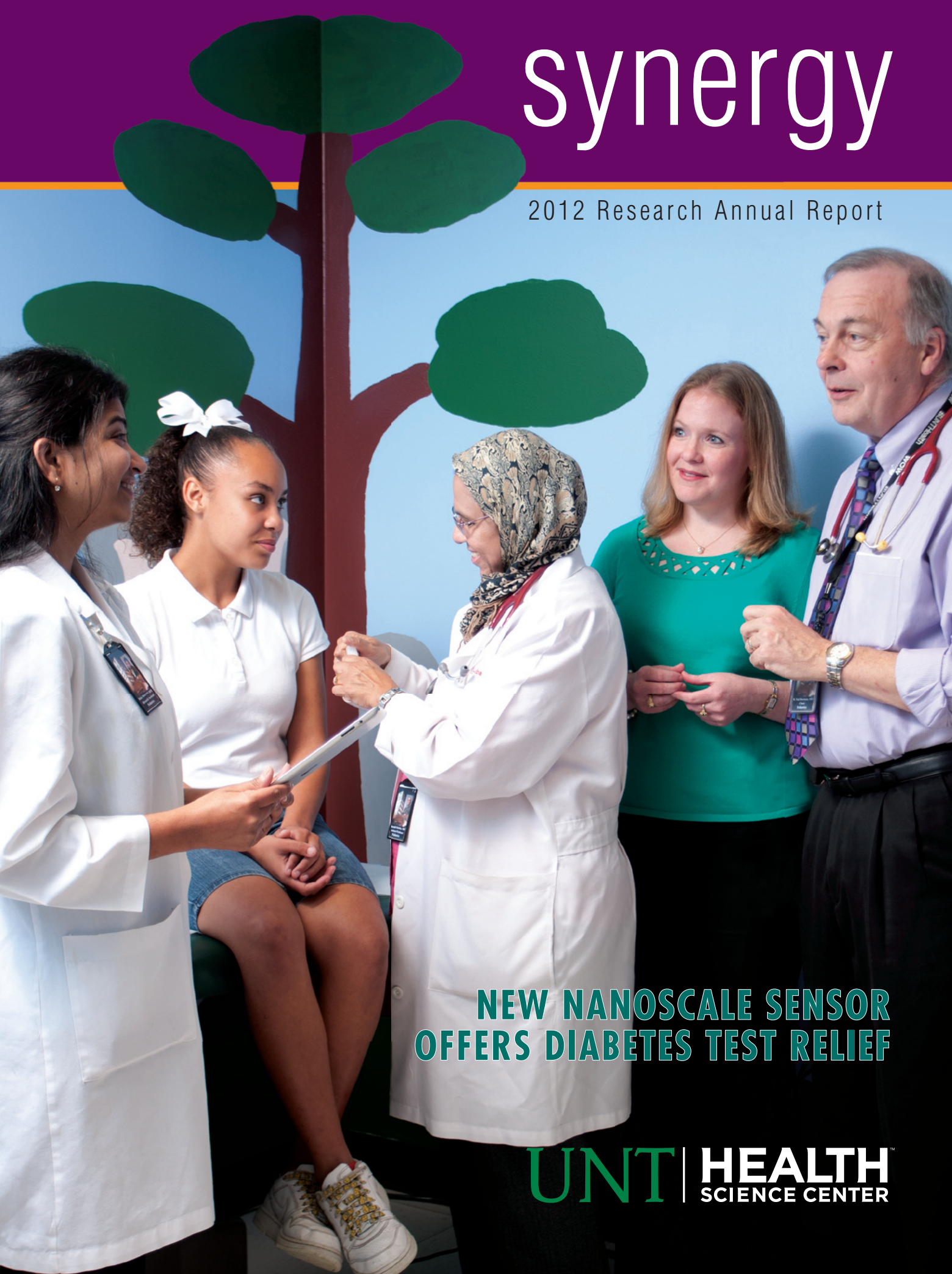


# synergy

2012 Research Annual Report



**NEW NANOSCALE SENSOR  
OFFERS DIABETES TEST RELIEF**

**UNT | HEALTH**  
SCIENCE CENTER



# UNTHSC continues emphasis on research and collaboration

It's hard to believe that this is the fifth edition of Synergy, the research report of the UNT Health Science Center (UNTHSC) and the 20th year that we are celebrating Research Appreciation Day (April 13). While it has been a tough year economically, UNTHSC continues to maintain and even grow research funding and produce quality research as other institutions deal with federal funding reductions. We also have continued to attract exceptional scientists, including Scott Walters to the School of Public Health whose research in addictive behaviors complements a number of other research activities on our campus and in the community. Sid O'Bryant, a translational researcher, who joins our aging and Alzheimer's group, brings expertise in early detection of Alzheimer's disease using a biomarker approach.

Our institution takes pride in working on early detection and prevention of disease. We have several community-based research studies funded through the Cancer Prevention Research Institute of Texas through the work of Katie Cardarelli and, in an independent study, Roberto Cardarelli. This couple, while working on different areas of cancer prevention, have already made an impact in the community with their early detection studies.

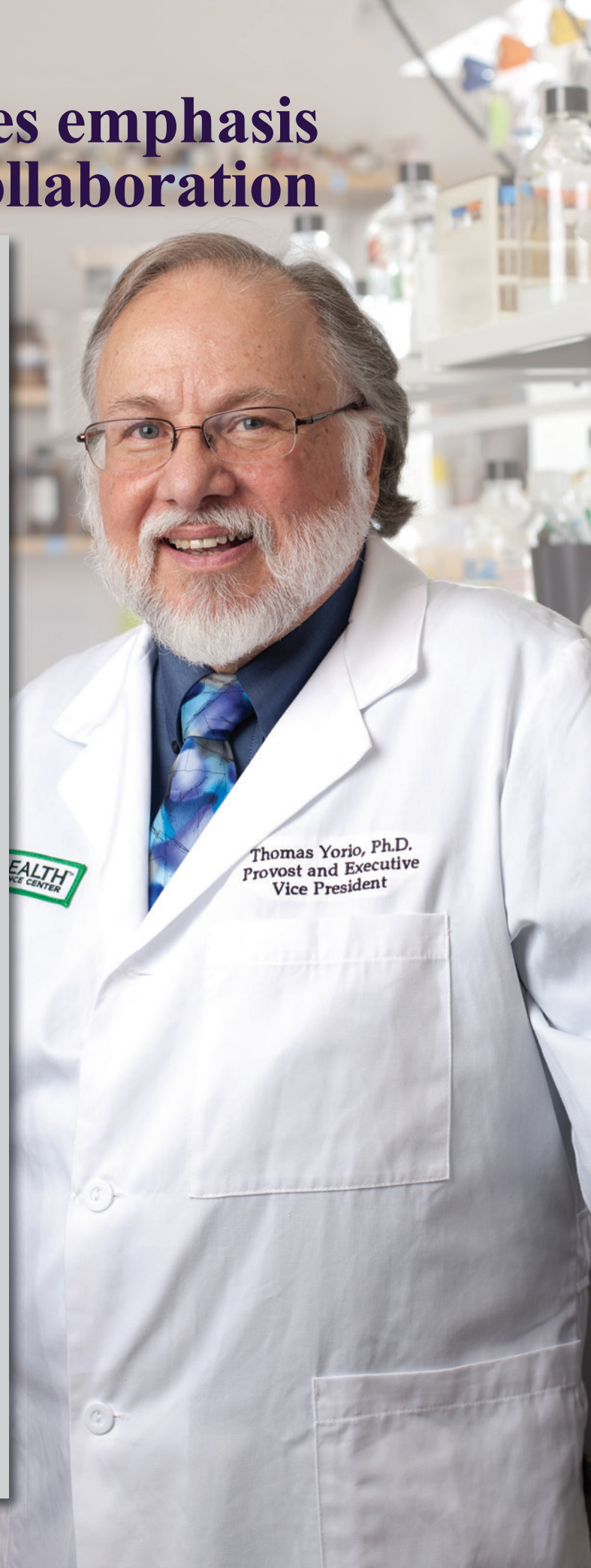
UNTHSC continues to be in the news with our Center for Human Identification, which helps bring closure to so many cases using DNA identity matches to identify crime victims. We also were in the national news media when a high school student, Shree Bose, working with faculty member Alakananda Basu, won the coveted Google Science Fair grand prize in the 17-18-year-old category. You can read about her amazing journey to this recognition in this issue of Synergy. Or you can read about the Stomp for Life program that addresses childhood obesity under the direction of Susan Franks in Family Medicine. Thad Miller brings his new tuberculosis research award from the Centers for Disease Control to look at patient compliance in connection with this still troubling disease.

Each year, more students enter their research projects for scientific review at Research Appreciation Day. I continue to be amazed at the collaboration, depth and breadth of their research initiatives as they enhance the UNT Health Science Center's reputation for cutting-edge research.

As you can see we are hard at work conducting studies that will make a positive impact on the health and quality of life for all of us. Enjoy this edition of Synergy, and, if you would like further information about any of these projects or about our research efforts, please contact me.



Thomas Yorio, PhD  
Provost and Executive Vice President  
for Academic Affairs and Research



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Cover Photo: New collaborative research at the UNT Health Science Center could result in juvenile diabetes tests using saliva instead of blood.



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Synergy is produced by the Research Office and Marketing and Communications Department at the University of North Texas Health Science Center, 3500 Camp Bowie Blvd., Fort Worth, Texas 76107-2699. (817) 735-2000. The publication is produced annually. Articles may be reprinted in their entirety with acknowledgment. Address requests for photographs or illustrations to the editor at [news@unthsc.edu](mailto:news@unthsc.edu).

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# Lyme disease research, legislation allow aggressive treatment

**Summertime, when kids and grown-ups abandon the confines of the indoors and head outside** to camp, hike, fish and commune with nature — and all of her friends. Flies, mosquitoes and ticks are just a few of the critters that go along with summer outdoors. We all do our best to avoid the biting and stinging insects, but what happens if you are accosted by a tick? What are the myths behind Lyme disease and other tick-borne diseases in Texas?

At the UNT Health Science Center, Phillip Williamson, PhD, assistant professor of Forensic and Investigative Genetics and director of the Center for Tick-borne Diseases, is considered one of Texas' top experts in tick-borne diseases and continues to research patterns in reported cases

isn't the most common pest in Texas. Ninety-five percent of the ticks in Texas are the Lone Star tick. We have documented people in Texas who haven't left the state, yet experience symptoms similar to Lyme disease after being bitten by the Lone Star tick. These symptoms are usually categorized as Southern Tick Associated Rash Illness or STARI, for which doxycycline is prescribed."

Recently, research by Williamson, several of the researchers in his lab and collaborators at UNT's Denton campus was published in *Emerging Infectious Diseases* exploring the type, frequency and distribution of tick-borne pathogens and bacterial agents in Texas. Their research showed that people in Texas

*Phillip Williamson, PhD*



*“There’s a misconception that there is no vulnerability for Lyme disease here in Texas.”*

and the Southern U.S. may experience tick-related illnesses very similar to Lyme disease that seem to be transmitted by ticks other than the normal Lyme vector.

Standard treatment following a tick bite would be two weeks of antibiotics. However, longer-term, more aggressive treatment with antibiotics can help prevent Lyme disease in some people.

The research that Williamson is conducting in the DNA labs at the UNT Health Science Center is helping the state

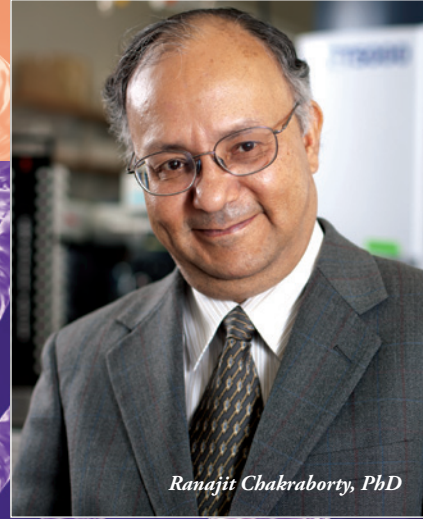
of Lyme disease in the state. Since 2004, Williamson has directed Texas' only lab that analyzes Texas ticks and tracks tick-borne diseases.

“There’s a misconception that there is no vulnerability for Lyme disease here in Texas,” Williamson said. “The black-legged deer tick, which commonly carries Lyme disease in the Eastern U.S.,

medical board and physicians better understand tick-borne diseases and create treatments that will prevent the debilitating effects that Claunch's wife had to experience. The new legislation allows physicians in Texas to treat chronic Lyme disease and attend continuing medical education courses to learn more about the disease.



# DNA lab creates investigative software tool



*Ranajit Chakraborty, PhD*

The UNT Health Science Center Institute of Applied Genetics recently developed new software that could enable law enforcement agencies to generate additional investigative leads. The agencies can search DNA profiles obtained from forensic evidentiary samples against DNA databases where previously no matches had been obtained and form a list of possible suspects.

The software enhances “familial searching,” which is based on the principle that DNA profiles of people who are closely related will likely contain similarities. A DNA profile generated from crime scene evidence can be searched against known profiles of convicted felons and arrestees to identify potential relatives of the true donor of the evidence sample. Typically, familial searching enables associations of parent-child or sibling-sibling relationships.

With the new software, MPKin FS Edition™, more investigative leads can be developed using forensic DNA technology and database searches. Police and detectives have another tool for identifying suspects and potentially solving more violent crimes.

“Since crimes are always a danger to society, and, further, since hideous crimes are often perpetrated by repeat offenders, this software has the potential to enlarge the net of apprehending repeat offenders so that they can be investigated based on crimes committed by their close relatives,” said Ranajit Chakraborty, professor of Applied Genetics. “Our society will be safer if we can apprehend offenders before they commit further crimes.”



# New gene therapy could reverse hypertrophy

*Joseph Yuan, PhD*

Can new research at the UNT Health Science Center reverse the damage caused by cardiac hypertrophy? People who have stress, high blood pressure or aortic stenosis, in which the aortic valve cannot open fully, are more prone to hypertrophy, which is an abnormal thickening and enlargement of the heart muscle and which can eventually result in congestive heart failure and death.

Joseph Yuan, PhD, assistant professor of Integrative Physiology, has brought his research in calcium signaling to the Health Science Center to determine which genes cause cardiac hypertrophy.

“An increase in calcium signaling due to the aforementioned risk factors also increases expression of prohypertrophic genes,” Yuan explained. “These are normally inactive genes in healthy individuals that get turned on, contributing to the enlargement of the left ventricle of the heart. This area of the heart thickens in an effort to increase blood circulation due to the extra work of pumping blood, but ironically, the heart becomes less efficient as a pump.”

Yuan’s research seeks to reverse this heart hypertrophy.

“Some people appear to have a predisposition for this hypertrophy as they develop a sedentary lifestyle,” Yuan said. “I hope my research can discover how to control hypertrophy through gene therapy. We are researching ways to reverse the hypertrophic damage by regulating the expression levels of prohypertrophic genes.”

Yuan’s research focuses on upstream events that control prohypertrophic gene expression. In particular, his research investigates the gating and regulation of a class of calcium channels called store-operated calcium channels (SOCs) and its activator molecule, STIM1. These SOCs are activated by STIM1 in response to depletion of calcium stores within the heart cell and allow calcium influx into the cell for normal cell function. However, in hypertrophic conditions, aberrant calcium influx via SOCs dramatically increases calcium levels within the heart cell, which goes through a signaling cascade leading to activation of prohypertrophic genes.

The researchers hope to downregulate the activity of SOCs through SOC genes and/or STIM1, then evaluate SOC components as therapeutic targets for the prevention and treatment of cardiac hypertrophy.



# TARCC pioneers blood test for Alzheimer's

**A**s a part of its focus on aging and Alzheimer's disease, the UNT Health Science Center, participates in the Texas Alzheimer's Research & Care Consortium (TARCC), a collaborative effort with Baylor College of Medicine in Houston, Texas Tech University Health Science Center, University of Texas Southwestern Medical Center and University of Texas Health Science Center at San Antonio.

"TARCC has tremendous value for Texans as well as researchers at UNTHSC," Robert Barber, PhD and TARCC member, said. "The results of consortium studies are yielding greater insight into the factors that impact risk and progression of Alzheimer's disease. The data and biological samples generated by the consortium fuel a large number of diverse and important research projects here in Fort Worth and across the state."

In 2010, TARCC researchers led by Sid O'Bryant, PhD, from Texas Tech University created a serum-protein blood test for Alzheimer's disease. The accuracy of this blood test was confirmed in an independent set of individuals from the Alzheimer's Disease Neuroimaging Initiative. No other blood test has been

independently validated as being effective at diagnosing Alzheimer's. Although further validation is required, the blood test, as part of a multi-tiered screening tool, could change geriatric medicine. This test could be affordably given on an annual basis to all individuals over 65 years of age, who are at increased risk for Alzheimer's disease.

In January, O'Bryant joined the Health Science Center to further his research into Alzheimer's in Mexican Americans. "This is the fastest aging population because it's the youngest, but little research has been done on Alzheimer's in this population," O'Bryant said. "We will work with Dr. Janice Knebl and the geriatricians around Fort Worth

to learn more about Alzheimer's disease. Eventually, we intend to look at the relationships between Alzheimer's and diabetes.

"We think Alzheimer's might look different in Hispanics than it does in Asians or African Americans. Perhaps the genetic risk factor is less frequent in Mexican Americans, because there is less frequency in that population." O'Bryant will begin recruiting for his study in April with the assistance of area physicians as they work together to find new breakthroughs in Alzheimer's research and treatment.

North Texas is known for the collaboration of a strong group of basic science and clinical professionals who will sit down together to find solutions. With the addition of the new System College of Pharmacy, as well as TARCC leadership, the depth of research will only expand.

TARCC participants have analyzed almost two million genetic markers in 800 participants using state-of-the-art genetic technology. Preliminary analyses have discovered genes that affect disease risk, which may lead to new drugs and therapies to improve the quality of life of Alzheimer's patients. TARCC's collaboration with the Alzheimer's Disease Genetics Consortium, in the largest study of Alzheimer's genetics to date, will provide Texas

researchers with more than \$100,000 worth of additional genetics data at no cost.

In addition, TARCC is evaluating links between cholesterol, insulin metabolism and the development of Alzheimer's disease. Researchers have measured a full lipid panel, in addition to heart disease and diabetes markers, in 300 Alzheimer's patients. Preliminary results confirm a significant risk for Alzheimer's disease and heart disease risk. It also revealed an association between Alzheimer's disease risk and elevated Lp-PLA2 (also a risk factor for heart disease) among people who carry the high-risk variant of the ApoE gene. These results could lead to reducing Lp-PLA2 levels for carriers of the high-risk variant of the ApoE gene.



*Sid O'Bryant, PhD*

# Detecting cancer earlier *in rural Texas*

While cancer rates in rural and urban areas are similar, rural Texans often aren't diagnosed until the cancer has become advanced and more difficult to treat. Rural physicians must continue to learn new screening guidelines. When physicians have the knowledge and tools to help prevent cancer, outcomes can improve.

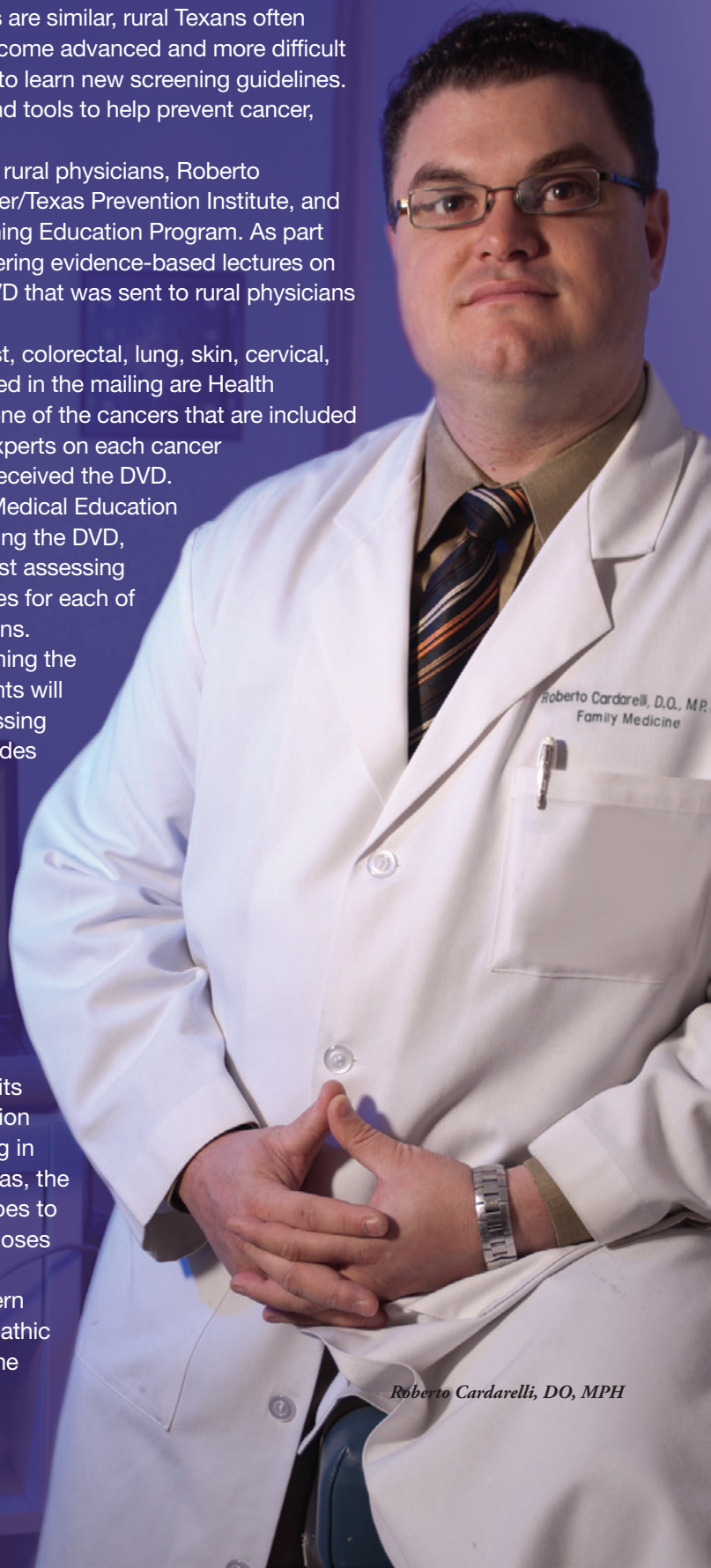
In an effort to provide this information and education to rural physicians, Roberto Cardarelli, DO, director of the Primary Care Research Center/Texas Prevention Institute, and his team initiated the Rural Texas Physician Cancer Screening Education Program. As part of the program, filmed segments of Texas specialists delivering evidence-based lectures on seven cancer screening guidelines highlight a one-hour DVD that was sent to rural physicians practicing in high-risk cancer cluster regions in the state.

The seven lectures cover screening guidelines for breast, colorectal, lung, skin, cervical, ovarian and prostate cancer. The 78 Texas counties included in the mailing are Health Professional Shortage Areas in high-risk cluster areas for one of the cancers that are included in the DVD. The lectures are recorded by Tarrant County experts on each cancer area. More than 2,400 physicians in 78 targeted counties received the DVD. Another 13 clinics associated with the Rural Osteopathic Medical Education program are helping evaluate. Before watching the DVD, physicians at the clinics took a pre-test assessing knowledge, attitudes and practices for each of the screening recommendations.

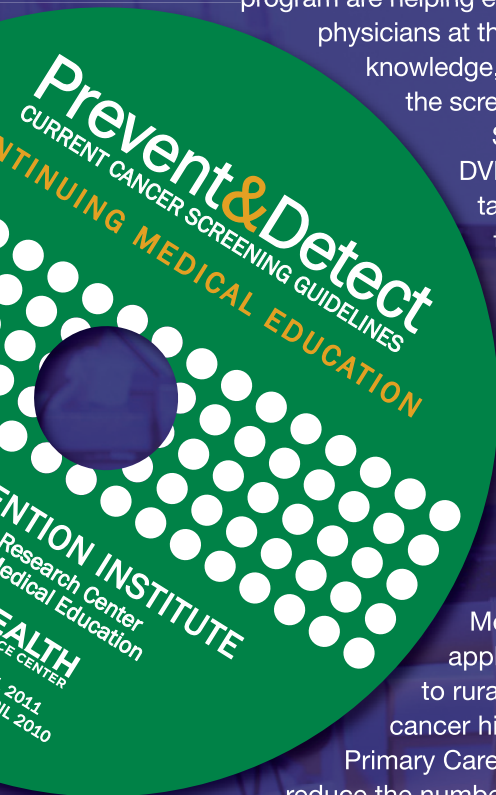
Six months after watching the DVD, physician participants will take a post-test reassessing their knowledge, attitudes and beliefs. One year after viewing the DVD, program staff will visit these clinics to review 50 charts per clinic to examine physician cancer screening practices.

Continuing Medical Education credits apply. By bringing education to rural physicians practicing in cancer high-risk regions in Texas, the Primary Care Research Center hopes to reduce the number of late cancer diagnoses and continue to improve preventive measures.

The program is in collaboration with the UT Southwestern Moncrief Cancer Institute and the Texas College of Osteopathic Medicine Department of Family Medicine. It is funded by the Cancer Prevention and Research Institute of Texas.



*Roberto Cardarelli, DO, MPH*





Students from Texas community centers stomp to rap songs touting healthy habits



# Stomping for life

There's a lot of stomping going on in four Fort Worth community center gyms, but it's all authorized in the name of fighting childhood obesity.

The brainchild of Susan Franks, PhD, the program, called Stomp for Life!, combines nutrition information and physical activities using props such as brooms and drumsticks in the manner of the traveling entertainment group STOMP.

But these routines are performed to rap songs with lyrics like: "I'm draggin' on, can't get my butt to move, Cause I drank too many sodas and I'm eatin' fried food."

"The kids love it," said Jasmine Chambers, recreation programmer for the City of Fort Worth. And the messages apparently are sinking in. Chambers said the kids' parents report that the children continually ask in the grocery store as their parents toss food into the basket, "How many grams of fat does that have?" and "How many carbs are in that?"

It's all by design. Franks, associate professor in Family Medicine and member of the Texas Prevention Institute, is breaking new ground by using the power of music to directly influence brain activity to improve retention of nutrition information and to help form healthy habits. The participants,

ages 9 through 12, learn educational lyrics and movement based on rhythms known to enhance learning and motivation.

"We chose to work with this age group because that's the age when kids want to start making their own decisions," Franks said.

Each child is measured before and after the 12-week program in order to evaluate the impact of the program on changes in weight, physical activity, dietary choices and motivation for healthy living.

She collaborated with UNT Denton's Kris Chesky, PhD, director of the Texas Center for Music and Medicine, and Debbi Jo Utter of Dance Concept of Fort Worth to develop the music and movement routines.

"A big hurdle that you have to overcome in health promotion programs for kids is their perception

that the information is boring and irrelevant to their lives," Franks said. "One of the goals of Stomp for Life is to positively engage the kids in learning about physical activity and nutrition topics. I wanted to make healthy living fun, relevant and exciting!"

The program was run in partnership with the City of Fort Worth Parks and Community Services Department. It is funded in part by the Coca-Cola Foundation.



Susan Franks, PhD

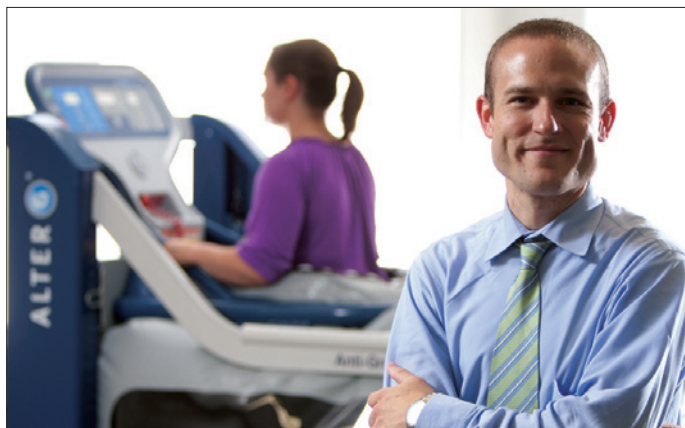
# Seed grant program boosts junior faculty research

A new seed grant program is supporting the research of junior faculty members at the UNT Health Science Center. The Research Office sponsored the Junior Faculty Seed Grant program this year to launch the projects of six junior faculty members, who received \$20,000 each to fund pilot studies, preliminary data collection, secondary data analysis and other activities, which could result in larger extramural funding.

Recipients represent each school at the UNT Health Science Center, and their projects will employ a variety of research methods, including bench top, community-based and physical therapy. Aside from giving faculty members a chance to start projects within their expertise, the program encourages new areas of research.

The Research Office plans to continue the program annually.

## Junior Seed Grant recipients and projects



### **Michael Conners, PT, DPT**

Assistant Professor  
Department of Physical Therapy  
School of Health Professions

#### *Stiffness Evaluation of Shoulder Disability*

Shoulder stiffness is a subjective finding of an objective assessment that is difficult to quantify in the clinical setting. Conners' project aims to develop a device to identify and quantify stiffness in a pathological state in the shoulder.



### **Rebecca Cunningham, PhD**

Research Assistant Professor  
Department of Pharmacology and Neuroscience  
Graduate School of Biomedical Sciences

#### *Androgens and Caspase-1: Role in Dopaminergic Neurodegeneration*

Cunningham will examine the role of androgens, the major male sex hormone, on dopaminergic neurodegeneration. Results from the study will clarify the clinical risk factor of male gender in aging and oxidative stress-associated neurodegenerative conditions and may lead to the development of therapeutic strategies aimed at decreasing the negative effects of androgens on dopamine neurons.





### **Eric B. Gonzales, PhD**

Assistant Professor  
Department of Pharmacology and Neuroscience  
Graduate School of Biomedical Sciences

#### ***Structure Determination of a Male Contraceptive Target***

This project addresses male contraception in a safe and reversible manner. Proteins, specifically ion channels, located in the sperm plasma membrane influence activity and function; the project aims to reveal the three-dimensional structure of one class of sperm ion channel that will provide the foundation for developing selective drugs for male contraception.



### **Heather Kitzman-Ulrich, PhD**

Assistant Professor  
Department of Family Medicine  
Texas College of Osteopathic Medicine

#### ***A Motivational and Family-Based Weight Management Program for African American Adolescents***

This study features an online component and will test a novel motivational and parenting-skills weight-loss program in primarily African-American families. Sixty families with overweight adolescents will be recruited through the Pediatrics Department to participate.

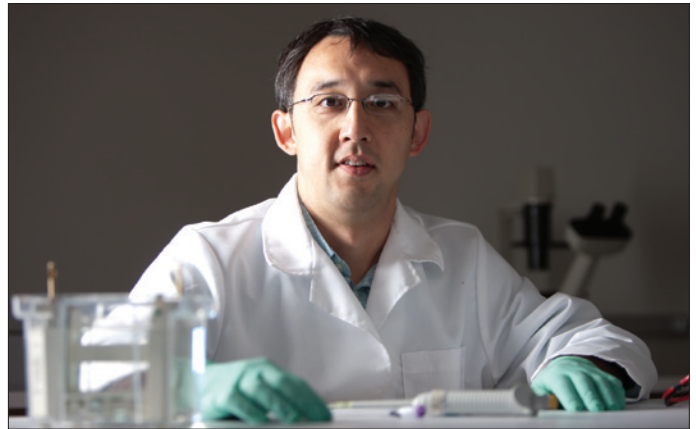


### **Fernando Wilson, PhD**

Assistant Professor  
Department of Health Management and Policy  
School of Public Health

#### ***Adversity in Health Care: The Role of Race and Ethnicity in Vehicle Crashes***

Texas is second only to California in vehicular injuries and fatalities of minority occupants. Hispanic and African-American injury victims face significantly worse outcomes compared to white non-Hispanics. This study will create a database on the life cycle of a motor vehicle crash – impact, emergency medical services response, ER/inpatient treatment and discharge – and analyze victims and their health care experiences from the moment of impact.



### **Joseph Yuan, PhD**

Assistant Professor  
Department of Integrative Physiology  
Graduate School of Biomedical Sciences

#### ***Gating Mechanism of TRPCs and Their Role in Cardiac Hypertrophy***

The grant will help researchers understand the molecular basis of abnormal enlargement of the heart, or cardiac hypertrophy, which can lead to heart failure. The project will research groups of inheritable traits/factors from heart cells that influence calcium dynamics associated with heart enlargement and manipulate these factors to study their function in this disease. The goal is to find therapeutic targets for the prevention and treatment of cardiac hypertrophy.

# Bridging the gap

in health services for refugees in Tarrant County

**M**ore than 1,500 refugees move to Tarrant County each year. They come here from all over the world – places like Iraq, Somalia and Bhutan – to escape traumatic situations. Many have spent years in refugee camps where they had little or no opportunities. They come to the United States for better lives, but once they get here, they can meet new challenges including different languages, a tough job market and navigating an unfamiliar health care system.

Amy Raines-Milenkov, MPH, DrPH, assistant professor of Obstetrics and Gynecology, is leading a community-based research project, the Building Bridges Initiative, that aims to fill gaps in social services available to these refugees in Tarrant County.

“A common theme in my research is vulnerable populations and populations that have fallen below the radar – people who have struggled a lot and continue to struggle,” she said. “I work with people whose needs and health haven’t been addressed, and that includes refugee populations.”

Through the U.S.’s resettlement program, refugees are placed in Tarrant County, and with the help of resettlement agencies they receive services

including Medicaid, job assistance, language assistance and case management for health services for about eight months. After that, they face these challenges on their own. That’s where the Building Bridges Initiative comes in.

“The resettlement agencies do a wonderful job with the resources and the mandates they have, but the challenge is that this is a really short period of time to provide such intensive services,” Raines-Milenkov said.

Building Bridges trains a diverse group of refugee women as community health workers so they can advocate for their communities. Raines-Milenkov and the first class of five workers – from Iraq, Somalia, Burma and Bhutan – conducted a series of focus groups with refugee women to pinpoint where health and social services can be improved and how refugees can better connect with what’s available.

The first round of focus groups found that many refugee women have trouble getting help with health issues including reproductive and women’s health, diabetes and depression, and learning how to navigate the U.S. health care system. The stress of economic instability, living in a strange new environment and not knowing the culture or the language underpin these concerns.





“They are very resilient, they’ve gone through a lot, and they’ve survived a lot.”



Amy Raines-Milenkov with community health workers Goma Timsina, Halimo Mubey and Thi Dab Htak, and Sandy-Asari Hogan, graduate research assistant.

After compiling the focus group findings, Building Bridges developed educational programs focused on refugees who no longer receive case management from resettlement agencies. Building Bridges holds informational meetings with large groups of refugees from various countries and subjects of interest, and it explains how to apply for

and maintain health services.

Throughout the project, the goal is to prove that the community health worker model is sustainable and to get other health organizations to adopt it.

“These people are very resilient. They’ve gone through a lot, and they’ve survived a lot,” Raines-Milenkov said. “We can’t take away what has

been done to them, but we can, through better systems and better ways to navigate the system, make it easier for them.”

By expanding community-based research projects like Building Bridges, Raines-Milenkov says the UNT Health Science Center’s Obstetrics and Gynecology Department will create better health outcomes for women in the community.



Left: Halimo Mubey Community Health Worker, says the Building Bridges Initiative has helped her connect her Somali community with needed services. “Most people qualify for Medicaid and food stamps, but they don’t know how to get them,” Mubey said.

Right: At a recent meeting, Goma Timsina, Community Health Worker, translated from English to the Nepali language to help answer Bhutanese refugees’ questions about health services.



# New nanoscale sensor

**D**iabetes can be a burdensome, debilitating disease that requires daily maintenance and attention that can challenge adults. It's an even bigger burden for children who must check their blood sugar levels daily with a finger stick and go through the process of drawing blood at a lab periodically. But collaborative research at the UNT Health Science Center, UT Dallas, UTA, the Texas Health Research and Education Institute, and Texas Instruments on an e-strip that can measure the equivalent of hemoglobin A1C using saliva may save young patients from a painful step. The small strip is then inserted into a digital reader to read blood glucose levels.

While the test must be done in a physician's office, eventually the patient may be able to put the test strip on her tongue, then seal the strip in a special mailing envelope and send it to the lab. Diabetic children could avoid a painful process associated with their disease.

"Glucose levels can change daily," explained Nusrath Habiba, MD, assistant professor of Pediatrics. "We check the A1C levels via a blood test periodically (monthly, quarterly, yearly) to verify the average level in the blood cells.

"Saliva has a protein encasing the glucose that is similar to that of hemoglobin – blood. If the saliva results are as dependable as the



*Dr. Nusrath Habiba tests an adolescent's saliva for insulin needs.*



*If the saliva results are as dependable as the hemoglobin test, it would be much less painful and invasive. Especially for children.*



# offers diabetes test relief



*Researchers Binky Bawa (left) and Kimberly Fulda, DrPH*

Medical Research Collaborative. In addition to UTD's involvement, the project benefits from the expertise of Paul Bowman, MD, chief of pediatrics; Kimberly Fulda, DrPH, director of the Primary Care Research Institute; and Researcher Binky Bawa.

"Saliva testing has wide implications. Because saliva contains so many proteins, it can be applied to testing for cancer and a variety of other illnesses," Habiba said. However, it first must be determined if the saliva test is as reliable as the blood tests.

hemoglobin test, it would be much less painful and invasive. Especially for children."

The e-strip is being tested on Type 2 diabetes patients at least 10 years of age. The results will be compared to those of the same gender and similar age. Results are expected this summer.

"Texas Instruments was instrumental in bringing scientists and physicians together to develop a nanoscale sensor that could become a brand new avocation for technology," said Wengchuang (Walter) Hu, PhD, associate professor of electrical engineering at UT Dallas and developer of the biosensor e-strip. Hu brings his expertise in nanoscale technology to the research which is supported by TxMRC, a collaborative group of scientists from the Texas



*Paul Bowman, MD, examines a young patient*

# Summer programs enrich student learning

Outreach to undergraduate students from diverse ethnic and socioeconomic backgrounds is a UNT Health Science Center priority that brought dozens of young people to the campus for four programs last summer.

One of the programs, the Joint Admission Medical Program (JAMP) Summer Internship, was in the Texas College of Osteopathic Medicine (TCOM). The other three were in the Graduate School of Biomedical Sciences (GSBS).

Through the GSBS offerings – Summer Multicultural Advanced Research Training (SMART), the Ronald E. McNair Post-Baccalaureate Achievement Program, and the Historically Black Colleges and Universities (HBCU) training program – more than 50 undergraduates from across the nation studied on campus for 12 weeks. Mentored by a faculty member, the students focused on various disciplines in biomedical research, experienced professional development and participated in the annual UNTHSC Health Disparities Conference.

Students then had the opportunity to present their research at either the Annual Biomedical Research Conference for Minority Students or the Society for Advancement of Chicanos and Native Americans in Science Conference.

SMART has been a fixture at the UNT Health Science Center for 20 years, McNair for 13 and HBCU for two. All of the GSBS programs create a recruitment pipeline and help increase diversity in biomedical sciences.

“I am very proud of the graduate school’s faculty and institutional leadership for their commitment to promoting diversity in the biomedical sciences,” said Harlan Jones, PhD, assistant professor of Molecular Biology and Immunology and director of Recruitment and Minority Affairs. “As a former product of outreach programs, I know that these experiences can lead to successful outcomes for aspiring students.”

In JAMP’s ninth year, TCOM welcomed 28 college sophomores from throughout Texas following a rigorous application process. They spent five weeks in Medical College Admission Test prep courses, graduate-level physiology and medical ethics courses, clinical preceptorships and mentoring by TCOM students. They also worked on community service projects, participated in a theater arts evening, and attended skills and career workshops and numerous team-building activities.

JAMP coordinator Fernando Vasquez, assistant director of Medical Admissions and JAMP coordinator at the UNT Health Science Center, said the statewide two-year undergraduate program has provided hundreds of economically disadvantaged students with additional academic preparation, mentoring and financial support over the past nine years.

“By focusing on student success, JAMP has positioned itself to be a viable pathway for students who otherwise may not have considered medical school,” he said. “JAMP is now a recognized and formidable program that enhances the educational opportunities for these students who have the academic talent and motivation to succeed, while diversifying the face of medicine.”

JAMP recently received the 2010 Texas Higher Education Star Award from the Texas Higher Education Coordinating Board.





# Ovarian cancer cure? Just Google it



Shree Bose, left and  
Alakananda Basu, PhD

**A** Fort Worth high school student is the Grand Prize winner in the first international Google Science Fair, under the mentorship of a UNTHSC professor. Alakananda Basu, PhD, professor in Molecular Biology and Immunology, guided Shree Bose, 17, who made headlines around the world with her project on the effect of the chemotherapy drug cisplatin on ovarian cancer cells.

From the outset, Bose showed initiative. The Fort Worth Country Day School student approached Basu in an email asking if she could work in her lab. “Shree impressed me, so I gave her the option of working on one of my projects,” Basu said. “It was a more complicated project, but I thought she could handle it.”

Ovarian cancer is the fifth leading cause of cancer-related death among women. The anticancer drug cisplatin frequently is used in the treatment of ovarian cancer. However, patients often develop resistance to the drug and this is a major cause of therapy failure. An alteration in the metabolic processes is fundamental to most cancers. The adenosine monophosphate-activated protein kinase (AMPK) helps maintain cellular energy level.

“It was a more complicated project, but I thought she could handle it.”

Bose and researchers in Basu’s laboratory examined the effects of a pharmacologic inhibitor of AMPK on the sensitivity of the parental cisplatin-sensitive and cisplatin-resistant cells to cisplatin. Results showed that the AMPK inhibitor had opposite effects on cisplatin-induced cell death in parental versus cisplatin-resistant ovarian cancer cells. While AMPK inhibitor caused a dramatic increase in cell death in cisplatin-resistant ovarian cancer cells, it in fact reduced the sensitivity of drug-sensitive ovarian cancer cells to cisplatin. Thus, the status of AMPK may decide cisplatin sensitivity and AMPK inhibitor may be used in combination with cisplatin to combat cisplatin resistance.

The ovarian cancer project is one of several Basu has conducted in human disease. Early in her career, she wanted to cure diseases because her niece was born with a congenital blood disorder. In addition to mentoring her graduate students and Bose, Basu has always mentored in the UNT Health Science Center’s outreach programs to encourage underrepresented and disadvantaged students to study the sciences. “I love science,” she says, “not as a job, but as a passion.”



# Risky college drinking starts early

*Scott Walters, PhD*

**O**n many college campuses, alcohol consumption is a rite of passage. So it stands to reason that freshmen increase risky drinking immediately after the start of school, while progressively using fewer behaviors that might reduce the consequences of drinking.

According to research by Scott Walters, PhD, professor of Behavioral and Community Health, behaviors to limit drinking and avoid drinking and driving declined over the data collection period, while students' intent to get drunk and peak blood alcohol concentration levels increased immediately after school started. Walters studied the drinking behavior of 76,882 incoming, first-year students at 258 colleges across the U.S. in the three months just before and after school started.

"Toward the end of summer, students become progressively less careful about their drinking," Walters says. "This trend starts well before school begins. But certain kinds of risky behaviors, like doing shots or drinking before going out for the evening, only increase after school starts."

In most areas, women surveyed were more likely to use protective behaviors. However, intent-to-get-drunk scores didn't vary by gender. Women were equally likely to engage in risky behaviors and showed similar increases after the start of school. Race/ethnicity and intent to join a fraternity or sorority had negligible effects on protective behavior scores.

"This was a particularly unique data set, in that nearly every other survey of college drinking is conducted after school begins," Walters said. "We know that students drink more in college than they do in high school, but we don't know exactly when this increase occurs. Because students completed this survey in the weeks just before and after the start of school, it tells us exactly what happens to drinking after school starts."

The study reinforces the importance of focusing prevention efforts during the first few weeks of college, including alcohol education programs, social norms marketing campaigns and visible law enforcement.



# Parents top source of health information

Parents, listen up. Research at the UNT Health Science Center indicates that you are a prime information source that your offspring use and believe at high levels.

Almost 95,000 students at 117 U.S. colleges and universities were asked where they receive information about topics such as drug use, sexuality and diet and the extent to which they consider these sources believable.

For the students surveyed, the four most believable sources of health information were health center medical staff, health educators, faculty/coursework and ... parents! The first three sources were used at levels much lower than their believability might suggest. Students indicated that these sources were listed as reliable, but the respondents were less likely to get health information from them. Friends and the Internet, although widely accessed, were seen as relatively unreliable.

"Our findings suggest a very strong role for parents," said Scott Walters, PhD, professor of Behavioral and Community Health. "Parents sometimes feel like their college-age children are no longer interested in what they think, but our results show just the opposite. In fact, in some ways parents are the optimal source for health information."



# Breathing new life into TB battle



Thaddeus Miller, DrPH

**R**ecent cases of tuberculosis (TB) in North Texas schools refocused attention on this debilitating respiratory disease as parents, educators, doctors and public health experts raced to treat the outbreak.

Although often curable and preventable, TB remains a threat. Research by Thaddeus Miller, DrPH, assistant professor of Health Management and Policy and of Internal Medicine, and other investigators at the UNT Health Science Center indicates that even successful treatment of active TB may not prevent lifelong impairment and increased risk of death. Miller's research has also sparked a fresh awareness of prevention's cost relative to cure and has begun to influence national policy.

TB elimination is among the goals of the U.S. Centers for Disease Control and Prevention. Last fall it selected UNTHSC as one of 10 national sites for the Tuberculosis Epidemiologic Studies Consortium (TBESC), with Miller as principal investigator.

"TB is curable with a long course of drugs, but to effectively treat it, a whole public health infrastructure needs to be in place," Miller said. "It takes at least six months of medication. Each dose has to be taken in the presence of someone; every dose has to be observed, in the clinic or in the patient's home or workplace. These are just some of the things that have to be figured into the cost of treating the disease—and these are some of the costs that are prevented when an active case never happens."

Some policy makers and legislators argue that prevention costs are too great. "When TB is in the news, there is political pressure to sustain funding," Miller said. "When it becomes less visible, other concerns get the resources, and we see TB resurgence as a result."

Although the U.S. is what Miller calls "an island of low incidence," immigration, travel and drug-resistant strains of TB necessitate constant improvement in detection and treatment. "Bang for the buck," or the most efficient return for the health care investment, is always crucial in public policy formulation. For example, a standard diagnostic for latent TB is a relatively inexpensive skin test. Recently developed blood assays may cost 10 or more times as much. But the latter may prove preferable if it leads to less illness.

"Right now, we just don't know which diagnostic is more cost effective," Miller said. The need to understand how to maximize return on public health investment is a primary motivation for the \$4.2 million study.

UNTHSC researchers will work with the Tarrant County Public Health (TCPH) department to compare skin tests against the assays in a large group of people who probably have latent TB. "We hope to enroll, over time, about 8,000 people, and across the entire project more than 50,000 people," Miller said.

"The citizens of Tarrant County will see real and substantial health protections as a result of the study process. We expect to reduce TB incidence in our community directly."

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*The citizens of Tarrant County will see real and substantial health protections as a result of the study process.*

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# Improving quality of life for people with HIV

*Johnny He, PhD*

**A**dvances in drug treatments for HIV and AIDS are giving people living with them a better chance for long, productive lives. But as life expectancy increases, so do the risks of side effects and lasting complications.

Johnny He, PhD, new associate dean of the Graduate School of Biomedical Sciences and professor of Cell Biology and Anatomy, brings funded research to the Health Science Center to explore how HIV and other viruses interact with the brain. He wants to find therapeutic strategies that will prevent neurological disorders that often accompany HIV.

“An estimated one in five people with HIV experiences dementia or memory loss that cannot be counteracted by the current crop of antiretroviral treatments,” He said. “So we are looking at how the HIV virus impacts the brain and the cells it infects.”

He and his research team believe they have identified a biomarker for HIV that will help determine how the virus affects the brain. The biomarker will also make diagnosing the disease and monitoring treatment outcomes easier.

“The brain is not like any other organ. You cannot draw blood to look at the disease profile or status,” He said. “The classic approach that people use to look at this is clinical – testing memory or responses to cues, or even looking at brain images. If you have a biomarker, you can very easily see the disease progression.”

Although current therapy effectively suppresses virus replication and propagation, people with AIDS must stay on the drugs for the rest of their lives. To find new and more effective treatments, He is

studying HIV from a basic virology standpoint to determine how replication is controlled and how the host and virus interact. By doing this, He has discovered additional accessible control points for virus replications.

“What we’ve found based on our work is that we can manipulate the virus replications at the translational level. This is unique because nobody has thought about the possibility of intervening by targeting the viral protein translation. We want to extend this finding to see if we can develop a new therapeutic strategy.”

In addition to studying the affects of HIV and AIDS on the brain, He is also looking at how other viruses, including hepatitis C (HCV), interact with HIV. With a 30 percent HCV co-infection rate among people with HIV and AIDS, liver problems become more prominent. By studying how HCV is transmitted from cell to cell, He hopes to discover why the virus only infects the liver and how HCV and HIV interact to affect the brain.

“Our recent data also show that hepatitis C can affect the brain. So that makes our work even more interesting because quality of life becomes an issue not only for HIV-infected people, but also for co-infected people.”

He plans to work with the Institute for Aging and Alzheimer’s Disease to explore the relationship between Alzheimer’s and AIDS.

“One of the strengths of this school is neurobiology and aging. It would be easy to link these two areas of research to expand our AIDS research program here at the Health Science Center, improving the quality of life for both AIDS and Alzheimer’s patients.”



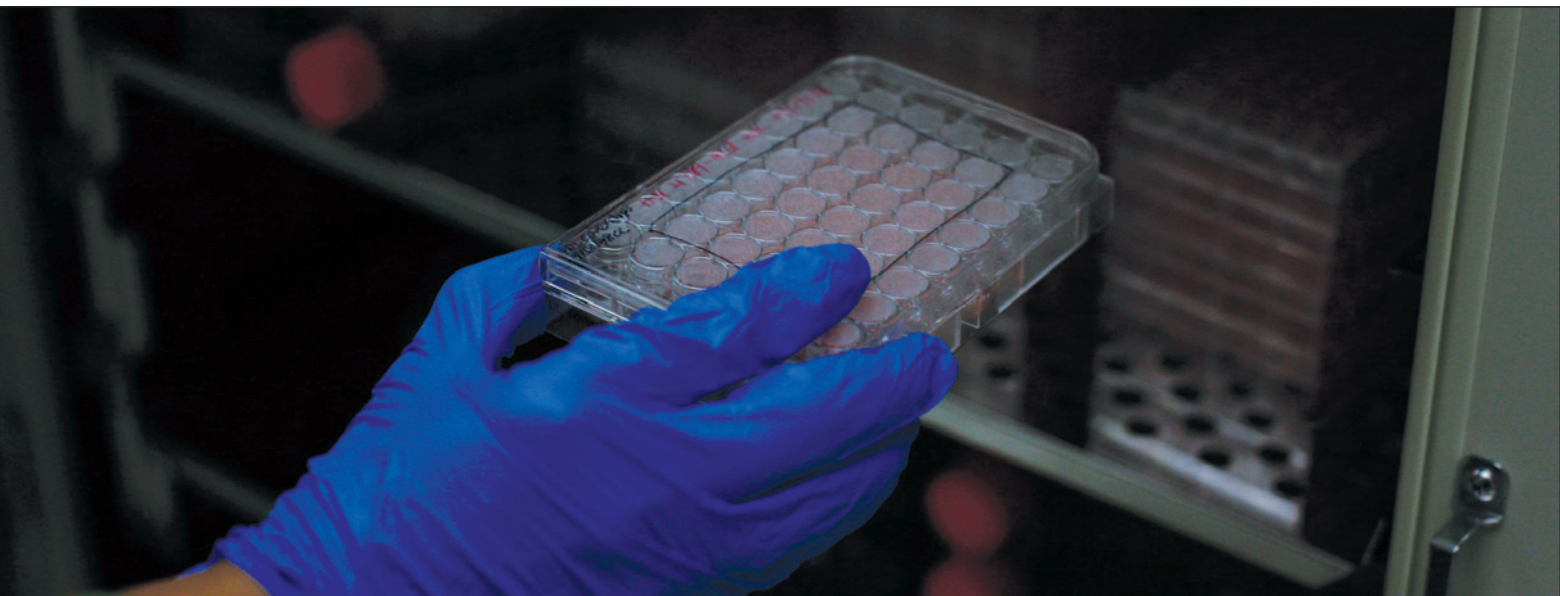
# RESEARCH funding by the numbers

**R**esearch at the UNT Health Science Center continues to grow, reaching an all-time high of over \$41 million in 2011. Since 2001 our research expenditures have increased 310 percent despite rigorous and increasing competition for research dollars.

Funding that supports UNT Health Science Center scientists' research is derived from a variety of sources. In 2011 almost 80 percent of research awards were from the federal government. The National Institutes of Health (NIH) often regarded as the highest standard reviewing biomedical science, funded 50 percent of UNT Health Science Center research studies. This is strong evidence that the quality and potential impact of the research produced by UNT Health Science Center faculty is outstanding. Our growth in research funding from the NIH impressively exceeds the national average which, at best, has been relatively flat for a number of years.

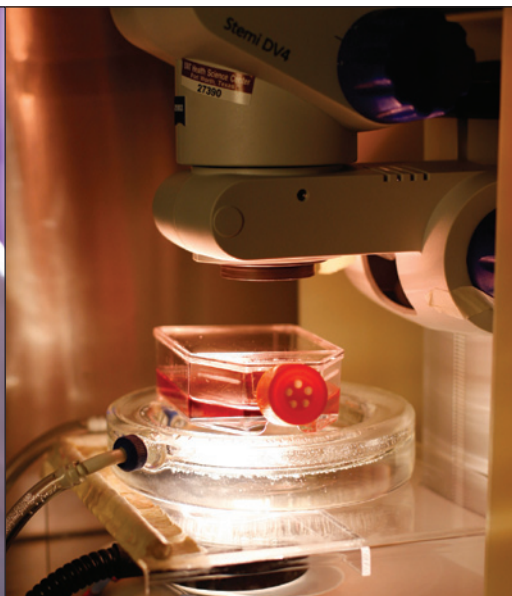
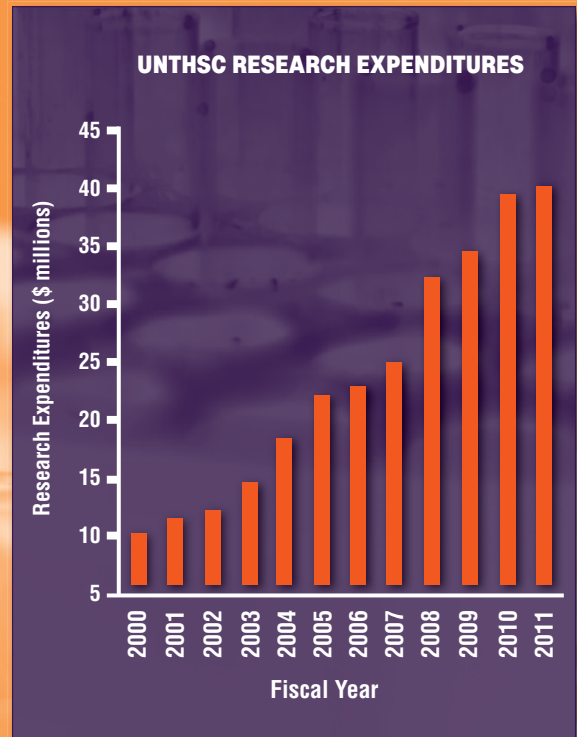
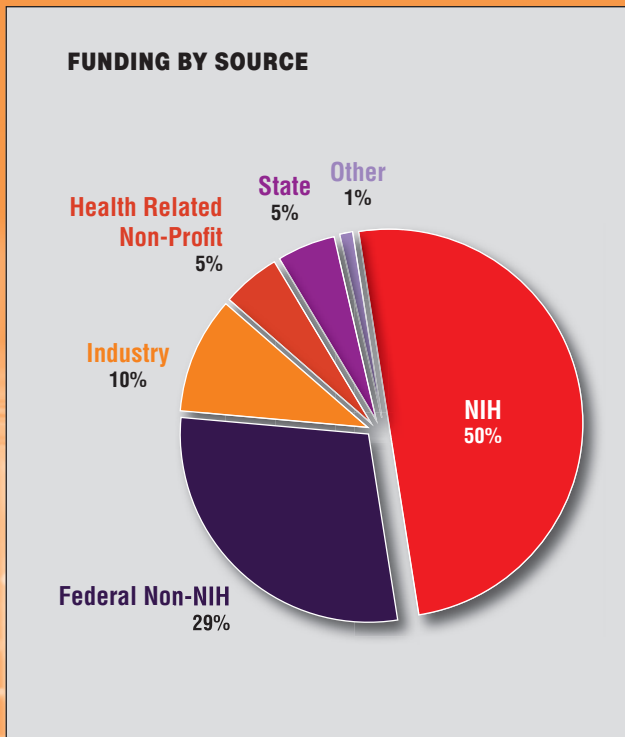
Translating research findings to create healthy communities continues to be our focus. UNT Health Science Center investigators perform cutting edge research in vital areas including aging and Alzheimer's, investigative genetics, community health, vision, cardiovascular disease and disease prevention. Our faculty remains dedicated to making discoveries that can be successfully translated into improved treatments, therapies and interventions designed to increase health and well being.

UNT Health Science Center. Our Discoveries. Your Health.





# 2011 Research Funding



# Library changes, technology spurs

In the fall, the Academic and Institutional Resources department debuted a new look and collaborative common space on the third floor of the Gibson D. Lewis Library that has transformed the area into central hub of activity and discussion.

The new collaborative commons area include:

- A **Research Discovery Room** designed for faculty research and inter-professional data exploration with up to 30 participants collaborating on projects using an 82-inch multi-touch sensing LCD display developed by Perceptive Pixel, Inc. The technology is used by major national news programs such as CNN, and enables story boarding, data visualization and multi-touch collaboration.
- A wall in the Research Discovery Room provides **floor-to-ceiling white board space** for planning and developing projects. The room also features a liquid crystal wall that appears clear but turns opaque with a flip of a switch, secluding the room as needed.
- **Modern modular furniture** in bright colors that are designed for group interaction. Network ports for computer access and power are widely available in the workspaces.
- **The Anatomy Bar**, where students can study human body scans from the National Library of Medicine on a large wall-mounted video screen or manipulate a virtual anatomy subject on a large projection table.
- The colors – predominantly **lime green, tropical orange, sunny yellow and turquoise** – were chosen to stimulate interaction and expression in cheerful, inviting hues.

Groupings are tucked into corners or stand alone on the third floor.

Stop by to see the new space. You never know what type of project you may become part of!

*Dr. Renee Drabier demonstrates the new multi-touch sensing LCD display.*





# imagination, collaboration



# Health Institutes of Texas

The Health Institutes of Texas were designed to leverage the UNT Health Science Center's growing expertise in public health, interdisciplinary scientific research, medical education and health care delivery. The ultimate goal is to use this model among various institutes to improve the health of Texans and beyond by reducing disparities, developing new treatments and therapies, and improving access to care in rural and underserved communities in Texas.



## Cardiovascular Research Institute (CRI)

The CRI seeks to further our understanding of cardiovascular disease and improve the techniques used in the prevention, detection, diagnosis and treatment of cardiovascular disease and the rehabilitation of its victims by targeting myocardial infarction, hypertension, congestive heart failure and stroke.



## Center for Commercialization of Fluorescence Technologies (CCFT)

Funded by an Emerging Technology Fund grant from the state of Texas, the CCFT works to develop and commercialize new approaches for diagnostics and treatment using the emerging fields of nanophotonics and nanotechnology.



## Center for Women's Health (Focused on Resources for her Health, Education and Research – For HER)

For HER is a collaborative, multidisciplinary organization created to address and meet the health care needs of women of all ages and ethnic groups.



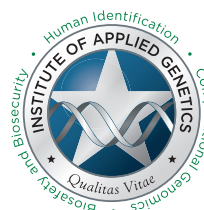
## Institute for Aging and Alzheimer's Disease Research (IAADR)

The IAADR focuses on early detection of Alzheimer's disease, estrogen's role in Alzheimer's and Parkinson's diseases, stroke therapy and identification of oxidation processes to measure brain aging, with several treatment drugs in clinical trials.



## Institute for Cancer Research (ICR)

The ICR provides leadership in all aspects of cancer research, education and training.



## Institute of Applied Genetics (IAG)

The mission of IAG is to improve safety, security and quality of life through the application of genetics. The mission is met through the institute's three centers: the Center for Human Identification, the Center for Computational Genomics, and the Center for Biosafety and Biosecurity.



## North Texas Eye Research Institute (NTERI)

NTERI is dedicated to preserving vision and curing eye disease by using basic research, clinical research and medical education of clinicians and scientists to improve treatment of glaucoma, age-related macular degeneration, diabetic retinopathy and other vision disorders.

## THE OSTEOPATHIC RESEARCH CENTER

### Osteopathic Research Center (ORC)

The ORC is the national center of collaborative research on the efficacy of osteopathic manipulative medicine through multi-center clinical trials, teaching research skills and promoting collaborative studies.



## Texas Prevention Institute (TPI)

The Texas Prevention Institute is dedicated to conducting innovative translational research focusing on primary care and chronic disease prevention. It is composed of the Center for Community Health, the Primary Care Research Center and the Texas Center for Health Disparities.



# Making the world a healthier place



**W**ithout a doubt, our nation's health care system is changing. The federal government struggles with health care reform; our physicians eye the changes in Medicare and Medicaid payments carefully; businesses weigh the costs of health insurance; and individuals tremulously make out their budgets with a line item for health care expenditures, hoping that their family doesn't need more than the allotment. These issues continue to hound Americans.

Yet, despite the precarious balancing act in which we find ourselves, the health care that we receive in the U.S. and in North Texas will continue to see tremendous advances as we work together to prevent and treat illnesses and injuries with advances in treatment, research, and new discoveries.

The UNT Health Science Center is committed to bringing top researchers and physicians to North Texas, not only to treat patients with common afflictions and circumstances, but to develop new ways to keep people healthy.

To that end, we have brought world renowned researchers, including Drs. Johnny He, Scott Walters, Sid O'Bryant, and Joseph Yuan, to Fort Worth to collaborate with established researchers. Leaders like Drs. James Simpkins, Arthur Eisenberg, Anuja Ghorpade, Meharvan Singh, Mark DeHaven, and Michael Forster team up to drive research and treatment advances in our key areas of aging and Alzheimer's disease, applied genetics, and primary care and prevention in innovative collaborations that help advance science and medicine.

To recognize our top scientists, in January we honored 22 faculty researchers with the President's Faculty Awards for outstanding contributions to their scientific field and to the UNT Health Science Center. In addition, 22 faculty educators and 22 clinical faculty members were recognized for their outstanding contributions to teaching our students and caring for our patients. With their combined talents and knowledge as a base, we will continue to recruit the top researchers educators and clinicians to work together to improve the quality of life for North Texans, and, indeed, the entire world.

Together, we're making the world a healthier place.

A handwritten signature in black ink, appearing to read "Scott B. Ransom, DO". The signature is fluid and cursive.

Scott B. Ransom, DO, MBA, MPH, President



UNT Health Science Center  
3500 Camp Bowie Boulevard  
Fort Worth, TX 76107-2699

# synergy

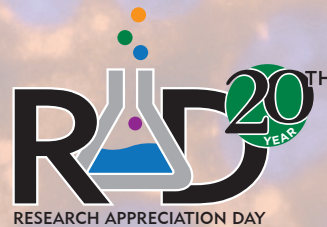
2012 Research Annual Report

## one last look

### *Our Discoveries. Your Health.*

Learn about new research discoveries at the  
**20th Annual Research Appreciation Day**

The poster and oral competition among students, postdoctoral fellows and residents is an institutional tradition encompassing medicine, public health and basic science. Students, faculty and staff share their research efforts with the campus community and the public, in addition to competing before expert panels of judges.



BENCH • BEDSIDE • COMMUNITY

Friday, April 13, 2012

Medical Education  
& Training Building

[unthsc.edu/RAD](http://unthsc.edu/RAD)